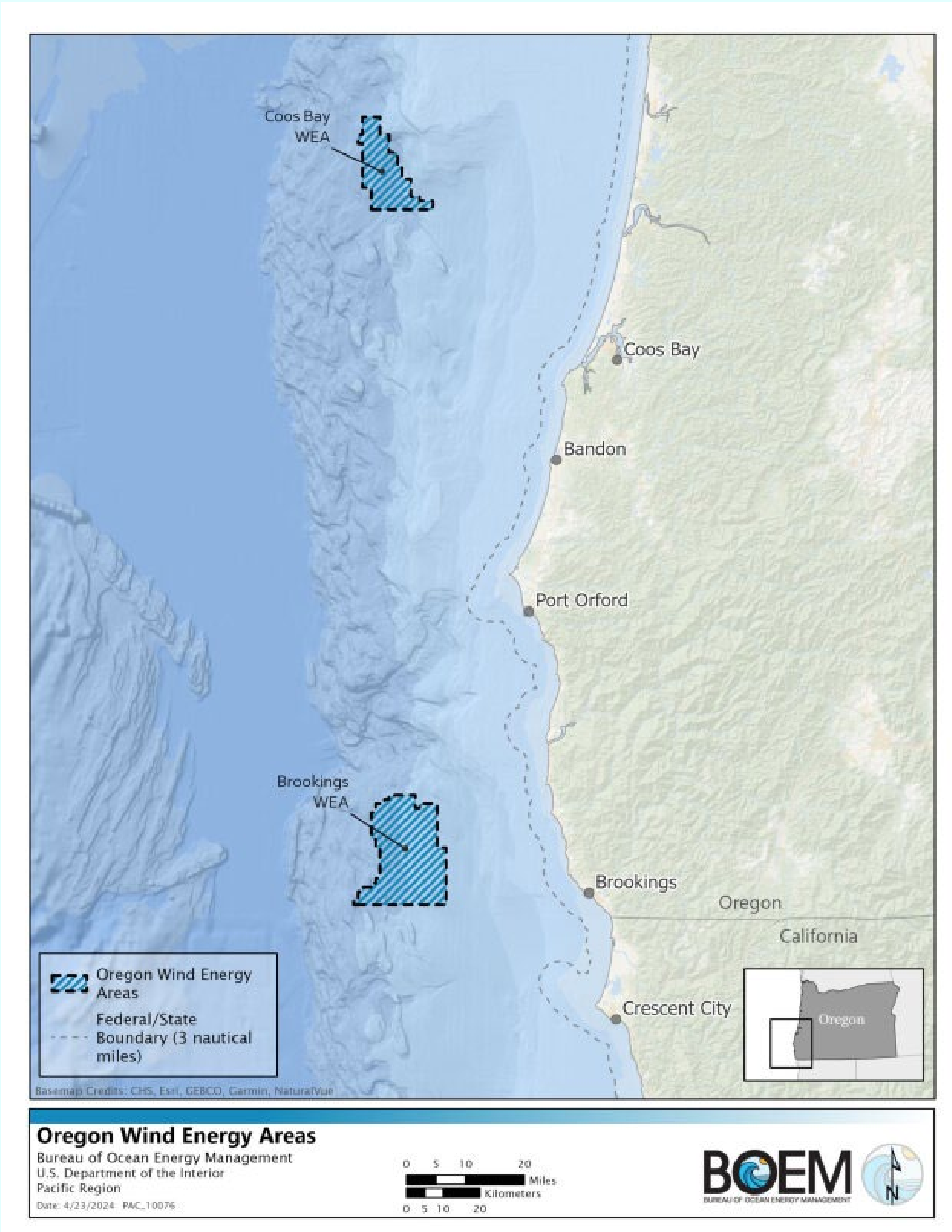
Draft Environmental Assessment

Commercial Wind Lease Issuance on the Pacific Outer Continental Shelf Offshore, Oregon



April 2024

U.S. Department of the Interior
Bureau of Ocean Energy Management
Pacific Region

OCS EIS/EA
BOEM 2024-018

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Commercial Wind Lease and Grant Issuance and Site Assessment Activities on the Pacific Outer Continental Shelf of Oregon

Draft Environmental Assessment

Agency Name and Region	**Bureau of Ocean Energy Management, Pacific OCS Region**
Document Type	Environmental Assessment
BOEM Publication Number	OCS EIS/EA BOEM 2024-018
Activity Type	Lease Issuance, Site Assessment, and Site Characterization Activities
Document Date	April 30, 2024
Location	Camarillo, California
For More Information	https://www.boem.gov/renewable-energy/state-activities/Oregon

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Abbreviations and Acronyms

ADCP	acoustic Doppler current profiler
AIS	Automated Identification System
APCD	Air Pollution Control District
AUV	autonomous underwater vehicle
BIA	biologically important areas
BLS	Bureau of Labor Statistics
BMP	Best Management Practice
BOEM	Bureau of Ocean Energy Management
BSEE	Bureau of Safety and Environmental Enforcement
BSR	Bottom Simulating Reflector
CalEPA	California Environmental Protection Agency
CD	Consistency Determination
CDFW	California Department of Fish and Wildlife
CEQ	Council on Environmental Quality
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CHIRP	compressed high intensity radar pulse

CO	carbon monoxide
CO_2	carbon dioxide
COP	Construction and Operations Plan
cSEL	cumulative sound exposure level
CTCLUSI	Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians
CTSI	Confederated Tribes of Siletz Indians
CWA	Clean Water Act
dB	decibels
DLCD	Department of Land Conservation and Development (Oregon)
DOD	Department of Defense
DOI	Department of the Interior
DPS	Distinct Population Segment
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EJ	environmental justice
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESU	Evolutionary Separate Unit
ft	foot or feet
GAP	General Activities Plan
G&G	geological and geophysical
GDP	Gross Domestic Product
GEBCO	General Bathymetric Chart of the Oceans
GHG	greenhouse gas
HAP	hazardous air pollutant
HBS	Hydrate Bearing Sediments
HRG	high-resolution geophysical
HSZ	Hydrate Stability Zone
Hz	hertz
IPF	impact-producing factors
kg	kilograms
kHz	kilohertz
km	kilometers
km^2	square kilometers
kn	knots
lb	pounds
LEP	Limited English Proficiency
LiDAR	light detection and ranging
µPa	micropascal
m	meters
m^2	square meters

MBPC	Morro Bay Port Complex
mi	miles
mi^2	square miles
MISLE	Marine Information for Safety and Law Enforcement
MMPA	Marine Mammal Protection Act
MRTFB	Major Range and Test Facility Base
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MW	megawatt
MWh	megawatt hours
NA	not applicable
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NCCOS	National Centers for Coastal Ocean Science
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOI	Notice of Intent
NMFS	National Marine Fisheries Service (aka, NOAA Fisheries)
nm	nautical miles
NO_2	nitrogen dioxide
NO_x	nitrogen oxide
NOAA	National Oceanic and Atmospheric Administration
NOMAD	Naval Oceanographic and Meteorological Automated Devices
NREL	National Renewable Energy Laboratories
NRHP	National Register of Historic Places
NTL	Notice to Lessees
m/s	meters per second
OCMP	Oregon Coastal Management Program
OCS	Outer Continental Shelf
OCSLA	Outer Continental Shelf Lands Act
ODFW	Oregon Department of Fish and Wildlife
OSU	Oregon State University
PA	Programmatic Agreement
PacFIN	Pacific Fisheries Information Network
PACPARS	Pacific Coast Port Access Route Study
PCB	polychlorinated biphenyls
PFMC	Pacific Fishery Management Council
PM	particulate matter
PMSR	Point Mugu Sea Range
PNNL	Pacific Northwest National Laboratory
PSO	Protected Species Observer
PTS	Permanent Threshold Shift
ReCFIN	Recreational Fisheries Information Network
RMS	root mean square

ROV	remotely-operated vehicle
ROW	right-of-way
RUE	rights-of-use and easement
SAP	Site Assessment Plan
SEL	sound exposure level
SHPO	State Historic Preservation Officer
SO_2	sulfur dioxide
SO_X	sulfur oxides
TSS	Traffic Separation Schemes
TTS	Temporary Threshold Shift
USCG	U.S. Coast Guard
USV	uncrewed surface vessel
USFWS	U.S. Fish and Wildlife Service
UTP	underwater transponder positioning
VGP	Vessel General Permit
VMS	vessel monitoring system
WEA	Wind Energy Area

1 Purpose and Need for the Proposed Action

The U.S. Department of the Interior's Bureau of Ocean Energy Management (BOEM) prepared this environmental assessment (EA) to analyze whether the issuance of leases and grants within the Wind Energy Areas (WEAs) in Oregon (Figure 1-1) would result in significant impacts to the environment, and therefore require the preparation of an environmental impact statement prior to lease issuance.

The Proposed Action for this EA is the issuance of commercial wind energy lease(s) within the Oregon Wind Energy Areas (Figure 11) on the OCS, and the granting of rights-of-way (ROWs) and rights-of-use and easements (RUEs) in support of wind energy development. Issuance of leases or grants would allow for site characterization activities and only the submittal of SAPs and COP for BOEM's consideration and approval, which does not constitute an irreversible and irretrievable commitment of resources. As stated in 30 CFR 585.200, a lease issued under this part confers on the lessee the right to one or more project easements without further competition for the purpose of installing gathering, transmission, and distribution cables; pipelines; and appurtenances on the OCS as necessary for the full enjoyment of the lease. The lessee must apply for the project easement (30 CFR 585.200 (b)) and BOEM will incorporate the approved project easement in that lease as an addendum.

Therefore, BOEM's environmental analysis is focused on the effects of site characterization and site assessment activities expected to take place after the issuance of commercial wind energy leases. The purpose is to allow lessees access to gather information in the WEAs. BOEM is responsible for offshore renewable energy development in Federal waters. BOEM requires information from lease holders to evaluate future offshore wind plans. The issuance of a lease by BOEM to a lessee conveys no right to proceed with construction of a wind energy facility. BOEM may decide to issue leases within all of, a portion of, or none of the WEAs analyzed in the EA; BOEM's decision regarding lease issuance is memorialized in a Final Sale Notice.

On February 13, 2024, BOEM released the Announcement of Area Identification Memorandum (Memorandum). This Memorandum documents the analysis and rationale supporting the recommended designation of two WEAs offshore Oregon for environmental analysis and consideration for leasing. BOEM partnered with the National Centers for Coastal Ocean Science (NCCOS) to compile relevant data and develop spatial models to identify suitable areas for offshore wind energy development in the region (Carlton et al. 2024). The Oregon WEAs encompass approximately 194,995 acres offshore southern Oregon; their closest points to shore range from approximately 18–32 miles, and water depths are 567–1531 meters (1,860–5,023 ft; Table 1-1).

Table 1-1: Descriptive Statistics for the Recommended Oregon Wind Energy Areas

WEA	Acres	Installation Capacity (MW)[1]	Homes Powered (MW)[2]	Power Production (MWh/yr): 40% Capacity Factor[3]	Power Production (MWh/yr): 60% Capacity Factor[4]	Maximum Depth (meters)	Minimum Depth (meters)
Coos Bay	61,203	991	346,752	3,471,482	5,207,224	1,414	635
Brookings	133,792	1,166	758,012	7,588,788	11,383,182	1,531	567
Total (or max, min)	194,995	3,156	104,764	1,060,270	16,590,406	1,531	567

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

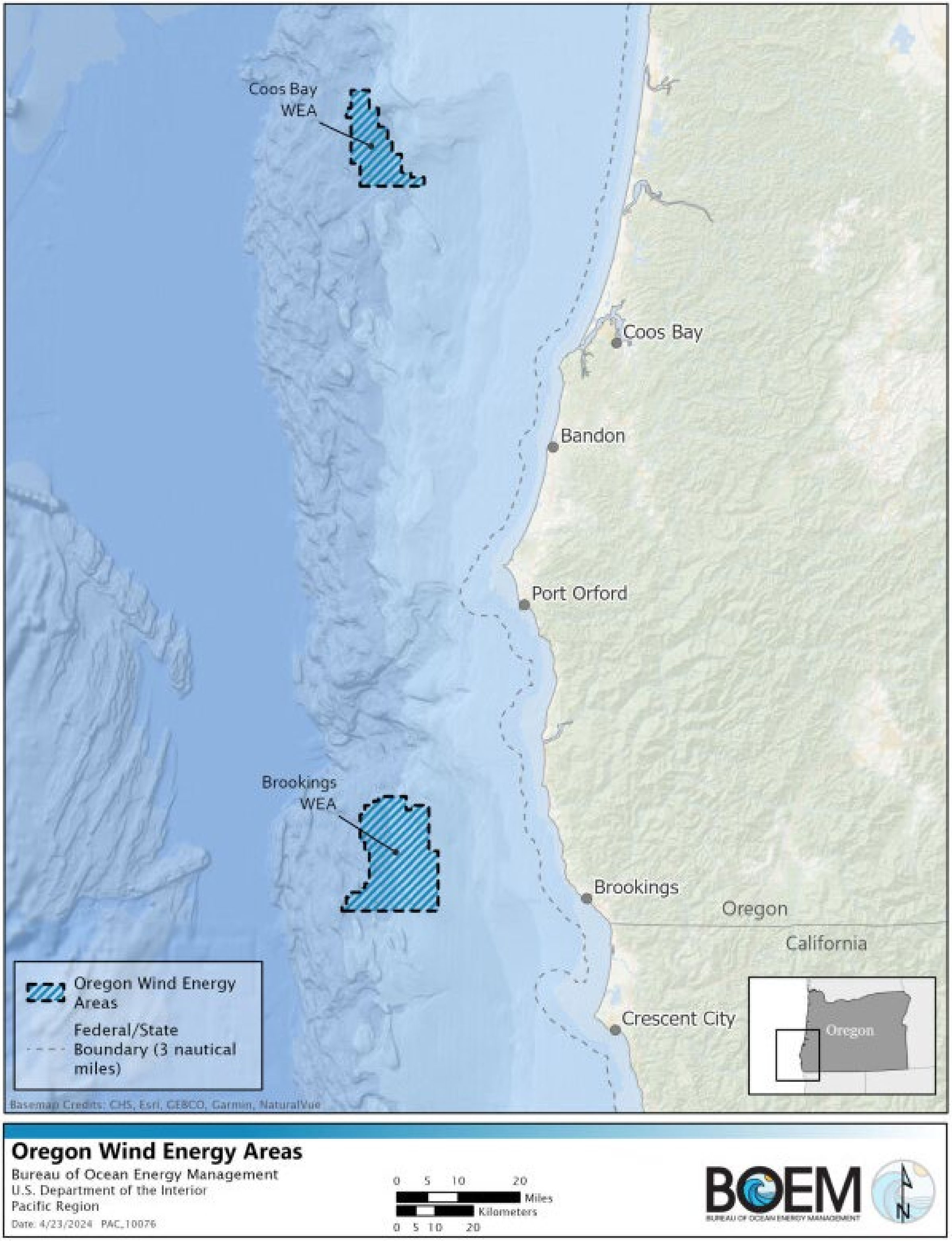


Figure 1-1: Map of Wind Energy Areas Offshore Oregon

2 The Proposed Action and Alternatives

2.1 THE PROPOSED ACTION

The Proposed Action is the issuance of (a) one commercial wind energy lease and associated easements within the Coos Bay WEA and one lease within Brookings WEA (Figure 1-1; Table 1-1) and (b) to grant ROWs, RUEs in support of wind energy development. Under the Proposed Action, BOEM would potentially issue leases that may cover the entirety of the WEAs, issue easements associated with each lease, and issue grants for subsea cable corridors and associated offshore collector/converter platforms. The potential ROWs, RUEs and easements would all be located within the Oregon OCS and may include corridors that extend from the OCS, through State waters to the onshore energy grid.

Because the issuance of a lease only grants the lessee the exclusive right to conduct site characterization activities and submit to BOEM a Site Assessment Plan (SAP) and/or a Construction and Operation Plan (COP), it does not constitute an irreversible and irretrievable commitment of resources thereby requiring BOEM to consider the impacts associated with the siting, construction, and operation of any commercial wind power facilities.

The Proposed Action of lease issuance will be followed by site characterization and assessment activities on the OCS and State waters. After lease issuance, a lessee would conduct surveys to collect data and, if authorized to do so pursuant to an approved SAP, install meteorological and oceanographic devices to characterize the site's environment and to assess the wind resources in the proposed lease area. Site assessment activities, described in a SAP, would most likely include the temporary placement of meteorological and oceanographic buoys (i.e., metocean or met buoys) and other oceanographic devices within a lease area. Site characterization activities, or surveys, would most likely gather geophysical, geotechnical, biological, archaeological, and/or ocean data. See section 2.5 and Appendix F for more details on the meteorological buoys, oceanographic devices, and survey details and examples. BOEM's regulatory authority is limited to the OCS, and therefore BOEM cannot approve site assessment or characterization activities in State waters or onshore areas.

BOEM would evaluate the potential impacts of the activities described in the COP in a separate National Environmental Policy Act (NEPA) document tied to the level of potential impacts, likely an Environmental Impact Statement (EIS). The NEPA process would include an analysis of the potential impacts and reflect, but is not limited to, required consultations with the appropriate Federal, Tribal, State, and local entities; public involvement including public meetings and comment periods; collaboration with the BOEM Oregon Intergovernmental Renewable Energy Task Force; and preparation of an independent, comprehensive, site- and project-specific impact analysis using the best available information. A COP would contain design parameters such as turbine size, anchoring type, project layout, installation methods, and associated onshore facilities and informed from the site assessment and site characterization activities. Pursuant to 30 CFR 585.628, BOEM would use information and analysis provided in the NEPA document in the determination to approve, approve with modification, or disapprove a lessee's COP. After lease issuance but prior to project implementation, BOEM retains the authority to prevent the environmental impacts of a commercial wind power facility from occurring by disapproving a COP for failure to meet the statutory standards set forth in the Outer Continental Shelf Lands Act (OCSLA).

The timing of lease issuance, as well as weather and sea conditions, would be the primary factors influencing timing of site assessment and site characterization survey activities. Under the reasonably foreseeable scenario, BOEM could issue leases in late 2024. SAPs are expected to be submitted to BOEM within one year of lease issuance (30 CFR 585.601). For leases issued in late 2024, surveys could begin in spring of 2025. Lessees have up to five years to perform site assessment activities before they must submit a COP (30 CFR 585.235(a)(2)). Therefore, site assessment activities could continue through early 2030 prior to a COP being submitted.

2.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, no leases or grants would be issued in the Oregon WEAs at this time. Site characterization surveys and off-lease site assessment activities as described in the Proposed Action do not require BOEM approval and could still be conducted under the No Action Alternative, but these activities would not be likely to occur without a commercial wind energy lease or grant. The No Action Alternative will serve as the baseline of current conditions against which action alternatives are evaluated.

2.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED FURTHER

Because the Proposed Action will not result in the approval of a wind energy facility and is expected to result only in site assessment and site characterization activities, BOEM has not identified any additional action alternatives that could result in meaningful differences in impacts to the various resources analyzed in this document. Public comments from the draft Wind Energy Area suggested the exclusion of seafloor areas that could potentially have hard substrate, chemosynthetic communities, or other unique and fragile habitats. The Area Identification Memorandum 2024 acknowledges there will likely be multiple seafloor areas where leaseholders will be excluded from placing structures to avoid protected habitats. This EA considers a total number of devices that accounts for additional sampling and surveying anticipated to consider seafloor disturbances and multiple cable corridors in and around the WEAs. Alternatives that do not meet the purpose and need are not considered in a NEPA analysis; thus, alternate methods of combating climate change suggested in public comments, such as reducing energy use, implementing other forms of energy development such as nuclear or solar, or including water desalinization plants on wind energy platforms are not evaluated in this EA.

BOEM notes that the Ad Hoc Marine Planning Committee (Committee) recommends U.S. West Coast wide cumulative effects analysis of all wind energy proposed areas (taking into consideration all areas closed to fishing) on all commercial and recreational fisheries, fishing communities, and impacts to domestic seafood production (including port-based fishery-specific facilities and related services). BOEM anticipates, and is planning for, future coordination with the Committee and PFMC on this and other recommendations.

2.4 INFORMATION CONSIDERED IN DEVELOPING THIS ENVIRONMENTAL ASSESSMENT

BOEM considered the following non-exhaustive list of information sources as a part of earlier outreach and comment periods related to siting WEAs offshore Oregon with links available through http:/www.boem.gov/oregon:

- Data Gathering and Engagement Summary Report: Oregon Offshore Wind Energy Planning 2021
- Oregon Offshore Wind Mapping Tool (OROWindMap)
- Comments received in response to the 2022 Call for Information and Nominations
- Comments received in response to the 2023 Request for Comment on the Draft WEAs

- BOEM NCCOS Report: A Wind Energy Siting Analysis for the Oregon Draft WEAs (Carlton et al. 2024)
- BOEM Oregon Intergovernmental Renewable Energy Task Force meetings, including public comment at the end of the meetings
- Comments received at consultation meetings and written comments from federally recognized Tribes. BOEM notified over eighty federally recognized Tribes of the Draft WEAs and invited government-to-government consultation
- Input from Federal and State agencies and State renewable energy goals
- Domestic and global offshore wind market and technological trends

2.5 FORSEEABLE ACTIVITIES AND ASSUMPTIONS FOR THE PROPOSED ACTION

BOEM reasonably expects the Proposed Action of lease issuance will be followed by site characterization and assessment activities on the OCS and State waters. However, until BOEM receives survey plans or a SAP pursuant to 30 CFR 585.605, which does not occur until after a lease is issued, information in this section and Appendix F focuses on the most common activities and equipment used offshore the U.S. West Coast or in similar ocean conditions. For example, lessees often install buoys and conduct surveys in ocean waters as a first step to obtain information necessary to support a COP.

2.5.1 Site Assessment: Metocean Buoys and Ocean Devices

2.5.1.1 Buoy Installation, Operations and Maintenance, and Decommissioning Assumptions

Metocean buoys are anchored at fixed locations to monitor and evaluate the viability of wind as an energy source. In addition, lessees usually gather data on wind velocity, barometric pressure, atmospheric and water temperatures, and current and wave measurements. To obtain these data, scientific measurement devices such as anemometers, vanes, barometers, and temperature transmitters are mounted either directly on a buoy or on a buoy’s instrument support arms. Floating light detection and ranging (LiDAR) is of increasing interest to measure wind speeds at multiple heights. BOEM is anticipating that up to six buoys will be deployed in and near to each leased area in the Oregon WEAs. BOEM knows of no LiDAR offshore data currently available to validate wind models and so assumes that multiple LiDAR buoys and placements will be needed for each lessee.

Onboard power supply sources for buoys may include solar arrays, lithium or lead-acid batteries, and diesel generators, which require an onboard fuel storage container with appropriate spill protection and an environmentally sound method to perform refueling activities.

The National Data Buoy Center maintains a status list of buoys currently deployed offshore Oregon maintained by NOAA (https://www.ndbc.noaa.gov/obs.shtml). The National Renewable Energy Laboratories (NREL) and Pacific Northwest National Laboratories (PNNL) regularly deploy LiDAR buoys offshore (https://www.pnnl.gov/projects/lidar-buoy-program; PNNL 2019). This document assumes buoy installation and decommissioning operations would take approximately one day, in agreement with PNNL’s typical deployment procedure. On-site inspections and preventative maintenance (e.g., marine fouling, wear, or lens cleaning) are expected to occur with one vessel trip per year for all buoys. Buoy decommissioning would occur in Year 6 or Year 7 after lease execution.

2.5.1.2 Buoy Hull Types and Anchoring Systems

The choice of hull type used usually depends on installation location and measurement requirements. Discus-shaped, boat-shaped, and spar buoys (Figure 2-1) are the buoy types that would most likely be adapted for offshore wind data collection. A large discus-shaped hull buoy has a circular hull 10–12 m (33–40 ft) in diameter (Figure 2-2). A boat-shaped hull buoy is an aluminum-hulled buoy that is 6 m long, in the case of NOAA's NOMAD buoy (Figure 2-1; Figure 2-2).

Mooring design depends on hull type, location, and water depth (National Data Buoy Center 2008). For example, a smaller buoy in shallow coastal waters may be moored using an all-chain mooring. On the OCS, a larger discus-type or boat-shaped hull buoy may require a combination of a chain, nylon, and buoyant polypropylene materials designed (National Data Buoy Center 2008) with one or two weights. In 2020, PNNL installed two LiDAR buoys off California that had a boat-shaped hull and were moored with a solid cast iron anchor weighing approximately 4,990 kg (11,000 lb) with a 2.3-m^2 footprint. The mooring line was comprised of chain, jacketed wire, scour chain, nylon rope, polypropylene rope, and subsurface floats to keep the mooring line taut to semi-taut. The mooring line was approximately 1,200 m long in the Morro Bay WEA (PNNL 2019).

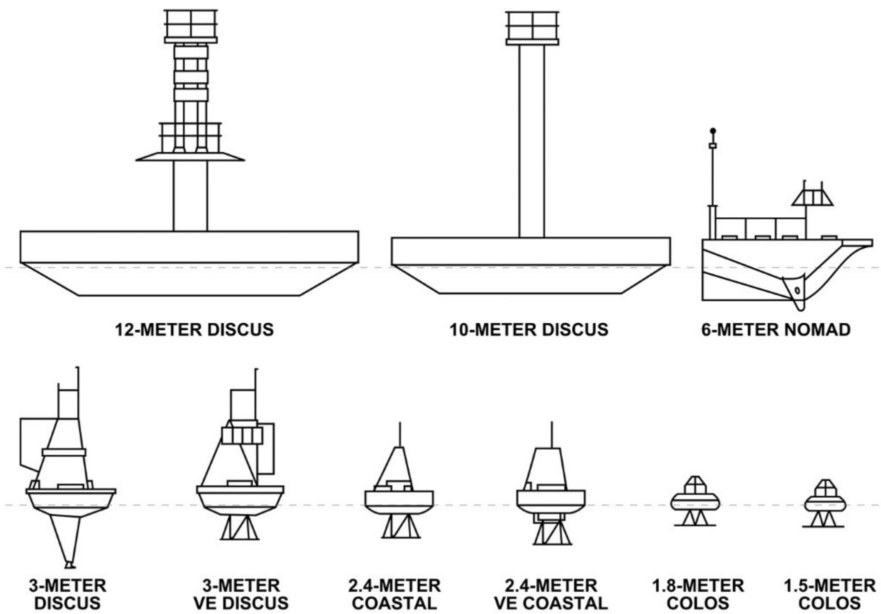


Figure 2-1: Buoy Schematic

Source: National Data Buoy Center (2008)

Figure 2-2: 10-Meter Discus-Shaped Hull Buoy (left); 6-Meter Boat-Shaped Hull Buoy (right)

Source: National Data Buoy Center (2008)

2.5.1.3 Buoy Installation, Operation, and Decommissioning

Onshore activities (fabrication, staging, or launching of crew/cargo vessels) related to the installation of buoys are expected to use existing ports and infrastructure. Boat-shaped and discus-shaped buoys are typically towed or carried aboard a vessel to the installation location. The buoy is then lowered to the ocean from the deck of the transport vessel or placed over the final location and the mooring anchor dropped. The accuracy of the anchor bottom location and the size and type of anchor used depends on the buoy type, bottom slope, sediment type, depth, and water currents of the local area. The buoy is anchored to the seafloor with a solid cast iron anchor weighing approximately 11,000 lb (2.3 m^2 footprint). The approximate 1,650-meter-long mooring line connecting the buoy to the mooring anchor is comprised of various components and materials, including chain, jacketed wire, nylon rope, polypropylene rope, and subsurface floats to keep the mooring line taut to semi-taut, reduce slack, and eliminate looping. Since the mooring line will be taut to semi-taut, it is unlikely that the chain at bottom of the mooring line will sweep and disturb the seafloor. Metocean buoy anchors deployed at similar depths in California used a solid cast iron anchor weighing approximately 11,000 lbs and approximately 2.3 m2 (PNNL 2019), but larger anchors could be used depending on exact site conditions. In total, BOEM anticipates that bottom disturbance associated with the installation of meteorological buoys would disturb the seafloor up to an estimated 10 m2 per buoy. The buoy will have a watch circle (i.e., excursion radius) of approximately 1,250 m. After installation, the transport vessel would likely remain in the area for several hours while technicians configure proper operation of all systems (PNNL 2019).

Monitoring information transmitted to shore would include systems performance information such as battery levels and charging systems output, the operational status of navigation lighting, and buoy positions. Additionally, all data gathered via sensors would be fed to an onboard radio system that transmits the data string to a receiver onshore (Tetra Tech EC Inc. 2010).

Decommissioning is assumed to be essentially the reverse of the installation process, removing BOEM and BSEE approved facilities and returning the site of the lease or grant to a condition that meets the requirements under 30 CFR 285 subpart I and 30 CFR 585. Decommissioning of buoys is expected to be completed within one day per buoy equipment recovery and would be performed with the support of a vessel(s) equivalent in size and capability to that used for installation.

2.5.1.4 Other Equipment and Instrumentation

Multiple types of instrumentation are commonly installed upon a buoy to measure meteorological data and attached to the buoy or cable to measure oceanographic or biologic parameters. In addition to LiDAR, conventional anemometers, sonic detection, and ranging equipment may be used to obtain meteorological data. A met buoy could also accommodate environmental monitoring equipment such as avian monitoring equipment including thermal imaging cameras, tagging receivers, acoustic monitoring for marine mammals, data logging computers, visibility sensors, water measurements including temperature, and communications equipment.

The speed and direction of ocean currents will likely be assessed with Acoustic Doppler Current Profilers (ADCPs). The ADCP is a remote sensing technology that transmits sound waves at a constant frequency and measures the ricochet of the sound wave off fine particles or zooplankton suspended in the water column. The ADCPs may be mounted independently on the seafloor, attached to a buoy, or have multiple instruments deployed as a subsea current mooring. A seafloor mounted ADCP would likely be located near the meteorological buoy and would be connected by a wire that is buried into the ocean bottom. A subsea current mooring might have 8–10 ADCPs vertically suspended from an anchor combined with several floats made of syntactic foam. These moorings do not breach the surface. A typical ADCP has 3 to 4 acoustic transducers that emit and receive acoustical pulses from different directions, with frequencies ranging from 300-600 kHz with a sampling rate of every 1 to 60 minutes. A typical ADCP is about one to two feet tall and one to two feet wide. Its mooring, base, or cage (surrounding frame) would be several feet wider. Based on information from existing West Coast lessees, BOEM is anticipating that up to three ADCP moorings could be installed in the lease area, and up to seven may be installed along the export cable route.

