# Appendix A: Resources Eliminated from Detailed Consideration, and Assessment of Resources with Negligible Impacts

## A-1. Water Quality

Water quality impact is expected to be **negligible** in the WEAs and along cable routes. All vessels are required to comply with the discharge requirements under Section 402 of the Clean Water Act and the level of additional vessel traffic associated with site assessment and site characterization activities will not result in changes to water quality. The U.S. Army Corps of Engineers (USACE) Nationwide Permit (NWP) Program was developed to streamline the evaluation and approval process for certain types of activities that have only minimal impacts on the aquatic environment that require USACE permits for discharge of dredged or fill material under Section 404 of the Clean Water Act and/or for Section 10 of the Rivers and Harbors Act of 1899. Met buoys would likely qualify for USACE general permits. Short-term and localized resuspension of seafloor sediment into the water column resulting from core and grab sampling is not expected to result in any lasting impact to water or sediment quality in either the WEA or along any surveyed projected transmission cable route.

## A-2. Bats

The potential impacts on bats associated with activities described in the scenario for the Proposed Action (HRG surveys, geotechnical/benthic sampling, and biological surveys off the coast of Oregon) would be **negligible**. Impacts on bats offshore in the Pacific are analyzed in detail within the Commercial Wind Lease and Grant Issuance and Site Assessment Activities on the Pacific Outer Continental Shelf Humboldt Wind Energy Area, California, Final EA (BOEM 2022a) and the Commercial Wind Lease and Grant Issuance and Site Assessment Activities on the Pacific Continental Shelf Morro Bay Wind Energy Area, California, Final EA (BOEM 2022b). While bats are expected to be rare in the Oregon WEAs, bats could have avoidance or attraction responses to vessels and buoys due to noise, lighting, and the possible presence of insects. Bats have been recorded as using offshore ships as opportunistic stopover sites (Pelletier et al. 2013); thus, while it is undocumented, it is possible that vessels could unintentionally transport bats into the offshore environment.

The bat species that are most likely to occur offshore over Federal waters are the hoary bat (*Lasiurus cinereus*) and western red bat (*Lasiurus blossevillii*) (H.T. Harvey & Associates 2020). Hoary bats are known to migrate south in autumn offshore and along the coast of central California, and western red bats are also known to migrate offshore of central California (Cryan and Brown 2007), so it is assumed that these species likely migrate off the coast of southern Oregon. The Mexican free-tailed bat (*Tadarida brasiliensis*) has been recorded offshore of the California coast and could occur off southern Oregon, which is the northern limit of its geographic range. Some species of bats hunt for insects in offshore areas where they normally migrate across open ocean areas, such as the Baltic Sea, and have been found to forage for flying insects around, and rest on, offshore wind turbines (Ahlén et al. 2007). No other species of bats are expected to occur in the marine portion of the Proposed Action area based on the lack of museum records and literature. However, recent and ongoing BOEM-supported acoustic surveys along the California coast have detected 15 species of bats along the coast and around offshore rocks so it is possible that other species could occur over Federal waters.

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. Although bats are rare in the WEAs, bats could have avoidance or attraction responses to the survey vessels and met buoys due to noise, lighting, and the possible presence of insects. There may be temporary impacts on bats from onshore operational noise and human activity during construction and decommissioning or during survey operations of the offshore export cable route in coastal areas; these operations, however, will not be out of character for the areas existing vessel traffic and operations. Due to the scarcity of bats offshore in the WEAs, the limited amount of added vessel traffic, and based on up to five met buoys per lease, collisions between bats and boats/met buoys are unlikely. Thus, the overall impact of activities associated with the Proposed Action would be **negligible**.

## A-3. References

Ahlén I, Bach L, Baagøe HJ, Pettersson J. 2007. Bats and offshore wind turbines studied in southern Scandinavia.

BOEM. 2022a. Commercial Wind Lease and Grant Issuance, and Site Assessment Activities on the Pacific Outer Continental Shelf Humboldt Wind Energy Area, California. Environmental Assessment. Camarillo (CA): U.S. Department of the Interior, Bureau of Ocean Energy Management. 90 p. Report No.: OCS EIS/EA BOEM 2022-026. OEM 2022

BOEM. 2022. Commercial Wind Lease and Grant Issuance, and Site Assessment Activities on the Pacific Outer Continental Shelf, Morro Bay Wind Energy Area, California. Environmental Assessment. Camarillo (CA): U.S. Department of the Interior, Bureau of Ocean Energy Management. 101 p. Report No.: OCS EIS/EA BOEM 2022-024.

Cryan PM, Brown AC. 2007. Migration of bats past a remote island offers clues toward the problem of bat fatalities at wind turbines. Biological Conservation. 139(1-2):1-11

H.T. Harvey & Associates. 2020. Existing conditions and potential environmental effects. In: Severy M, Alva, Z, Chapman G, Cheli M, Garcia T, Ortega C, Salas N, Younes A, Zoellick J, Joacobson A, editors. California North Coast Offshore Wind Studies. Humboldt (CA): Schatz Energy Research enter. p. 191. schatzcenter.org/pubs/2020-OSW-R13.pdf.

# Appendix B: Current and Reasonably Foreseeable Planned Actions

## B-1. Introduction

This appendix discusses ongoing and reasonably foreseeable planned actions that could occur in the vicinity of the Proposed Action and whether these actions could impact the same resources potentially impacted by the Proposed Action. The Proposed Action is issuance of (a) one commercial wind energy lease and associated easements within the Coos Bay WEA and one lease within Brookings WEA and (b) to grant ROWs, RUEs in support of wind energy development. The Coos Bay WEA is 61,203 acres with a maximum depth of 1,414 meters and minimum depth of 635 meters. The Brookings WEA is 133,792 acres with a maximum depth of 1,531 meters and a minimum depth of 567 meters. Planned actions may include those taking place in areas between the WEA and onshore for cable corridors and substation facilities. Those areas on the OCS would later be granted to a lease holder as rights-of-way (ROWs) and/or rights-of-use and easement (RUEs) in support of wind energy development.

BOEM considered ongoing and reasonably foreseeable planned actions that would occur offshore Oregon, as well as activities that would take place in state waters (Figure B-1). However, the geographic boundaries for activities that could interact with marine mammals, sea turtles, fishes, fishing, and birds is beyond this area due to the extensive migration patterns of many species. This section addresses ongoing and planned actions that overlap with this regional area and may occur between the start of Proposed Action activities in 2024 and the completion of decommissioning of meteorological buoys in 2029, contingent on the timing of lease issuance.

Critical offshore infrastructure in the vicinity of the Oregon WEAs is shown in Figure B-1. Built structures include one existing submarine telecommunication cable in the Coos Bay WEA. Several existing telecommunication cables exist outside of the WEAs and power cables are permitted offshore Newport to the north of the WEAs (not shown).