2.5.2 Site Characterization Surveys

2.5.2.1 Surveying and Sampling Assumptions

Site characterization activities involve geological, geotechnical, and geophysical surveys of the seafloor to ensure that mooring systems, turbines, and cables can be properly located, as well as look for shallow hazards. These survey methods can also be used to inform archaeological and historic resources assessments. Biological surveys are also part of site characterization surveys and collect data on potentially affected habitats, marine mammals, birds, sea turtles, and fishes. Lessees would likely focus survey effort within the entire WEA proposed for lease and potential cable easement routes during the 5-year site assessment term. The purpose of site characterization surveys is to collect required information prior to the submission of a SAP and a COP. Table 21 describes the types of site characterization surveys, types of equipment, and deployment methods-. If sufficient survey data are available, additional surveys may not be necessary.

BOEM regulations require that the lessee provide data from surveys with its SAP (30 CFR 585.610) before the installation of met buoys. BOEM guidelines provide recommendations to lessees for acquiring the information required for a SAP. *BOEM Guidelines for Information Requirements for a Renewable Energy SAP* is available at http://www.boem.gov/Final-SAP-Guidelines/ (BOEM 2019). BOEM national survey guidelines for some resources can be found at http://www.boem.gov/Survey-Guidelines/.

Site characterization surveys can be conducted before and after met buoy approval to collect data for the COP (30 CFR 585.626). BOEM Guidelines for *Information Needed for Issuance of a Notice of Intent (NOI) Under the National Environmental Policy Act (NEPA) for a Construction and Operations Plan (COP)* outlines information and data needed for the environmental assessment of a COP.

For the Proposed Action, BOEM assumes that the lessee would employ these methods to acquire the information required under 30 CFR 585.610 and 585.626. Lease holders could propose additional methods if they are within the degree of impact proposed in this document.

Table 2-1: Site Characterization Surveys, Equipment, Methods, and Resources

Survey Type	Resource Surveyed or Information Used to Inform	Survey Equipment or Method	Code of Federal Regulations
High-resolution geophysical surveys	Shallow hazards, archaeology, bathymetry, benthic zone	Side-scan sonar, sub-bottom profiler, magnetometer, multibeam echosounder; ROV; AUV; HOV	30 CFR 585.610(b)(2) 30 CFR 585.610(b)(3)
Geotechnical/sub-bottom sampling	Geological	Vibra, piston, gravity cores; cone penetration tests	30 CFR 585.610(b)(1) 30 CFR 585.610(b)(4)
Biological	Benthic habitats	Grab sampling; benthic sled; underwater imagery/ sediment profile imaging; ROV; AUV	30 CFR 585.610(b)(5)
Biological	Avian	Aerial digital imaging; visual observation; radar; thermal or acoustic monitoring	30 CFR 585.610(b)(5)
Biological	Bats	Ultrasonic detectors installed on buoy and survey vessels, radar, thermal monitoring	30 CFR 585.610(b)(5)
Biological	Marine mammals, sea turtles	Aerial or vessel-based surveys, acoustic monitoring	30 CFR 585.610(b)(5)
Biological	Fishes, some invertebrates	Direct sampling using vessel-based surveys; underwater imagery; acoustic monitoring; environmental DNA	30 CFR 585.610(b)(5)

2.5.2.2 Geophysical Information: High-Resolution Geophysical (HRG) Surveys

High-Resolution Geophysical (HRG) surveys would be performed to determine siting for geotechnical sampling, whether hazards will interfere with seabed support of the turbines, the presence and hazards, archaeological and habitat resources, and to define seabed slope, water depth, and seafloor conditions. HRG surveys use electrically induced sonar transducers to emit and record acoustic pulses, and do not use air or water compression to generate sound.

Following BOEM's guidelines for geophysical data to fulfill information requirements listed in 30 CFR 585.610, 585.611,585.626, and 585.627, surveys would be undertaken using equipment and methods described in Table 21 and Table 22. Estimated numbers of vessel trips and survey days for site characterization are shown in Table 23. Equivalent technologies to those listed in these tables may be used if their potential impacts are similar to those analyzed for the equipment described in this EA and are reviewed by BOEM prior to the surveys being conducted. Vessels performing surveys are relatively slow moving (approximately 0–11.1 km/hr [0–6 kn]).

The line spacing for HRG surveys would vary depending on the data purpose:

- To collect geophysical data for shallow hazards assessments (including multibeam echosounder, side-scan sonar, and sub-bottom profiler systems), BOEM recommends surveying at a 150-m (492-ft) primary line spacing and a 500-m (1640-ft) tie-line spacing over the proposed lease area;
- For the collection of geophysical data for archaeological resources assessments (including magnetometer, multibeam echosounder, side-scan sonar, and sub-bottom profiler systems), BOEM

recommends surveying at a 30-m (98-ft) primary line spacing and a 500-m (1640-ft) tie-line spacing over potential pre-contact archaeological sites once part of the terrestrial landscape and since inundated by global sea level rise during the Pleistocene and Holocene, generally thought to be in waters less than 100 m depth, which is typically in cable landing areas.

Table 2-2: High-Resolution Geophysical Survey Equipment and Methods

Equipment Type	Data Collection and/or Survey Types	Description of the Equipment
Bathymetry/depth sounder (multibeam echosounder)	Collection of bathymetric data for shallow hazards, archaeological resources, and benthic habitats	A depth sounder is a microprocessor-controlled, high-resolution survey-grade system that measures precise water depths in both digital and graphic formats. The system would be used in such a manner as to record with a sweep appropriate to the range of water depths expected in the survey area. This EA assumes the use of multibeam bathymetry systems, which may be more appropriate than other tools for characterizing those lease areas containing complex bathymetric features or sensitive benthic habitats such as hardbottom areas.
Gradiometer	Collection of geophysical data for shallow hazards and archaeological resources assessments	Gradiometer surveys would be used to detect and aid in the identification of ferrous or other objects having a distinct magnetic signature. The gradiometer sensor is typically towed as near as possible to the seafloor and anticipated to be no more than approximately 6 m (20 ft) above the seafloor. This methodology is not anticipated to be used at this time in the WEAs since depths are 500 m or greater, but will be used to survey potential cable routes that will occur in depths shallower than 500 m.
Side-scan sonar	Collection of geophysical data for shallow hazards and archaeological resource assessments	This survey technique is used to evaluate surface sediments, seafloor morphology, and potential surface obstructions (MMS 2007). A typical side-scan sonar system consists of a top-side processor, tow cable, and towfish with transducers (or "pingers") located on the sides which generate and record the returning sound that travels through the water column at a known speed. BOEM assumes that the lessee would use a digital dual-frequency side-scan sonar system with 300–500 kHz frequency ranges or greater to record continuous planimetric images of the seafloor.
Shallow and medium (seismic) penetration sub-bottom profilers	Collection of geophysical data for shallow hazards and archaeological resource assessments and to characterize subsurface sediments	Typically, a high-resolution CHIRP system sub-bottom profiler is used to generate a profile view below the bottom of the seabed, which is interpreted to develop a geologic cross-section of subsurface sediment conditions under the trackline surveyed. Another type of sub-bottom profiler that may be employed is a medium penetration system such as a boomer, bubble pulser, or impulse-type system. Sub-bottom profilers are capable of penetrating sediment depth ranges of 3 m (10 ft) to greater than 100 m (328 ft), depending on frequency and bottom composition.

CHIRP = Compressed High Intensity Radar Pulse kHz = kilohertz

Several different survey methods can be used to collect high resolution geophysical data. Typically, these methods are based on the water depth of the survey area. However, availability of equipment may affect which survey methods are chosen. The following is a description of each of the possible decisions for these survey methods:

- Autonomous Underwater Vehicle (AUV) survey. AUV surveys consist of an autonomous (non-tethered) submersible with its own power supply and basic navigation logic. An AUV can run many geophysical sensors at once and typically would consist of a multibeam echosounder, side-scan sonar, magnetometer, and a sub-bottom profiler. AUVs also have forward looking sonar for terrain avoidance, a doppler velocity logger for velocity information, an internal navigation system for positioning, an ultra-short baseline pinger for positioning, and an acoustic modem for communication with a surface survey vessel. For single AUV operations the surface survey vessel follows the AUV, keeps in communication via the acoustic modem, provides navigation information to the AUV, and monitors the health of the AUV. During multiple AUV surveys, several AUVs are deployed at once. These AUVs run independently from the survey vessel. Navigation updates and modem communication are provided by a network of Underwater Transponder Positioning devices (UTPs). These transponders are deployed to the seabed in known locations. In both methods of operation, the survey vessel recovers, maintains, and launches the AUV(s) and UTPs (for further details, see Appendix F). A survey vessel may deploy AUVs and UTPs through a moon pool, which is a large opening through the deck and bottom of a vessel for lowering tools and instruments into the sea.
- Shallow multi-instrument towed surveys. Towed surveys typically happen in shallower waters. A survey vessel will tow side-scan sonar, magnetometers and/or gradiometers with winches to provide altitude adjustments. In addition, passive acoustic monitoring, and, if needed, medium penetration seismic can be towed from hardpoints on the vessel. The survey vessel usually has hull mounted multibeam echosounders, a sub-bottom profiler, and an ultra-short baseline system.
- Deep-tow survey. Deep tow surveys use towed methodology in deep waters. The vessel uses a large winch with thousands of meters of cable to tow the survey instruments at depth. The survey instruments usually consist of a large weight (depressor) followed by a side-scan, sub-bottom, and potentially a multibeam. Mounted in a survey vehicle. In deep waters the survey vehicle might be 8–10 km behind the survey vessel, sometimes requiring the use of a chase vessel to provide ultra-short baseline navigation for the survey vehicle. Vessels maintain slower speeds of 0–4.5 knots when towing equipment.
- Uncrewed Surface Vessel survey. Uncrewed Surface Vessels (USV) are remote controlled vessels that are controlled by operators on shore or from another vessel. USVs can be simple with a single instrument, designed for shallow waters, and controlled by an operator that maintains visual contact with the USV. USVs can also be larger, the size of a small survey vessel, are operated over the horizon, could tow instruments, and use radar and cameras to operate safely and monitor for protected species. USVs can be electrically powered with batteries, sail/solar powered, and/or use diesel motors and generators.

Additionally, BOEM calculated an estimated HRG survey duration for all the OCS blocks within the two Oregon WEAs. These calculations are based on BOEM's *Geophysical and Geotechnical Guidelines* and assume a single AUV and a single survey vessel conducting 24-hr operations. The calculated line miles for the Brookings area are approximately 5,718-km (3,553-mi) and the Coos Bay area approximately 2257-km (1,402-mi). Daily maintenance of the AUV was estimated at four hours, line turns were estimated to be ten minutes in duration, and AUV speed at 1.5-m/s (~3 knots). Additionally, 10% equipment downtime and 10% weather downtime were added. Transits to and from port due to weather, equipment failure, resupply, and crew changes were not considered due to the lack of sufficient data. For example, BOEM has no means of determining at this time what ports might be used. The total estimated survey time for both areas was 89 days. BOEM acknowledges this calculated survey is, perhaps, the best-case scenario as weather and equipment downtimes are unknown. If the survey days increased by 150%, this would equal a more conservative 134 days.

2.5.2.3 Geotechnical Surveys

Geotechnical surveys are conducted to measure the physical properties of shallow sediments. These measurements are used to design anchor systems, foundations, conduct slope stability studies, determine the armor level of export cables, and determine appropriate cable burial methods. Geotechnical surveys use HRG surveys to select sites for sampling, ensuring the sites are free from archeological, geological, and benthic hazards. The samples for geotechnical evaluation are collected either by direct sampling or in-situ methods. Direct sampling usually employs a dredge or corer off a survey vessel which retrieves a sediment sample from the seabed and returns it to the deck of the vessel for further analysis. In-situ methods use a probe, that is pushed, or dropped into the seabed, and can record various properties of the sediment. Likely methods to obtain geotechnical data and estimated seabed disturbance are in Table 2-3**.**

The BOEM Guidelines for Providing Geophysical, Geotechnical, and Geohazard Information **(**BOEM 2023a) recommend high frequency sub-bottom profiler data and recommend medium penetration seismic surveys. Medium penetration seismic systems, such as boomer, sparker, or other low frequency systems, can be used to provide information on sedimentary structures that exceed the penetrative capability of a high frequency sub-bottom system. BOEM guidance recommends collection of sedimentary structure data 10 m beyond the depth of disturbance, which may not be possible for a high frequency sub-bottom profiler system in certain sediment types (i.e., sand). Survey contractors may elect to acquire medium penetration seismic in areas that are predicted to have poor sub-bottom penetration.

BOEM anticipates that a geotechnical sample would be taken at every proposed wind turbine anchor site, every anchor touchdown point, every export cable touchdown point, and every kilometer along an export cable route. An unknown number of geotechnical samples might be needed for slope stability studies. In addition, the amount of effort and number of vessel trips required to collect the geotechnical samples varies greatly by the type of technology used to retrieve the sample. The area of seabed disturbed by individual sampling events (e.g., collection of a core or grab sample) and placement of met buoy anchors could range up to an estimated 10 m^2 (Table 2-3) although the maximum disturbance for many methods is less than half that area. Some vessels require anchoring for brief periods using small anchors; however, most deployments for this sampling work would likely involve a vessel having dynamic positioning capability (i.e., no seafloor anchoring impacts) (BOEM 2014a). If a vessel intends to anchor, an anchoring plan must be submitted. Anchoring can cause bottom disturbance of a small area, and anchoring is unlikely in to occur in deep waters.

Table 2-3: Likely Methods to Obtain Geotechnical Data, Associated Sounds, and Estimated Seabed Disturbance.

Geotechnical Method	Use	Description of Equipment and Methods	Acoustic Noise	Seabed Disturbance
Dredge	Collect upper 5–10cm of sediment	Spring loaded dredge is lowered to the seabed by hand or with a small winch. Interaction with the seabed causes spring to release and tension on the line provides the closing force for the dredge. Useful for identifying the type of seabed sediment.	None	< 1 m^2
Box Cores	Collect undisturbed "box" of sediment up to 0.5 m x 0.5 m x 1.0 m.	A box core is lowered to the seabed by winch and penetrates the seabed, when tension is applied the box core jaws close, sealing the sample inside. Once on deck various tests can be performed. This type of equipment is also used for benthic studies.	USBL beacon for positioning.	< 4 m^2
Gravity / Piston Coring / Jumbo Piston Coring	Collect a core of sediments for analysis. 3–4" diameter, 10 m–20 m.	Coring is typically conducted off a survey vessel. Gravity coring simply uses a weighted core barrel to take a sample. Piston coring uses a trigger to drop the weighted core barrel into the seabed with a piston that attempts to preserve the seabed. A jumbo piston core is a larger piston corer with increased diameter and length.	USBL beacon for positioning.	< 4 m^2
Cone Penetrometer (CPT)	Measure several properties including tip resistance, pore water pressure, sleeve resistance, among others.	An electrically operated machine pushes a coiled rod into the seabed with a cone penetrometer at the tip. Typically deployed from survey vessels. They are winched to the seabed and remain connected to the survey vessel via umbilical for data transmission and power.	USBL beacon for positioning. Motor noises during operation.	< 10 m^2
StingerCPT	Measure several properties including tip resistance, pore water pressure, sleeve resistance, among others.	A hydrodynamic dart with a cone penetrometor at the tip. CPT Stingers are typically deployed from survey vessels, much like a gravity core. The CPT records as the equipment embeds into the seafloor. It may then push the CPT further into the seafloor.	USBL beacon for positioning. Motor noises during operation.	< 4 m^2

Geotechnical Method	Use	Description of Equipment and Methods	Acoustic Noise	Seabed Disturbance
Vibracore	Obtain samples of unconsolidated sediment; may also be used to gather information to aid archaeological interpretation of features identified through HRG surveys (BOEM 2020a)	Vibracore samplers typically consist of a core barrel and an oscillating driving mechanism that propels the core barrel into the sub-bottom. Once the core barrel is driven to its full length, the core barrel is retracted from the sediment and returned to the deck of the vessel. Typically, cores up to 6 m long with 8 cm diameters are obtained, although some devices have been modified to obtain samples up to 12 m long (MMS 2007a; USACE 1987).	Vibrations from the motor.	< 10 m^2
Borings	Sampling and characterizing the geological properties of sediments at the maximum expected depths of the structure foundations (MMS 2007)	A drill rig is used to obtain deep borings. The drill rig is mounted over a moon pool on a dynamically positioned vessel with active heave compensation. Geologic borings can generally reach depths of 30–61 m within a few days (based on weather conditions). The acoustic levels from deep borings can be expected to be in the low-frequency bands and below the 160 dB threshold established by NMFS to protect marine mammals (Erbe and McPherson 2017).	Vessel and drill noise.	< 10 m^2

2.5.3 Vessel Trips for Site Assessment and Site Characterization

Vessel trips anticipated for site assessment and site characterization activities were estimated (Table 2-4). BOEM projected vessel trips information from the deployments of two LiDAR buoys in the Humboldt and Morro Bay WEAs offshore California (PNNL 2019). PNNL used a marine vessel, transiting at 5 knots, to tow the Morro Bay LiDAR buoy from shore to deployment site and back to port in one day. To assist with estimating vessel trips needed for metocean buoys, BOEM followed PNNL planned which was three vessel trips for a 12-month deployment (buoy deployment, mid-year maintenance, buoy recovery).

Vessels performing surveys or towing equipment are relatively slow moving at approximately 7.4–11.1 km/hr [0–6 kn]. Buoy installation vessels are typically 65 to 100 feet (20 to 30 meters) in length. Crew boats used for buoy operations and maintenance are usually 51 to 57 feet (16 to 17 meters) in length with 400 to 100-horsepower engines and 1,800-gallon fuel capacity.

Table 2-4: Estimated Number of Vessel Trips for Site Characterization and Site Assessment Over a 3–5 Year Period for Each Lease Area

Survey Task	Estimated Number and Duration of Survey Days/Round Trips[1]
HRG surveys of all OCS blocks within lease area(s) [2]	90 to 140 trips
Geotechnical and benthic sampling	20 trips of 24-hrs each or 250 trips of 10-hrs each
Avian surveys[3]	30 to 60 trips of 10-hrs each
Fish surveys[3]	8 to 370 trips of 10-hrs each
Marine mammal and sea turtle surveys[3]	30 to 60 trips of 10-hrs each
Metocean buoy installation	6 (1 round trip x 6 buoys)
Metocean buoy maintenance trips (at 1 per year)	30 (6 buoys x 5 years)
Metocean buoy decommissioning	6 (1 round trip x 6 buoys)
Additional trips for maintenance/weather challenges	45-60
Total estimated number of round trips	260–960

[1] A range has been provided when data or information was available to determine an upper and lower number of round trips. Otherwise, only a maximum value was determined. Number of vessel trips are intended to be conservative estimates of survey requirements, with actual numbers likely to be lower.

[2] For calculation of HRG survey days via AUV, see section 2.5.2.2. For geotechnical sampling, the lower range assumes 24-hr survey days, whereas the upper range assumes 10-hr survey days.

[3] Avian, fish, and marine mammal and sea turtle surveys are typically done during daylight hours (10-hours). These surveys may occur at the same time from the same vessel but not concurrently with HRG surveys. Totals include vessel trips for both.

2.5.4 Non-Routine Events

Non-routine and low-probability events and hazards that could occur in the WEAs during site characterization and site assessment-related activities include the following: (1) allisions and collisions between the site assessment structures or associated vessels and other vessels or marine life; (2) spills from collisions or fuel spills resulting from generator refueling; and (3) recovery of lost survey equipment.

2.5.4.1 Allisions and Collisions

An allision occurs when a moving object (i.e., a vessel) strikes a stationary or moored object (e.g., met buoy); a collision occurs when two moving objects strike each other. A met buoy in the WEA could pose a risk to vessel navigation. An allision between a ship and a met buoy could result in the damage or loss of the buoy and/or the vessel, as well as loss of life and spillage of petroleum product. Vessels associated with site assessment and site characterization activities could collide with other vessels, resulting in damages to the vessels, petroleum product spills, or capsizing. However, risk of allisions and collisions is reduced through routing measures such as Traffic Separation Schemes (TSS), safety fairways, anchorages, and United States Coast Guard (USCG) Navigation Rules and Regulations. Thus, collisions and allisions are considered unlikely. Further, areas of relatively higher traffic were excluded from the WEAs further reducing the risk. Risk of allisions with buoys would be reduced by USCG-required marking and lighting.

BOEM anticipates that aerial surveys (if necessary) would not be conducted during periods of reduced visibility conditions, as flying at low elevations would pose a safety risk during storms.

2.5.4.2 Spills

A petroleum spill could result from allisions, collisions, accidents during the maintenance or transfer of offshore equipment and/or crew, or due to natural events (i.e., strong waves or storms). From 2000 to

2009, the average spill size for vessels other than tank ships and tank barges was 88 gallons (USCG 2011). Should a spill from a vessel associated with the Proposed Action occur, BOEM anticipates that the volume would be similar. Diesel fuel is lighter than water and may float on the water's surface or be dispersed into the water column by waves. Diesel would be expected to dissipate rapidly, evaporate, and biodegrade within a few days (MMS 2007). BOEM used NOAA's Automated Data Inquiry for Oil Spills to predict dissipation of a maximum spill of 2,500 barrels, a spill far greater than what is assumed as a non-routine event during the Proposed Action. Results of the modeling analysis showed that dissipation of spilled diesel fuel is rapid. The amount of time it took to reach diesel fuel concentrations of less than 0.05% varied between 0.5 and 2.5 days, depending on ambient wind direction and speed (Tetra Tech EC Inc. 2015), suggesting that 88 gallons would reach similar concentrations faster and limit the potential environmental impact to negligible.

Most modern met buoys do not use petroleum, further reducing the possibility of a spill. Any vessels used to conduct survey activities will be required to comply with USCG spill prevention requirement and to follow 33 CFR Parts 151, 154, and 155, which contain guidelines for spill response plans and shipboard oil pollution emergency plans. Further, a spill would be expected to dissipate rapidly and then evaporate and biodegrade within a day or two, limiting the potential impacts to a localized area for a short duration.

2.5.4.3 Lost Survey Equipment

In the event of equipment lost during surveys or a met buoy disconnecting from its anchor, recovery operations may be undertaken. Recovery operations may be performed in a variety of ways, including ROVs and grapnel lines, depending on water depth and equipment lost. If grapnel lines (e.g., hooks, trawls) are used to retrieve lost equipment, bottom disturbances could result from dragging the line along the bottom until it hooks the lost equipment. In addition, after the line catches the lost equipment, components are dragged along the seafloor until recovery.

Survey equipment could be carried away by currents or become embedded in the seafloor. Additional bottom disturbance may also occur. For example, a broken vibracore rod that cannot be retrieved may need to be cut and capped 1–2 m (3–6.5 ft) below the seafloor. For the recovery of lost survey equipment, BOEM will work with the lessee/operator to develop an emergency response plan. Selection of a mitigation strategy would depend on the nature of the lost equipment, and further consultation with stakeholders may be necessary. Potential impacts associated with recovery of lost survey equipment may include vessel trips, noise and lighting, air emissions, and routine vessel discharges from a single vessel. Bottom disturbance and habitat degradation may also occur from recovery operations.

2.6 IMPACT PRODUCING FACTORS

The analysis in this EA considers the potential effects of routine and non-routine activities associated with lease issuance, site assessment activities, and site characterization activities within the WEAs. This EA uses a reasonably foreseeable scenario of site assessment activities and site characterization surveys that could be conducted because of the Proposed Action. Section 2.5 and Appendix F describe activities and surveys to meet the requirements of the renewable energy regulations at 30 CFR Part 585 and are based on BOEM's guidance for lessees, previous lease applications and plans that have been submitted to BOEM, and previous EAs prepared for similar activities.

Impact-producing factors (IPFs) associated with the various activities in the Proposed Action that could affect resources include:

- Noise
- Bottom disturbance
- Lines and cables used in site assessment and characterization (entanglement risk to marine wildlife)
- Vessel trips
- Economic impacts
- Air emissions

2.7 OFFSHORE ACTIVITIES AND RESOURCES ELIMINATED FROM FURTHER CONSIDERATION

BOEM has focused the main body of this EA on the potential impacts for resources with potential impacts known or stated as concerns in comments. Resources that are expected to experience negligible or no impacts from the site assessment and site characterization activities have been scoped out of this EA. However, the resources listed below could be within the scope of analysis for future actions (i.e., development of a wind lease area).

Resource areas for which detailed analyses are not carried out in this EA include water quality and bats (see Appendix A).

Water Quality

Water quality impacts in the WEAs and along cable routes is anticipated to be short-term and localized. Therefore, water quality in the WEAs and along cable routes is not discussed further in this document as **negligible** impacts are anticipated.

Bats

The overall impact of activities associated with the Proposed Action on bats would be **negligible**. Few bats are expected to migrate or forage in the WEAs, and activity, if any, is most likely to occur during a short period during migration in the late summer or early fall.

Current and Reasonably Foreseeable Planned Actions

Additionally, current and reasonably foreseeable planned actions that could occur in the vicinity of the Proposed Action can be found in Appendix B. Ongoing and planned actions that overlap with this regional area and may occur between the start of Proposed Action activities in 2024 through approximately 2029. BOEM used a localized geographic scope to evaluate impacts from planned actions for resources that are fixed in nature (i.e., their location is stationary, such as benthic and archaeological resources), or for resources where impacts from the Proposed Action would only occur in waters in and directly around the proposed lease areas. There is no indication that the issuance of a lease or grant of a RUE or ROW and subsequent site characterization would involve expansion of existing port infrastructure.

3 Description of Affected Environment and Environmental Impacts

This section describes aspects of the natural and human environment that may be impacted by the Proposed Action and briefly describes those impacts. Resources unlikely to be impacted by the Proposed Action are discussed in section 2.7. Additional resources that are unlikely to be affected by the Proposed Action are noted in the individual resource sections with an accompanying statement explaining why impacts are not expected.

The Proposed Action for some resources includes Best Management Practices (BMPs) to reduce or eliminate potential risks to or conflicts with specific environmental resources. If leases or grants are issued, BOEM will require the lessee to comply with BMPs through lease stipulations and/or as conditions of SAP approval. The lessee's SAP must contain a description of environmental protection features or measures that the lessee will use. Specific information on the BMPs is listed in Appendix D.

3.1 GEOLOGY

3.1.1 Affected Environment

The Area impacted by the Proposed Action is located within the submerged Cascadia Subduction Zone, a forearc basin bordered by the Juan de Fuca and North American tectonic plates. The local geomorphology is influenced by regional subduction, mass-wasting, and mixed fault vergence within the Cascadia deformation front (Watt and Brothers 2020). The area is seismically active with several 7.0+ earthquakes occurring since 1900, none directly offshore Oregon but near the Mendocino Triple Junction in California and on Vancouver Island, Canada. However, the last major megathrust earthquake, measuring 9.1 magnitude, occurred on January 26, 1700 (Tajalli Bakhsh et al. 2020).

The Oregon continental shelf is relatively broad, followed by an abrupt descent into the continental slope and abyssal plain. Seafloor slopes range from 0–2° on the continental shelf, 0–5° on the mid-upper continental slope and exceed 10° near mass-wasting scarps and submarine canyon walls on the lower slope (Lenz et al. 2018).

Hydrographic surveys by NOAA indicate potential seafloor hazards in the WEAs. Bathymetry, potential faults with surface expression, areas of anomalous high backscatter, seeps detected in the water column, and other mapped instances of outcropping rock are presented in Figure 3-1.

Legacy 2D seismic, acquired in the late 1970s and early 80s for oil and gas exploration, indicates a Bottom Simulating Reflector (BSR) along most of the Oregon and Washington continental slope. This BSR is observed in water depths between 600 to 2,000 m and extends across large portions of the continental shelf and slope. BSRs can indicate the presence of methane hydrate in the seabed (Shipley et al. 1979). The BSR itself is the buried end of the Hydrate Stability Zone (HSZ) with Hydrate Bearing Sediments (HBS) possible between the BSR and the seabed. The area of potential HBS is shown in Figure 3-1.

3.1.2 Impacts of the Proposed Action

Although the geology of the Oregon continental shelf is complex, the anticipated impacts to the local geologic resources by activities performed as part of a SAP and site characterization activities include HRG surveys and geotechnical sampling. Geotechnical sampling within the WEAs would result in only minor, temporary disturbance of the upper 25 m (82 ft) of sediment that underlies the seafloor.

Conclusion

Impacts to geologic resources would be limited to the lease area and potential export cable routes. HRG survey activity would be temporary and short-term. Geologic impact would be **negligible** and temporary in duration.

3.1.3 No Action Alternative

Under this alternative, commercial leases and grants would not be issued in the Oregon WEA(s). The implementation of the No Action Alternative would mean that the minor, temporary disturbances to local geological resources associated with the Proposed Action would not occur. BOEM expects ongoing activities and planned actions to have continuing regional impacts on geological resources over the timeframe considered in this EA.

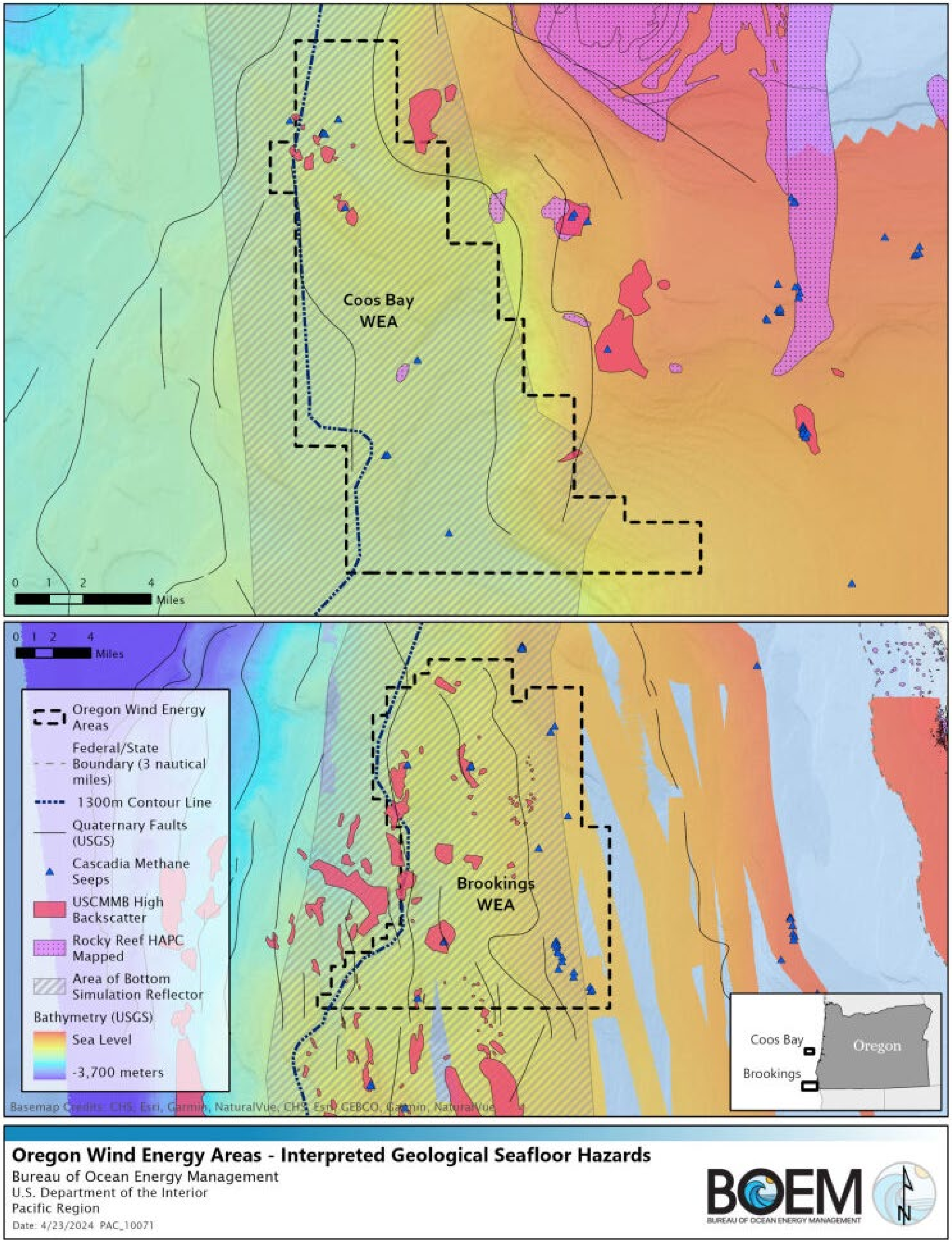


Figure 3-1: Seafloor Features, Including the 1,300 m Contour, Bathymetry, Faults, Methane Seeps, HAPC, Hardbottom, and Essential Fish Habitat Conservation Areas for Oregon WEAs: Coos Bay (top panel) and Brookings (lower panel)

Sources: Conrad and Rudebusch (2023); HAPC: OSU AT&SML; Hard bottom: USCMMB; CH3 Seeps: Merle et al. (2021)

3.2 AIR QUALITY

3.2.1 Affected Environment

Air quality is defined by the concentration of pollutants, including greenhouse gases (GHGs), in the ambient atmosphere. Pollutant concentrations are determined by a variety of factors, including the quantity and timing of pollutants released by emitting sources, atmospheric conditions such as wind speed and direction, presence of sunlight, and barriers to transport such as mountain ranges.

The Proposed Action's primary potential areas of impact on the air quality are onshore areas corresponding to the Coos Bay WEA (Coos County) and the Brookings WEA (Curry County). The western coastal areas of Douglas, Lane, and Lincoln counties also have the potential to be impacted, depending on wind velocity and vessel activity.

Air pollutants can be classified as criteria pollutants, hazardous air pollutants (HAPs), and greenhouse gases. The criteria pollutants are carbon monoxide (CO), lead, ground-level ozone, particulate matter (PM), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2), which are all regulated under the health-based National Ambient Air Quality Standards (NAAQS). HAPs are those pollutants that are known to cause cancer or other serious health effects. These pollutants are frequently associated with specific industries or equipment, for example, benzene from oil and gas operations. GHGs are gases that trap heat in the atmosphere. The primary GHGs are carbon dioxide (CO_2), methane, and nitrous oxide. Fossil fuel combustion represents the vast majority of the energy related GHG emissions, with CO_2 being the primary GHG (EPA 2022). In contrast to the NAAQS and HAPs contaminants, which have more local impacts, GHGs have a global impact.

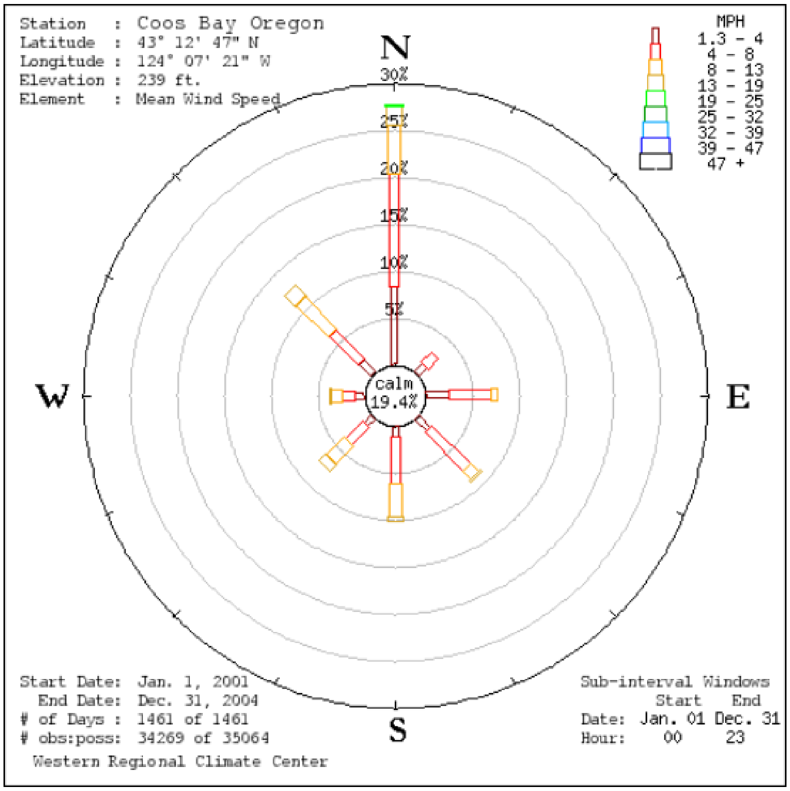
When the monitored pollutant levels in an area exceed the NAAQS for any pollutant, the area is classified as being in "nonattainment" for that pollutant. The Federal and State attainment status for Coos, Brookings, Douglas, Lane, and Lincoln counties NAAQS contaminants is found at 40 CFR 81.338. None of the potential areas of impact are classified as nonattainment for any NAAQS criteria pollutants. The U.S. Environmental Protection Agency (USEPA) has air quality permitting jurisdiction over sources on the OCS offshore Oregon. The Oregon Department of Environmental Quality has air quality permitting jurisdiction over Oregon State waters (with the exception of areas covered by the Lane Regional Air Protection Agency).

The Clean Air Act, under the Visibility Protection and Prevention of Significant Deterioration provisions (Sections 169A and 162, respectively), gives special air quality and visibility protection to national parks larger than 6,000 ac and national wilderness areas larger than 5,000 ac. These are called Class I areas. Very little degradation of air quality, including air quality-related values such as visibility, is allowed in Class I areas. The nearest Class I area to an Oregon WEA is the Kalmiopsis Wilderness, approximately 60 miles east of the Brookings WEA.

Air pollutants are transported primarily by wind, so the wind speed and direction are significant factors to consider in determining adverse impacts. Based on wind monitoring in Coos Bay, the wind comes predominantly from the north and northwest. This indicates that pollutant emissions created in the Coos Bay WEA will tend to drift south and southeast toward Coos Bay (to the southeast) and open water (to the south). Wind monitoring in Red Mound (Figure 3-3), indicates that pollutant emissions created in the Brookings WEA, if they were to transport to land, would tend to drift to the southeast and south-southeast.

In addition to Coos and Curry counties, the western portions of Douglas County, Lane County, and Lincoln County can also be considered potential impact areas, depending upon wind direction and level of emissions.

Coos Bay Oregon



Coos Bay Oregon - Wind Frequency Table (percentage)

Latitude : 43° 12' 47" N
Longitude : 124° 07' 21" W
Elevation : 239 ft.
Element :

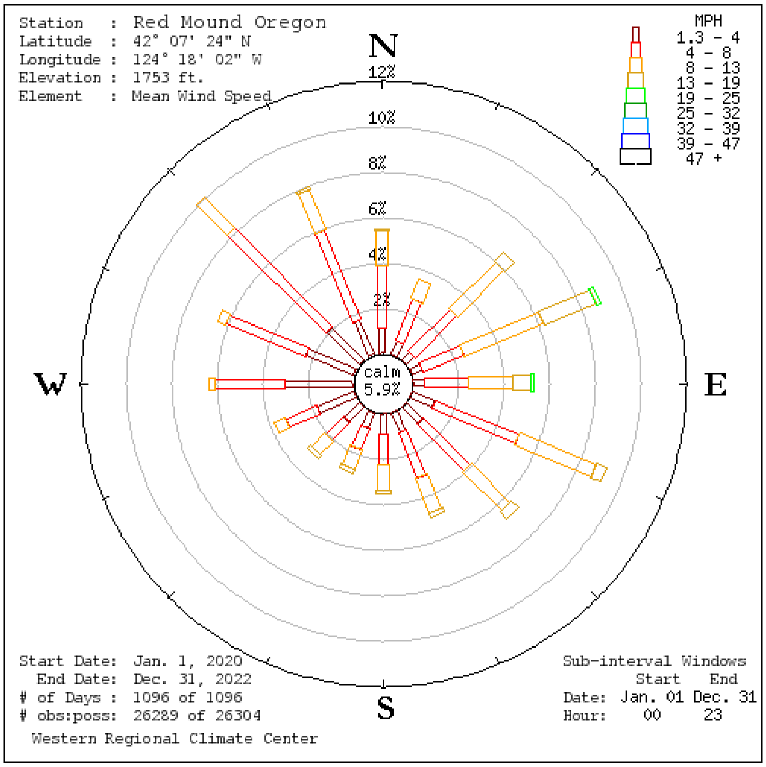
Start Date : Jan. 1, 2001
End Date : Dec. 31, 2004
# of Days : 1461 of 1461
obs : poss : 34269 of 35064

Sub Interval Windows
Start End
Date Jan. 01 Dec. 31
Hour 00 23

Figure 3-2: Coos Bay Windrose, 2001–2004

Source: Western Regional Climate Center (2023)

Red Mound Oregon



Red Mound Oregon - Wind Frequency Table (percentage)

Latitude : 42° 07' 24" N
Longitude : 124° 18' 02" W
Elevation : 1753 ft.
Element : Mean Wind Speed

Start Date : Jan. 1, 2020
End Date : Dec. 31, 2022
# of Days : 1096 of 1096
obs : poss : 26289 of 26304

Sub Interval Windows
Start End
Date Jan. 01 Dec. 31
Hour 00 23

Figure 3-3: Red Mound Windrose, 2020–2022

Source: Western Regional Climate Center (2023)

3.2.2 Impacts of the Proposed Action

The factors associated with this project that can potentially produce adverse impacts on air quality are summarized in Table 3-1. The primary air contaminants emitted are CO, NO_2, SO_2, fine particulate matter ($PM_{2.5}$), and GHGs, though these emissions would be generated in negligible quantities due to the size and limited number of emissions sources. Marine diesel and lube oils, to a lesser degree due to their low volatility, are also potential contaminants.

CO, NO_2, SO_2, and PM are criteria pollutants that are regulated under the NAAQS, which are health-based standards. Marine diesel and lube oils may contain HAPs, primarily benzene, and have adverse human health effects. They are also hydrocarbons, which, if volatilized, become precursors of photochemical smog (i.e., ozone, another NAAQS contaminant). NO_2, in the presence of sunlight, is also an ozone precursor. The primary GHG emitted is carbon dioxide. GHGs, in contrast to the other contaminants in Table 3-1, have a global, rather than local, impact. CO_2 traps heat in the atmosphere and creates adverse impacts such as climate change, ocean acidification, and sea level rise.

Table 3-1: Potential Emission Sources that can Potentially Produce Adverse Impacts on Air Quality

Source	Impact-Producing Factors (IPFs)	Primary Contaminants
Marine vessels	• Stack emissions • Fugitive emissions[1] • Fuel and lubricant spills	CO, NO_2, $PM_{2.5}$, SO_2, marine diesel, lube oils, greenhouse gases
Auxiliary engines	• Stack emissions • Fugitive emissions[1] • Fuel and lubricant spills	CO, NO_2, $PM_{2.5}$, SO_2, marine diesel, lube oils, greenhouse gases
Buoy back-up generators	• Stack emissions • Fugitive emissions[1] • Fuel and lubricant spills	CO, NO_X, $PM_{2.5}$, SO_2, marine diesel, lube oils, greenhouse gases
Trucks and locomotives	• Engine exhaust	CO, NO_X, $PM_{2.5}$, SO_2, greenhouse gases
Goods-movement equipment (includes cranes, winches, and gantries)	• Engine exhaust	CO, NO_X, $PM_{2.5}$, SO_2, greenhouse gases

[1] Fugitive emissions are those which could not reasonably pass through a stack, chimney, vent, or other functionally-equivalent opening (40 CFR 70.2).
NO_X = Oxides of nitrogen

3.2.2.1 Marine Vessels

Marine vessels are the source of stack emissions from the main exhaust stack of the engine that is used to propel the vessel. These emissions are primarily the products of combustions: CO, nitrogen oxides (NO_X), $PM_{2.5}$, oxides of sulfur (SO_X), and GHGs. Fugitive hydrocarbon emissions may occur from the transfer and storage of fuel. Hydrocarbon emission may also result from fuel and lubricant spills. Stack emissions from marine vessels are the primary emissions sources associated with this Proposed Action. Diesel particulate matter, which constitutes most of the $PM_{2.5}$ emissions, is an important contaminant to consider during idling of vessels in port due to its potential health impacts.

All marine vessels used for surveys are expected to comply with Federal and State air quality regulations for engine upgrade requirements, as well as monitoring, recordkeeping, and reporting requirements.

3.2.2.2 Auxiliary Engines

Auxiliary engines are those internal combustion engines that are not used for the propulsion of the vessel and are used to power onboard equipment such as cranes, electrical generators, pumps, and compressors. Air emissions from auxiliary engines include CO, NO_X, $PM_{2.5}$, and GHGs, primarily carbon dioxide. Fugitive hydrocarbon emissions may occur from the transfer and storage of fuel for these engines. Hydrocarbon emission may also result from fuel and lubricant spills.

3.2.2.3 Back-up Generator for Buoys

Buoys may be deployed with onboard back-up generators in case the buoy batteries or battery recharging system fails. Buoy back-up generators are generally powered by diesel fuel. Air emissions are primarily CO, NO_X, $PM_{2.5}$, and GHGs. The possibility of a fuel spill also exists during filling operations and if the generator's fuel tank is ruptured.

3.2.2.4 Truck and Locomotive Traffic

Trucks and trains may be used to transport equipment and personnel to and from the onshore staging area(s). Associated air emissions would include CO, Nox, $PM_{2.5}$, SO_X, and GHGs.

3.2.2.5 Goods-Movement Equipment

Goods-movement equipment includes cranes, gantries, and winches, and are used to load and unload equipment and materials onto docks, boats, barges, or intermodally. Associated air emissions would be CO, Nox, $PM_{2.5}$, SO_X, and GHGs.

Conclusion

Vessel activity will primarily take place between 20 and 50 mi offshore and, if there are multiple leases granted, survey activity may not occur simultaneously. Truck and locomotives activity, if they occur, would be involved if they are needed to transport parts and equipment to the staging area. The emissions from these activities are expected to be insignificant due to their short-term nature.

Emissions will mix in the ambient atmosphere, be quickly dissipated, and will be indistinguishable from the emissions created by other daily vessel traffic offshore Coos, Curry, Douglas, Lane, and Lincoln counties.

Table 3-2: Emissions Estimates from WEA Site Characterization and Site Assessment Off North Carolina

Activity	CO	NO_X	VOCs	PM_{10}	$PM_{2.5}$	SO_X	CO_2	N_20	CH_4	CO_2e
Site Characterization Surveys	3.50	37.99	1.46	2.07	2.07	3.74	1,828.78	0.05	0.24	1,900.47
Site Assessment: Construction of Meteorological Towers[1]	0.36	2.11	0.43	0.14	0.14	0.20	131.33	0.003	0.04	144.39
Site Assessment: Operation of Meteorological Towers	4.03	22.04	1.85	1.47	1.47	1.64	790.99	0.01	0.04	801.83
Site Assessment: Decommissioning of Meteorological Towers[1]	0.36	2.75	0.44	0.16	0.17	0.27	164.32	0.00	0.04	176.07
Sum of Emissions from All Sources[2]	8.26	64.89	4.18	3.85	3.85	5.86	2,915.42	0.07	0.35	3,022.77

Notes: Units are tons per year (Metric tons per year for greenhouse gases) in a single year.

[1] Towers are not being considered but this serves as a conservative (high) estimate for construction, deployment, and decommissioning of meteorological buoys and equipment.

[2] Sum of individual values may not equal summary value because of rounding.

PM_{10} = particulate matter with aerodynamic diameters of 10 microns or less

$PM_{2.5}$ = particulate matter with aerodynamic diameters of 2.5 microns or less

Source: BOEM (2015)

In a WEA off of North Carolina that is larger than the Oregon WEAs (approximately 300,000 acres), none of the criteria pollutants had emissions greater than 100 tons per year, which is the default value for the major source threshold (Table 3-2). Therefore, the emissions from survey activities for the Oregon WEAs should be substantially less. Survey vessels and ancillary equipment emit a variety of air pollutants, including NO2, SO2, PM, volatile organic compounds, CO, and GHGs. The air emissions from this Proposed Action are anticipated to be primarily from the survey vessels' propulsion engines and engines that power ancillary equipment. Lesser amounts of air pollutants may be emitted from trucks, locomotives, and goods-movement equipment if they are used to transport equipment and personnel to the project staging area.

The GHG emissions from this action will be from marine vessels operating per lease and while this level of emissions would be additive to the global inventory, it is not expected to have any measurable impacts on the local environment.

Impacts on Class I areas are expected to be **negligible** because the emissions from marine vessels will be too small to affect air quality in any Class I areas.

3.2.3 No Action Alternative

Under this alternative, commercial leases and grants would not be issued in the Coos Bay or Brookings WEAs, and geological and geophysical (G&G) activities would not occur pursuant to wind energy development. However, BOEM expects other ongoing activities and planned actions to have continuing regional impacts on air quality. Impacts from urban development and increasing air, vessel, and onshore traffic will continue to contribute to climate change and will have negative impacts on air quality. Implementation of the No Action Alternative would not meaningfully reduce ongoing impacts to air quality from existing actions.

3.3 MARINE AND COASTAL HABITATS AND ASSOCIATED BIOTIC ASSEMBLAGES

3.3.1 Affected Environment

A variety of marine and coastal habitats exist within and nearby the WEAs, and species that reside in these habitats are characteristic of the Oregonian (cool-temperate) Biogeographic Province. Large-scale upwelling brings dissolved nutrients to the surface which enhance biological productivity and support significant biodiversity and biomass in the region. General references that describe the study region or the relevant ecological patterns within the California Current System include Allen et al. (2006) and Kaplan et al. (2010), and these studies are incorpated by reference into this section. Key habitats and species that may be affected by the site assessment and site characterization activities are sumarized below. The Pacific Fishery Management Council (PFMC) classifies all of these habitats as essential fish habitat (EFH) for one or more federally managed fisheries .

The Proposed Action Project Area includes the Brookings and Coos Bay WEAs, potential cable routes, and vessel transit routes to and from the ports.

3.3.1.1 Benthic Habitat

Soft substrate dominates benthic habitat along Oregon’s continental shelf and upper slope, grading from coarse sand and shell at shallow depths to finer sand on the inner and middle continental shelf (extending to ~100 m depth) and fine silt and mud on the outer shelf (~100 to 200 m) and slope (> 200 m) (Romsos et al. 2007; Cochrane et al. 2017). A variety of habitats may occur in the area of potential impact, including offshore banks, rock outcrops, gas seeps, submarine canyons, and artificial substrates (marine debris, shipwrecks).

Key structuring processes for invertebrate communities show cross-shelf patterns (i.e., perpendicular to the coastline) (Henkel et al. 2020; Goldfinger et al. 2014), and environmental drivers include depth, sediment grain size, dissolved oxygen levels, and organic material/silt. For example, sediments on the continental shelf consist of sandy habitats nearshore and are dominated by filter-feeding organisms. Progressively deeper environments of silt and clay sediments follow, along with an increase in deposit feeders. At the shelf break, where the continental slope begins, the sediment becomes completely silt and clay (e.g., mud), and the community is dominated by deposit feeders (BLM 1980).

Invertebrate prey serve as a forage base for larger piscine predators, some of which are commercially harvested, and include a variety of flatfishes (e.g., Dover and petrale soles), rays (e.g., longnose and California rays), thornyheads, sablefish, and hagfishes.

Structure-forming invertebrates such as corals and sponges provide both habitat and food for other species. At all depths, fish assemblages at rock outcrops consist primarily of rockfishes (*Sebastes* spp.). Special habitats in the region include offshore banks (Tissot et al. 2008), seeps and their associated chemosynthetic communities (Kennicutt et al. 1989), and submarine canyons (BLM 1980).

Benthic habitats within the WEAs are entirely comprised of outer shelf and upper slope habitats. Within the larger study region, soft sediments cover most of the area, with rock outcrops forming a minority of substrates (Carlton et al. 2024). The WEAs have generally avoided the shelf break and EFH Conservation Areas, as well as rocky reef EFH Habitat Areas of Particular Concern for Pacific Coast Groundfish (Figure 3-1). Species distribution modeling indicate that the WEAs are not hotspots of deep coral occurrence (Carlton et al. 2024).

3.3.1.2 Pelagic Environments

This ecosystem is defined here as all open water habitat seaward of coastal habitats. Phytoplankton and zooplankton communities in the region are diverse and vary according to season and oceanographic conditions. These communities have been summarized by Kaplan et al. (2010). The pelagic environment also hosts a variety of larger animals including jellyfishes, krill, macro-invertebrate and fish larvae, forage fishes (e.g., myctophids, etc.), squid, tuna, and sharks (Kaplan et al. 2010).

3.3.1.3 Intertidal and Coastal Habitats

Defined as the interface between terrestrial and marine zones, two types of intertidal habitats exist: soft sediments (e.g., sandy and cobble beaches, mudflats) and hard substrate (e.g., rock outcrops, human-made structures such as rock walls). The coastal zone is defined in this document as benthic and water column habitats and species that reside seaward of intertidal habitats out to the Federal-State waters delineation point (3 nm from shore). Key references that summarize details concerning regional coastal habitats are described by Kaplan et al. (2010). Special coastal features include kelp forests, seagrasses, and estuaries all of which are also desginated as Habitat Areas of Particular Concern for Pacific Coast Groundfish.

3.3.1.4 Threatened and Endangered Species

Twenty-eight taxa that occur or potentially occur in the region's coastal and marine habitats are listed as threatened and endangered under the Endangered Species Act (ESA) (Table 3-3).

Table 3-3: Marine Fish Taxa Listed as Threatened or Endangered Under the ESA

Common Name	Scientific Name	Federal Status
Chinook salmon ESUs[1]	*Oncorhynchus tshawytscha*	
Sacramento River Winter-Run	-	Endangered
Upper Columbia River Spring-Run	-	Endangered
California Coastal	-	Threatened
Central Valley Spring-Run	-	Threatened
Lower Columbia River	-	Threatened
Puget Sound	-	Threatened
Snake River Fall-Run	-	Threatened
Snake River Spring/Summer-Run	-	Threatened
Upper Willamette River	-	Threatened
Chum salmon ESUs[1]	*Oncorhynchus keta*	
Columbia River	-	Threatened
Hood Canal Summer-Run	-	Threatened
Coho salmon ESUs[1]	*Oncorhynchus kisutch*	-
Central California Coast	-	Endangered
Lower Columbia River	-	Threatened
Oregon coast	-	Threatened
Southern Oregon/ Northern California Coast	-	Threatened

Common Name	Scientific Name	Federal Status
Steelhead DPS[2]	*Oncorhynchus mykiss*	-
Southern California	-	Endangered
Central California Valley	-	Threatened
Central California Coast	-	Threatened
Lower Columbia River	-	Threatened
Middle Columbia River	-	Threatened
Northern California	-	Threatened
Puget Sound	-	Threatened
Snake River Basin	-	Threatened
South-Central California Coast	-	Threatened
Upper Columbia River	-	Threatened
Upper Willamette	-	Threatened
Green sturgeon, Southern DPS[2]	*Acipenser medirostris*	Threatened
Eulachon, Southern DPS[2]	*Thaleichthys pacificus*	Threatened

1 As defined under the ESA, ESU refers to Evolutionarily Separate Unit
2 As defined under the ESA, DPS refers to Distinct Population Segment

3.3.2 Impacts of the Proposed Action

Stressors to the environment may include benthic disturbance and the associated water quality changes from disturbance (turbidity and sediment suspension), noise, introduction of artificial habitat, and accidents. This impact analysis assumes that standard lease stipulations, regulations, best management practices, and project design criteria that protect the environment (e.g., Anchoring Plan that includes hard substrate avoidance; Marine Debris Prevention Program) will be implemented by lessees when required. See Appendix D for Best Management Practices to Minimize Impacts to Hard Bottom and Anchoring Plan.

3.3.2.1 Benthic Habitats

Each met buoy deployed within the lease areas is estimated to disturb a maximum of 2.3 m^2 (25 ft^2) of seafloor from its solid cast iron anchor (PNNL 2019). Up to six met buoys per lease may be installed as part of the Proposed Action. Impacts to the outer shelf and upper slope habitats, including EFH, would be crushing or smothering of organisms by an anchor. Sediment suspension by anchor placement would cause temporary turbidity in the water column and could interfere with filter-feeding of nearby invertebrates and the respiration and feeding of fishes. Physical sampling methods (grab samplers, benthic sleds, bottom cores, deep borings) may disturb, injure, or cause mortality to benthic resources and EFH in the immediate sampling area. Data collection buoys and associated mooring systems may act as small artificial reefs situated within an area that may exclude fishing, and these areas may provide a benefit to local benthic and fish assemblages associated with hard substrate. Decommissioning of the buoy may create short-term sediment suspension and would remove or reduce the artificial reef effect.

In the unlikely event of recovering lost equipment, seafloor disturbance would be expected during the recovery operation. Impacts to the outer shelf and upper slope habitats, including EFH, would be crushing or smothering of organisms by the dragging of grapnel lines to retrieve the lost item(s). If a vibracore rod cannot be retrieved, there would be additional bottom disturbance during the cutting and capping of the rod.

3.3.2.2 Pelagic Environments

Noise from HRG surveys and project vessels may alter fish behavior within the WEAs but the effect would be temporary and is not expected to affect viability of regional populations. Further details of noise from HRG surveys are discussed in section 3.4, Marine Mammals and Sea Turtles.

3.3.2.3 Intertidal Coastal and Habitats

Impacts to benthic resources in coastal and intertidal habitats are not expected for site assessment and site characterization activities. Any impacts that could occur would be from accidental events, such as vessel grounding or collision. Impacts to fishes and EFH may occur from noise generated by project vessels and potential introduction of invasive species from non-local project vessels. These potential effects are not expected to affect viability of regional populations or cause long-lasting damage to habitats.

3.3.2.4 Threatened and Endangered Species

The regional population viability of species listed in Table 3-3 is not expected to be adversely affected by the stressors associated with the project, and thus no additional conservation measures are proposed.

Conclusion

Impacts to benthic resources would be limited to the immediate footprint of the anchors or direct sampling. Sediment suspension would be temporary and short-term. Noise impacts from HRG surveys and project vessels to EFH and fishes would be **minimal** and temporary in duration. The artificial reef effect may provide a local, short-term (less than 5 years) benefit to benthic fish populations.

3.3.3 **No Action Alternative**

Under the No Action Alternative, climate change would continue to cause impacts to marine and coastal habitats and benthic assemblages within the geographical analysis area. These impacts are likely to be incremental and difficult to discern from effects of other actions such as urban development, mariculture, shipping and vessel discharges, and dredging. Local climate change-induced impacts to marine and coastal habitats and associated biotic assemblages, such as sea-level rise or physiological stress from ocean acidification, are likely to be incremental and may be difficult to discern at short time scales (less than 5 years) from effects of other actions such as urban development, fishing, mariculture, shipping and vessel discharges, point and non-point sources of pollution, and dredging. Implementation of the No Action Alternative would not meaningfully reduce ongoing impacts to coastal habitats and associated biotic assemblages when compared to the Proposed Action.

3.4 **MARINE MAMMALS AND SEA TURTLES**

3.4.1 **Affected Environment**

There are approximately 30 species of marine mammals known to occur in Oregon waters including 7 baleen whale species, 16 toothed whale and dolphin species, and 6 species of seals and sea lions, 10 of which are listed under the ESA. Three ESA-listed species of sea turtles may occur in waters offshore Oregon. Detailed species descriptions, including State, habitat ranges, population trends, predator/prey interactions, and species-specific threats are described in the U.S. Pacific Marine Mammal Stock Assessments (Carretta et al. 2023) and sea turtle status reviews (Seminoff et al. 2015; NMFS and USFWS 2020a; 2020b). These documents are incorporated by reference. Table 3-4 lists the protected species likely to occur in the Project Area, and Figure 3-4 shows critical habitat and biologically important areas that occur in the Project Area.

The Proposed Action Area includes the Brookings and Coos Bay WEAs, potential cable routes, and vessel transit routes to and from the ports.

Species that are unlikely to be present in the Proposed Action Area—due to their location outside of the species' current and expected range of normal occurrence—will not be considered further in this document. The loggerhead sea turtle (*Caretta caretta*), olive ridley sea turtle (*Lepidochelys olivacea*), and green sea turtle (*Chelonia mydas*) are considered tropical, subtropical, and warm temperate species and rarely stray into cold waters. If these species were found in the Proposed Action Area, they would likely become cold stressed in the environment to the point of stranding or death and therefore are not carried forward for further analysis.