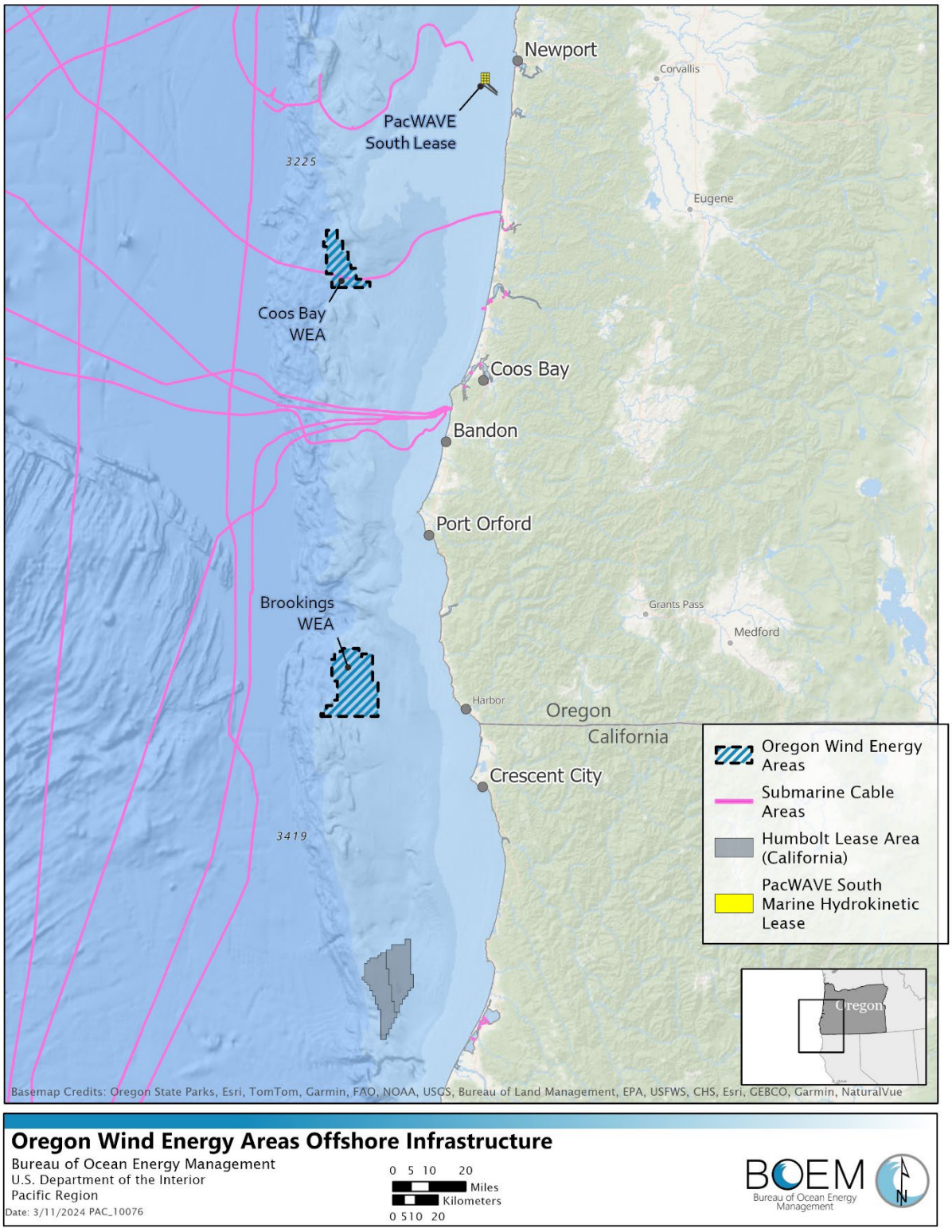



**Figure B-1: Map of Reasonably Foreseeable Infrastructure (Existing) and Renewable Energy Projects (Permitted) in Relation to the Oregon Wind Energy Area**

## B-2. Current and Reasonably Foreseeable Planned Actions

Ongoing and reasonably foreseeable planned actions include: (1) other renewable energy development activities; (2) military use; (3) marine transportation; (4) commercial fishing management; (5) ocean surveys for species management; (6) other scientific activities; and (7) undersea telecommunications cables on the seafloor. There are many other ocean uses and people using the ocean, those topics such as recreational fishing and Tribal interests, are described in Chapter 3.

### B-2.1. Other Renewable Energy Development Activities

PacWave South is a research lease permitted by BOEM and the Federal Energy Regulatory Commission to host marine hydrokinetic devices offshore the town of Newport. Up to 20 wave converter devices could potentially be moored and connected through power cables to shore. Multiple power cables are planned for installation in 2025, which is 56 miles northeast of the Coos Bay WEA.

BOEM is managing federal oversight authority on five existing wind energy leases in California, two leases are located in northern California off Humboldt County, which is 62 miles south of the Brookings WEA. Current activities include site characterization surveys and site assessment activities similar to the Proposed Action. These leases in California are not authorized to construct wind turbines.

### B-2.2. Military Use

BOEM's Final WEA recommendations are a result of balancing key existing use. A prominent interest was military mission compatibility. The Department of Defense (DoD) utilizes the air and sea space offshore Oregon coast to ensure national security and defense. DoD activities offshore the United States typically include land, air, and sea-based uses. The DoD, in a letter to BOEM dated May 17, 2022, provided the results of the DoD Clearinghouse's review of areas offshore Oregon would be suitable with offshore wind activities (**Appendix G**). This review identified an area to the south of the Coos Bay WEA that is incompatible with wind energy development because of existing classified infrastructure and national security features. BOEM excluded this area from further consideration and the WEAs in this EA avoid the area identified by DoD.

While not anticipated, military training and testing activities may be displaced during the execution of site assessment and characterization activities. Modifications to these activities may be necessary to allow for training and readiness requirements. BOEM and lessees will continue coordination with DoD during this period to deconflict activities when practicable.

### B-2.3. Marine Transportation

Over the five-year timeframe assessed in the Oregon EA, BOEM assumes that shipping and marine transportation activities would increase above the density of use shown in Figure B-2. Automatic Identification System (AIS) is an automated and autonomous tracking system, which is used globally and can track different classes of marine vessels. Vessel traffic from 2019 for Cargo Vessels, Tugs and Tow Vessels, and Tankers is tracked through AIS (Figure B-2) and shows a range of 10 to 100 vessels a year transiting the WEAs. Density of vessel traffic increases offshore and in ports.

BOEM reviewed 2017, 2019, and 2020 AIS vessel information retrieved from Marine Cadastre to determine vessel traffic patterns and identify how they may conflict with offshore wind planning in Oregon (2020 AIS Vessel Traffic by Type, 2019 AIS Vessel Traffic by Type, and 2017 AIS Vessel Traffic by Type). Most commercial vessels that traversed the Oregon WEAs with AIS transmitters are cargo vessels. Vessel traffic patterns moved further away from shore between 2017 and 2020. More vessels traversed the areas in and around the Coos Bay and Brookings WEAs in 2019 than in 2017 or 2020.

The US Coast Guard conducted a Pacific Coast Port Access Route Study (PACPARS) to evaluate safe access routes for the movement of vessel traffic proceeding to or from ports or places along the western seaboard of the United States and to determine whether a Shipping Safety Fairway and/or routing measures should be established, adjusted, or modified. The PARS evaluated shipping along the coasts of California, Oregon, and Washington. The final report was published in the Federal Register on June 5, 2023 (88 FR 36607) with recommended voluntary fairways. Data gathered during this Pacific Coast PARS may result in the establishment of one or more new vessel routing measures, modification of existing routing measures, or disestablishment of existing routing measures off the Pacific Coast between Washington and California and overlaps with the Project Area. This process will take several years. The proposed fairways do not overlap with the Coos Bay or Brookings WEA.

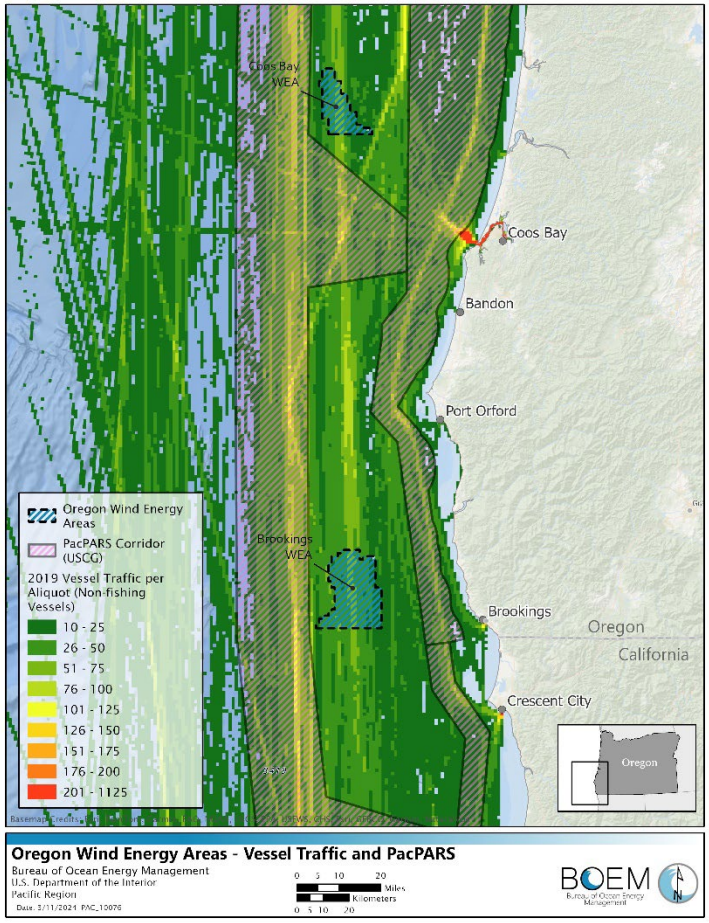



**Figure B-2: Potential Future Routes Proposed by the US Coast Guard (USCG) and Vessel Traffic from 2019 and for Cargo Vessels, Tugs and Tow Vessels, and Tankers Relative to the Oregon Wind Energy Areas**