Table 3-4: Protected Marine Mammals and Sea Turtles Likely to Occur in the WEAs

a. Baleen Whales

Common Name	Scientific Name	Stock	ESA/MMPA Status	Occurrence
Blue whale[1]	*Balaenoptera musculus*	Eastern North Pacific	Endangered/Depleted	Late summer and fall
Fin whale[1]	*Balaenoptera physalus*	California, Oregon, and Washington	Endangered/Depleted	Year-round
Sei whale[1]	*Balaenoptera borealis*	Eastern North Pacific	Endangered/Depleted	Year-round
Humpback whale	*Megaptera novaeangliae*	California, Oregon, and Washington (Central American DPS and Mexico DPS)	Endangered/Threatened	Spring to fall, subset year-round
North Pacific gray whale[1]	*Eschrichtius robustus*	Eastern North Pacific	-	Oct–Jan and March–May
North Pacific right whale	*Eubalaena japonica*	Eastern North Pacific	Endangered/Depleted	Uncommon
Minke whale[1]	*Balaenoptera acutorostrata*	California, Oregon, and Washington	-	Year-round

b. Toothed and Beaked Whales

Common Name	Scientific Name	Stock	ESA/MMPA Status	Occurrence
Sperm whale[1]	*Physeter macrocephalus*	California, Oregon, and Washington	Endangered/Depleted	Year-round
Killer whale	*Orcinus orca*	Eastern North Pacific Transient/ West Coast Transient[2]	-	Sporadic
Killer whale – southern resident	*Orcinus orca*	Southern Resident	Endangered	Year-round
Baird's beaked whale	*Berardius bairdii*	California, Oregon, and Washington	-	Year-round
Cuvier's beaked whale	*Ziphius cavirostris*	California, Oregon, and Washington	-	Year-round
Mesoplodont beaked whales	*Mesoplodon spp.*	California, Oregon, and Washington	-	Year-round
Short-finned pilot whale	*Globicephala macrorhynchus*	Mexico DPS	-	Year-round low numbers

Common Name	Scientific Name	Stock	ESA/MMPA Status	Occurrence
Northern right whale dolphin	*Lissodelphis borealis*	Central America DPS	-	Year-round
Risso's dolphin	*Grampus griseus*	California, Oregon, and Washington	-	Year-round
Short-beaked common dolphin	*Delphinus delphis*	California, Oregon, and Washington	-	Year-round
Pacific white-sided dolphin	*Lagenorhynchus obliquidens*	California, Oregon, and Washington	-	Year-round
Dall's porpoise	*Phocoenoides dalli*	California, Oregon, and Washington	-	Year-round
Harbor porpoise	*Phocoena phocoena*	Northern California/Southern Oregon stock	-	Late spring to early fall off Southern OR

c. Sea Lions and Seals

Common Name	Scientific Name	Stock	ESA/MMPA Status	Occurrence
Steller sea lion	*Eumetopias jubatus*	Eastern DPS	Delisted with critical habitat	Year-round
Northern fur seal	*Callorhinus ursinus*	California	-	Year-round
California sea lion	*Zalophus californianus*	U.S. Stock	-	Year-round
Northern elephant seal	*Mirounga angustirostris*	California	-	Year-round
Harbor seal	*Phoca vitulina richardsi*	California	-	Year-round
Guadalupe fur seal[3]	*Arctocephalus townsendi*	Throughout its range	Threatened	Spring/summer, seasonal low numbers

d. Sea Turtles

Common Name	Scientific Name	Stock	ESA/MMPA Status	Occurrence
Leatherback sea turtle	*Dermochelys coriacea*	Throughout range	Endangered	June–Oct; limited sightings
Green sea turtles	*Chelonia mydas*	East Pacific DPS	Threatened	Extralimital
Loggerhead sea turtle	*Caretta caretta*	North Pacific DPS	Endangered	Limited occurrence possible in summer–fall
Olive ridley sea turtle	*Lepidochelys olivacea*	Breeding colony populations on the Pacific coast of Mexico	Endangered	Expected during warming events, like El Niño
Olive ridley sea turtle	*Lepidochelys olivacea*	Wherever found, except where listed as Endangered	Threatened	Expected during warming events, like El Niño

1 Critical habitat has not been designated for these ESA-listed species.

2 The Alaska Stock Assessment Report contains assessments of all transient killer whale stocks in the Pacific and the Alaska Stock Assessment Report refers to this same stock as the "West Coast Transient" stock

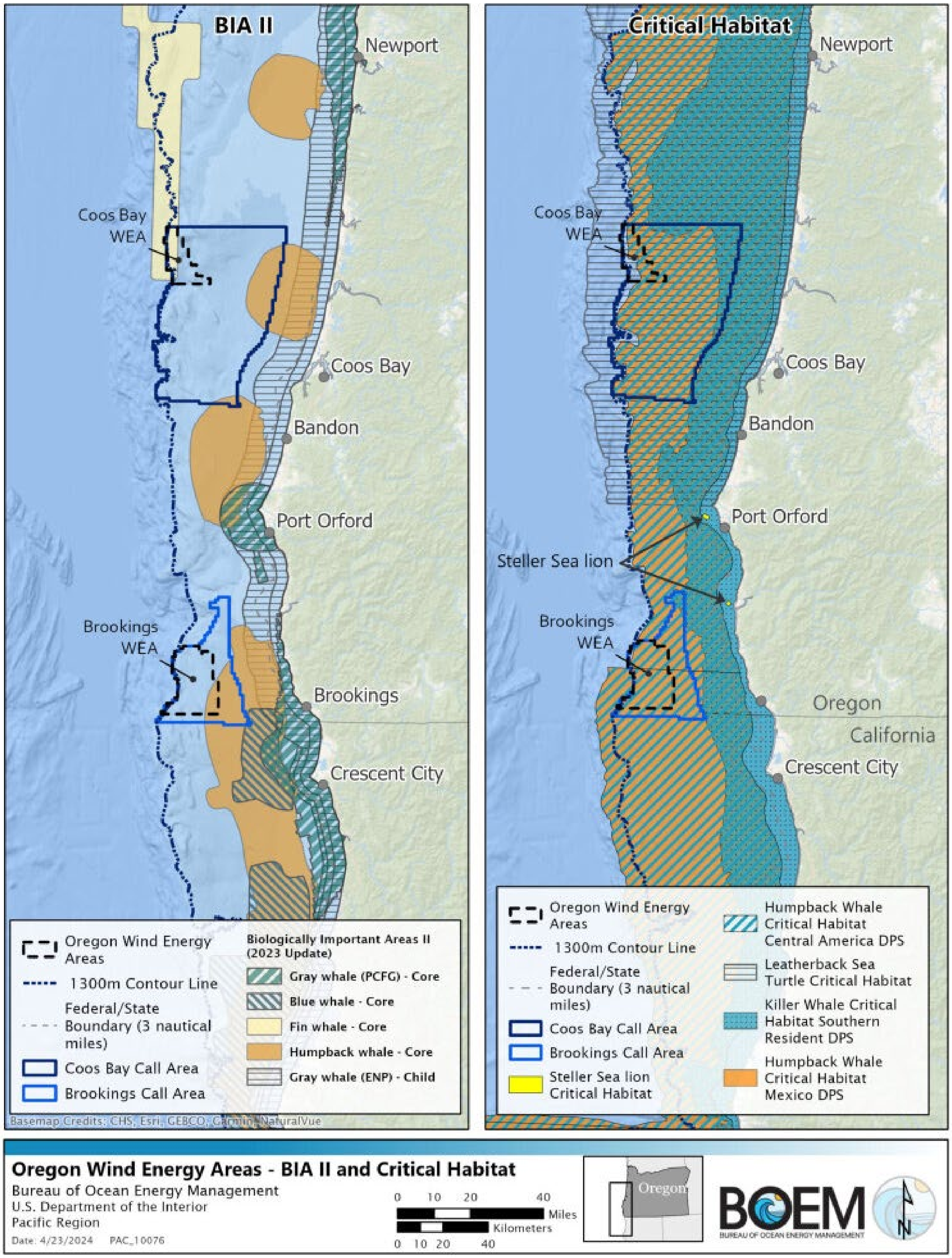


Figure 3-4 Critical Habitat, and Core Biologically Important Areas for Marine Mammals and Leatherback Sea Turtles Relative to Oregon WEAs

Source: Carretta et al. 2023; Calambokidis et al. 2024

3.4.2 Impacts of the Proposed Action

The potential impacts for marine mammals and sea turtles associated with the Proposed Action include noise from HRG and geotechnical surveys, the potential for collision with project-related vessels, and potential entanglement in mooring systems associated with the installation of a met buoy.

BOEM recommends lessees incorporate BMPs into their SAPs and COPs to minimize any potential impacts. These have been developed through years of conventional energy operations and refined through BOEM's renewable energy program and consultations with NMFS, including vessel strike avoidance BMPs, visual monitoring, and shutdown and reporting. These BMPs, which will minimize or eliminate potential effects from site assessment and site characterization activities to protected marine mammal and sea turtle species, are in Appendix D.

In compliance with Section 7 of the ESA, BOEM will consult with NMFS regarding the potential impacts of the Proposed Action to ESA-listed species. The analysis presented below will be reflected in the consultation with NMFS.

3.4.2.1 Vessel-based HRG Surveys

For a sound to affect marine species, it must be able to be heard by the animal. Effects on hearing ability or disturbance can result in impacts to important biological behaviors such as migration, feeding, resting, communication, and breeding. Baleen whales hear lower frequencies; sperm whales, beaked whales and dolphins hear mid-frequencies; porpoise hear high frequencies (Table 3-5); seals hear frequencies from 50 Hz to 86 kHz; sea lions hear frequencies from 60 Hz to 39 kHz (NMFS 2016; 2018). Sea turtles are low frequency hearing specialists with a range of maximum sensitivity between 100 and 800 Hz (Bartol and Ketten 2006; Bartol et al. 1999; Lenhardt 1994; 2002; Ridgway et al. 1969) (Table 3-5).

The assessment of potential hearing effects in marine mammals is based on NMFS' technical guidance for assessing acoustic impacts, defined as Permanent Threshold Shift (PTS) and Temporary Threshold Shift (TTS) (NMFS 2018) (Table 3-5). PTS results in permanent hearing loss while TTS is a temporary loss in hearing function related to the exposure level and durations. The methodology developed by the U.S. Navy is currently thought to be the best available data to evaluate the effects of exposure to survey noise by sea turtles that could result in physical effects (NMFS 2021; U.S. Navy 2017) (Table 3-5).

Table 3-5: Impulsive Acoustic Thresholds Identifying the Onset of PTS and TTS for Marine Mammals and Sea Turtle Species

Hearing Group	Generalized Hearing Range	Permanent Threshold Shift Onset	Temporary Threshold Shift Onset
Low frequency (e.g., Baleen Whales)	7 Hz to 35 kHz	219 dB Peak 183 dB cSEL	213 dB Peak 179 dB cSEL
Mid-frequency (e.g., Dolphins and Sperm Whales)	150 Hz to 160 kHz	230 dB Peak 185 dB cSEL	224 dB Peak 178 dB cSEL
High frequency (e.g., Porpoise)	275 Hz to 160 kHz	202 dB Peak 155 dB cSEL	148 dB Peak 153 dB cSEL
Phocid pinnipeds (True Seals) (underwater)	50 Hz to 86 kHz	218 dB Peak 185 dB cSEL	212 dB Peak 181 dB cSEL

Hearing Group	Generalized Hearing Range	Permanent Threshold Shift Onset	Temporary Threshold Shift Onset
Otariid pinnipeds (Sea Lions and Fur Seals)	60 Hz to 39 kHz	232 dB Peak 203 dB cSEL	226 dB Peak 199 dB cSEL
Sea Turtles	30 Hz to 2 kHz	230 dB Peak 204 dB cSEL	226 dB Peak 189 dB cSEL

cSEL = cumulative sound exposure level dB = decibels Hz = hertz kHz = kilohertz

Sources: mammals: NMFS (2018); sea turtles: U.S. Navy (2017)

Source levels and frequencies of HRG equipment were measured under controlled conditions and represent the best available information for HRG sources (Crocker and Fratantonio 2016). Using 19 HRG source levels (excluding side-scan sonars operating at frequencies greater than 180 kHz, and other equipment that is unlikely to be used for data collection/site characterization surveys associated with offshore renewable energy) with NOAA's sound exposure spreadsheet and HRG Level B calculator tools, injury (PTS) and disturbance ranges were calculated for listed species. To provide the maximum impact scenarios, the highest power levels and most sensitive frequency setting for each hearing group were used. A geometric spreading model, together with calculations of absorption of high frequency acoustic energy in sea water, when appropriate, was used to estimate injury and disturbance distances for listed marine mammals. The spreadsheet and geometric spreading models do not consider the tow depth and directionality of the sources; therefore, these are likely overestimates of actual injury and disturbance distances. All sources were analyzed at a tow speed of 2.315 m/s (4.5 kn), based on the same activities in the Atlantic (Baker and Howson 2021).

Using physical criteria about various HRG sources, such as source level, transmission frequency, directionality, beamwidth, and pulse repetition rate, Ruppel et al. (2022) divided marine acoustic sources into four tiers that could inform regulatory evaluation. Tier 4 includes most high resolution geophysical, oceanographic, and communication/tracking sources, which are considered unlikely to result in incidental take of marine mammals and therefore termed *de minimis.* The majority of acoustic sources under this Proposed Action fall into this *de minimis* category, as evidenced in the analysis below. Best Management Practices (Appendix D) are therefore applicable to only those acoustic sources that are shown to present a risk of disturbance to protected species, i.e., CHIRP sub-bottom profilers, boomers, sparkers, and MBES operating below 160 kHz.

<u>Potential for injury</u>: For marine mammal species expected to occur in the Proposed Action Area, PTS distances are generally small ranging from 0 to 47 m (0 to 154 ft). The largest possible PTS distance is 251.4 m (825 ft) for porpoise species, only when the 100 kHz multibeam echosounder is used (Table 3-6). However, this range is likely an overestimate since it assumes the unit is operated in full power mode and that it is an omnidirectional source. Additionally, the range does not take the absorption of sound over distance into account.

PTS exposure thresholds (calculated for 204 cSEL and 23 dB peak criteria) (U.S. Navy 2017) are higher for sea turtles than for marine mammals. Based on the PTS exposure thresholds for sea turtles, HRG sound source levels are not likely to result in PTS. The predicted distances from these mobile sound sources indicate the sound sources are transitory and have no risk of exposure to levels of noise that could result in PTS for sea turtles (NMFS 2021).

Table 3-6: Permanent Threshold Shift Exposure Distances (in Meters) for Marine Mammal Hearing Groups from Mobile HRG Sources Towed at 4.5 Knots

a. mobile, impulsive, intermittent sources

HRG Source	Highest Source Level (dB re 1 µPa)	Low Frequency (e.g., Baleen Whales)[1]	Mid-Frequency (e.g., Dolphins, Sperm Whales)[1]	High Frequency (e.g., Porpoise)	Phocids (True Seals)	Otariids (Sea Lions, Fur Seals)	Sea Turtles
Boomers, Bubble Guns (4.3 kHz)	176 dB SEL, 207 dB RMS, 216 peak	0.3	0	5	0.2	0	0
Sparkers (2.7 kHz)	188 dB SEL, 214 dB RMS, 115 peak	12.7	0.2	47.3	6.4	0.1	0
CHIRP Sub-Bottom Profilers (5.7 kHz)	193 dB SEL, 209 dB RMS, 214 peak	1.2	0.3	35.2	0.9	0	NA

b. mobile, non-impulsive, intermittent sources

Mobile, Impulsive, Intermittent HRG Sources	Highest Source Level (dB re 1 µPa)	Low Frequency (e.g., Baleen Whales)[1]	Mid-Frequency (e.g., Dolphins, Sperm Whales)[1]	High Frequency (e.g., Porpoise)	Phocids (True Seals)	Otariids (Sea Lions, Fur Seals)	Sea Turtles
Multibeam echosounder (100 kHz)	185 dB SEL, 224 dB RMS, 228 peak	0	0.5	251.4*	0	0	NA
Multibeam echosounder (>200 kHz)	182 dB SEL, 218 dB RMS, 223 peak	NA	NA	NA	NA	NA	NA
Side-scan sonar (>200 kHz)	184 dB SEL, 220 dB RMS, 226 peak	NA	NA	NA	NA	NA	NA

[1] PTS injury distances for listed marine mammals were calculated with NOAA's sound exposure spreadsheet tool using sound source characteristics for HRG sources in Crocker and Fratantonio (2016).

* This range is conservative as it assumes full power, an omnidirectional source, and does not consider absorption over distance.

NA = not applicable due to the sound source being out of the hearing range for the group

RMS = root mean square SEL = sound exposure level

Potential for disturbance: Using the same sound sources as for the PTS analysis, the disturbance distances to 160 dB re 1 µPa RMS for marine mammals and 175 dB re 1 µPa RMS for sea turtles were calculated using a spherical spreading model (20 LogR). These results describe maximum disturbance exposures for protected species to each potential sound source (Table 3-7).

The disturbance distances depend on the equipment and the species present. The range of disturbance distances for all protected species expected to occur in the Proposed Action Area is from 40 to 502 m

(131 to 1,647 ft), with sparkers producing the upper limit of this range. Disturbance distances to protected species are conservative, as explained above, and any behavioral effects will be intermittent and short in duration.

Table 3-7: Maximum Disturbance Distances (in Meters) for Marine Mammal Hearing Groups from Mobile HRG Sources Towed at 4.5 Knots

a. mobile, impulsive, intermittent sources

HRG Source	Low Frequency (e.g., Baleen Whales)[1]	Mid-Frequency (e.g., Dolphins and Sperm Whales)[1]	High Frequency (e.g., Porpoise)	Phocids (True Seals)	Otariids (Sea Lions and Fur Seals)	Sea Turtles
Boomers, Bubble Guns (4.3 kHz)	**224**	**224**	**224**	**224**	**224**	**40**
Sparkers (2.7 kHz)	**502**	**502**	**502**	**502**	**502**	**90**
CHIRP Sub-Bottom Profilers (5.7 kHz)	**282**	**282**	**282**	**282**	**282**	**50**

b. mobile, non-impulsive, intermittent sources

Mobile, Impulsive, Intermittent HRG Sources	Low Frequency (e.g., Baleen Whales)[1]	Mid-Frequency (e.g., Dolphins and Sperm Whales)[1]	High Frequency (e.g., Porpoise)	Phocids (True Seals)	Otariids (Sea Lions and Fur Seals)	Sea Turtles
Multibeam echosounder (100 kHz)		**370**	**370**	**NA**	**NA**	**NA**
Multibeam echosounder (>200 kHz)	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
Side-scan sonar (>200 kHz)	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

[1] Disturbance distances for listed marine mammals were calculated with NOAA's [Associated Level B Harassment Isopleth Calculator] using sound source characteristics for HRG sources in Crocker and Fratantonio (2016).

NA = not applicable due to the sound source being out of the hearing range for the group.

3.4.2.2 AUV-based HRG Surveys

Instead of mounted on vessel hulls, or towed behind vessels, HRG equipment may be deployed on AUVs to conduct site characterization surveys. These surveys may or may not make use of underwater transponder positioning (UTP) systems. UTP systems include an array of transponders placed temporarily on the seabed that communicate with AUVs to improve positioning accuracy. Typical AUV and UTP specifications are described in Appendix F. Level B disturbance is expected within 45-48 m of the AUV and UTP for marine mammals and within 9 m for sea turtles. Since the AUVs and UTPs are used intermittently for a few seconds at a time, impacts to marine mammals and sea turtles from UTPs are expected to be discountable.

3.4.2.3 Geotechnical Surveys

Geotechnical surveys (vibracores, piston cores, gravity cores) related to offshore renewable energy activities are typically numerous, but brief, sampling activities that introduce relatively low levels of sound into the environment. General vessel noise is produced from vessel engines and dynamic positioning to keep the vessel stationary while equipment is deployed, and sampling is conducted. Recent analyses of the potential impacts to protected species exposed to noise generated during geotechnical survey activities determined that effects to protected species from exposure to this noise source are extremely unlikely to occur (NMFS 2021).

3.4.2.4 Project-related Vessel Traffic

Vessel strikes pose a threat to the West Pacific population of leatherback sea turtles. Of leatherback strandings documented in central California between 1981 and 2016, 11 were determined to be the result of vessel strikes (7.3% of total; NMFS unpublished data). The range of the West Pacific population overlaps with many high-density vessel traffic areas, and it is possible that the vast majority of vessel strikes are undocumented. However, information on leatherback vessel strikes for other locations is not available (NMFS and USFWS 2020a). While some risk of a vessel strike exists for large whales in all the U.S. West Coast waters, 74% of blue whale, 82% of humpback whale, and 65% of fin whale known vessel strike mortalities occur in the shipping lanes in the southern California Bight and outside the San Francisco Bay Area, with less than 1% of total mortality for all species occurring in Oregon waters (Rockwood et al. 2017).

The number of vessel trips for surveys within the Proposed Action Area is a conservative estimate (Table 2-4), meaning that BOEM included a higher number of trips than likely in its estimate. If future consultation with NMFS, U.S. Fish and Wildlife Service (USFWS), or other State or Federal agency results in vessel speed requirements, BOEM will work with the Oregon Department of Land Conservation and Development (DLCD) staff to ensure that any new requirements remain consistent and do not diminish the level of resource protection provided by this requirement.

Best Management Practices for Vessel Strike Avoidance and Injured/Dead Protected Species Reporting (Appendix D) are meant to minimize the risk of vessel strikes to protected species. These include

- immediate operator reporting of a vessel strike of any ESA-listed marine animal;
- reporting observations of injured or dead protected species;
- having qualified PSOs on board (or dedicated crew) to monitor a vessel strike avoidance zone for protected species;
- steering a course away from any whale detected within 500 m of the forward path of any vessel; or stopping the vessel to avoid striking protected species.

If a sea turtle is sighted within the operating vessel’s forward path, the vessel operator must slow down to 6 kn (unless unsafe to do so) and steer away as possible. Crews must report sightings of any injured or dead protected species (marine mammals and sea turtles) immediately, regardless of whether the injury or death is caused by their vessel, to the West Coast Stranding Hotline. In addition, if it was the operator’s vessel that collided with a protected species, the Bureau of Safety and Environmental Enforcement (BSEE) must be notified within 24 hours of the strike. Lessees will also be directed to NMFS’ Marine Life Viewing Guidelines, which highlight the importance of these BMPs for avoiding impacts to mother/calf pairs (https://www.fisheries.noaa.gov/topic/marine-life-viewing-guidelines#guidelines-&-distances).

Additionally, wherever available, lessees will ensure all vessel operators check for daily information regarding protected species sighting locations. These media may include, but are not limited to: Channel 16 broadcasts, whalesafe.com, and the Whale/Ocean Alert App.

Although the project-related vessel traffic would increase the overall vessel traffic and risk of collision with protected marine mammal and sea turtle species in the Proposed Action Area, vessels associated with vessel strikes on the U.S. West Coast do not have mandated vessel strike avoidance protocols. BOEM's BMPs align with recommended types of enhanced conservation measures to decrease ship strike mortality (Rockwood et al. 2017). Similar activities have taken place since at least 2012 in association with BOEM's renewable energy program in the Atlantic OCS, following similar BMPs, and there have been no reports of any vessel strikes of marine mammals and sea turtles. BOEM believes that impacts to protected species from vessel interactions will be negligible because of vessel strike avoidance BMPs, as well as reporting requirements (Appendix D).

3.4.2.5 Entanglement or Entrapment

Most entanglements are never observed, but there are many cases of entangled whales with unidentified gear (International Whaling Commission 2016). There are reports of large whales (including humpback, right, and fin whales) interacting with anchor moorings of yachts and other vessels, towing small yachts from their moorings or becoming entangled in anchor chains, sometimes with lethal consequences (Benjamins et al. 2014; Harnois et al. 2015; Love 2013; Richards 2012; Saez et al. 2021). Animals may swim into moorings accidentally or actively seek out anchor chains or boats as a surface to scratch against (Benjamins et al. 2014).

Reviews of entanglements of large whales and sea turtles have resulted in recommendations to reduce the risk of entangling animals (International Whaling Commission 2016), some of which are practicable for marine industries in general. General recommendations to reduce entanglement risks include reduced number of buoy lines and no floating lines at the surface, which have a high risk of interacting with turtles and whales that spend a good deal of time at the surface of the water. Other recommendations include reducing the amount of slack in line, and using sinking lines, rubber-coated lines, sheaths, chains, acoustic releases, weak links, and other potential solutions to lower entanglement risk.

Including the multiple met buoys deployed along the Northeast Atlantic coast associated with site assessment activities and PNNL's LiDAR buoys in California, no incidents of entanglement have been reported to date. BOEM continues to work with lessees and requires the use of the best available mooring systems, using the shortest practicable line lengths, anchors, chain, cable, or coated rope systems, to prevent or reduce to discountable levels any potential entanglement of marine mammals and sea turtles. BOEM reviews each buoy design to ensure that reasonable low risk mooring designs are used. Potential impacts on protected marine mammal species from entanglement related to buoy operations are thus expected to be discountable.

Lost or derelict fishing gear may become entangled in the met buoy lines and present an entanglement risk to protected species. Approximately twelve met buoys total for the two lease areas may be deployed as part of the Proposed Action. From 1982 to 2017, direct entanglements in fishing gear were most attributed to unidentifiable gear, netting, and pot/traps (Saez et al. 2021). Changes in gillnet fishing regulations helped address the 1980s increase, which was primarily gray whales entangled with gillnets (Saez et al. 2021). Considering the general inshore deployment (~200 ft water depth) and weight of pot traps, it is unlikely that these will be moved in such a way as to become entangled in met buoy lines and present an entanglement risk to protected species. Risk of secondary entanglement related to buoy deployment and operations are thus expected to be discountable.

Any potential displacement of fishing effort, as a result of leasing and site characterization and site assessment activities, are described in section 3.7 and are expected to be limited in spatial scope, considering existing fishing grounds, and short-term. Entanglement impacts to marine mammals and sea turtles, as a result of displaced fishing effort, are expected to be discountable.

Moon pool usage presents a potential for marine mammals and sea turtles to become entrapped. Although moon pools have not been proposed for use offshore Oregon, they may be used to deploy and/or retrieve AUVs. There is no known record of entrapment of protected species in the moon pools in the Pacific. The limited occurrence of sea turtles in Oregon waters, as well as BOEM's BMPs described in Appendix D, reduce the potential impact from moon pools to discountable levels.

3.4.2.6 Impacts to Critical Habitat

Effective May 21, 2021, NMFS issued an updated final rule to designate critical habitat for the endangered Central America DPS and the threatened Mexico DPS of humpback whales (NMFS 2021). Critical habitat for these DPSs serve as feeding habitat and contain the essential biological feature of humpback whale prey. Critical habitat for the Central America DPS of humpback whales contains approximately 48,521 nmi^2 of marine habitat in the North Pacific Ocean within the portions of the California Current Ecosystem off the coasts of Washington, Oregon, and California. Specific areas designated as critical habitat for the Mexico DPS of humpback whales contain approximately 116,098 nmi^2 of marine habitat in the North Pacific Ocean, including areas within portions of the eastern Bering Sea, Gulf of Alaska, and California Current Ecosystem. The Oregon WEAs overlap with offshore portions of humpback whale critical habitat where, if humpback whales are present, they are generally present in lower numbers compared to the core feeding areas in shallower water closer to shore (Calambokidis 2022, pers. Comm.; Figure 3-4). Any displacement of prey species as a result of vessel transits and surveys conducted as part of the Proposed Action is anticipated to be short-term and temporary and is not anticipated to destroy or adversely modify critical habitat.

The Eastern U.S. stock of Steller sea lions is not listed under the ESA (78 FR 66140) and is not considered depleted under the MMPA. NMFS is currently reviewing existing Steller sea lion critical habitat to consider any new and pertinent sources of information since the 1993 designation, including the delisting of the eastern DPS. Rookeries at Long Brown Rock, Seal Rock, and Pyramid Rock offshore Port Orford and Gold Beach, respectively, are still designated as critical habitat for Steller sea lions (59 FR 30715). The Proposed Action is anticipated to be short-term and temporary and is not expected to restrict access to or use of these rookeries, nor destroy or adversely modify critical habitat.

Critical habitat (feeding) for leatherback sea turtles stretches along the California coast from Point Arena to Point Arguello east of the 3,000-meter depth contour; and 25,004 mi^2 (64,760 km^2) stretching from Cape Flattery, Washington to Cape Blanco, Oregon east of the 2,000-m depth contour. The Coos Bay WEA overlaps with a small portion of critical habitat for leatherback sea turtles (Figure 3-4). Very few leatherback sightings have been made in the vicinity of the WEA (NMFS 2012) and any displacement of prey species due to vessel transits and surveys conducted as part of the Proposed Action are anticipated to be short-term and temporary and are not anticipated to destroy or adversely modify critical habitat.

Conclusion

BOEM places stipulations in leases that protect the environment during the proposed activities, including stipulations resulting from consultations required under other Federal statutes (Appendix D). Due to these stipulations and the nature of the proposed activities, the impacts to critical habitat and protected marine mammal and sea turtle species from site assessment and site characterization activities related to noise from HRG and geotechnical surveys, collisions with project-related vessels, and entanglement in met buoy moorings are anticipated to be **negligible**.

BOEM will evaluate actual HRG survey equipment proposed for use when any future survey plan is submitted in support of any site characterization activities that may occur in the WEAs, and BOEM will continue to reevaluate the BMPs as new information becomes available.

The incremental impacts under the Proposed Action as a result of the above-mentioned individual IPFs will result in **negligible** impacts for marine mammals and sea turtles and do not add significantly to impacts from ongoing and planned actions, which are expected to be several times greater than the incremental impacts of the Proposed Action alone.

3.4.3 No Action Alternative

Marine mammals and sea turtles in the Proposed Action Area are subject to a variety of ongoing anthropogenic impacts that overlap with the Proposed Action including collisions with vessels (ship strikes), entanglement, fisheries bycatch, anthropogenic noise, disturbance of marine and coastal environments, effects on benthic habitat, and climate change (Carretta et al. 2023; NMFS and USFWS 2020a; 2020b). Climate change has the potential to impact the distribution and abundance of marine mammal prey due to changing water temperatures, ocean currents, and increased acidity (Meyer-Gutbrod et al. 2021; Sydeman et al. 2015). Additionally, bottom trawling and benthic disruption have the potential to result in impacts on prey availability and distribution.

Under this alternative, commercial leases and grants would not be issued in the Oregon WEAs and the negligible to minor impacts to marine mammals and sea turtles from the Proposed Action will not occur. However, BOEM expects ongoing activities and planned actions to have continuing regional impacts on marine mammal and sea turtle species over the timeframe considered in this EA.

3.5 COASTAL AND MARINE BIRDS

3.5.1 Affected Environment

The marine and coastal bird population off southern Oregon is both diverse and complex, being composed of as many as 170 species (eBird 2023). Of the many different types of birds that occur in this area, three groups are generally the most sensitive to the potential impacts of the Proposed Action: marine birds (e.g., grebes, alcids, gulls, terns, loons, albatrosses, storm-petrels, shearwaters, and cormorants), waterfowl (geese and ducks), and shorebirds (e.g., plovers and sandpipers). While some of these species breed in the area, others may spend their non-breeding or “wintering” period in the area or may simply pass through during migration. This analysis considers the Coos Bay and Brookings regions and their shorelines, the offshore cable routes, and WEAs.

Several bird species that have the potential to occur within the Proposed Action Area are protected by the State and/or Federal governments due to declining populations and/or habitats. In addition, all native birds within the area are protected by the Migratory Bird Treaty Act of 1918, which is enforced by the USFWS. Special-status marine and coastal bird species found within the vicinity of the proposed activities are in Table 3-8.

Table 3-8: Special-Status Marine and Coastal Birds Within or Near the Proposed Action Area

Common Name	Scientific Name	Federal Status	State Status
Brant	*Branta bernicla*	-	OSS
Harlequin Duck	*Histrionicus histrionicus*	-	OSS
Black Oystercatcher	*Haematopus bachmani*	BCC	OSS
Western Snowy Plover	*Charadrius nivosus nivosus*	T, BCC	T
Marbled Godwit	*Limosa fedoa*	BCC	-

Common Name	Scientific Name	Federal Status	State Status
Red Knot	*Calidris canutus*	BCC	-
Rock Sandpiper	*Calidris ptilocnemis*	-	OSS
Lesser Yellowlegs	*Tringa flavipes*	BCC	-
Willet	*Tringa semipalmata*	BCC	-
Marbled Murrelet	*Brachyramphus marmoratus*	T	E
Scripps's Murrelet	*Synthliboramphus scrippsi*	BCC	-
Ancient Murrelet	*Synthliboramphus antiquus*	BCC	-
Cassin's Auklet	*Ptychoramphus aleuticus*	BCC	-
Tufted Puffin	*Fratercula cirrhata*	BCC	OSS-C
Western Gull	*Larus occidentalis*	BCC	-
California Least Tern	*Sternula antillarum browni*	E	E
Caspian Tern	*Hydroprogne caspia*	-	OSS
Laysan Albatross	*Phoebastria immutabilis*	BCC	-
Black-footed Albatross	*Phoebastria nigripes*	BCC	-
Short-tailed Albatross	*Phoebastria albatrus*	E	E
Fork-tailed Storm-Petrel	*Hydrobates furcatus*	-	OSS
Leach's Storm-Petrel	*Hydrobates leucorhous*	-	OSS
Murphy's Petrel	*Pterodroma ultima*	BCC	-
Hawaiian Petrel	*Pterodroma sandwichensis*	E	-
Cook's Petrel	*Pterodroma cookii*	BCC	-
Buller's Shearwater	*Ardenna bulleri*	BCC	-
Pink-footed Shearwater	*Ardenna creatopus*	BCC	-
Brandt's Cormorant	*Urile penicillatus*	BCC	-
Brown Pelican	*Pelecanus occidentalis*	DE	E

Status: E = Endangered T = Threatened DE = Delisted (formerly Endangered) C = Candidate
BCC = Bird of Conservation Concern OSS = Oregon Sensitive Species OSS-C = OSS–Critical

3.5.2 Impacts of the Proposed Action

This section discusses the potential impacts of routine events associated with the preferred alternative on marine and coastal birds. IPFs for marine and coastal birds include (1) active acoustic sound sources, (2) vessel and equipment noise and vessel traffic, (3) underwater noise, (4) vessel attraction, (5) disturbance to nesting or roosting, (6) disturbance to feeding or modified prey abundance, (7) aircraft traffic and noise from surveys, (8) met buoys, (9) trash and debris, and (10) accidental fuel spills.

Active Acoustic Sound Sources

The primary potential for impact to marine and coastal birds from active acoustic sound sources is to marine birds and waterfowl that dive below the water surface and are exposed to underwater noise (Turnpenny and Nedwell 1994), including the Marbled Murrelet as well as other alcids, loons, cormorants, storm-petrels, shearwaters, petrels, grebes, and sea ducks. Among the threatened and endangered species, Western Snowy Plovers are shorebirds that are unlikely to come into contact with HRG surveys. Marbled Murrelets are more likely to come into contact with HRG surveys, as they forage offshore and feed by diving. The Short-tailed Albatross and Hawaiian Petrel may occur in the area but generally feed by snatching prey from the sea surface. Only those species that dive are at risk of exposure to active acoustic sound sources since pulses are directed downward and are highly attenuated near the surface. In addition, active acoustic sound sources such as side-scan sonar and sub-bottom profilers are highly directive (e.g., downward, toward the seafloor), with beam widths as narrow as a few degrees; this directivity and narrow beam width also diminishes the risk to bird species other than diving species. Because of these factors, other species of seabirds, waterfowl, and shorebirds would not be affected by active acoustic sound sources and are not discussed further for this IPF.

Birds have a relatively restricted hearing range for airborne noise, from a few hundred hertz to about 10 kHz (Dooling et al. 2000). Data regarding bird hearing range for underwater noise is limited; however, a recent study using psychophysics found that Great Cormorants (*Phalacrocorax carbo*) learned to detect the presence or absence of a tone while submerged (Hansen et al. 2017). The greatest sensitivity was found at 2 kHz, with an underwater hearing threshold of 71 dB re 1 µPa RMS. The hearing thresholds are comparable to seals and toothed whales in the frequency band 1–4 kHz, which suggests that cormorants and other aquatic birds make special adaptations for underwater hearing and make use of underwater acoustic cues (Hansen et al. 2017).

Active acoustic sound sources usually have one or two (sometimes three) main operating frequencies. The frequency ranges for representative sources are 100 and 400 kHz for the side-scan sonar; 3.5, 12, and 200 kHz for the chirp sub-bottom profiler; and 240 kHz for the multibeam depth sounder. The low frequency underwater noise generated by several types of survey equipment (e.g., sub-bottom profilers) would fall within the airborne hearing range of birds, whereas noise generated by other types of survey equipment (e.g., side-scan sonar, depth sounders) is outside of their airborne hearing range, which may be more limited underwater, and should be inaudible to birds.

Some marine birds and waterfowl, including gulls, terns, pelicans, and sea ducks, either rest on the water surface or shallow-dive for only short durations. Most of these birds would be resting on the water surface in the area surrounding survey vessels or would be dispersed; therefore, they would not come into contact with the active acoustic sounds. However, those birds that shallow-dive could come into contact with active acoustic sounds, with the majority of the sound energy directed toward the seafloor. Therefore, the energy level that these diving birds could be exposed to would be for such a short time and have a lower sound energy that it would result in a negligible impact.

Diving marine birds and waterfowl such as alcids, loons, cormorants, storm-petrels, shearwaters, petrels, grebes, and sea ducks could be susceptible to active acoustic sounds generated from survey equipment, especially those species that would likely dive, rather than fly away from a vessel (e.g., grebes, loons, alcids, and some diving ducks). However, seismic pulses are directed downward and highly attenuated near the surface; therefore, there is only limited potential for direct impact from the low frequency noise associated with active acoustic sound sources to affect diving birds. In addition, active acoustic sound sources such as side-scan sonar and sub-bottom profilers are highly directive, with beam widths as narrow as a few degrees or narrower; the ramifications of this directionality include a lower risk of high-level exposure to diving birds that may forage close to (but lateral to) a survey vessel.

Investigations into the effects of acoustic sound sources on seabirds are extremely limited, however studies performed by Stemp (1985) and Lacroix et al. (2003) did not observe any mortality to the several species of seabirds studied when exposed to seismic survey noise; further, they did not observe any differences in distribution or abundance of those same species as a result of HRG survey activity. Based on the directionality of the sound and the low frequency equipment used for HRG surveys, it is expected that there would be no mortality or life-threatening injury and little disruption of behavioral patterns or other non-injurious effects of any diving marine birds or waterfowl from this acoustic impact, resulting in a negligible impact.

Vessel and Equipment Noise and Vessel Traffic

The primary potential impacts to marine and coastal birds from vessel traffic and noise are from underwater vessel and equipment noise, attraction to vessels and subsequent collision or entanglement, disturbance to nesting or roosting, and disturbance to feeding or modified prey abundance (Schwemmer et al. 2011). Since all survey activities are performed from vessels, with the exception of those conducted via aircraft, most survey activities have the potential to impact marine and coastal birds from vessel traffic and the associated vessel and equipment noise.

Underwater Noise

The sound generated from individual vessels can contribute to overall ambient noise levels in the marine environment on variable spatial scales. As stated above, birds have a relatively restricted hearing range, from a few hundred hertz to about 10 kHz (Dooling et al. 2000) for airborne noise, with few data available regarding bird hearing range for underwater noise. The survey vessels would contribute to the overall noise environment by transmitting noise through both air and water. Underwater noise produced by vessels is a combination of narrow-band (tonal) and broadband sound. Tones typically dominate up to about 50 Hz, whereas broadband sounds may extend to 100 kHz. According to Southall (2005) and Richardson et al. (1995), vessel noise typically falls within the range of 100–200 Hz. Noise levels dissipate quickly with distance from the vessel. The underwater noise generated from the survey vessels would dissipate prior to reaching the coastline and the shore/beach habitats of shorebirds, including the threatened Western Snowy Plover. Because of the dissipation of underwater noise from survey vessels prior to reaching the shore/beach habitat, it is expected that underwater noise would produce negligible impacts to shorebird species, including the Western Snowy Plover.

Some marine birds—including gulls, terns, pelicans, albatrosses, shearwaters, and petrels, as well as the endangered Short-tailed Albatross and Hawaiian Petrel—either rest on the water surface, skim the water surface, or shallow-dive for only short durations. Because of these behaviors, members of these families would not come in contact with underwater vessel and equipment noise generated from HRG survey vessels, or the contact would be for such a short time that it would result in little disruption of behavioral patterns or other non-injurious effects. Therefore, impacts to these marine birds (including the Short-tailed Albatross, and Hawaiian Petrel) from vessel and equipment noise would be negligible.

Diving marine birds and waterfowl—including the Marbled Murrelet as well as alcids, loons, grebes, cormorants, storm-petrels, shearwaters, petrels, and sea ducks—could be susceptible to underwater noise generated from HRG survey vessels and equipment. Site assessment-related surveys typically use a single vessel. This level of vessel activity per survey event is not a significant increase in the existing vessel and equipment noise, the vessels are typically moving at slow speeds, and noise levels dissipate quickly with distance from the vessel. Therefore, impacts of underwater noise from survey vessels to the Marbled Murrelet and other diving marine birds and waterfowl are expected to be negligible.

Vessel Attraction

A single vessel is typically involved in a site assessment-related survey. This level of vessel traffic is not a significant increase over existing vessel traffic in nearshore or offshore waters. In addition, vessels performing surveys are relatively slow moving (approximately 7.4–11.1 km/hr [0–6 kn]), which allows for marine and coastal birds to easily move out of the way of survey vessels.

The potential for bird strikes on a vessel is not expected to be significant to individual birds or their populations. However, a number of marine bird species, including members of the gulls, terns, albatrosses, storm-petrels, shearwaters, petrels, pelicans, and alcids, are generally attracted to offshore rigs and vessels. The attraction of some of these bird species is due to light attraction at night (Black 2005; Montevecchi 2006; Montevecchi et al. 1999; Wiese et al. 2001b). However, some birds engage in ship following as a foraging strategy, especially with commercial or recreational fishing vessels. In addition, in an open environment like the ocean, objects are easy to detect and birds locate vessels easily from long distances and approach to investigate. Bird mortality has been documented as a result of light-induced attraction and subsequent collision with vessels. Birds exhibiting this behavior are typically alcids and petrels, with bird strikes typically occurring at night and occasionally resulting in mortality (Black 2005). In addition, alcids may also dive to escape disturbance, increasing their potential for collision with a vessel or gear in the water. Vessels will have down-shielded lighting to minimize the potential light attraction of birds (typical mitigation measures are listed below and in Appendix D). However, even if Marbled Murrelets or other birds were attracted to the survey vessels or dove near a survey vessel, there is a very low potential for either vessel collision or entanglement, since the vessels are moving relatively slowly at less than 6 kn (< 11.1 km/hr) and the gear is towed from 1 to 3.5 m (3.3 to 11.5 ft) below the surface. There is no empirical evidence indicating that these types of marine and coastal birds could become entangled in HRG survey gear in spite of the potential for attraction to this gear. Given the low potential for collision or gear entanglement, the impacts are not expected to result in mortality or serious injury to individual birds and are therefore expected to have a negligible impact to these types of seabirds from vessel attraction.

Shorebirds including the Western Snowy Plover that reside along the shorelines are not known to be attracted to vessels. Therefore, there would not be any impacts to shorebirds from vessel attraction. The Short-tailed Albatross and Hawaiian Petrel are members of Family *Procellariidae*, which are highly pelagic, and could be attracted to survey vessels offshore. However, as discussed above for other pelagic bird families, there is a low potential of impact from vessel collision or gear entanglement; therefore, the impacts are expected to be negligible to individual birds and their populations, as the Short-tailed Albatross and Hawaiian Petrel are rarely present in the vicinity of the Oregon WEAs.

Disturbance to Nesting or Roosting

There is the potential for impact to marine and coastal birds from the potential disturbance of breeding colonies by airborne noise from vessels and equipment (Turnpenny and Nedwell 1994). Most marine and coastal bird species nest and roost along the shore and on coastal islands. Survey vessels for renewable energy projects are expected to make daily round trips to their shore base.

If a vessel approached too close to a breeding colony, vessels could cause a disturbance to breeding birds, with the potential to adversely affect egg and nestling mortality. Surveys would not occur close enough to land to affect marine and coastal bird breeding colonies during survey activities. However, survey vessels are anticipated to transit from a shore base to offshore and return daily. The expectation is that this daily vessel transit would occur at one of the shore bases identified or at other established ports, which have established transiting routes for ingress and egress in the coastal areas and existing vessel traffic. Because of this existing vessel traffic, it is not anticipated that marine and coastal birds would roost in adjacent areas, or if they did already roost nearby, the addition of survey vessels would not significantly increase the existing vessel traffic such that there would be any noticeable effect. In addition, noise generated from the survey vessels and equipment would typically dissipate prior to reaching the coastline and the nesting habitats of coastal birds. Impacts of airborne vessel and equipment noise to nesting or roosting marine and coastal birds would be negligible.

The Western Snowy Plover is a ground nester along the shoreline. As discussed above, these taxa are not expected to nest in areas that would be disturbed by survey vessels transiting from port to offshore or coastal locations; therefore, there would be no impact to the nesting of these taxa. The Marbled Murrelet breeds inland in coastal old-growth forests and will not be impacted at their nesting sites. Short-tailed Albatross and Hawaiian Petrel do not breed near the Proposed Action Area; therefore, these species would not experience nesting impacts from survey activities.

Disturbance to Feeding or Modified Prey Abundance

Marine and coastal birds require specialized habitat requirements for feeding (Kushlan et al. 2002). Survey vessel and equipment noise could cause pelagic bird species, including gulls, terns, jaegers, alcids, pelicans, storm-petrels, albatrosses, shearwaters, and petrels, to be disturbed by the survey vessel and equipment noise and relocate to alternative areas, which could result in a localized, temporary displacement and disruption of feeding. These alternative areas may not provide food sources (prey) or habitat requirements similar to that of the original (preferred) habitat and could result in additional energetic requirements expended by the birds and diminished foraging opportunity. However, it is expected that if these species temporarily moved out of the area it would be limited to a small portion of a bird's foraging range, and it would be unlikely that this temporary relocation would affect foraging success. Impacts to pelagic birds from disturbance associated with vessel and equipment noise would be negligible.

Coos Bay and the southern Oregon coastline are extremely important for transient shorebirds during both northbound and southbound migrations. Possible indirect impacts to marine and coastal birds from vessel and equipment noise may include relocation of some prey species, which is primarily linked to seasonality. During their annual migrations, a number of marine and coastal birds have specific stopover locations for species-specific foraging to accumulate fat reserves. Because of the noise produced from survey vessels, there is the potential for an indirect impact of modified prey abundance and distribution that migrating birds rely on for the accumulation of fat reserves to fuel their migration, which could result in additional energetic requirements for the migrating birds. However, it is unlikely that bird prey species would be affected by survey vessels to a level that would affect foraging success. As noted previously, surveys would not take place within coastal nearshore areas or within bays (e.g., Coos Bay). If prey species exhibit avoidance of the area in which a survey is performed, it is expected to be limited to a very small portion of a bird's foraging range and for a limited duration. Therefore, there is the potential for minor, temporary displacement of species from a portion of preferred feeding grounds during migration and minor, short-term displacement of marine and coastal bird species from non-critical activities during non-migration seasons resulting in minor impacts.

Western Snowy Plovers feed along the shoreline and would not be impacted by vessel and equipment noise. Marbled Murrelets and Brown Pelicans forage in nearshore waters and could be temporarily displaced from preferred foraging areas by transiting vessels. Short-tailed Albatrosses and Hawaiian Petrels are only present while on long-distance foraging trips or during the non-breeding season and would experience temporary displacement. This would be limited to a very small portion of a bird's foraging range. It is unlikely that this temporary relocation resulting from survey vessel noise would affect foraging success of Short-tailed Albatrosses and Hawaiian Petrels.

Aircraft Traffic and Noise

Potential impacts to marine and coastal birds from aircraft traffic include noise disturbance and collision. Noises generated by project-related survey aircraft that are directly relevant to birds include airborne sounds from passing aircraft for both individual birds on the sea surface and birds in flight above the sea surface. Both helicopters and fixed-wing aircraft generate noise from their engines, airframe, and propellers. The dominant tones for both types of aircraft are generally below 500 Hz (Richardson et al. 1995) and are within the airborne auditory range of birds. Aircraft noise entering the water depends on aircraft altitude, the aspect (direction and angle) of the aircraft relative to the receiver, and sea surface conditions. The level and frequency of sounds propagating through the water column are affected by water depth and seafloor type (Richardson et al. 1995). Because of the expected airspeed (250 km/hr [135 kn]), noise generated by survey aircraft is expected to be brief in duration, and birds may return to relaxed behavior within 5 minutes of the overflight (Komenda-Zehnder et al. 2003); however, birds can be disturbed up to 1 km (0.6 mi) away from an aircraft (Efroymson et al. 2000).

The physical presence of low-flying aircraft can disturb marine and coastal birds, including those on the sea surface as well as in flight. Behavioral responses to flying aircraft include flushing the sea surface into flight or rapid changes in flight speed or direction. These behavioral responses can cause collision with the survey aircraft. However, Efroymson et al. (2000) reported that the potential for bird collision decreases for aircrafts flying at speed greater than 150 km/h.

Considering the relatively low numbers of aerial surveys, along with the short duration of potential exposure to aircraft-related noise, physical disturbance, and potential collision to marine and coastal birds, it is expected that potential impacts from this activity would range from negligible to minor.

Metocean Buoys

Potential impacts to marine and coastal birds from met buoys include noise disturbance/lighting, collisions, loss of habitat, and decommissioning. Noise and other disturbance generated by the installation or decommissioning of met buoys are expected to be short-term and localized, resulting in negligible impacts to birds. Because buoy height is anticipated to be up to approximately 12 m (40 ft) above the ocean surface, collisions with buoys are unlikely. Although seabirds, including terns, gulls, and cormorants may roost on buoys, roosting on buoys does not pose a threat to these birds. Thus, overall impacts to birds from met buoys are expected to be negligible. Although it is possible that Peregrine Falcons could use a tower as a perch to opportunistically prey on seabirds, this predation would be expected to have a negligible impact on birds overall.

Due to their excellent vision, birds flying during daytime hours are unlikely to collide with met buoys. However, birds that are night-flying or flying under other conditions that would impair their vision could potentially collide with met buoys, leading to injury or death. Managing the type of lighting present on the buoys can minimize collisions.

Because the met buoys would be 18–32 mi from the shoreline, the chances of birds colliding with the buoys would be rare, resulting in minor impacts on marine and coastal bird populations. Because the met buoys would be removed after the site assessment activities are concluded or at the end of the lease, any impacts on birds from the buoys would be temporary and thus negligible.

Trash and Debris

Plastic is found in the surface waters of all the world's oceans and poses a potential hazard to marine birds through entanglement or ingestion (Laist 1987). The ingestion of plastic by marine and coastal birds can cause obstruction of the gastrointestinal tract, which can result in mortality. Plastic ingestion can also include blockage of the intestines and ulceration of the stomach. In addition, plastic accumulation in seabirds has also been shown to be correlated with the body burden of polychlorinated biphenyls (PCBs), which can cause lowered steroid hormone levels and result in delayed ovulation and other reproductive problems (Pierce et al. 2004).

Site characterization activities may generate trash comprising paper, plastic, wood, glass, and metal. Most trash is associated with galley and offshore food service operations. However, over the last several years, companies operating offshore have developed and implemented trash and debris reduction and improved handling practices to reduce the amount of offshore trash that could potentially be lost into the marine environment. These trash management practices include substituting paper and ceramic cups and dishes for those made of Styrofoam, recycling offshore trash, and transporting and storing supplies and materials in bulk containers when feasible, and have resulted in a reduction of accidental loss of trash and debris. In addition, all authorizations for shipboard surveys would include guidance for marine debris awareness. The guidance would be similar to BSEE's Notice to Lessees (NTL) No. 2015-G03 ("Marine Trash and Debris Awareness and Elimination") or any NTL that supersedes this NTL. Therefore, the amount of trash and debris dumped offshore would be expected to be minimal, as only accidental loss of trash and debris is anticipated, some of which could float on the water surface. Therefore, impacts from trash and debris on marine and coastal birds, as generated by site characterization vessels or sampling and other site characterization related activities, would be negligible. See Appendix D for Best Management Practices to Minimize Marine Trash and Debris**.**

Impacts of Accidental Fuel Spills

If the accident occurred in nearshore waters, shorebirds (including Western Snowy Plovers), waterfowl, and coastal seabirds (such as alcids [including Marbled Murrelets] gulls, terns, loons, pelicans, cormorants, and grebes) could be impacted either directly or indirectly. Direct impacts would include physical oiling of individuals. The effects of oil spills on coastal and marine birds include the potential of tissue and organ damage from oil ingested during feeding and grooming from inhaled oil, and stress that could result in interference with food detection, predator avoidance, homing of migratory species, and respiratory issues.

Indirect effects could include oiling of nesting and foraging habitats and displacement to secondary locations. The potential of a vessel collision occurring is quite low, with the potential for a resultant spill even lower. Impacts to birds from accidents are unlikely; however, if they occur, there could be possible impacts on their food supply. Impacts to shorebirds, waterfowl, and marine bird species would range from negligible to minor depending on timing and location. Since the populations of the Western Snowy Plover and Marbled Murrelet are already in peril, if an accidental fuel spill occurred that affected any of these species or their food supply, there would be a moderate impact to these species since birds are very susceptible to oiling impacts.

If the accidental event occurred in offshore waters, fuel and diesel would float on the water surface. There is potential for oceanic and pelagic seabirds, such as alcids, storm-petrels, albatrosses, shearwaters, and petrels, to be directly and indirectly affected by spilled diesel fuel. Impacts would include oiling of plumage and ingestion (resulting from preening). Indirect impacts could include oiling of foraging habitats and displacement to secondary locations. The potential of a vessel collision occurring is quite low, with the potential for a resultant spill even lower. Impacts to oceanic and pelagic birds from a spill incident involving survey vessels within offshore waters would range from negligible to minor. However, since populations of Short-tailed Albatross and Hawaiian Petrel are already imperiled, if an accidental fuel spill occurred that affected them, there would be a moderate impact to that species since birds are susceptible to oiling impacts.

Measures to Minimize Potential Adverse Impacts to Birds

To minimize the potential for adverse impacts on birds, BOEM has developed measures to reduce or eliminate the potential risks to or conflicts with specific environmental resources. If leases or grants are issued, BOEM may require the lessee to comply with these measures, as deemed appropriate at the time of review, through lease stipulations and/or as conditions of SAP approval. The following measures are intended to ensure that the potential for adverse impacts on birds is minimized, if not eliminated.

- The lessee will use only red flashing strobe-like lights for aviation obstruction lights and must ensure that these aviation obstruction lights emit infrared energy within 675–900 nanometers wavelength to be compatible with DOD night vision goggle equipment.

- Any lights used to aid marine navigation by the lessee during construction, operations, and decommissioning of a meteorological tower or buoys must meet USCG requirements for private aids to navigation (Form CG-2554: https://www.dcms.uscg.mil/forms/smdsearch4081/2554/).
- For any additional lighting not described in (1) or (2) above, the lessee must use such lighting only when necessary, and the lighting must be hooded downward and directed, when possible, to reduce upward illumination and illumination of adjacent waters.
- An annual report shall be provided to BOEM documenting any dead birds found on vessels and structures during site assessment and site characterization. The report must contain the following information: the name of species, date found, location, a picture to confirm species identity (if possible), and any other relevant information. Carcasses with Federal or research bands must be reported to the U.S. Geological Survey's Bird Band Laboratory, available at https://www.pwrc.usgs.gov/BBL/bblretrv/.
- Anti-perching devices must be installed on the met buoys to minimize the attraction of birds.

Conclusion

Overall, impacts to birds would be **negligible**. The construction, presence, and decommissioning of met buoys would pose minimal threats to birds. Loss of water column habitat, benthic habitat, and associated prey abundance are expected to have negligible impacts because of the small area affected by buoys. Impacts to birds in coastal waters from vessel traffic are expected to be negligible due to the amount of existing vessel traffic. Impacts on birds from site characterization surveys are expected to be negligible. Impacts to birds from trash or debris releases and from accidental fuel spills would be moderate for species that have special-status designations and are susceptible to spills, but since it is an accidental impact and unlikely to happen, the impact to birds in general are expected to be negligible. Potential noise impacts from met buoy deployment could have localized, short-term minor impacts on birds foraging near or migrating through the construction site, and noise impacts from decommissioning are expected to be negligible. The risk of collision with a met buoy would be negligible because of buoy height and distance from shore. Additionally, lessees operating on the OCS can reduce impacts to birds by following the Best Management Practices (Appendix D).

3.5.3 No Action Alternative

Coastal and marine birds in the geographic analysis area are subject to a variety of ongoing human-caused impacts that overlap with the Proposed Action, including fisheries bycatch in gillnet and other fisheries, oil spills, various contaminants, plastics pollution, anthropogenic noise, habitat destruction, introduced predators, disturbance of marine and coastal environments, and climate change. Many coastal and marine bird migrations cover long distances, and these factors can have impacts on individuals over broad geographical scales. Climate change has the potential to impact the distribution and abundance of coastal and marine bird prey due to changing water temperatures, ocean currents, and increased acidity.

Under this alternative, commercial leases and grants would not be issued in the Coos Bay and Brookings WEAs. However, BOEM expects other ongoing activities and planned actions to have continuing regional impacts on coastal and marine birds over the timeframe considered in this EA. Impacts from urban development and increasing air, vessel, and onshore traffic will continue to contribute to climate change and will have negative impacts on coastal and marine birds. Implementation of the No Action Alternative would not meaningfully reduce ongoing impacts to coastal and marine birds from existing and potential future actions. The largest ongoing contributors to impacts on coastal and marine birds and bats stem from habitat destruction, disturbance of marine and coastal environments, and commercial and recreational fishing activities, primarily through bycatch.

3.6 SOCIOECONOMICS

3.6.1 Affected Environment

The area of potential socioeconomic effects from site assessment and site characterization activities in the Oregon WEAs includes Coos and Curry counties and the Ports of Newport (Yaquina), Coos Bay, Port Orford, Brookings, Crescent City, and Humboldt (Eureka). This affected environment for socioeconomics was selected due to their proximity to the WEAs—within 88 mi or less of the Oregon WEAs (Figure 3-5) and the likelihood that activities associated with the Proposed Action will be based in their ports. Port facilities and capacity for supporting the activities, such as site assessments and site characterizations, are associated with the Proposed Action.

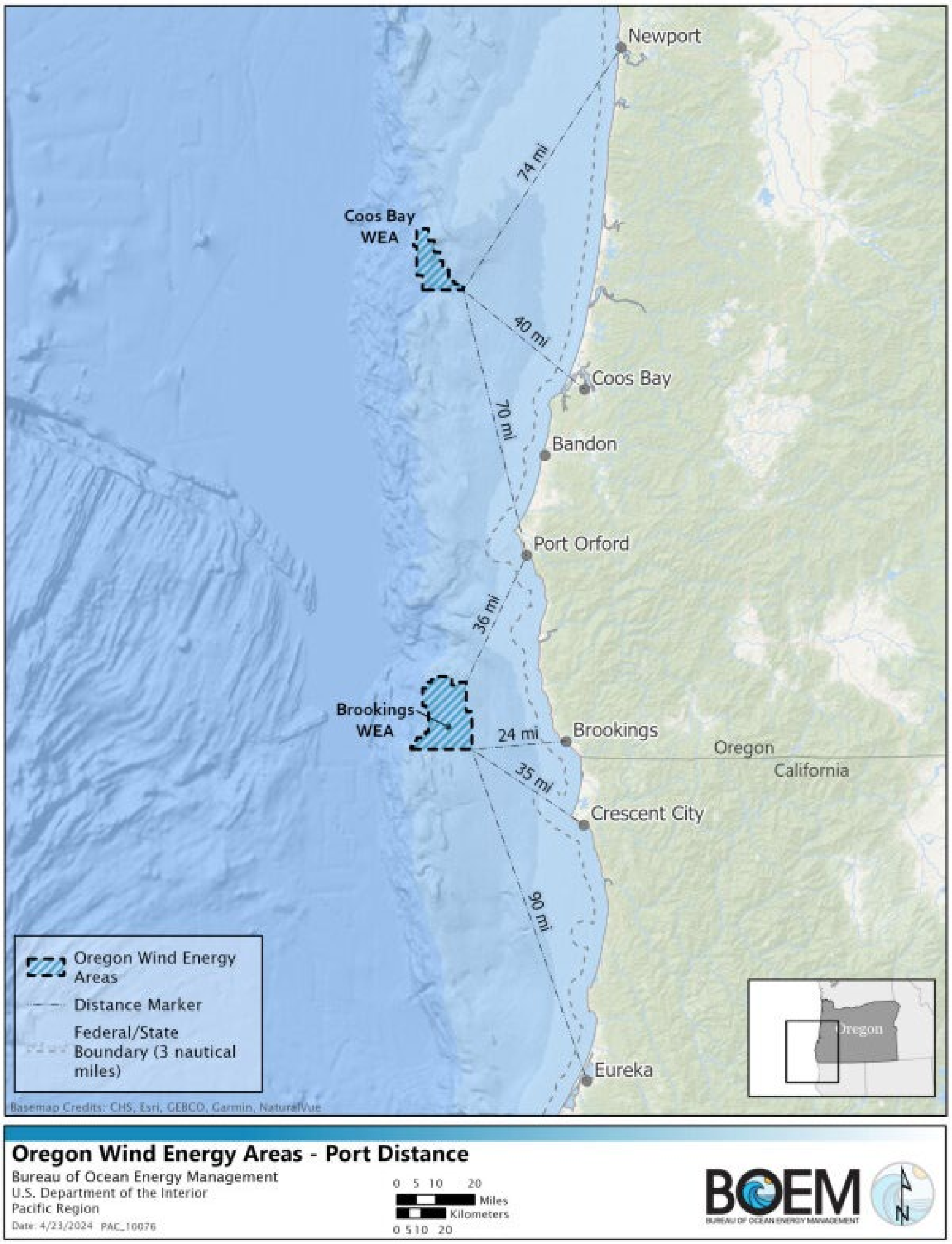


Figure 3-5: Ports < 88 Miles from the Brookings and Coos Bay WEAs

3.6.1.1 Counties

Coos County has a total of 1,596 mi^2 located on Oregon's southern coast north of Curry County and south of Douglas County. It is known as a working-class area with community and Tribal roots (Smith and Masterson 2013). Coos Bay, Oregon's largest estuary and deepest bay on the Pacific Coast between Seattle and San Francisco, and the Coos Bay Rail, established in the 1800s, which connects regional manufacturers to the nation's rails system today, are important features of Coos County.