### B-2.4. Commercial Fisheries Management

The Pacific Fishery Management Council (PFMC) is responsible for making recommendations for Federal fisheries management measures to the National Oceanic and Atmospheric Administration (NOAA) Fisheries for implementation (https://www.pcouncil.org/). NOAA Fisheries also creates and implements some fisheries management measures as part of U.S. obligations under various international fishery

agreements. Along the US West Coast, PFMC manages 119 species and four Federal fishery management plans (FMPs): 1) Pacific Salmon, 2) Pacific Groundfish, 3) coastal Pelagic Species (e.g., sardines, anchovies, and mackerel), and 4) Highly Migratory Species (e.g., tunas, sharks, and swordfish) (PFMC 2022a; 2022b; 2023a; 2023b). PFMC works with the International Pacific Halibut Commission to manage Pacific halibut fisheries. PFMC's Fishery Ecosystem Plan helps incorporate ecosystem issues into PFMC's fishery management plans. The fishery management plans of PFMC were established, in part, to manage fisheries to avoid overfishing, which is accomplished through an array of management measures, including annual catch quotas, minimum size limits, and closed areas. PFMC is required to achieve optimum yield for public trust marine resources and safeguarding these resources, their habitats, and the fishing communities that rely on their harvest. Areas designated to restrict fishing type and or locations are reviewed periodically.

### B-2.5. National Oceanic and Atmospheric Administration Ocean Surveys

NOAA National Marine Fisheries Service (NFMS) conducts ocean surveys to assess threatened and endangered species, fished stock assessments, and habitats in the California Current Large Marine Ecosystem. Other Federal and state agencies, academic institutions, and research organizations rely on data from these surveys to assess the current state of the ecosystem, inform sustainable management of fisheries stocks, develop management actions to conserve protected species, and understand and predict the impacts of climate change on living marine resources. In any one year, NOAA conducts up to fourteen Mission-Critical Scientific Surveys in the BOEM Oregon WEAs. NOAA disclosed details of surveys related to Oregon offshore wind planning in prior letters. NFMS surveys were an input into the spatial siting analysis where NFMS ranked the priority of these surveys in relation to the Oregon draft WEAs (Carlton et al. 2024, Appendix D).

Some of NOAA NFMS' surveys focus on stock assessments of commercially fished species and to monitor the condition of nearly 500 fish stocks. Stock assessments of fish in the West Coast region involve both the Northwest and Southwest Fisheries Science Centers within NMFS from at-sea data collection surveys every year. Fishery managers, primarily through the PFMC, use the results of stock assessments to evaluate the status of fish stocks and set the amounts of fish that commercial and recreational fisheries can sustainably harvest from a stock in one year.

Data results from these surveys are used in sections 3.4 Marine Mammals and Sea Turtles and 3.7 Commercial Fishing. BOEM anticipates continued coordination and cooperation with NOAA to reduce or avoid conflict between site assessment and site characterization activities and scientific surveys.

### B-2.6. Scientific Activities

The Regional Cabled Array (RCA; https://oceanobservatories.org/regional-cabled-array/) and provides a constant stream of real time data from the seafloor and through the water column across the Juan de Fuca plate. A network of 900 kilometers of electro-optical cables supplies unprecedented power (10 kilovolts, 8 kilowatt), bandwidth (10 Gigabit Ethernet (GbE), and two-way communication to scientific sensors on the seafloor and throughout the water column. More than 140 instruments are connected to the RCA. Data are sent through a variety of telecommunications sub-sea cables, made from fiber-optics and copper. The cables provide a communication system between RCA's seven nodes and the shore station in Pacific City, Oregon. The closest node is *PN1C (Oregon Offshore)*, located offshore Newport Oregon.

Buoys are currently deployed near the Proposed Action area with historical datasets and current conditions available at NOAA's National Data Buoy Center (https://www.ndbc.noaa.gov). There are many buoys and stations near the Oregon WEA, including in Newport, South Beach, Stonewall Bank, Valino Island, and west of Coos Bay.

High-resolutions geophysical (HRG) surveys are done periodically offshore Oregon by research institutions and Federal agencies such as the US Geological Survey. The Expanding Pacific Research and Exploration of Submerged Systems (EXPRESS) is a partnership that collaborates and publishes many of the larger seafloor surveys done since 2017 in the area (www.usgs.gov/science/express). Results from these surveys partially informed the draft WEA and section 3.1 Geology in particular. HRG surveys in State waters typically need a state permit.

### B-2.7. Undersea Telecommunication Cables

Submarine cables include fiber-optic cables and trans-Pacific cables primarily for telecommunications. One cable exists across the southern end of the Coos Bay WEA.

## B-3. References

Carlton J, Jossart JA, Pendleton F, Sumait N, Miller J, Thurston-Keller J, Reeb D, Gilbane L, Pereksta D, Schroeder D, Morris Jr JA. 2024. A wind energy area siting analysis for the Oregon Call Areas. Camarillo (CA): U.S. Department of the Interior, Bureau of Ocean Energy Management. 237 p. Report No.: BOEM 2024-15.

NMFS. 2022. Fish Stock Assessment Report. Quarterly summary of the activities of the national stock assessment enterprise for Fiscal Year 2021. https://www.fisheries.noaa.gov/national/population-assessments/fish-stock-assessment-report (accessed February 1, 2022).

PFMC. 2022a. Pacific Coast Salmon Fishery Management Plan for Commercial and Recreational Salmon Fisheries off the Coasts of Washington, Oregon, and California as Revised through Amendment 23. Portland (OR): Pacific Fisheries Management Council. 84 p. https://www.pcouncil.org/documents/2022/12/pacific-coast-salmon-fmp.pdf/

PFMC. 2022b. Pacific Coast Groundfish Fishery Management Plan for the California, Oregon, and Washington groundfish fishery. Portland (OR): Pacific Fishery Management Council. 147 p. https://www.pcouncil.org/documents/2022/08/pacific-coast-groundfish-fishery-management-plan.pdf/

PFMC. 2023a. Coastal Pelagic Species Fishery Management Plan as Amended through Amendment 20. Portland (OR): Pacific Fishery Management Council. 53 p. https://www.pcouncil.org/documents/2023/06/coastal-pelagic-species-fishery-management-plan.pdf/

PFMC. 2023b. Fishery Management Plan for U.S. West Coast Fisheries for Highly Migratory Species as Amended through Amendment 7. Portland (OR): Pacific Fishery Management Council. 86 p. https://www.pcouncil.org/documents/2023/04/fishery-management-plan-for-west-coast-fisheries-for-highly-migratory-species-through-amendment-5.pdf/

USCG. 2024. Port Access Route Study: The Pacific Coast from Washington to California. 42 p. Report No.: USCG-2021-0345 PAC-PARS.