Curry County has a total of 1,627 mi^2 located on Oregon's southern coast north of Del Norte County, California and south of Coos County, Oregon. Curry County is a resource-based economy with connections to the Rogue River and Siskiyou National Forest. Recreational activities include windsurfing at Floras Lake, hiking forests and beaches, and sightseeing (Travel Curry County).

Lincoln County has a total of 980 mi^2 located on Oregon's northern coast north of Lane County and south of Tillamook County. Travel (primarily tourism), trade, health services and construction are the primary industries in Lincoln County (Bureau of Economic Analysis). Newport, situated within the County, is one of the two major fishing ports of Oregon (along with Astoria) and ranks in the top twenty of fishing ports in the U.S.

Coos, Curry, and Lincoln counties have smaller workforces, higher unemployment rates, and lower per capita income when compared to statewide data. Total employment is the lowest in Curry County. Coos, Curry, and Lincoln counties' population and labor statistics are detailed in Table 3-9.

Table 3-9: Population, Labor Force, and Employment Statistics

Area	Population*	Labor Force Participation Rates	Total Employment*	Unemployment Rate	Per Capita Income*
Coos County	64,990	49.1%	18,020	4.4%	$31,824
Curry County	23,447	43.7%	5,343	4.4%	$34,302
Lincoln County	50,813	47.9%	13,733	4.1%	$32,776
Oregon	4,240,137	62.3%	1,575,613	3.4%	$37,816

Source: State of Oregon Employment Department, data for 2021; *Census Quick Facts, Population data for 2022, Employment for 2021; Labor Force percentages from Morrissette (2022).

The total ocean economy provides a large portion of the total employment in Coos and Curry counties compared to the statewide data. The total ocean economy provides 3.4% in Lincoln County, which is similar to statewide data. NOAA (2022) defines the total ocean economy as all ocean economic activities—living resources, marine construction, ship and boat building, marine transportation, offshore mineral extraction, and tourism and recreation—within a defined U.S. geography.

Coos County ocean-related jobs make up 14% of employment, 18% of employment in Curry County, and 24% of employment in Lincoln County, compared to 2% statewide. Ocean economy wages per employee are well below the coastal statewide average in Curry and Lincoln counties and modestly below Coos County. Coos, Curry, and Lincoln counties' total ocean economy employment and wages are detailed in Table 3-10.

Table 3-10: Ocean Economy Employment and Wages

Area	% of Total Economy	Employed	% of total county employment*	Wages ($ millions)	Wages per Employee
Coos County	14%	3,115	17%	$99.3	$31,900
Curry County	18%	1,133	21%	$26.2	$23,100
Lincoln County	24%	4,034	3.4%	$114.0	$28,300
Oregon	2%	39,481	3%	$1,600	$39,300

Source: NOAA 2022, data from 2020; *total employment from Table 3-9 divided by ocean economy number of individuals employed.

Recreation and tourism are the primary ocean economy sectors in Coos, Curry, and Lincoln counties. Tourism and recreation included eating and drinking establishments, hotels, marinas, boat dealers and charters, campsites and RV parks, science water tours, and recreational fishing (NOAA 2022), which is further explained in section 3.8. The next highest ocean economy sector in "other" for Coos and Curry counties includes representation from marine construction, ship and boat building, offshore mineral extraction, or non-categorized data. In contrast, living resources is the next highest industry sector for Lincoln County. Living Resources includes commercial fishing, fish hatcheries, aquaculture, and seafood processing and seafood markets (NOAA 2022), which is further examined in section 3.7. Coos, Curry, and Lincoln counties' ocean economy sectors are detailed in Table 3-11.

Table 3-11: Ocean Economy by Sector in 2020

Area	Living Resources	Tourism & Recreation	Marine Transportation	Other**
Coos County	7.9%	77.4%	1.3%	13.4%
Curry County	*	89%	*	11%
Lincoln County	9.1%	88.2%	*	2.7%
Oregon	6.1%	54.7%	32.3%	6.8%

*Indicates unavailable information

**Data classified as "other" contains information that is aggregated.

Source: NOAA 2022

3.6.1.2 Ports

A lessee may use one of these six ports to perform activities associated with the Proposed Action, such as characterizing a lease site (e.g., installation of meteorological towers and meteorological buoys), conducting resource surveys (e.g., meteorological, and oceanographic data collection), or testing installation of various technology. This section describes and summarizes the location, facilities, vessel accommodations and restrictions (shoreside and marine), interests, and employment capacity for Newport (Yaquina), Coos Bay, Port Orford, Brookings, Crescent City, and Humboldt (Eureka) (See Table 3-12). Map figures for each port are in Appendix C.

Table 3-12: Summary of Port Critical Components Often Associated with Vessels Carrying Out Proposed Action Activities

Port	Miles from WEA*	Vessel Restrictions	Vessel Accommodations	Port Interests	Employed*	Impact Category
Port of Port Orford	70 from Coos Bay; 36 from Brookings	No shoreside capacity, vulnerable to southern storms, shallowness	None	Commercial (boats < 40 ft)	4 (FTE)	Negligible
Port of Brookings	23	Shallowness, jetties, narrow entrance, no maintenance facilities	Few	Recreational	7	Negligible
Port of Coos Bay	40	Conflict of industrial and privately owned uses, few maintenance facilities	Moderate to Moderate-High	Commercial, Recreation, and Industrial	31	Minor
Port of Newport (Yaquina Bay)	74	n/a	Moderate-High to High	Commercial, Recreational, Industrial, and Institutional**	28	Minor
Port of Crescent City	32	Shallowness, jetties, narrow entrance, no maintenance facilities	None	Recreation and Tourism	14 (FTE)	Negligible
Port of Humboldt Bay (Eureka)	88 from Brookings; 23 from "Lease areas OCS-P 0561 and OCS-P 0562" in California	Conflict of industrial and privately owned uses, few maintenance facilities, precarious channel conditions	Moderate to Moderate-High	Commercial, Recreation, and Industrial	6	Moderate

*Employment figures are estimates from Port websites and staff directories.

**Institutional refers to both or either university and/or Federal government research physical (dock space or vessels) and or human capital.

Source: Individual port websites, including staff directories and Army Corps of Engineers

The Port of Port Orford, Oregon: Port Orford is on Oregon's coast, 250 mi south of the Columbia River and 390 mi north of San Francisco Bay. Port Orford facilities include almost three acres of dock area and two large-capacity hydraulic cranes for lifting boats from the water for repairs and/or storage and removing fish catches from boats. The turning basin at Port Orford is 340 ft long, 100 ft wide, and 16 ft deep. The extension to locally constructed breakwater is 550 ft long (USACE 2023). Port Orford is home to many commercial fishermen and used as a "harbor of refuge" during severe storms (USACE 2023). About 150 fishing and private boats, ranging from 20 to 40 ft in size, use the dock each year. Although not situated directly on the Port of Port Orford, the Oregon State University (OSU) Port Orford Field Station—part of OSU's coastwide Marine Studies Initiative—supports research such as SCUBA surveys, hook-and-line (catch and release) surveys of fish populations, and remote operated vehicles (ROV) and oceanographic monitoring (OSU). The Port of Port Orford has a five volunteer Commissioners Board, one general manager, and four part-time crane operators (Port of Port Orford).

The Port of Brookings Harbor, Oregon

The Port District of Brookings Harbor covers an area of 400 mi^2 reaching from the mouth of the Chetco River to the Oregon-California border, north to the drainage of the Pistol River, and east to the Curry-Josephine County line. The navigation channel is 14 ft long and 120 ft deep. The turning basin is 650 ft long, 250 ft wide, 14 ft deep. Commercial boat basin access is 200 ft long, 100 ft wide, 12 ft deep (U.S. Army Corps).

The Port of Brookings has two large boat basins, one for commercial fishing boats and the other for sport boats, and a public boat launching ramp. There are four fish receiving docks and a sea-going barge dock for lumber loading and storage, as well as a U.S. Coast Guard Station and a privately owned marina. The Port of Brookings has over 502 moorage slips, more than 280 passable days per year, it is classified as a shallow-draft harbor, and has more than 31,000 bar crossings and 95,000 recreational users annually (Port of Brookings Harbor).

The Port of Brooking Harbor has a five volunteer Commissioners Board, which is responsible for all activities at the Port. The Port also employs six staff to manage the harbor, office, fuel dock, and beach front RV park (Port of Brookings Harbor).

The Port of Coos Bay, Oregon

The Port of Coos Bay is on the Oregon coast 200 mi south of mouth of Columbia River and 445 mi north of San Francisco Bay; it is about 13 mi long and 1 mi wide, with an area at high tide of about 15 mi^2. The Port of Coos Bay has three channels: (1) from the Pacific Ocean to river mile 1, the channel is 700 ft wide and 47 ft deep; (2) from Coos Bay to Millington, there is a channel 2 mi long, 150 ft wide and 22 ft deep; and (3) from deep water in Coos Bay to Charleston, the channel is 3,200 ft long, 150 ft wide, and 17 ft deep (USACE 2023).

The Port of Coos Bay offers public access for fishing and harbor crafts and three lumber docks. It also owns a 200-ft dock on the Isthmus Slough, a barge slip, and two small-boat basins capable of mooring 250 fishing and recreation craft (U.S. Army Corps). Several industrial and private interests within the Port of Coos Bay are described below:

- North Bend and Empire (industrial) privately owned mill and lumber docks and oil terminals.
- North Split (industrial) T-dock and wood chip loading facility.
- Charleston (commercial) receipt of fresh fish and shellfish and a large seafood receiving and processing plant.
- Joe Ney Slough (private) floating moorage for mooring about 50 fishing vessels.
- Jordan Cove (industrial) 248 ft long dock for wood chip ships.

Oregon International Port of Coos Bay is designated a State Port, consequently members of the Board of Commissioners are appointed by the Governor and confirmed by the Oregon Senate for 4-year terms. There are 12 port staffers, 16 maria staff, including maintenance personnel in Charleston, and 18 staff supporting the adjacent Coos Bay Rail (Port of Coos Bay).

The Port of Newport (Yaquina Bay), Oregon

The Port of Newport is located on the central Oregon coast in the City of Newport and encompasses approximately 59 mi^2. The Port of Newport has an access channel is 2,035 ft long, 100 ft wide, and 10 ft deep (U.S. Army Corps). The Port of Newport has two berths: one is 435 ft long and the second one is 520 ft long, capable of serving ocean-going vessels at McLean Point on north side of bay. Port of Newport has a public wharf with 300 ft of frontage for servicing fishing boats and maintains 510 berths for mooring commercial and sport fishing vessels. On the south side of bay, about 1.2 mi above the entrance, the Port of Newport has constructed South Beach Marina with a 600-pleasure craft and shallow-draft fishing boat capacity. The marina provides shelter for 232 boats and is maintained by the Port of Newport to a depth of 10 ft. In collaboration with the Marine Science Center, OSU, maintains a

220-ft pier for docking large and small research vessels, as well as a 100-ft float for docking small boats above the port entrance (USACE 2023). The Port of Newport has robust staff compromised of several port managers, including those with specialized financial and operation roles, separate teams of commercial and recreational marina staff, RV park staff, international terminal staff, and at least two NOAA-employee liaisons (Port of Newport).

Crescent City Harbor, California

Upon review of all ports within 88 mi of the WEAs, Crescent City in Del Norte County had the lowest ability to support activities associated with Proposed Action, and thereby is not included in the description. The Port of Crescent City has identified “supporting wind farm development” in their strategic plan (Crescent City Harbor District 2018), but it has little to no physical (infrastructure or geophysical) capacity and few socioeconomic abilities (e.g., harbor staffing) to support activities associated with the Proposed Action. Details about Crescent City Harbor activities and employment is available on their website. Details about the location and entrance channel are available on the USACE website.

The Port of Humboldt Bay, California

The Port of Humboldt Bay (Humboldt Harbor) is on the northern California coast approximately 225 nm north of San Francisco and approximately 156 nm south of Coos Bay, Oregon. Humboldt Bay is the only harbor between San Francisco and Coos Bay with deep-draft channels large enough to permit the passage of large commercial ocean-going vessels. The Bar and Entrance Channel is approximately 8,500 ft long and 500 to 1,600 ft wide, with a congressionally authorized depth of 48 ft Mean Lower Low Water and an allowable over depth of 3 ft. The Humboldt Harbor oversees and promotes several projects and programs, such as dredging, retention and improvement of commercial fishing facilities, improvement of transportation and maritime facilities, pilotage licensing, Oil Spill Co-op coordination, shoreline protection projects, mariculture, and aquaculture. Humboldt Bay Harbor and Recreation and Conservation District has approximately six full time personnel (Humboldt Bay Harbor).

3.6.2 Impacts of the Proposed Action

3.6.2.1 Counties

Temporary increases in employment from Proposed Action activities, such as surveying, tower and buoy fabrication, and construction could occur in various local economies associated with onshore- and offshore-related industries in Coos, Curry and Lincoln counties, Oregon. However, BOEM expects any impacts to employment, population, and the local economies in and around these counties to be short-term, and imperceptible, and thus negligible. An analysis of similar projects on the east coast (BOEM 2014) found that the small number of workers (approximately 10–20 people) directly employed in site characterization surveys would be insufficient to have a perceptible impact on local employment and population.

The approximate number of workers directly employed could be measurable, but the benefits to the local economy in Curry County would be difficult to measure, especially when there are no ports that can adequately support the activities performed in a site characterization or assessment. Although, Coos County and Lincoln County have ports that can support the activities performed in a site characterization or assessment, the ports and counties have more than three times the amount of population, total ocean economy employees, and port staff represented in Curry County. Therefore, the overall beneficial impacts to the local economy, including labor, employment, and wages, would be negligible when taking into consideration the distribution of activities and the time frame over which they would occur in Coos and Lincoln counties.

3.6.2.2 Ports

Proposed Action impacts on the Port of Port Orford and Brookings in Curry County, Oregon, and the Port of Crescent City in Del North County, California are negligible. These three ports have the lowest physical (infrastructure or geophysical) capacity and socioeconomic ability to support Proposed Action activities.

The Ports of Coos Bay, Newport, and Humboldt have suitable physical infrastructure or geophysical capacity for hosting maritime vessels frequently used in carrying out the Proposed Action. Coos Bay has the physical characteristics (i.e., a deep-draft navigation channel and available upland space) to serve various staging, operations and maintenance for floating offshore wind (McDonald, 2022). Trowbridge et al. (2022) notes that the Port of Coos Bay "represents the best option (across metrics) for supporting floating wind activities in Oregon." The Ports of Coos Bay and Newport have sufficient human capital to support additional vessels coming in and out of their ports, though the Port of Humboldt Bay does not. Therefore, impacts on employment, labor, and wages in the Port of Coos Bay and the Port of Newport are minor, but impacts on employment, labor, and wages in the Port of Humboldt Bay are moderate.

The cumulative impact of leasing in the Oregon WEA and the California lease areas OCS-P 0561 and OCS-P 0562 could be moderate on the Port of Humboldt Bay. California lease area OCS-P 0561 is 23 mi from the Port of Humboldt Bay (Figure 3-6), which could heighten its use and attractiveness to vessels conducting surveying, tower and buoy fabrication, and other activities needed to carry out the Proposed Action in Oregon. Furthermore, the Port of Humboldt has already begun development as a terminal project aimed to "design and construct the site in such a way that it can serve multiple purposes either simultaneous with the offshore wind energy functions" (Humboldt Bay Harbor, Recreation and Conservation District 2023, Shields et al. 2023).

Conclusion

The Proposed Action would produce **negligible** impacts on employment and wages in Curry County and the Port of Port Orford and the Port of Brookings. The Proposed Action would have beneficial, short-term, and minor impacts on employment and wages in Coos County if site characterization and assessment use locally based employees, pay employees state-average wages, and use the Port of Coos Bay facilities (e.g., fuel, repair, storage, docking). The impact of the Proposed Action to the Port of Crescent City would be **negligible**. The Port of Humboldt Bay, the Port of Newport and Port of Coos Bay have the highest likelihood of hosting and serving vessels used for site assessment and characterization. The impacts on employment, labor, and wages are anticipated to be **minor**, beneficial, and unobtrusive in the Port of Newport.

3.6.3 No Action Alternative

Under this alternative, commercial leases and grants would not be issued in the Coos Bay or Brookings WEA. However, BOEM expects other activities and planned actions to have continuing regional impacts on economic activity over the timeframe considered in this EA. Impacts from urban development and increasing air, vessel, and onshore traffic will continue to contribute to climate change and will have negative impacts on the region's economy. Implementation of the No Action Alternative would not meaningfully reduce ongoing impacts to economic activities from existing and potential future actions.

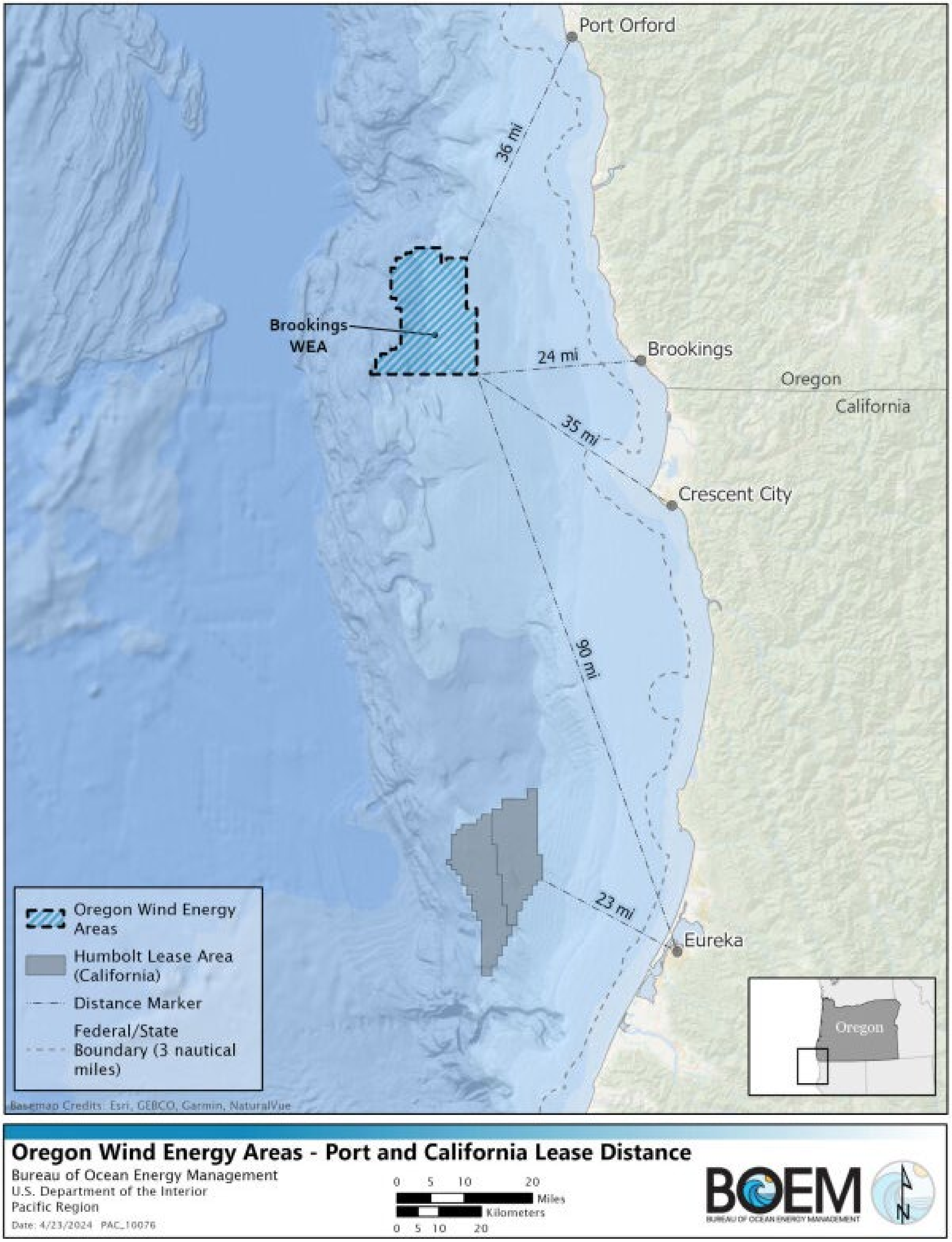


Figure 3-6: Distance Between Port of Humboldt and the Oregon and California WEAs

3.7 COMMERCIAL FISHING

3.7.1 Affected Environment

The waters offshore Oregon support numerous types of fishing, and stakeholders place high cultural and economic significance on these activities. The tables below summarize the importance of commercial fisheries for the ports in Oregon which are closest to the Oregon WEAs, specifically Newport (Yaquina), Coos Bay, and Brookings. Species of commercial interest in Oregon include groundfish, coastal pelagic species, crab, highly migratory species, salmon, shellfish, and shrimp. In 2021, commercial fishery landings and revenue were 51,948 metric tons and 74.6 million dollars for the Port of Newport, 10,073 metric tons and 43.2 million dollars for the Port of Coos Bay, and 5,472 metric tons and 18.7 million dollars for the Port of Brookings, respectively (Table 3-13). Table 3-14 describes the trends in fishing effort and vessel characteristics, and Table 3-15 describes Oregon commercial fisheries, gear types, and locations.

Table 3-13: Commercial Fishery Landings and Revenue for Oregon Port Areas, 2021

Port Areas in Oregon	Landed Weight (Metric Tons)	Dollars (Millions)
Newport	51,948	74.6
Coos Bay	10,073	43.2
Brookings	5,472	18.7
Total	144,055	205.4

Source: PacFIN 2022b

Table 3-14: Trends in Fishing Effort and Vessel Characteristics

Sector	Average Length of Haul	Main Geographic Area	Usual Depth (in fathoms)	Average Length (ft) of Vessel (2020)	Number of Vessels (2020)
Trawl, Bottom trawl	~3 hours	Astoria, OR; hotspots near Newport, OR and Fort Bragg, CA	0–100	70’	50
Trawl, Mid-water trawl, rockfish	~1.2–1.8 hours	Central WA to Central OR, concentrated on OR-WA border	50–100	87’	28
Trawl, Mid-water trawl, shoreside whiting	~2–2.5 hours	Concentrated near Newport, OR and Astoria, OR	50–250	93’	28
Trawl, Mid-water trawl, At-sea whiting-Catcher-processors	~2.5–3.3 hours	lat 48–47°N, lat 43°N	100–250	303’	10
Trawl, Mid-water trawl, At-sea whiting-Mothership	~2–2.5 hours	lat 47°N and lat 43°N	100–250	107’	15
Fixed gear, Pot, Open Access, Non-Catch Share	~15–40 pots per set	Majority between Astoria, OR and Fort Bragg, CA	100–300	35’	87
Fixed gear, Hook-and-line, Open Access, Non-Catch Share	~2,500 hooks per set	lat 48–32°N, dispersed evenly along coast, proportion of landings in the 48°N, 39°N, & 34°N latitudinal bins increased slightly.	Majority depth 150–200 but up to 750	27’	528

Sector	Average Length of Haul	Main Geographic Area	Usual Depth (in fathoms)	Average Length (ft) of Vessel (2020)	Number of Vessels (2020)
Fixed gear, Pot, Limited Entry, Catch Share	~15–40 pots per set	Washington and Oregon, plus two areas of concentration off Fort Bragg and San Francisco, CA	100–600	59’	36
Fixed gear, Hook-and-line, Limited Entry, Catch Share	~3,200 hooks per set	> 50% occurred in the 48°N latitudinal bin in 2017 and 2019; increased landings in the 46°N latitudinal bin 2017 to 2019; no landings south of 43°N after 2016.	Majority depth 200–250 but up to 750	47’	33

1 fathom = 6 feet.

Sources: Somers et al. 2022, FishEYE Web application: https://connect.fisheries.noaa.gov/fisheye/fisheyelandingpage.html.

Table 3-15: Oregon Commercial Fisheries, Gear Types, and Locations

Fishery	Gear Type	Washington	Oregon
Tuna	Mobile (troll/pole, hook, and line)	Generally near surface, 30–40 nm or more from shore	Generally near surface, 30 nm or more from shore at 50–100 up to 500–2,000 fathoms
Salmon	Mobile (troll, hook, and line)	10–180 fth from Canada to Oregon border	Breakers to 200 fathoms; sometimes up to 650 fathoms
Crab	Fixed (pot)	0–10 fth up to 90–100 fth; mostly sandy or mud bottom; Important Tribal issues here – only southernmost 38 mi open to all	Breakers to 130 fathoms and up to 700 in some years; around tops of canyons, high spots
Shrimp	Mobile (trawl)	30–150 fth; muddy, flat, soft bottom	30–150 fathoms; 90% in 60–140 fathoms; muddy, soft, flat bottom
Groundfish	Mobile (bottom and midwater trawl, hook, and line)	Surface to 700 fth; midwater trawl generally at 1,000 fth, but nets are not this deep	Breakers to 400–700 fathoms; 1,200 fathoms for midwater, but nets are not this deep
Black Cod (Sablefish)	Mobile (trawl); fixed (pots, long line)	100–500 fth	100–500/650 fathoms
Halibut	Fixed (long line)	90–100 fth	22 nm at 100–125 fathoms
Spot Prawns	Fixed (pot)	85–130 fth; primarily hard bottom at ~100 fth	85–130 fth; primarily hard bottom at ~100 fth

1 fathom = 6 feet; 1 nm (nautical mile) = ~2,025 yards or 1.5 statute (land) miles.
Bottom trawling is not allowed outside of 700 fathoms in the entire West Coast EEZ.

Source: Based on Industrial Economics, Inc. 2012, Table 6-5

NCCOS Report (Carlton et al. 2024): Data and Information

Data and information from the Appendices of Carlton et al. (2024) provide an overview of the commercial fisheries resources in the Oregon Call Areas and WEAs. The Carlton et al. (2024) models used information from NMFS and Oregon Department of Fish and Wildlife (ODFW) for nine fisheries in Oregon, including at-sea hake mid-water trawl, groundfish bottom trawl, shoreside hake mid-water trawl, groundfish fixed gear-pot, pink shrimp trawl, groundfish fixed gear-longline, Dungeness crab, albacore commercial, and albacore charter. Spatial models show raw effort, raw revenue, and ranked importance (combined effort and revenue) across fisheries.

3.7.2 Impacts of the Proposed Action

Data collection buoys and vessel traffic associated with the Proposed Action may generate space-use conflicts and interfere with fishing operations by (1) making the area occupied by met buoys temporarily less accessible as fishing grounds, (2) reducing fishing efficiency, and/or (3) causing economic losses associated with gear entanglement. Data collection buoys emplaced within leases may inadvertently be spatially incompatible with nearby fishing operations, particularly for bottom trawling, due to the challenge of navigating and deploying/retrieving fishing gear near fixed structures. Fishers may suffer decreased efficiency when trying to avoid buoys during their operations. If fishers fail to avoid buoys, subsequent entanglement may result in damage to or loss of fishing gear. If damage to a data collection buoy or its scientific instrumentation occurs because of fishing operations, the fishing vessel captain could be held financially responsible.

The spatial extent of fishing grounds that may be impacted by buoys and traffic is estimated using, as an analog, USCG safety zone considerations for OCS facilities (33 CFR §147.1), where 500 m (1,640 ft) safety zones were established to promote the safety of life and property (e.g., 33 CFR §147.1109). This approach estimates a 0.785 km^2 (0.303 mi^2) circular zone per buoy—a very small fraction of the total fishing grounds available for the Pacific Coast Groundfish Fishery (PFMC 2020), the Pacific Coast Salmon Fishery (PFMC 2016), and the West Coast albacore fishery (Frawley et al. 2021). Given that harvest strategies vary among individual fishers, potential impacts may also vary. The Pacific Fishery Management Council's (PFMC) role and background is further explained in Appendix B.

Oregon and its nearshore waters host a variety of commercial fisheries, so the expected increase in activity from Proposed Action vessels will be small compared to the overall level of effort. Marine vessels associated with the Proposed Action mobilizing and transiting from ports to the WEA may reduce efficiency of fishing operations due to time delays associated with congestion or avoidance. These vessels may accidentally damage fishing gear (e.g., by cutting trap floats) or release marine debris which could cause entanglement or interfere with other fishing operations. These impacts would be short-term and temporary; lessees have five years to complete their surveys, buoy deployments typically last one year, and the duration of a single survey is days or a few weeks.

Many of the region's important fishing grounds are in depths less than 900 m (2,953 ft), so a buoy within the WEA (900 m and 1,300 m [2,953 ft and 4,265 ft] depth) decreases conflict with the fishing industry due to its offshore location. At the end of the 5-year term data collection, instrumentation will be decommissioned, and large marine debris objects removed so any space-use conflict will be eliminated. Vessel operators are required to comply with pollution regulations outlined in 33 CFR 151.51-77 so only accidental loss of trash and debris is anticipated. Lessees will develop a Fisheries Communications Plan with a designated liaison. Other measures may include a Local Notice to Mariners, vessel traffic corridors, lighting specifications, incident contingency plans, or other appropriate measures. Some of these navigational safety measures are also expected to reduce negative interactions between fishers and project vessels.

Impacts from project activities to fish in the Project Area are likely to be largely undetectable and temporary due to the minimal influence project activities may have across larger spatial and temporal scales. Impacts to fish from met buoy installation, HRG and geotechnical surveys, and vessel operations associated with the Proposed Action will be localized and short-term. Impacts are expected to last for the duration of the activities that are producing the noise and are not expected to have long-lasting consequences. Fish species capable of sensing the introduced noise may alter their behavior and leave the affected area temporarily.

PTS exposure distances (in m) from mobile, impulsive, intermittent HRG sources towed at a speed of 4.5 kn for fishes are the following for the listed HRG sources: boomers, bubble guns (4.3 kHz) 3.2 m, and sparkers (2.7 kHz) 9.0 m. This range is conservative as it assumes full power, an omnidirectional source, and does not consider absorption over distance. Maximum disturbance distances from HRG mobile, impulsive, intermittent sources towed at a speed of 4.5 knots for fishes for the following HRG sources are: boomers, bubble guns (4.3 kHz) 708 m, and sparkers (2.7 kHz) 1,585 m. Chirp Sub-Bottom Profilers (5.7 kHz) do not cause PTS exposure or disturbance to fishes, because the sound source is out of the hearing range of fishes (BOEM 2022). BOEM anticipates further investigation to all these anthropogenic noise sources in preparation for future environmental review of a COP.

Conclusion

Potential impacts to commercial fishing from the Proposed Action are expected to be **minor** and temporary in duration (five years or less), and primarily associated with a spatial incompatibility around the data collection buoy(s) and interactions with project vessels, which is comparatively small in size when compared to the full extent of available fishing grounds. BOEM recommends lessees incorporate BMPs that will aim to minimize adverse effects to commercial fishing from their site assessment and site characterization activities.

3.7.3 No Action Alternative

Under this alternative, commercial leases and grants would not be issued in the Oregon WEAs. However, BOEM expects ongoing activities and planned actions to have continuing regional impacts on commercial fishing over the timeframe considered in this EA. Impacts from urban development and increasing air, vessel, and onshore traffic will continue to contribute to climate change and will have negative impacts on commercial fishing. Implementation of the No Action Alternative would not meaningfully reduce ongoing impacts to commercial fishing from existing and potential future actions.

3.8 RECREATION AND TOURISM

This section defines and describes the recreation and tourism ocean economy and the environments affected by the Proposed Action. Recreation and tourism occur on coastal lands and include shore-based activities such as visiting historic towns and landmarks, biking, bird watching, and beach going. Recreation and tourism also include ocean activities and attractions used by locals and tourists, such as recreational fishing, diving, and scenic water tours.

3.8.1 Affected Environment

The affected environment for recreation and tourism includes Coos, Curry, and Lincoln counties due to their proximity to the WEAs and likelihood that activities associated with the Proposed Action will be based in their ports.

Coos County is home to the Port of Coos Bay and Bandon Dunes Golf Resort, one of the top tourist attractions in Oregon. Coos County is comprised of various historical sites and known as Oregon’s Adventure Coast.

Curry County is mostly rural, varied geography, and a mild, wet climate that hosts farming, ranching, fishing, and foraging, as well as several recreational opportunities (e.g., visiting state parks, diving, windsurfing, kayaking, and surfing). The Chetco, Sixes, and Rogue River are tourist attractions for rafting expeditions. The Port of Port Orford and the Port of Brookings Harbor are also located in Curry County.

Lincoln County is home to the City and Port of Newport (Yaquina Bay) and includes the Historic Bayfront district and several tourist attractions, such as the Yaquina Head lighthouse, the Yaquina Bay Bridge, Oregon Coast Aquarium, and Underseas Garden.

Most of the total ocean economy jobs in Coos, Curry, and Lincoln Counties are in the tourism and recreation sectors (Table 3-16).

Table 3-16: Ocean Economy by Sector

Area	Living Resources	Tourism & Recreation	Marine Transportation	Other*
Coos County	7.9%	77.4%	1.3%	13.4%
Curry County	*	89%	*	11%
Lincoln County	9.1%	88.2%	*	2.7%
Oregon	6.1%	54.7%	32.3%	6.8%

Source: The National Ocean Economics Program (ENOW Explorer) publishes datasets on ocean economy employment, wages, and sectors by state and county in the U.S.
*Data classified as "other" contains information that is aggregated.

3.8.1.1 Tourism and Recreation Gross Domestic Product

In 2020, 62.7% of the total economy, when measured by GDP, brought in $114.5 million, with an average of $47,500 GDP per employee, to Coos County. 79.5% of the total economy, when measured by GDP, brought in $38.7 million, with an average of $38,400 GDP per employee, to Curry County. 79.7% of the total economy, when measured by GDP, brought in $169.7 million, with an average of $47,700 GDP per employee to Lincoln County. The Ocean Economy Tourism and Recreation GDP for Coos, Curry, and Lincoln counties is summarized in Table 3-17.

Table 3-17: Tourism and Recreation GDP

Area	% of the Ocean Economy	Total GDP (in Million)	GPD by Employee
Coos County	62.7%	$114.5	$47,500
Curry County	79.5%	$38.7	$38,400
Lincoln County	79.7%	$169.7	$47,700
Oregon	36.6%	$1,000	$46,500

Source: The National Ocean Economics Program (ENOW Explorer) publishes datasets on ocean economy employment, wages, and sectors by state and county in the U.S.

LaFranchi and Daugherty (2011) surveyed Oregonians regarding non-consumptive activities or activities enjoyed on the coast without taking anything out of the ocean or from the beach. They found that the top activities were beach going, sightseeing or scenic enjoyment, wildlife viewing, and/or photography and that $87.72 was the average expenditure per person. Further, visits to Lincoln County made up almost 43% of the total distribution of coastal trips reported (Figure 3-7).

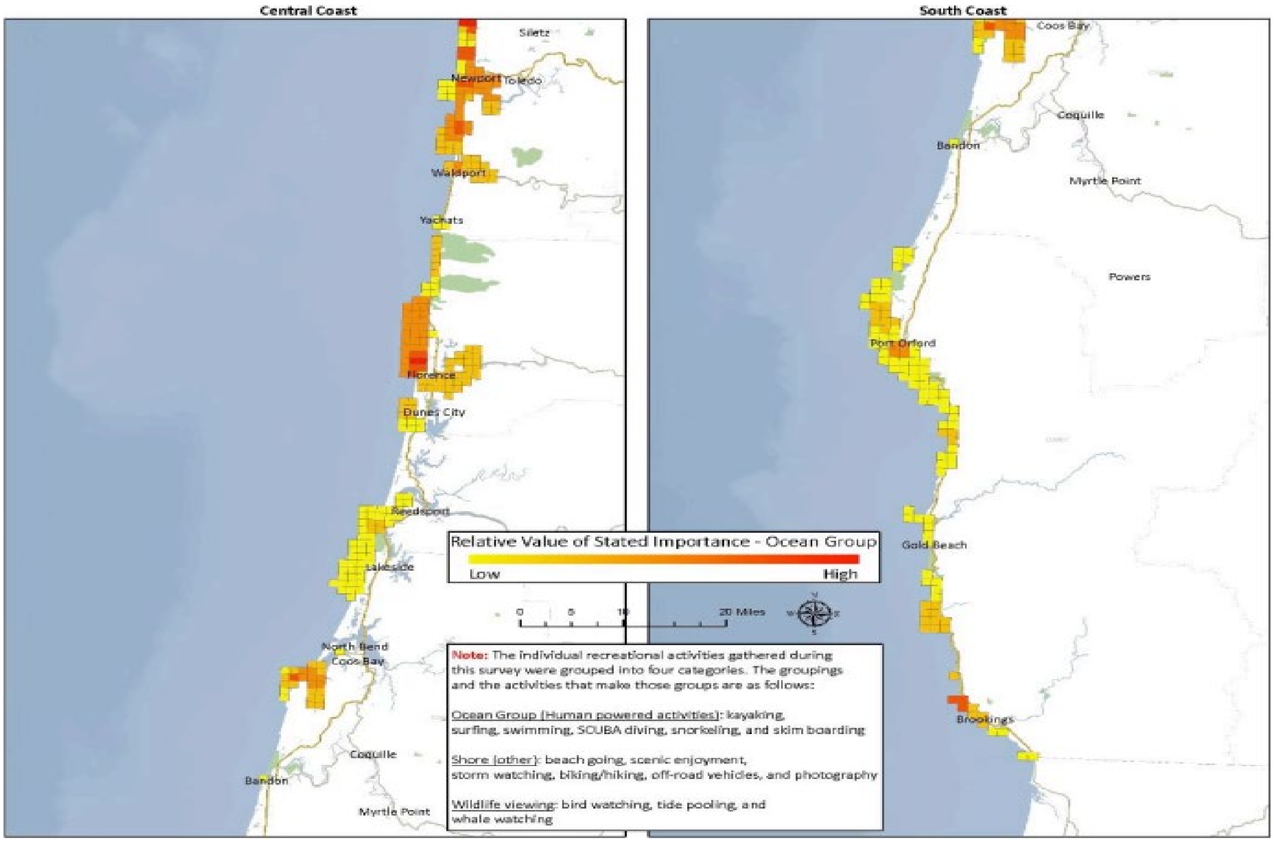


Figure 3-7: Coastal Oregon Recreation Use: Non-Consumptive Ocean-Based Activities

Source: LaFranchi and Daugherty (2011)

3.8.1.2 Recreational Fishing

Recreational fishing refers to non-commercial activities of fishermen who fish for sport or pleasure, regardless of whether the fish are retained or released. Several businesses and industries (e.g., the for-hire fleets, bait and tackle businesses, tournaments) support recreational fisheries (NOAA 2015) Recreational fishing ports and related or supported industries could be impacted by the Proposed Action in Lincoln, Coos, and Curry Counties. Annual recreational fishing data for the number, weight, and species caught; target species; number of anglers; number of trips ("effort"); and expenditures are available through angler surveys and charter boat logbooks and the Recreational Fisheries Information Network (RecFIN) that is managed by the Pacific Fishery Management Council (PFMC). Recreational fishing activities and trends in southern Oregon are summarized in Table 3-18.

Table 3-18: Gear, Location, and Number of Vessels in Southern Oregon Recreational Fisheries

Species	Principal Gears	Fishing Area	# of Recreational Boat Fishing Trips*
Tuna	Surface-hook-and line: Troll and bait boat (live bait)	Out to 20–50 nm (within a 70–80-mile radius of port)	4,067
Groundfish	Hook-and-line, pots	Bottom fishing very important; within 5 nm or 40 fathoms (within 30-mile radius of port); look for reefs and high spots	40,507

Species	Principal Gears	Fishing Area	# of Recreational Boat Fishing Trips*
Halibut	Hook-and-line	Within 40–100 fathoms; focus on sand or gravel habitat	3,637
Salmon	Hook-and-line, Troll	Breakers to 50 fathoms; usually stay within 20 nm	27,441
Crab	Pots	Often inside of bays and estuaries; in the ocean out to 20–70 fathoms	Not available

Sources: PFMC 2022a; PFMC 2023a; RecFIN 2023, Based on Industrial Economics, Inc. 2012, Tables 6-5 and 6-6; *Ports included in the analysis are Winchester Bay, Port Orford, Gold Beach, Florence, Charleston, Brookings, and Bandon.

Carlton et al. (2024) identified the most suitable areas for potential WEAs in the Oregon Call Areas using comprehensive spatial analysis to understand and define space-use conflicts between fisheries and Proposed Action. Their overall suitability analysis showed few interactions or conflicts in the salmon trolling fishery and the charter albacore tuna[1] in the proposed WEAs, but it also revealed low to moderate space use conflict in the Coos Bay Call Area. However, no interactions or space use conflict between fisheries and the Proposed Action was shown for the proposed Brookings Call Area and low to moderate space use conflict occurred in the albacore and salmon fisheries in the Coos Bay Call Area. The overall suitability results for albacore tuna and salmon from Carlton et al. (2024) are shown in Appendix C.

3.8.1.3 Industries Supporting Recreational Fisheries

Many businesses, such as restaurants, hotels, boat rental and repair shops, bait and tackle stores, and fishing guides, provide goods and services to recreational fishers (“anglers”). In 2021, there were approximately 120,000 boat angler trips and 1.3 million fish caught in southern Oregon (NOAA 2023). In 2017, the average expenditure per angler per day in Oregon ranged from $193.52 for a private boat or boat rental to $485.22 for a charter boat (Lovell et al. 2020). The total recreation-related establishments in Coos, Curry, and Lincoln counties are summarized in Table 3-18.

Table 3-19: Recreational Related Establishments in Coos, Curry, and Lincoln Counties, 2019

Industry	Coos	Curry	Lincoln	Oregon
Restaurants	132	70	170	1625
Hotels, motels, and B&Bs	27	29	94	380
RV parks and campgrounds	6	15	14	69
Marinas	2	-	4	9
Boat dealers	3	-	2	11
Scenic and sightseeing water transportation (a)	1	1	12	16
Recreational goods rental	1	-	1	7
Sporting and athletic goods manufacturing	2	-	-	8
All other recreation industries (b)	2	5	6	78

(a) Includes party/head and charter boats.
(b) Includes fishing guide services and recreational fishing clubs.

[1] Salmon trolling and albacore fishing are hook-and-line fisheries that use several lures or baited hooks towed from the vessel. The vessel is almost always moving and trying to match speed to the targeted species. Added vessel traffic from the Proposed Action could impede or create space use conflicts with trolling fisheries.

Source: U.S. Bureau of Labor Statistics 2022: NAICS 72251, restaurants and other eating places; 7211, traveler accommodation; 721211, RV parks and campgrounds; 713930, marinas, 441222, boat dealers; 487210, scenic and sightseeing water transportation; 532284, recreational goods rental; 339920, sporting and athletic goods manufacturing; 713990, all other amusement and recreation industries.

3.8.2 Impacts of the Proposed Action

3.8.2.1 Routine Activities

The temporary placement of met buoys could impact marine viewsheds and beach going tourism, which is high in Lincoln County, but relatively low for Coos and Curry counties. Ocean sports, such as surfing, diving, and kayaking, rarely occur on the OCS and will not be affected or impacted. Increased maritime traffic for conducting geophysical, geotechnical, biological, archaeological, and ocean use surveys could have small, short-term, minor impacts on recreational fisheries, namely salmon and albacore fishing in Coos and Lincoln counties, but negligible in Curry County.

Conclusion

Recreation and tourism bring outside money into Coos, Curry, and Lincoln's economy when visitors from more than 50 miles away come for recreation, overnight stays, to visit friends and family, and to conduct business. The Proposed Action could increase the amount of people visiting the affected counties and thereby increase economic activities such as restaurants and hotels. The impacts from the Proposed Action on recreation and tourism will likely be short-term, beneficial, and difficult to measure and overall **minor**.

3.8.3 No Action Alternative

Under this alternative, commercial leases and grants would not be issued in the Coos or Brookings WEA. However, BOEM expects ongoing activities and planned actions to have continuing regional impacts on tourism and recreational activity over the timeframe considered in this EA. Impacts from urban development and increasing air, vessel, and onshore traffic will continue to contribute to climate change and will have negative impacts on tourism and recreational activity. Implementation of the No Action Alternative would not meaningfully reduce ongoing impacts to tourism and recreational activity.

3.9 ENVIRONMENTAL JUSTICE

Environmental justice (EJ) means the just treatment and meaningful involvement of all people, regardless of income, race, color, national origin, Tribal affiliation, or disability, in agency decision-making and other Federal activities that affect human health and the environment so that people:

(i) are fully protected from disproportionate and adverse human health and environmental effects (including risks) and hazards, including those related to climate change, the impacts of environmental and other burdens, and the legacy of racism or other structural or systemic barriers; and

(ii) have equitable access to a healthy, sustainable, and resilient environment in which to live, play, work, learn, grow, worship, and engage in cultural and subsistence practices (EO 14096).

The effects of this Proposed Action on minority, low-income, Tribal, and disabled populations were analyzed in accordance with Executive Order 14096—Revitalizing Our Nation's Commitment to Environmental Justice for All (88 FR 25251); Executive Order 13166—Improving Access to Services for Persons with Limited English Proficiency (Federal Register 2000); CEQ's Environmental Justice Guidance Under NEPA (CEQ 1997); and EPA's Technical Guidance for Assessing Environmental Justice in Regulatory Analysis (EPA 2016).

3.9.1 Affected Environment

This Proposed Action's potential areas of impact on the human environment are Coos County, Curry County, and possibly (depending on wind velocity and survey activity) portions of Douglas, Lane, and Lincoln counties, which are the corresponding onshore areas with respect to the Coos Bay WEA and the Brookings WEA.

3.9.2 Demographics

Demographic analysis of Coos, Brookings, Douglas, Lane, and Lincoln counties shows that there are no minority populations that exceed 50% of the total county population, and that the minority population percentages of the counties are generally lower, with the exception of American Indians, than the minority population percentages of Oregon (Table 3-19). All four counties surveyed have a larger percentage of disabled persons and persons living in poverty than the percentages in Oregon.

EJ-related impacts most often occur on a localized, sub-county scale. Therefore, additional analyses were performed using screening and mapping tool (EPA 2024) to focus on local demographics in select communities with the potential of being impacted (Table 3-20). Demographics were determined for 5-mi radii centered on schools (Table 3-20) chosen for their potential downwind locations with respect to WEAs and vessel traffic and proximity to port activity. Again, there were no indications of minority or low-income neighborhoods that might be disproportionately, adversely impacted by the Proposed Action.

Table 3-20: Demographics for Coos, Brookings, Douglas, Lane, and Lincoln Counties

Category	Coos	Curry	Douglas	Lane	Lincoln	Oregon	U.S.
Total population	64,990	23,598	112,297	382,353	50,813	4,240,137	333,287,557
White alone	89.9%	91.2%	92.1%	88.6%	89%	85.9%	75.5%
Black or African American alone	0.7%	0.7%	0.6%	1.3%	1.0%	2.3%	13.6%
American Indian and Alaska Native alone	3.0%	2.7%	2.1%	1.6%	4.1%	1.9%	1.3%
Asian alone	1.4%	1.0%	1.2%	3.2%	1.6%	5.1%	6.3%
Native Hawaiian and Other Pacific Islander alone	0.3%	0.2%	0.2%	0.3%	0.2%	0.5%	0.3%
Hispanic or Latino	7.5%	8.0%	6.8%	10.1%	10.1%	14.4%	19.1%
White alone, not Hispanic or Latino	83.9%	84.8%	86.4%	80.2%	81.1%	73.5%	58.9%
Persons in poverty	17.4%	14.8%	16.5%	14.4%	15.2%	12.1%	11.5%
Language other than English spoken at home age 5 yrs +	5.2%	6.7%	3.8%	8.4%	7.2%	15.3%	21.7%
With a disability, under age 65 years, 2017–2021	16.6%	15.5%	14.2%	12.8%	15.3%	10.2%	8.7%

Source:U.S. Census Bureau (2023)

Table 3-21: Micro-Demographics for Schools in Selected Areas

Category	Adam Middle School, Brookings	Sunset Middle School, Coos Bay	Siuslaw Middle School, Florence	Yaquima View Elementary School, Newport	State Average
Population	12,425	33,224	13,704	12,530	4,240,137
People of Color (see note)	19%	20%	12%	22%	24%
Limited English-Speaking Households	1%	1%	1%	1%	2%
Language spoken at home (total non-English)	9%	7%	5%	14%	-
English	91%	93%	95%	86%	-
Spanish	7%	4%	2%	11%	-
Air Toxics Cancer Risk (lifetime risk per million)	16	20	20	17	28
Air Toxics Respiratory Health Index	0.24	0.3	.33	.18	0.38
Persons with Disabilities	21.9%	23.1%	24.3%	19.3%	14.9%

Note: The term “People of Color” is defined by the U.S. EPA as the people in a block group who list their racial status as a race other than white alone and/or list their ethnicity as Hispanic or Latino.

Source: EPA (2023a)

3.9.3 Impacts of the Proposed Action

This Proposed Action involves marine vessels for each lease conducting survey operations and deploying or servicing buoys. The IPFs with respect to EJ are primarily related to air and water pollutant releases. Socioeconomic impacts on EJ communities will be negligible due to the action’s required level of personnel and activity.

The air emissions are derived primarily from internal combustion engines used for propulsion of marine vessels, and auxiliary engines used for powered equipment such as cranes and winches. These emissions are primarily NO_2, SO_2, CO, and PM. GHGs are also produced, primarily in the form of CO_2. Other sources are the emissions of hydrocarbons from fuel and lubricants. Fuel and lubricants can be released during both normal operations and as a result of emergency events. In the unlikely event of a marine vessel capsize or hull breach, hydrocarbons will enter the marine environment and either vaporize, become entrained in the seawater, or, if met with an ignition source, would create combustion contaminants, including visible emissions and odors. Liquid and gaseous pollutants can also be released during the vessel refueling process and as breathing losses from both onboard and onshore storage tanks. The possibility of hydrogen releases from buoy lead-acid batteries exists but is negligible, due to the extremely small amounts released.

Vessel operations during activities will be limited in scope and short in duration. Most of the routine emissions from normal vessel operations will be emitted approximately 20 to 40 mi offshore and will be diluted by normal atmospheric mixing action prior to reaching shore. Emissions will be indistinguishable from those of other marine vessels traversing offshore southern Oregon and will not significantly impact the air quality in corresponding counties, and therefore will have no EJ impacts.

Limited English Proficiency (LEP)

Limited English Proficiency refers to persons who are not fluent in English. While the proportion of Hispanics and Latinos in the 5-county area of potential impact (7.5–10.1%) is below both the Oregon and national averages, Spanish may be spoken in at least 11% of households in the area (Table 3-20).

Translation of vital documents and interpretation of vital information may be provided at BOEM's discretion and in accordance with resource availability.

Conclusion

Due to the limited scope and short duration of the proposed project activities, the project is not expected to cause any significant adverse impacts in the corresponding onshore communities. Therefore, no significant disproportionately high adverse human health or environmental effects on minority, low-income, Tribal, or disabled populations are expected, and impact is **negligible**.

The population of the potentially affected area is overwhelmingly non-Hispanic white, and the proportions of minorities and persons in poverty are all below Oregon percentages, except for the percentage of American Indians (Table 3-19).

Two of the basic tenets of EJ are disclosure and public participation in government environmental permitting processes. There is a significant Hispanic population in the 5-county study area. This potential problem may be resolved by providing translation and interpretation services to the public, as needed, and as BOEM resources permit.

There appear to be significant proportions of people with disabilities—up to 24.3% in the 5-mi radius around Siuslaw Middle School in Florence. This is significantly greater than the Oregon State value of 14.9%. Because disabilities vary, there may not be a single action or a set of actions that would address all possibilities. BOEM may employ targeted outreach methods such as video conferencing.

3.9.4 No Action Alternative

Under the No Action Alternative, leases and grants would not be issued for the two WEAs and there would be no G&G activities pursuant to conducting wind energy activities. Adoption of the No Action Alternative would have no impacts on minority, low-income, Tribal, and disabled populations in the 5-county area. Ambient concentrations of air contaminants would remain unchanged, subject to future changes in the economy, regulations, technology, and population.

The absence of site assessment and site characterization activities within the WEAs would not have disproportionately high or adverse environmental or health effects on minority, low-income, Tribal, or disabled populations.

3.10 TRIBES AND TRIBAL RESOURCES

BOEM conducted preliminary coordination with Tribes specifically mentioned in this section and will incorporate and respond to those reviews for the final version. BOEM looks forward to further input and continuing BOEM's responsibilities to work with Tribal governments. This section is for public disclosure and comment.

Among Tribes with ancestral ties and current connections to the land and sea in the region of the Proposed Action are the Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians (CTCLUSI), Confederated Tribes of Siletz Indians (CTSI), Coquille Indian Tribe, Elk Valley Rancheria, and Tolowa Dee-ni` Nation. Additionally, the Confederated Tribes of the Umatilla Indian Reservation, Confederated Tribes of Warm Springs, Cow Creek Band of Umpqua Tribe of Indians, Hoh Tribe, Karuk Tribe, Makah Tribe, Quileute Tribe, and Quinault Indian Nation have expressed concerns over impacts to migratory species of cultural, spiritual, and economic importance that may pass through the WEAs. Given the limitations of this EA, this section briefly highlights some important connections to the resources in the region.

While current models suggest the potential for archaeological findings along the southern Oregon and northern California coast that date back 15,000 years (Jenkins et al. 2012), the first people may have arrived over 20,000 years ago (Peltier and Fairbanks 2006, Raghavan et al. 2015). Oral history of many Tribes associates their creation with the ocean or adjacent lands. The abundant natural resources of the coast became vital to the lifeways and cultural identities of the Indigenous Peoples. The ocean and rivers of the region provided food, transportation, opportunities for trade, and the coastal landscapes, seascapes, and viewsheds became sacred cultural elements.

Many Native Americans live near and use areas where BOEM activities are proposed and conducted. The ancestors of today's tribes occupied vast areas of land and depended on nearby ocean resources, even prior to both sea level rise at the end of the last ice age and interaction with the U.S. government. Furthermore, it is important to note the impact that the history of Federal law and policy has had on tribal access to ancestral lands. Policies such as the Indian Removal Act of 1830 enabled mass removal of Native Americans from their lands; these types of actions continue to have long-lasting impacts on tribes and their relationship with the Federal government. Jurisdictional boundaries, such as the California/Oregon border, further fragmented Tribes. During the "Termination Era" of the mid-20th Century, the Western Oregon Indian Termination Act ceased Federal recognition of Tribal sovereignty in western Oregon (Public Law 588, 1954). The California Rancheria Act terminated recognition of 44 Tribes in California, including Elk Valley and Smith River (Tolowa) (Public Law 85-671, 1958). Tribal resilience and protests, however, led to Federal restoration acts, particularly in the 1970s and 1980s, as well as recent land restoration acts.

Today, Tribes maintain cultural, spiritual, economic, and customary connections to marine and shoreline resources of the region. Some Tribes hold adjudicated rights to marine resources in the region. Ocean viewsheds—unobstructed ocean views—hold important cultural and spiritual significance. Many Tribes provide environmental stewardship of natural resources in southern Oregon and northern California, and they share concerns about ecosystem threats from climate change, habitat degradation, and exploitation of wild plants and animals. Several Tribes support conservation initiatives and protected status for traditional lands (cf., Tolowa Dee-ni` Nation c2006-2023a; Coquille Indian Tribe 2023). In September 2023, Tolowa Dee-ni` Nation, along with Resighini Rancheria and Cher-Ae Heights Indian Community of the Trinidad Rancheria, announced the Yurok-Tolowa-Dee-ni` Indigenous Marine Stewardship Area, which extends south from the California/Oregon border (Native News Online 2023). CTCLUSI nominated a large portion of Coos Bay as a Traditional Cultural Property (TCP) (https://ctclusi.org/wp-content/uploads/2020/11/CTCLUSI-FAQs.pdf). Tribes in the region also generate income from ventures tied to coastal and marine resources, including commercial fishing (e.g., Tolowa Dee-ni` Nation c2006-2023b).

The United States has a unique legal relationship with Indian tribal governments as set forth in the Constitution of the United States, treaties, statutes, Executive Orders, and court decisions. Further, the Federal Government has enacted numerous statutes and regulations that establish and define a trust relationship with Indian tribes, recognizing the right of self-governance and supporting tribal sovereignty and self-determination. Tribes exercise inherent sovereign powers over their members and territory. The Federal Government continues to work with Indian tribes on a government-to-government basis to address issues concerning Indian tribal self-government, tribal trust resources, and Indian tribal treaty and other rights (Executive Order 13175).

Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians

The CTCLUSI is a confederation of three coastal Tribes: Coos (including Hanis Coos and Miluk Coos), Lower Umpqua Tribe, and Siuslaw Tribe (CTCLUSI 2023). The CTCLUSI claim a direct interest in land and waters in Coos, Curry, Lincoln, Douglas and Lane Counties, and inland to high points in the Coastal

Range. The CTCLUSI also claim a direct interest in the Ocean from shore to at least 12 nm past the continental shelf.

In 1855, CTCLUSI signed the Oregon Coast Treaty, but it was never ratified by Congress. In 1954, the Western Oregon Termination Act was passed by Congress severing relations with 43 Tribes and bands of Indians in Western Oregon, including CTCLUSI. In 1984, after years of hard work, Public Law 98-481 restored Federal recognition to CTCLUSI.

Since Restoration, CTCLUSI has worked toward the restoration and protection of its lands and the surrounding environment. On January 8, 2018, the Western Oregon Tribal Fairness Act (Public Law 115-103) was signed into law. This law provides for approximately 14,700 acres of BLM administered lands in western Oregon to be held in trust on behalf of CTCLUSI. In 2019, CTCLUSI nominated a large portion of the lands and waters of Coos Bay (Q'alya Ta Kukwis Shichdii Me) as a TCP pursuant to the National Historic Preservation Act. Federal agencies have acknowledged and recognized the TCP as eligible for listing on the National Register of Historic Places.

CTCLUSI have been actively engaged with BOEM and the State of Oregon in offshore wind planning and have provided extensive comments throughout the process. The Tribe has shared its concerns about potential impacts to ocean viewsheds, submerged pre-contact landforms, traditional cultural properties, commercial fisheries, and resident and migratory species of importance to the Tribe. CTCLUSI is a member of the BOEM Oregon Intergovernmental Renewable Energy Task Force and entered into a co-management agreement with Oregon Department of Fish and Wildlife in 2023 to protect, restore, and enhance fish and wildlife populations and habitat in southwest Oregon. On October 25, 2023, CTCLUSI Council passed a resolution (23-153) *Opposing Offshore Wind Energy Development to Protect Tribal Resources*.

Coquille Indian Tribe

The Coquille Indian Tribe had permanent settlements on Lower Coos Bay and the Coquille River. Today, the Tribe manages the Coquille Forest in Coos County, Oregon, and has a co-management agreement with ODFW to protect, restore, and enhance fish and wildlife populations and habitat in southwest Oregon. The Tribe is a member of the BOEM Oregon Intergovernmental Renewable Energy Task Force and has been engaged with BOEM and the State of Oregon in offshore wind planning, providing input throughout the process. The Tribe has expressed concerns about potential impacts to sustainable ecosystems, ocean viewsheds, submerged pre-contact landforms, as well as potential impacts to the local economy, fisheries, and treaty rights.

Tolowa Dee-ni` Nation and Elk Valley Rancheria

*Tolowa Dee-ni` Nation*: Ancestral lands of the Tolowa Dee-ni` Nation include over 100 mi of coastline in southern Oregon and northern California (from Sixes River to the north and Wilson Creek to the south), and inland to the Coastal Range within the Applegate Watershed. Today, Tolowa people mainly live at the former Smith River Rancheria. In September 2023, Tolowa Dee-ni` Nation, Resighini Rancheria, and Cher-Ae Heights Indian Community of the Trinidad Rancheria announced the Yurok-Tolowa-Dee-ni` Indigenous Marine Stewardship Area, an ocean-protected area extending 3 nm from the California/Oregon border south to Little River (Native News Online 2023). On November 9, 2023, Tolowa Dee-ni' Nation Council passed a Resolution (2023-47) in opposition to offshore wind energy.

Elk Valley Rancheria: Elk Valley Rancheria is geographically located in Tolowa ancestral territory. The Tribe, along with the Smith River Rancheria, comprises the modern-day descendants of the Tolowa people. Del Norte County is part of their aboriginal territory.

BOEM has invited government-to-government consultation and engagement with Tolowa Dee-ni` Nation and Elk Valley Rancheria throughout the planning process and will continue to do so. Elk Valley Rancheria submitted comments through the Federal Register on the Draft WEAs and BOEM consulted with the Tribe in November 2023; Tolowa Dee-ni' Nation met with BOEM on February 6, 2024, to discuss their concerns.