# Appendix C: Supplemental Information for Ports, Fisheries, and Military Activities

## C-1. Port Maps

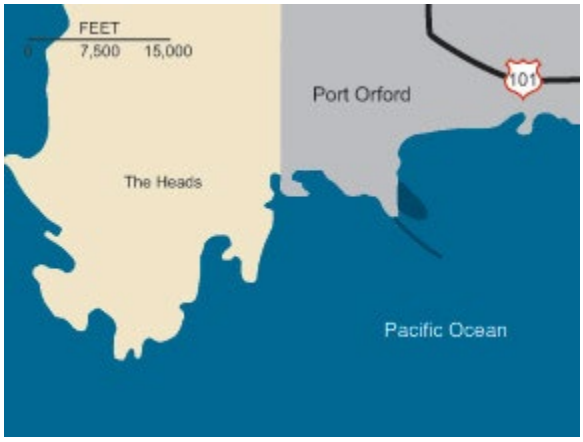



**Figure C-1. Port of Port Orford, Oregon**

Source: Army Corps of Engineers (https://www.nwp.usace.army.mil/Locations/Oregon-Coast/Port-Orford/)


**Figure C-2. Port of Brookings, Oregon**

Source: Army Corps of Engineers (https://www.nwp.usace.army.mil/Locations/Oregon-Coast/Port-Orford/)


**Figure C-3. Port of Coos Bay, Oregon**

Source: Army Corps of Engineers (https://www.nwp.usace.army.mil/Locations/Oregon-Coast/Port-Orford/)


**Figure C-4. Port of Newport (Yaquina Bay), Oregon**

Source: Army Corps of Engineers (https://www.nwp.usace.army.mil/Locations/Oregon-Coast/Yaquina-Bay/)

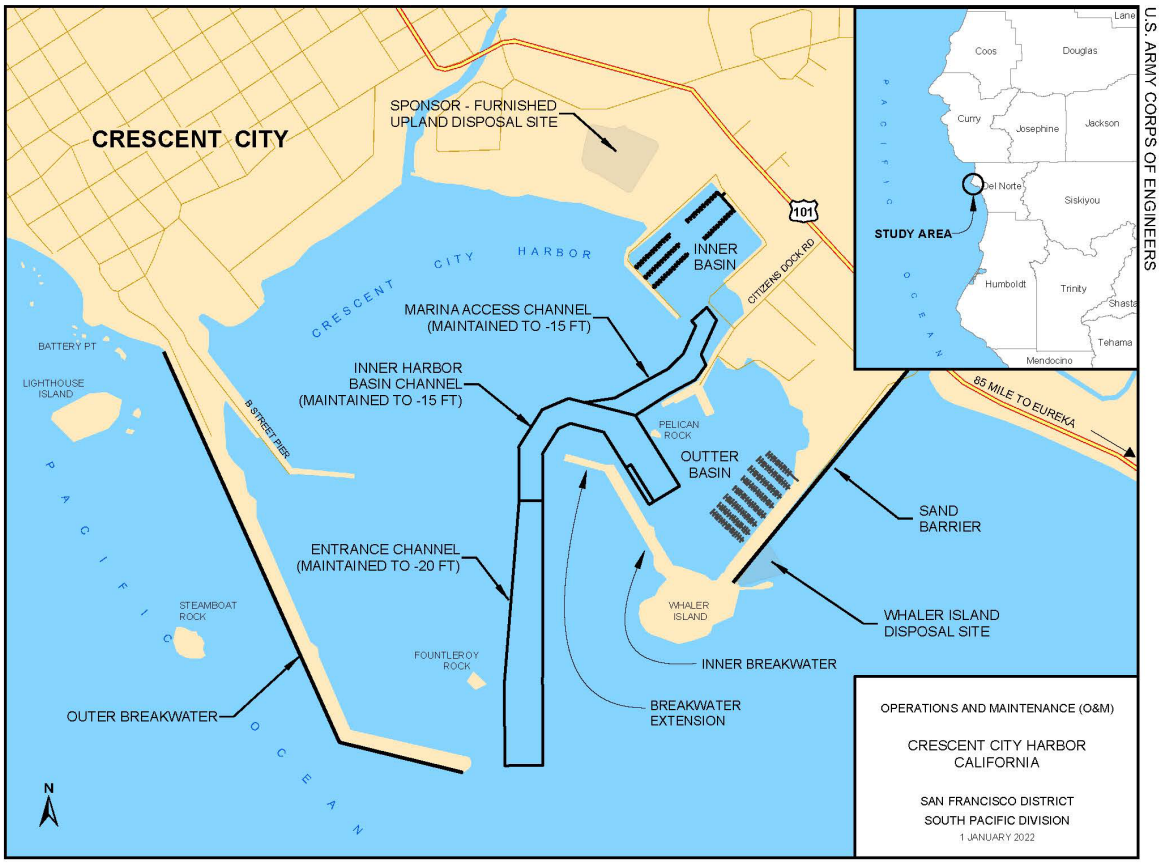



**Figure C-5. Port of Crescent City, Oregon**

Source: Army Corps of Engineers (https://www.spn.usace.army.mil/Missions/Projects-and-Programs/Current-Projects/Crescent-City-Harbor-/)

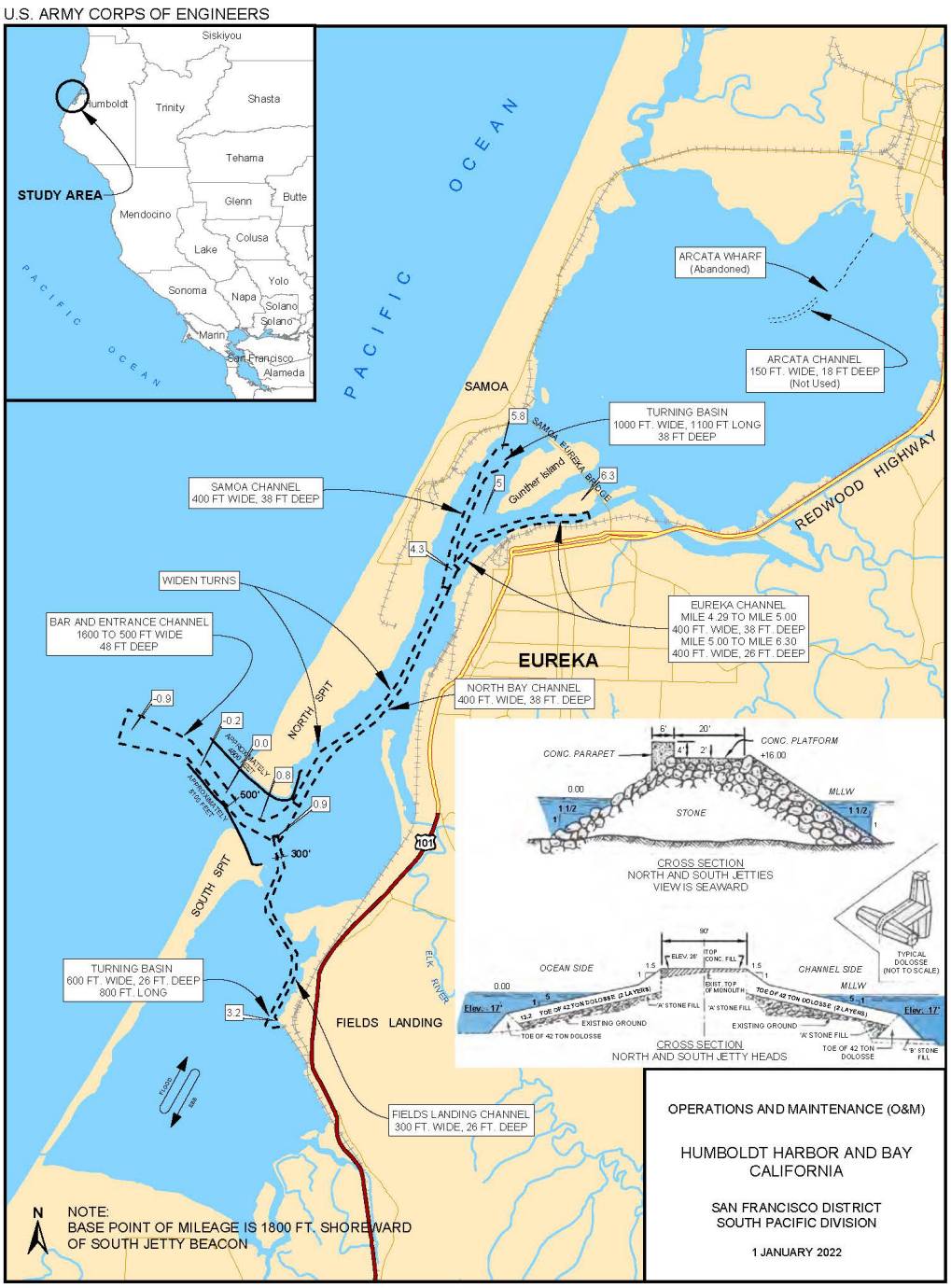



**Figure C-6. Port of Humboldt Bay (Eureka), California**

Source: Army Corps of Engineers (https://www.spn.usace.army.mil/Missions/Projects-and-Programs/Current-Projects/Humboldt-Harbor-Bay--/)

## C-2. Fisheries Figures from Carlton et al. (2024)

The Draft WEAs in Carlton et al. (2024) are not the same as the final WEAs presented in this Environmental Assessment. The figures below show the two Draft WEAs identified through the spatial suitability modeling process in Carlton et al. (2024). The Brookings WEA was later modified in the Oregon Area ID Memo 2024, with a portion of the WEA removed to better prevent conflict with long term oceanic monitoring and sensitive habitat.

Data and information from the Appendices of the NCCOS Draft Report (Carlton et al. 2024) provide an overview of the commercial fisheries resources in the Oregon Call Areas and WEAs. The NCCOS models used information from NMFS and 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.

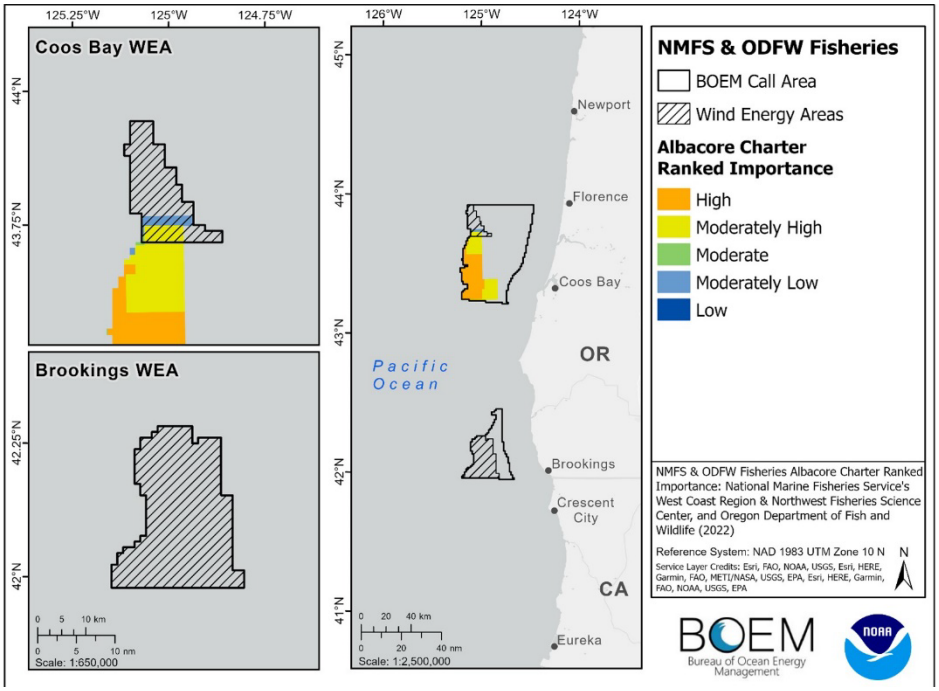



**Figure C-7. Ranked Importance of Charter Albacore- Relative to Oregon WEAs**

Source: Carlton et al., 2023 (Figure 3.72)

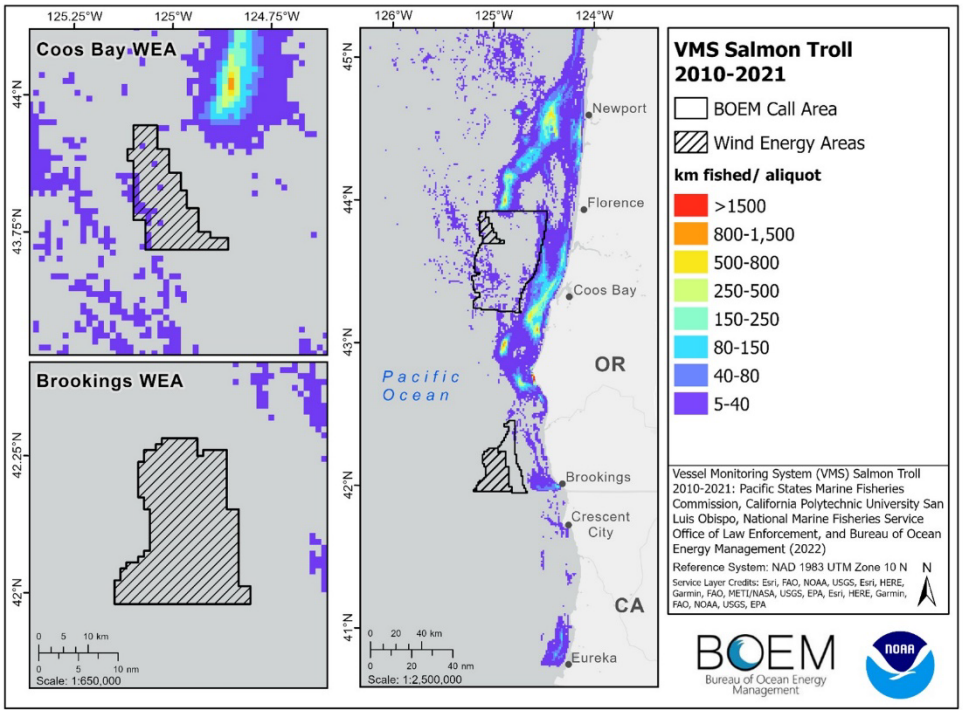



**Figure C-8. Salmon Troll Fishing Relative to Oregon-WEAs**

Source: Carlton et al., 2023 (Fig. 3.79)

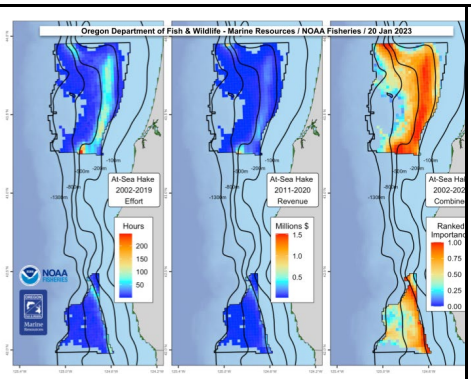
From Appendix E in Carlton et al. (2024) pp 184 - 185: “Below are nonconfidential maps that NMFS and ODFW prepared for each of the nine fisheries. For each fishery, the map on the left shows raw effort, middle map shows raw revenue, and the map on the right shows the ranked importance (i.e., combined effort and revenue), with the exception of groundfish bottom trawl and recreational charter albacore that do not have a revenue map.”

At-sea hake mid-water trawl

**Data source:**

Effort: NMFS At-Sea Hake Observer Program (nearly 100% coverage)

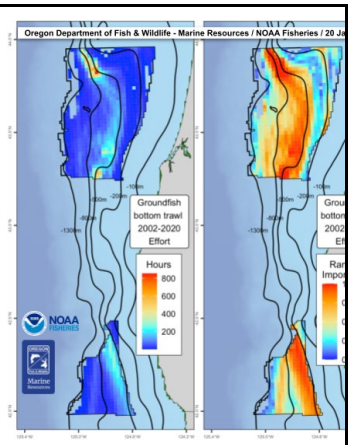
Revenue: NMFS At-Sea Hake Observer Program (nearly 100% coverage) & PacFIN




Groundfish bottom trawl

**Data Source:**

Effort: ODFW State logbooks in PacFIN

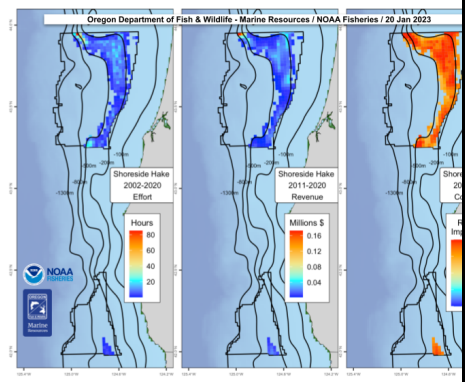



Shoreside hake mid-water trawl

**Data Source:**

Effort: ODFW State (2002-2010, 2020) & PacFIN logbooks (2011-2019)

Revenue: NMFS West Coast Groundfish Observer Program & ODFW Fish Tickets in PacFIN