Confederated Tribes of Siletz Indians

The Confederated Tribes of Siletz Indians (CTSI) includes descendants of over 30 Tribal bands from southern Washington to northern California. Treaties between 1851 and 1855 led to the development of the Coast (Siletz) Reservation, established by Executive Order in 1855, and extending along the coast from the Siltcoos River to Cape Lookout. In 1954, Federal recognition of CTSI was terminated by Public Law 588. In 1977, CTSI was the second Tribe in the country restored to Federal recognition (CTSI 2023). To date, the Tribe has declined invitations for government-to-government consultation on the Oregon WEAs; BOEM will continue to invite government-to-government consultation and engagement with CTSI.

Other Interested Tribes

Through BOEM's engagement with West Coast Tribes, the Confederated Tribes of the Umatilla Indian Reservation, Confederated Tribes of Warm Springs, Cow Creek Band of Umpqua Tribe of Indians, Hoh Tribe, Karuk Tribe, Makah Tribe, Quileute Tribe, and Quinault Indian Nation have each expressed concerns over migratory species of cultural, spiritual, and economic importance that may pass through the WEAs. The Umatilla, Cow Creek, and Karuk Tribes have expressed concerns about impacts that offshore wind energy development may have on salmon and other anadromous species; Hoh, Makah, Quileute, and Quinault Tribes each have adjudicated treaty-reserved rights extending onto the OCS offshore Washington and have concerns over potential impacts to migratory species of cultural, spiritual, and economic importance, as well as concerns over displacement of commercial fishers into their adjudicated treaty areas. Comment letters on the Draft WEAs were received from: CTCLUSI, Confederated Tribes of Warm Springs, Coquille Indian Tribe, Cow Creek Band of Umpqua Indians, Elk Valley Rancheria, Karuk Tribe, the Makah Tribe, and a combined letter from the Hoh and Quileute Tribes and Quinault Indian Nation.

3.10.1 Affected Environment

This analysis considers Tribes and Tribal resources in the affected environment that may be impacted from issuance of lease(s), site assessment activities, and site characterization. It does not consider impacts from construction of wind turbines, which cannot be undertaken until BOEM receives for review a COP. Issuance of a wind lease only provides the ability to submit a COP. Tribal governments have expressed concerns about impacts from offshore wind energy development to submerged archaeological sites, ocean viewsheds, traditional cultural properties, fisheries, treaty-reserved rights, resident and migratory species, and associated ecosystems. Tribal representatives have expressed to BOEM that Tribes identify themselves as part of their interconnected coastal ecosystems and that they often consider impacts to elements of the ecosystem to be impacts on the Tribe. Tribal governments have also stated they do not have sufficient workforce and technical capacity to adequately review activities related to offshore wind planning and development.

3.10.2 Impacts of the Proposed Action

The assessment of potential impacts to Tribes and Tribal resources is informed by communications between Tribes and BOEM, including informational and consultation meetings relating to offshore energy development in Oregon and northern California. Given the concerns shared by several Tribes over potential impacts within the California Current Ecosystem, BOEM invited government-to-government consultations with over eighty West Coast Tribes, including all Tribes identified above. BOEM held consultations with CTCLUSI and the Coquille Indian Tribe related to the Proposed Action; additionally, BOEM consulted with Elk Valley Rancheria and held information sharing meetings with the Karuk Tribe and Tolowa Dee-ni' Nation. The IPFs in section 2.6 apply to Tribes and Tribal resources. This section discusses the IPFs of noise, bottom disturbance, entanglements, vessels, and economics, and altered viewsheds. Air emissions, which are analyzed in sections 3.2 and 3.9, and lighting, analyzed in sections 3.5 and 3.7, are not covered in this section, because the potential impacts are the same.

3.10.2.1 Noise

Tribes may identify impacts to Tribal resources if fish, marine mammals, and other marine organisms are affected by noise produced during HRG surveys. Impacts to fish and EFH from HRG surveys and vessels are expected to be minimal and temporary in duration (section 3.3). Noise impacts on marine mammals from HRG surveys and vessels could have short, intermittent behavioral effects on individual animals. However, impacts of noise on marine species are expected to be negligible to minimal (section 3.4). Throughout the leasing and site assessment process, BOEM will continue to engage with Tribes interested in HRG surveys, associated noise, and potential effects on marine organisms.

3.10.2.2 Bottom Disturbance and Entanglements

Impacts on archaeological resources from seafloor disturbance would be avoided or mitigated by the requirement for an archaeological survey prior to the occurrence of any seafloor-disturbing activities within the lease area (section 3.11). Impacts of bottom disturbance or entanglements on marine habitats (section 3.3) and wildlife (section 3.4) are expected to be negligible.

3.10.2.3 Vessels

Vessels associated with site assessment and characterization have potential to impact Tribes through interference with Tribal uses of the ocean for cultural activities and commercial and customary fishing activities. BOEM assumes vessels supporting surveys and met buoy installation would launch from existing port facilities. Survey vessels may be visible to Tribes in coastal and nearshore areas when vessels traverse from ports to the WEAs. However, over the 5-year period of site assessment and characterization, BOEM expects the types of vessels and the level of vessel activity to mostly be indistinguishable from the existing level of vessel activity.

Survey vessels transiting from ports to the WEA lease areas could coincide with Tribal fishing activities. As with other fishing groups, there is potential for Tribal fishers to experience reduced efficiency of fishing efforts from increased vessel congestion in ports and nearshore areas. The level of increased vessel activity and associated potential space-use conflicts with Tribal fishers would likely result in few short-term occurrences or would be indistinguishable from existing levels of vessel activity in nearshore areas. Accidental impacts such as damage or entanglement to Tribal fishers' gear from survey vessels or debris are possible, but the likelihood of such events can be reduced or avoided through standard vessel safety measures, as described for commercial fishing (section 3.7). Overall, impacts from nearshore vessel activities are anticipated to be negligible to minor given the limited total number of vessel trips expected in the context of existing levels of activity in the region.

3.10.2.4 Economic Impacts

Considering the temporary nature and limited economic effects of site assessment and characterization activities, economic impacts on Tribes from these activities is expected to be temporary and with limited change, if any, from existing conditions (section 3.6). Overall, economic impacts on Tribes from site assessment and characterization activities are expected to be negligible. Economic impacts of commercial wind development in the WEAs, including economic impacts on Tribes, would be analyzed for any COPs submitted.

3.10.2.5 Altered Viewsheds

While the impact of turbine construction on ocean viewsheds is concerning to Tribes, the Proposed Action does not include significant or long-term alteration of viewsheds. Survey vessels could be within the viewshed of onshore historic properties, but such effects would be limited and temporary. The amount of regular existing ocean vessel traffic is much greater than temporary, short-term vessel activity for site surveys, and boats regularly in the area for other purposes include vessels much larger than survey vessels. Met buoys are not expected to be noticeably visible from the shore or inland areas. The potential visual impact of wind turbines in the WEAs was simulated for various day and night conditions at key observation points in Oregon (BOEM 2023b), and a visual resource impact assessment of installed wind turbines would be included in the analyses of specific COPs.

Conclusion

Potential impacts to Tribes and Tribal resources from effects of noise, bottom disturbance, and entanglements on resources important to Tribes are expected to be negligible based on the impact assessment of these factors on fish, marine mammals, and historic properties. Impacts of increased vessel activity on Tribal uses of coastal and nearshore areas would be negligible to minor because vessel activity would likely be mostly indistinguishable from existing levels, or would be temporary, and would not extend beyond the immediate timeframe of survey activities. Impacts of vessels on nearshore and offshore Tribal fishing activities would likely be negligible to minor, with potential for short-term space-use conflicts between individual vessels. Impacts on Tribes from economic effects of the Proposed Action would be negligible. No impacts from changes in ocean and coastal viewsheds are anticipated for site assessment and characterization activities. Overall, impacts to Tribes and Tribal resources from the Proposed Action are expected to be minor and temporary.

3.10.3 No Action Alternative

Under the No Action Alternative, BOEM would not hold a lease sale within the WEAs, and no lease-related site assessment and characterization activities would occur. Although leases would not be issued under the No Action Alternative, BOEM expects ongoing activities and planned actions, along with changing environmental conditions, to have continuing local and regional impacts on Tribes and Tribal resources over the timeframe considered in this EA.

Ongoing and expected future activities under the No Action Alternative include continued commercial and recreational vessel traffic, port utilization and maintenance, commercial and recreational fishing, nearshore maintenance and development projects, and ongoing and future water management regimes, including dams. These actions have potential to produce space-use conflicts or impacts on resource availability for Tribal members; however, such impacts are, for the most part, expected to represent a continuation of existing conditions and impact levels. Tribes and Tribal resources are also expected to be impacted by continuation of recent patterns of increased drought conditions and wildfire frequency and severity (Goode et al. 2018). Implementation of the No Action Alternative would not meaningfully reduce ongoing impacts to Tribes and Tribal resources when compared to the Proposed Action.

3.11 **HISTORIC PROPERTIES**

Historic properties are defined as any pre-contact period or historic period district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places

(NRHP) (54 USC § 300308). This can also include properties of traditional religious and cultural importance to a Tribe that meet criteria for inclusion in the NRHP (54 USC § 302706). Both site assessment activities (i.e., installation of meteorological buoys) and site characterization (i.e., HRG survey and geotechnical exploration) have the potential to affect historic properties. Construction activities associated with the placement of site assessment structures that disturb the ocean bottom have the potential to affect historic properties on or under the seabed. Vessel traffic associated with surveys and construction, although indistinguishable from existing ocean vessel traffic could, at times, be visible from coastal areas, potentially impacting historic properties onshore. Similarly, although indistinguishable from other lighted structures on the OCS, some meteorological buoys might be visible from historic properties onshore.

3.11.1 **Affected Environment**

Historic properties within or nearby the two WEAs include potential submerged pre-contact sites dating back at least 15,000 years and shipwrecks dating from at least the 16th through mid-20th centuries. Based on the current understanding of sea level rise and the earliest date of human occupation in the western hemisphere, any submerged pre-contact site on the Pacific OCS would be located shoreward of the 130 m (427 ft) bathymetric contour line (Clark et al. 2014; ICF International et al. 2013). Additionally, pre-contact period sites would most likely be found in the vicinity of paleochannels or river terraces that offer the highest potential of site preservation; however, preservation conditions are variable and depend on local geomorphological conditions and the speed of sea level rise. Water depths across the WEAs range from approximately 567–1,531 m (1,860–5,023 ft), therefore, the potential for submerged pre-contact period sites is non-existent within the WEAs. There is, however, the potential for submerged pre-contact sites to exist within a yet to be determined transmission cable corridor extending from the two WEAs toward shore.

According to the BOEM Pacific Shipwreck Database, there are no reported shipwreck losses within or near the Brookings WEA. The current Database does not indicate any losses within the Coos Bay WEA, but there are two potential locations for the same vessel, *C.A. Klose*, immediately east of the WEA. Though the database lists *C.A. Klose*'s possible location in this area, it is not likely to be there considering there are sources that identify the vessel as having been wrecked and salvaged in 1906 off Ocean Park, WA (Gibbs 1991).

The information presented in this section is based on existing and available information and is not intended to be a complete inventory of historic properties within the affected environment. The WEAs have not been extensively surveyed and that, in part, is the reason that BOEM requires the results of historic property identification surveys to be submitted with a SAP and COP. Additional background information on potential historic properties near the WEA and an overview of the types of cultural resources that might be expected on the Pacific OCS may be found in the BOEM-funded report *Inventory and Analysis of Coastal and Submerged Archaeological Site Occurrence on the Pacific Outer Continental Shelf* (ICF International et al. 2013). See Appendix D for Best Management Practices to Minimize Potential Adverse Impacts to Historic Properties.

3.11.2 **Impacts of the Proposed Action**

3.11.2.1 Site Characterization

As described in section 2.5.2, site characterization activities include shallow hazards assessments, and geological, geotechnical, archaeological, and biological surveys, and may include installation, operation, and decommissioning of meteorological buoys. HRG surveys do not impact the seafloor and therefore have no ability to impact cultural resources. Geotechnical testing and sediment sampling does impact the bottom and, therefore, does have the ability to impact cultural resources. However, if the lessee conducts HRG surveys prior to conducting geotechnical/sediment sampling, the lessee may avoid impacts on historic properties by relocating the sampling activities away from potential cultural resources. Therefore, BOEM assumes the lessee will conduct HRG surveys prior to conducting geotechnical/sediment sampling, and, when a potential historic property is identified, the lessee will avoid it.

BOEM recommends lessees incorporate Best Management Practices into their plans. These practices are typical mitigation measures developed through years of conventional energy operations and refined through BOEM's renewable energy program and consultations under Section 106 of the National Historic Preservation Act. These measures will minimize or eliminate potential effects from site assessment and site characterization activities and protect historic properties. BOEM intends to include the following elements in the lease(s) that will ensure avoidance of historic properties:

The lessee may only conduct geotechnical exploration activities, including geotechnical sampling or other direct sampling or investigation techniques, in areas of the leasehold in which an analysis of the results of geophysical surveys have been completed for that area. The geophysical surveys should follow the recommendations in BOEM's Archaeological Survey Guidelines, and the analysis must be completed by a qualified marine archaeologist who meets both the Secretary of the Interior's Professional Qualifications Standards (48 Federal Register (FR) 44738–44739) and has experience analyzing marine geophysical data. This analysis must include a determination whether any potential archaeological resources are present in the area, and the geotechnical (seabed and subsurface) sampling activities must avoid potential archaeological resources by a minimum of 50 m (164 ft). The avoidance distance must be calculated from the maximum discernible extent of the archaeological resource. In no case may the lessee's actions impact a potential archaeological resource without BOEM's prior approval.

Additionally, during all ground-disturbing activities, including geotechnical exploration, BOEM requires that the lessee observes the unanticipated finds requirements stipulated in 30 CFR 585.802. If the lessee, while conducting activities, discovers a potential archaeological resource while conducting construction activities or other activities, the lessee must immediately halt all seafloor-disturbing activities within the area of discovery, notify BOEM within 72 hours of the discovery, and keep the location of the discovery confidential and not take any action that may adversely affect the resource until BOEM has made an evaluation and instructed the lessee on how to proceed.

Finally, vessel traffic associated with survey activities, although indistinguishable from existing ocean vessel traffic, could at times be within the viewshed of onshore historic properties. These effects would be limited and temporary.

3.11.2.2 Site Assessment

As described above, site assessment activities consist of construction, operation, and decommissioning of up to six meteorological buoys per lease area. To assist BOEM in complying with the National Historic Preservation Act (NHPA) and other relevant laws (30 CFR 585.611(a), and (b)(6)), the SAP must contain a description of the archaeological resources that could be affected by the activities proposed in the plan.

BOEM anticipates that bottom disturbance associated with the installation of meteorological buoys would disturb the seafloor up to an estimated 10 m2 although the maximum disturbance is likely 2.3-m2 footprint (PNNL 2019). This includes all anchorages and appurtenances of the support vessels. Impacts on archaeological resources to an estimated 10 m2 of each meteorological buoy could result in direct destruction or removal of archaeological resources from their primary context. Although this would be extremely unlikely given that site characterization surveys described above would be conducted prior to the installation of any structure (see e.g., 30 CFR 585.610-611), should contact between the activities associated with site assessment and a historic property occur, there may be damage or loss to archaeological resources.

Should the surveys reveal the possible presence of an archaeological resource in an area that may be affected by its planned activities, the applicant would have the option to demonstrate through additional investigations that an archaeological resource either does not exist or would not be adversely affected by the seafloor/bottom-disturbing activities (see 30 CFR 585.802(b. Although site assessment activities have the potential to affect cultural resources either on or below the seabed or on land, existing regulatory measures, coupled with the information generated for a lessee's initial site characterization activities and presented in the lessee's SAP, make the potential for bottom-disturbing activities (e.g., anchoring, installation of meteorological buoys) to cause damage to cultural resources very low.

Installation of meteorological buoys would likely not be visible from shore, based on the low profile of the structure (current industry standard buoys rise 12 to 15 ft above the sea surface); distance from shore; and earth curvature, waves, and atmosphere. Visual impacts to onshore cultural resources would be limited and temporary in nature and would consist predominately of vessel traffic, which most likely also would not be distinguishable from existing vessel traffic. Therefore, the likelihood of impacts on onshore cultural resources from meteorological structures and from construction vessel traffic would also be very low.

Conclusion

Bottom-disturbing activities have the potential to affect historic properties. However, existing regulatory measures, information generated for a lessee's initial site characterization activities, and the unanticipated discoveries requirement make the potential for bottom-disturbing activities (e.g., coring, anchoring, installation of meteorological buoys) to have an adverse effect (i.e., cause significant impact or damage) on historic properties very low. Visual effects on onshore cultural resources from meteorological structures, and vessel traffic associated with surveys and structure construction, are expected to be **negligible** and temporary in nature.

3.11.3 No Action Alternative

Under the No Action Alternative, no leases or grants would be issued in the Oregon WEAs at this time, and therefore no lease-related site assessment and characterization impacts on offshore cultural, historical, or archaeological resources would occur. Although leases would not be issued under the No Action Alternative, BOEM expects ongoing activities (such as bottom trawling) and changing environmental conditions to have continuing impacts on historic resources.

3.12 CUMULATIVE IMPACTS

"Cumulative impact" is the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over time. Cumulative impacts are considered for the action alternative. They were determined by combining the impacts of the action alternative proposed in this document with the impacts of other past, present, and reasonably foreseeable future actions (see Appendix B). Summarized below is the possible extent of future offshore wind development in Oregon on the Pacific Outer Continental Shelf.

3.12.1 Geology

The cumulative impacts under the Proposed Action resulting from activities performed as part of a SAP and site characterization activities would be **negligible** for the seafloor or subsea geology. The estimated area of disturbance from bottom sampling would be spread out across the leases within the WEAs and along the potential offshore export cable corridors. Therefore, collection of bottom samples would create negligible cumulative impacts.

3.12.2 Air Quality

Any additional emissions resulting from this Proposed Action would be additive to the existing environmental load, including emissions from nearby projects such as wind energy associated activities in the Humboldt Harbor area. However, cumulative impacts from the additional marine vessel and other emissions associated with the Proposed Action would be relatively small compared with the existing and projected future vessel traffic in the area and would not represent a substantive incremental contribution to cumulative impacts on air quality. Cumulative impacts are expected to be **negligible**.

3.12.3 Marine and Coastal Habitats and Associated Biotic Assemblages

The incremental impacts under the Proposed Action resulting from individual impact-producing factors would range from negligible to minor for marine and coastal habitats and associated biotic assemblages (including EFH). BOEM estimates that the cumulative impacts associated with the Proposed Action combined with ongoing and reasonably foreseeable planned actions would be **moderate** within the geographic analysis area because a notable and measurable adverse impact is anticipated, and most resources are expected to recover once impacting agents are removed and remedial or mitigating actions are completed. The primary impact-producing factors analyzed under the no-action alternative stem from bottom disturbance and turbidity from urban development, fishing, and dredging activities; water quality changes from point and non-point sources of pollution (including oil spills and urban and agricultural runoff); noise from marine vessels; and artificial reef effects from other marine infrastructure projects, such as telecommunication cables, mariculture, or other offshore energy projects, including future offshore wind development.

3.12.4 Marine Mammals and Sea Turtles

BOEM anticipates that the cumulative impacts associated with the Proposed Action and with ongoing and reasonably foreseeable planned actions as well as the environmental baseline would be **moderate** for marine mammals and sea turtles in Action Area because, though the impacts are unavoidable, the viability of the resource is not threatened, and affected marine mammal and sea turtle populations would recover completely when stressors are removed, or remedial actions taken. The main impact drivers stem from site characterization surveys, and construction, presence, and decommissioning of buoys; both of which will result in increases in vessel traffic and noise.

3.12.5 Coastal and Marine Birds

The incremental impacts under the Proposed Action resulting from individual IPFs are expected to be minor for birds and impacts from ongoing and planned actions are expected to be several times greater than the incremental impacts of the Proposed Action alone. BOEM anticipates that the cumulative impacts associated with the Proposed Action and with ongoing and reasonably foreseeable planned actions as well as the environmental baseline would be **moderate** for birds in the geographic analysis area because, though the impacts are unavoidable, the viability of the resource is not threatened, and affected birds would recover completely when stressors are removed, or remedial actions taken. The main impact drivers stem from site characterization surveys, and construction, presence, and decommissioning of buoys; both of which will result in increases in vessel traffic, noise, and artificial lighting.

3.12.6 Socioeconomics

Considering all the IPFs together, BOEM anticipates the overall impacts on the social and economic characteristics from planned activities, including the proposed project, and other offshore wind projects under BOEM's regulatory purview, in Coos County and the Ports of Coos Bay to be beneficial, **minor**, and difficult to measure. The cumulative impacts on Curry County and the Ports of Newport (Yaquina), Port Orford, Brookings, and Crescent City, to be **negligible**. The cumulative impacts on Curry County and the Ports of Newport (Yaquina), Port Orford, Brookings, and Crescent City, to be negligible. The impacts of the Proposed Action on employment, labor, and wages, as well as the cumulative impact of leasing in the Oregon WEA and the California lease areas OCS-P 0561 and OCS-P 0562 could be **moderate** in the Port of Humboldt.

3.12.7 Commercial Fishing

The incremental impacts under the Proposed Action because of the above-mentioned individual IPFs will result in negligible impacts for commercial fisheries and do not add significantly to impacts from ongoing and planned actions, including other offshore wind projects under BOEM's regulatory purview. See Appendix B for a brief description of the role of the PFMC in managing commercial fishing. BOEM anticipates that the potential cumulative impacts to commercial fisheries associated with the Proposed Action and with ongoing and reasonably foreseeable planned actions as well as the environmental baseline would be expected to be **minor** and temporary in duration (five years or less).

3.12.8 Recreation and Tourism

Considering all the IPFs together, BOEM anticipates the overall impacts on recreation and tourism from planned activities, including the Proposed Action, and other offshore wind projects under BOEM's regulatory purview, in Curry, and Lincoln Counties to be beneficial, **minor** and difficult to measure. The cumulative impacts on recreational fishing, specifically the albacore and tuna fisheries, in Coos County or near the Coos WEA could be **moderately** adverse. Although recreational fishing distribution may shift spatially, the overall impact on the fishing effort or intensity would be small and short term, and the fishery is expected to recover completely.

3.12.9 Environmental Justice

Cumulative impacts from the additional marine vessel emissions associated with the Proposed Action would be relatively small compared with the existing and projected future vessel traffic in the area. This would not represent a substantive incremental contribution to cumulative impacts on minority populations or those who have disabilities and is therefore expected to be **negligible**.

3.12.10 Tribes and Tribal Resources

Combining Tribal knowledge and concerns with scientific concepts and procedures leads to holistic and effective environmental stewardship. A potential cumulative effect for Tribal governments is the increased burden on Tribal staff to adequately engage in offshore activities within current regulatory timelines. Insufficient workforce and/or specific subject matter experts can be an impediment to providing in depth reviews and meaningful engagement. Additional administrative burden and cost for Tribes is a cumulative impact as multiple agencies are requesting expertise on lengthy technical documents and is considered to be **minor** and temporary.

3.12.11 Historic Properties

With the two WEAs being far apart in distance, it is not likely one WEA would add cumulative visual effects to the other because, the vessel traffic and meteorological structures would not be visible or discernible from the other WEA. This is similar for the Humboldt Bay leases that are south of Brookings off the California coast, in that their distance and visual effects to onshore cultural resources would be **negligible** and temporary.

4 Consultation and Coordination, and Stakeholder Comments

4.1 PUBLIC INVOLVEMENT

BOEM worked in partnership with the State of Oregon to outreach and involve the public in wind energy planning offshore Oregon starting in 2021. See section 2.4 for links to previous comment dockets and summary reports.

4.2 CONSULTATION

4.2.1 Endangered Species Act (ESA) and Marine Mammal Protection Act (MMPA)

Section 7(a)(2) of the ESA requires each Federal agency to ensure that any action that they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the adverse modification of designated critical habitat. To satisfy its ESA obligations, BOEM consults with NMFS and USFWS regarding potential impacts to listed species and designated critical habitat under the jurisdiction of the Services.

BOEM will request consultation under the ESA with NMFS on the Proposed Action expected to occur in the lease areas. If the lessee intends to design and conduct biological or other surveys to support offshore renewable energy plans that could interact with ESA-listed species, the surveys must be within the scope of activities described in forthcoming ESA consultations, or the lessee must consult further with BOEM and the Services (NMFS and USFWS). Additional time should be allowed for consultation and/or permits authorizing proposed activities which are outside of the scope of existing consultations/authorizations.

To ensure compliance with the MMPA, per BOEM regulation 30 CFR§ 585.801(b), BOEM will require that lease holders must not conduct any activity under their lease that may result in an incidental taking of marine mammals until the appropriate authorization has been issued under the MMPA of 1972 as amended (16 U.S.C. 1361 et seq.).

Operators in the OCS will incorporate BMPs to minimize or eliminate potential effects from site assessment and site characterization activities to protected marine mammal and sea turtle species, including vessel strike avoidance measures, visual monitoring, and shutdown and reporting (Appendix D). These practices have been developed through years of conventional energy operations and refined through BOEM's renewable energy program, updated scientific data, and consultations with NMFS. All survey plans and SAPs will be reviewed by BOEM to ensure inclusion of appropriate BMPs.

The lessee must comply with the BMPs identified by BOEM through its ESA consultation process, as well as those prescribed by any relevant authorization under the MMPA. These measures may be updated due to statutory, regulatory, or other consultation processes, including but not limited to consultation under the ESA or the MMPA. BOEM will provide up-to-date information at the pre-survey meeting, during survey plan review, or at another time prior to survey activities as requested by the lessee. At the lessee's option, the lessee, its operators, personnel, and contractors may satisfy these survey requirements related to protected species by complying with the NMFS-approved measures to safeguard protected species that are most current at the time an activity is undertaken under this lease, including but not limited to new or updated versions of the ESA consultation, or through new or activity-specific consultations.

4.2.2 **Essential Fish Habitat (EFH) Consultation**

The Magnuson-Stevens Fishery Conservation and Management Act (as amended) requires Federal agencies to consult with NMFS regarding actions that may adversely affect designated Essential Fish Habitat (EFH), and this consultation is ongoing. The assessment herein relied on formal EFH descriptions for managed species provided by the Pacific Fishery Management Council (PFMC 2022b; 2022c; 2023b; 2023c). BOEM will combine the consultation for fishes and invertebrates listed under the ESA with the EFH consultation and will communicate with the NMFS Oregon Coastal Office regarding ESA-listed species.

4.2.3 **Coastal Zone Management Act (CZMA)**

The Coastal Zone Management Act requires that Federal actions that are reasonably likely to affect any land or water use or natural resource of the coastal zone be “consistent to the maximum extent practicable” with relevant enforceable policies of the State’s federally approved coastal management program (15 CFR 930 Subpart C). BOEM will prepare a Consistency Determination (CD) under 15 CFR 930.36(a) to determine whether issuing leases and site assessment activities (including the construction/installation, operation and maintenance, and decommissioning of wind energy research buoys) in the Oregon WEAs is consistent to the maximum extent practicable with the provisions identified as enforceable by the Coastal Zone Management Program of the State of Oregon.

Concurrence is needed prior to lease issuance and is issued by the Oregon Coastal Management Program (OCMP), which follows a networked model that consists of multiple agencies with authority in the coastal zone. The OCMP is led by the Oregon Department of Land Conservation and Development (DLCD) and comprised of several Federal agencies, 10 State agencies, 33 cities, and 7 counties that have enforceable policies that complete the program, plus four coastal Tribes that are critical partners. In preparation of the CD and to facilitate the Federal consistency review process, BOEM will consult regularly with OCMP agencies, including working directly with Oregon DLCD and working through DLCD to collaborate with other agencies such as the Oregon Department of Fish and Wildlife.

4.2.4 **National Historic Preservation Act (NHPA)**

Section 106 of the NHPA (54 U.S.C. § 306108) and its implementing regulations (36 CFR 800) require Federal agencies to consider the effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation (ACHP) an opportunity to comment. BOEM determined that issuing commercial leases within the Oregon WEAs and granting ROWs and RUEs within the region constitutes an undertaking subject to Section 106 of the NHPA (16 U.S.C. 470f) and its implementing regulations (36 CFR § 800)

BOEM has a Draft Programmatic Agreement (PA) 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 Oregon. At the time of writing this EA, the PA has been routed for signature. BOEM initiated consultation on this EA through letters sent electronically on February 15, 2024, with the Oregon State Historic Preservation Office (SHPO) and ACHP. A separate letter was sent to 14 federally recognized Tribes on February 12, 2024, that provided advanced notice of the Oregon WEAs, EA, and invited them to be Cooperating Tribal Nations on the EA and as a consulting party for Section 106 of the NHPA.

BOEM further identified potential consulting parties pursuant to 36 CFR § 800.3(f), shared the list of parties with Oregon SHPO on February 7, 2024, and sent invitations to be a consulting party on February 15, 2025. The letter to these parties, which included certified local governments, historical preservation societies, and museums, solicited public comment and input regarding the identification of, and potential effects on, historic properties for the purpose of obtaining public input for the Section 106 review (36 CFR § 800.2(d)(3)) and invited them to participate as a consulting party. BOEM will continue with the consultation process as the Draft EA circulates for public comment.

4.2.5 Tribal Coordination and Government-to-Government Consultations with Federally Recognized Tribal Nations

BOEM recognizes the unique legal relationship of the United States with Tribal Nations. BOEM has a Trust responsibility and is required to consult with federally recognized Tribes, if a BOEM action (departmental regulation, rulemaking, policy, guidance, legislative proposal, grant funding formula changes, or operational activity) may have substantial direct effect on a federally recognized Tribe. In recognition of this special relationship, BOEM extended invitations to Tribal Nations for government-to-government and Tribal Nation coordination meetings. BOEM recognizes the special expertise that Tribal governments have with respect to potential environmental consequences that may occur because of this Proposed Action and invited those Tribes to participate as Cooperating Tribal Nations (cooperating agencies) in this EA.

5 List of Preparers and Reviewers

Name	Role
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Desray Reeb	Marine Mammals and Sea Turtles
Donna Schroeder	Marine and Coastal Habitats and Associated Biotic Assemblages
David Pereksta	Coastal and Marine Birds and Bats
Ingrid Biedron	Commercial Fishing
Stephanie Webb	Socioeconomics, Recreation, and Tourism
Erick Huchzermeyer	Geology, Geophysical, Geotechnical
Katsumi Keeler	Air Quality, Environmental Justice
Bert Ho	Historic Properties
Linette Makua, Melanie Hunter	NEPA Coordination
Abigail Ryder	Public Outreach Coordination
Lisa Gilbane	Project Supervisor
Matt Blazek	Vessel Traffic, Navigation
Erin Boydston, Natalie Dayal	Technical Editing

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BOEM’s mission is to manage development of U.S. Outer Continental Shelf energy and mineral resources in an environmentally and economically responsible way.