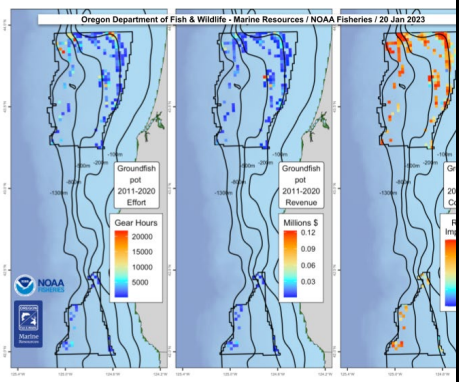



Groundfish fixed gear - pot

**Data Source:**

Effort: ODFW State logbooks

Revenue: ODFW State logbooks & ODFW Fish Tickets in PacFIN

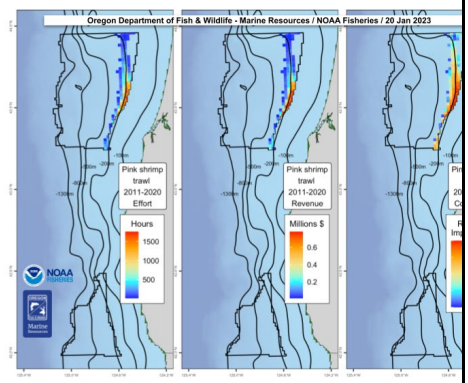



Pink Shrimp trawl

**Data Source:**

Effort: ODFW State logbooks

Revenue: ODFW State logbooks & ODFW Fish Tickets in PacFIN

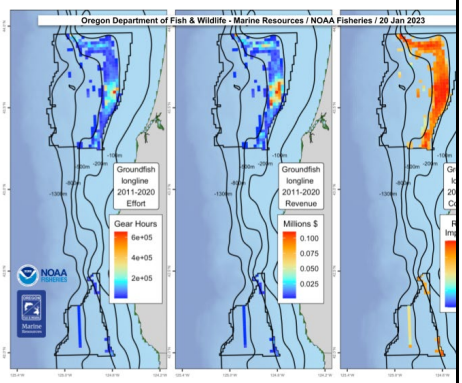



Groundfish fixed gear - longline

**Data Source:**

Effort: ODFW State logbooks

Revenue: ODFW State logbooks & ODFW Fish Tickets in PacFIN



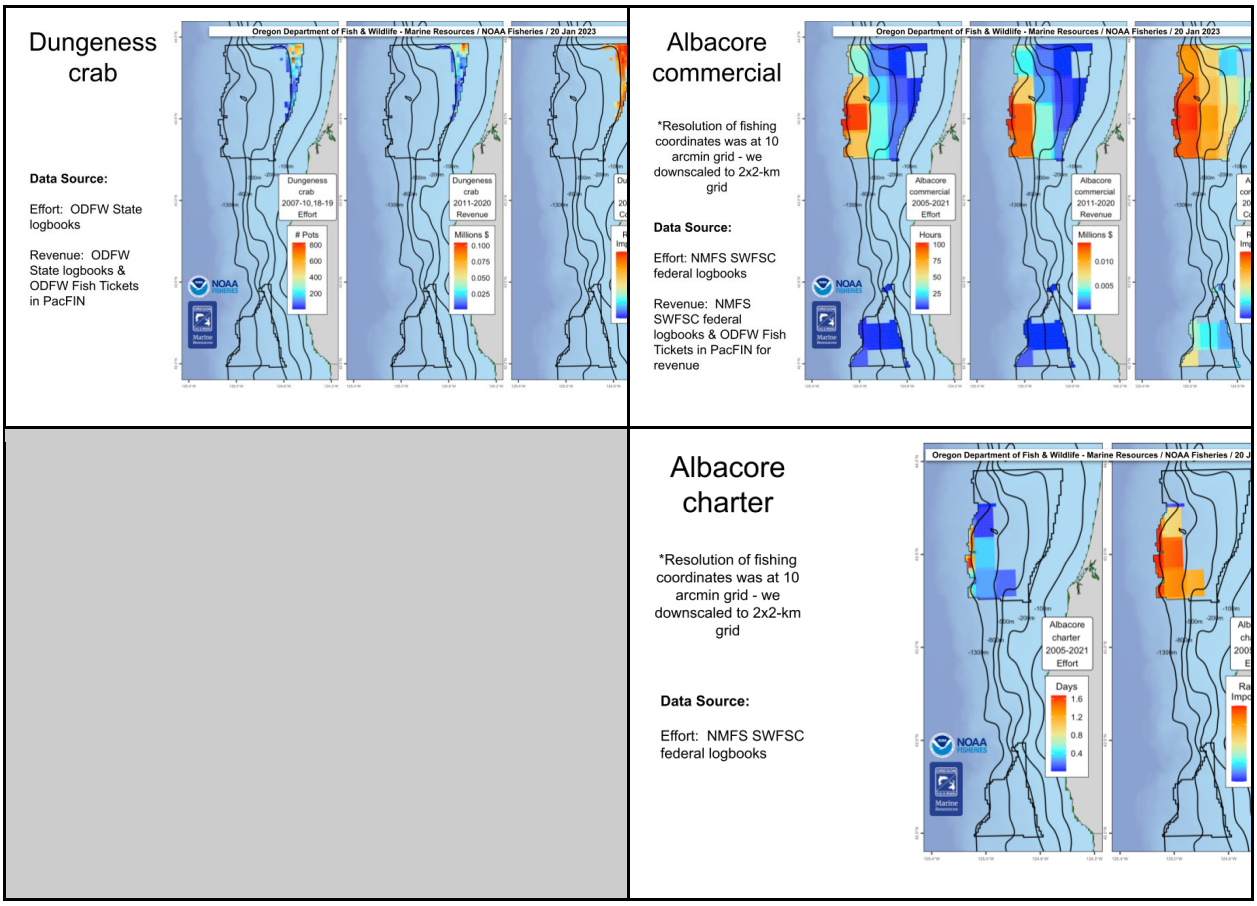
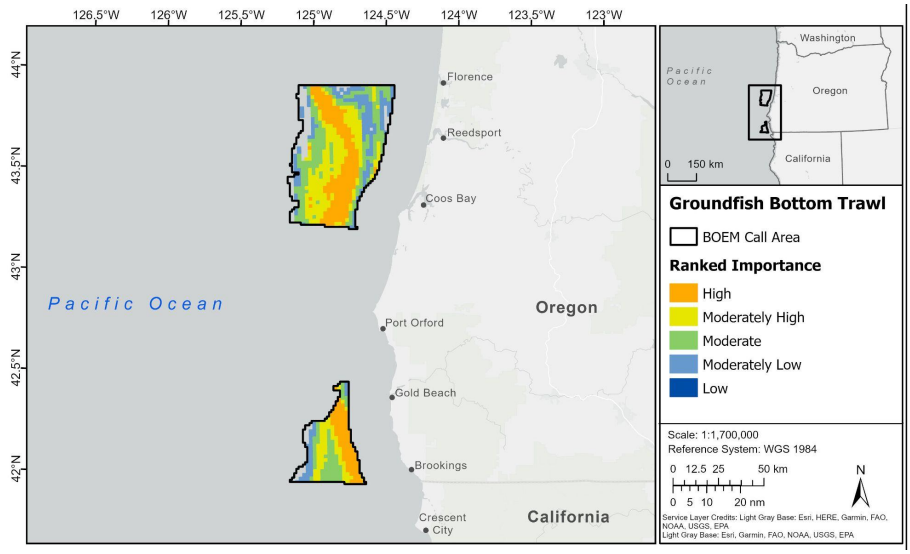
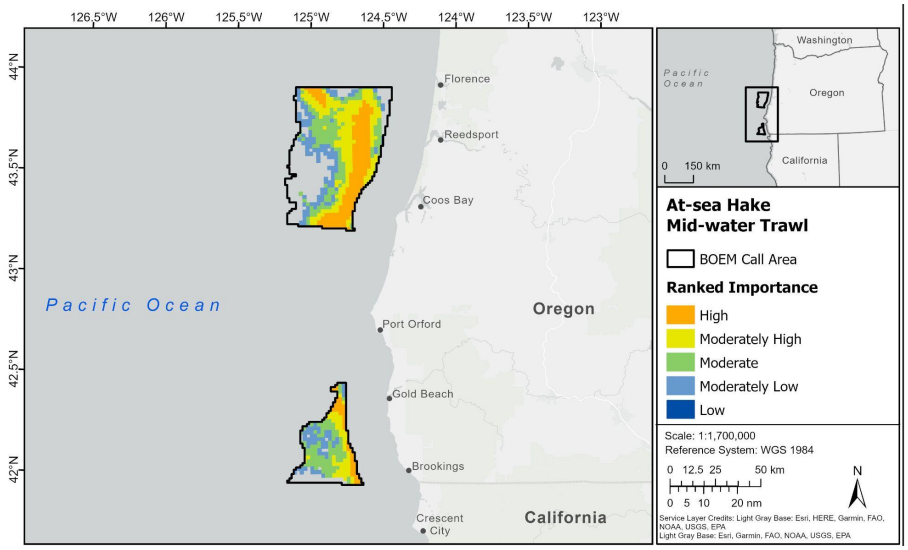
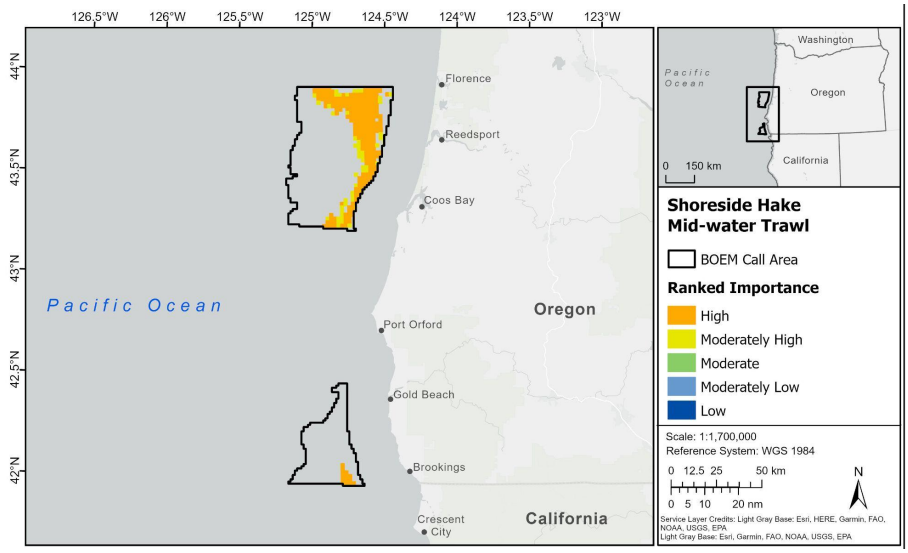
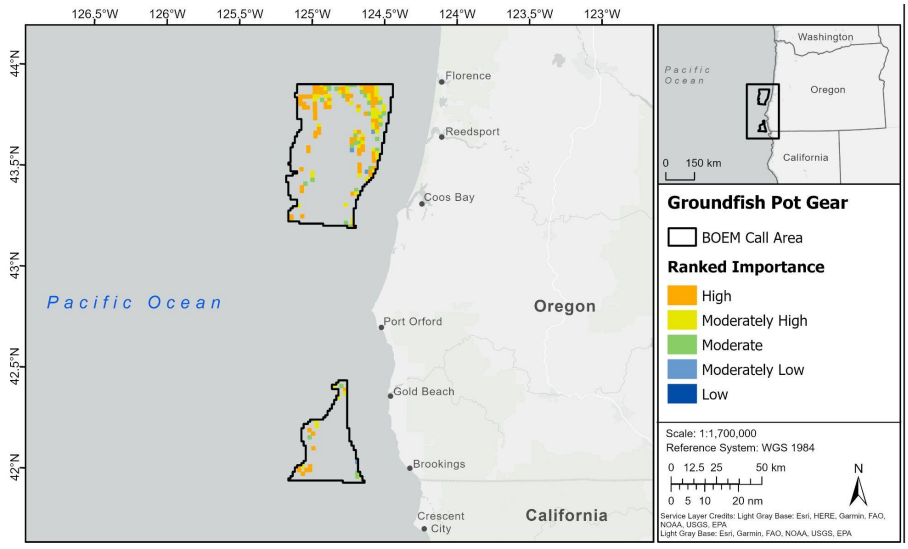



**Figure C-9. Raw Effort, Raw Revenue, and Ranked Importance**

Carlton et al. (2024), page 184–185

From Appendix E in Carleton et al. (2024), pp 185 - 188: "Below are the corresponding maps created by NCCOS using the data and recommendations provided by NMFS and ODFW."

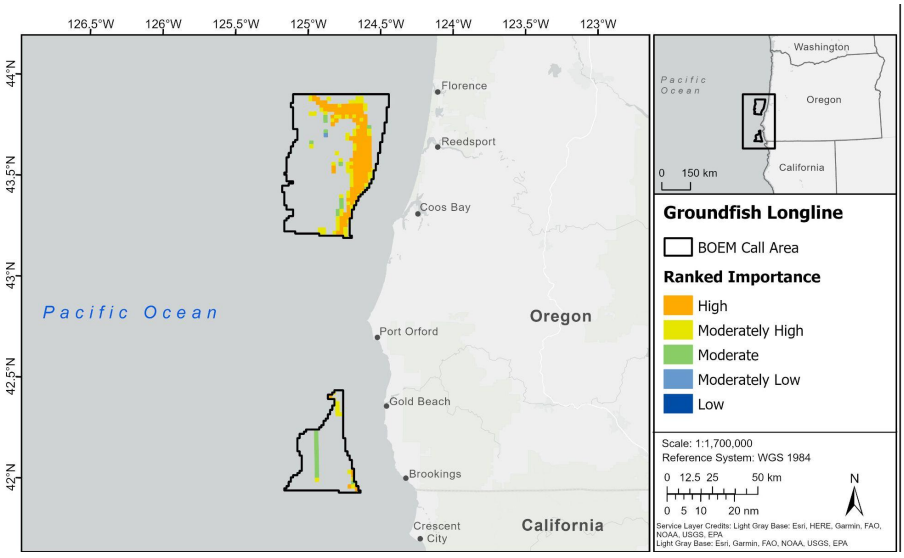
| **Map Title and Description** | NCCOS Map |
|---|---|
| **Groundfish:**<br>**Bottom Trawl**<br><br>Time Period: 2002–2020 (effort only)<br><br>Cells containing data with < 3 vessels have been removed due to confidentiality. |  |
| **At-sea Hake - Mid-water Trawl**<br><br>Time Periods:<br>a) revenue: 2011–2020<br>b) effort: 2002–2019<br><br>Cells containing data with < 3 vessels have been removed due to confidentiality. |  |

| | |
|---|---|
| **Shoreside Hake - Mid-water Trawl**<br><br>Time Periods:<br>a) revenue: 2011–2020<br>b) effort: 2002–2020<br><br>Cells containing data with < 3 vessels have been removed due to confidentiality. |  |
| **Groundfish fixed gear - pot**<br><br>Time Period: 2011–2020<br><br>Cells containing data with < 3 vessels have been removed due to confidentiality. |  |

**Groundfish fixed gear - longline**

Time Period: 2011–2020

Cells containing data with < 3 vessels have been removed due to confidentiality.




**Commercial Albacore:**

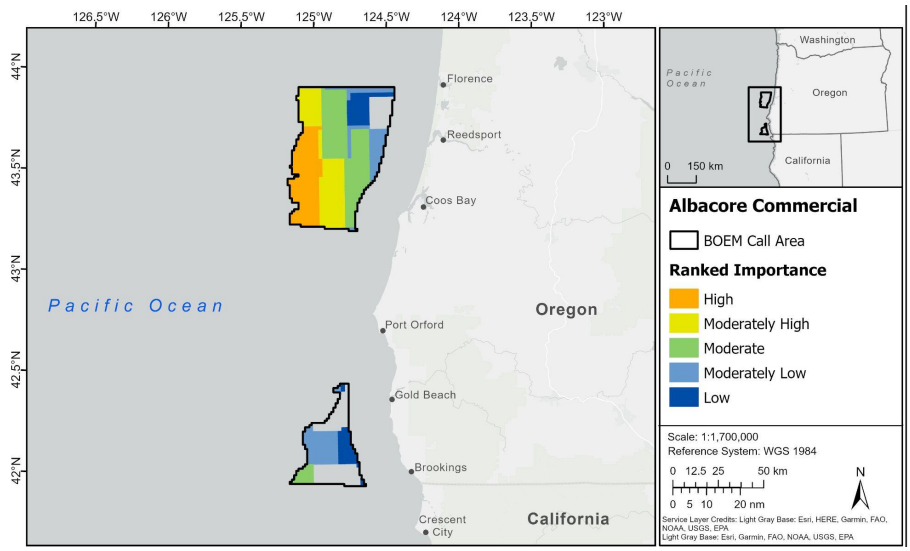
**Troll / Hook-and Line**

Time Periods:

a) revenue: 2011–2020

b) effort: 2005–2021

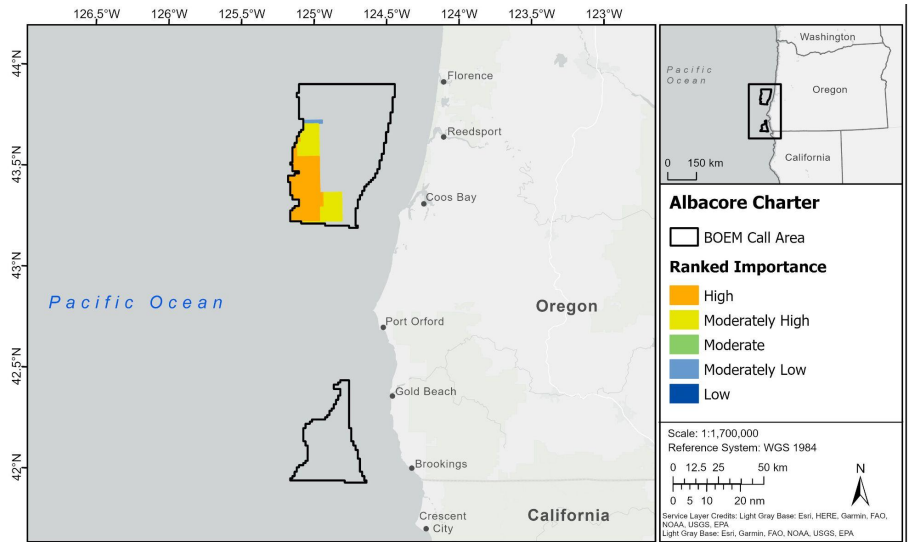
Cells containing data with < 3 vessels have been removed due to confidentiality.



**Charter Albacore:**

Time Period: 2005–2021 (effort only)

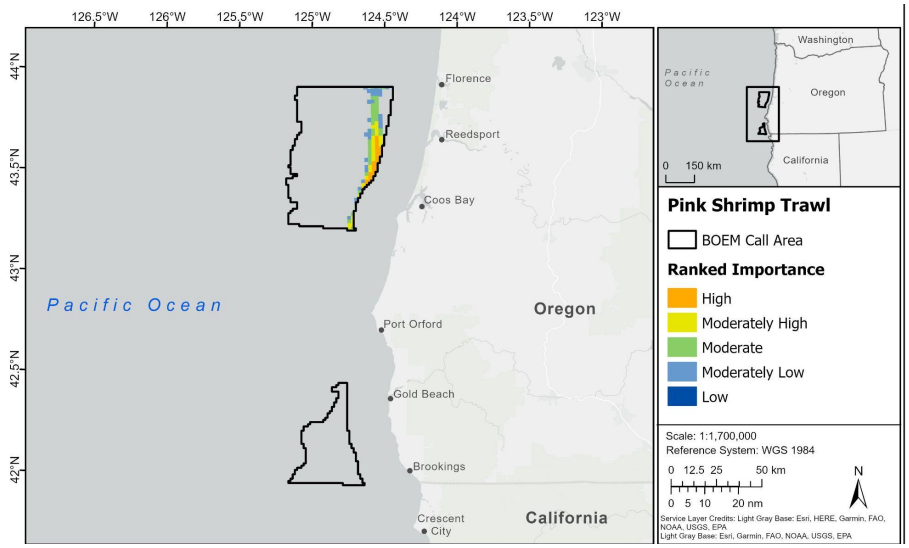
Cells containing data with < 3 vessels have been removed due to confidentiality.




**OR Pink Shrimp - Trawl**

Time Period: 2011–2020

Cells containing data with < 3 vessels have been removed due to confidentiality.



**OR Dungeness Crab - Pot**

Time Periods:

a) revenue: 2011–2020

b) effort: 2007/08–2010/11 and 2018/19–2019/20 seasons

Cells containing data with < 3 vessels have been removed due to confidentiality.

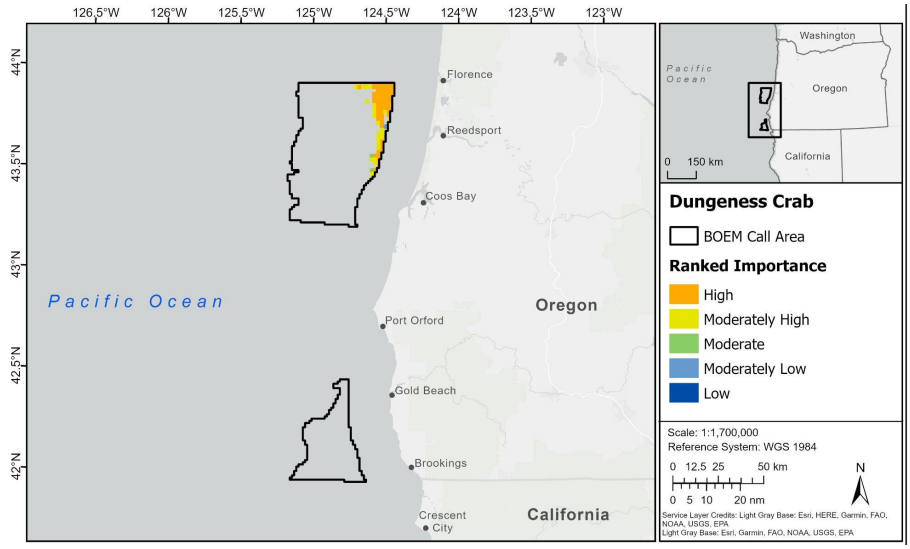



**Figure C-10. Fisheries Showing Ranked Importance**

Source: Carlton et al. (2024), pp 185–188

## C-3. DOD Assessment Map of the Oregon Offshore Planning and Call Areas (U)

See the following three pages.

ENERGY, INSTALLATIONS,
AND ENVIRONMENT

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE
3500 DEFENSE PENTAGON
WASHINGTON, DC 20301-3500

17 May, 2022

Necitas Sumait
Renewable Energy Section Chief
Bureau of Ocean Energy Management (BOEM)
Office of Renewable Energy Programs
Pacific Regional Office

Reference: Attachment (1) (U) DOD Assessment Map of the Oregon Offshore Planning and Call Areas (U)

Dear Ms. Sumait,

As requested, the Military Aviation and Installation Assurance Siting Clearinghouse coordinated within the Department of Defense (DoD) a review of the Oregon Offshore Planning and Call Areas. The results of our review (as depicted in Attachment 1) identified an area within and adjacent to the Coos Bay Call Area that would adversely impact DoD's mission.

A large portion within and adjacent to the Coos Bay Call Area is incompatible for development due to existing classified infrastructure. DoD requests wind development be excluded to ensure this infrastructure is not discovered or damaged by the construction of wind energy facilities. The Department of the Navy also conducts low-altitude aviator training within Military Training Route IR-346. The DoD requests wind development be excluded in this area as wind turbines will conflict with the safe and effective use of the airspace for training. (See Attachment 1)

- DON POC: Matthew Senska: matthew.senska@navy.mil; 571-970-8400

The areas shown in yellow (See Attachment 1) lie within radar line of site of multiple North American Aerospace Defense Command (NORAD) radar sites and will degrade NORAD operations. Considering both the expected heights of offshore turbines and future cumulative wind turbine effects, these adverse impacts are potentially mitigatable through Radar Adverse-impact Management (RAM). For projects where RAM mitigation is acceptable, we ask that BOEM include the following in any sale notification and project approval conditions:

1) Project owner will notify NORAD 30-60 days ahead of project completion and when the project is complete and operational for RAM scheduling;
2) Project owner contribute funds to DoD of no less than $80,000 toward the execution of the RAM for each Radar system affected;
3) Curtailment for National Security or Defense Purposes as described in the leasing agreement.

These conditions shall be accomplished by the lessee entering into an agreement with the DoD. The DoD requests that BOEM require the developer to enter into an agreement to mitigate the identified impact. Sixth Generation Over the Horizon Radar is currently in development. Offshore wind turbines may create adverse impacts to that system, but are not definitive at this time.

- NORAD POC: Frederick Shepherd: frederick.l.shepherd.civ@mail.mil; 719-556-3260

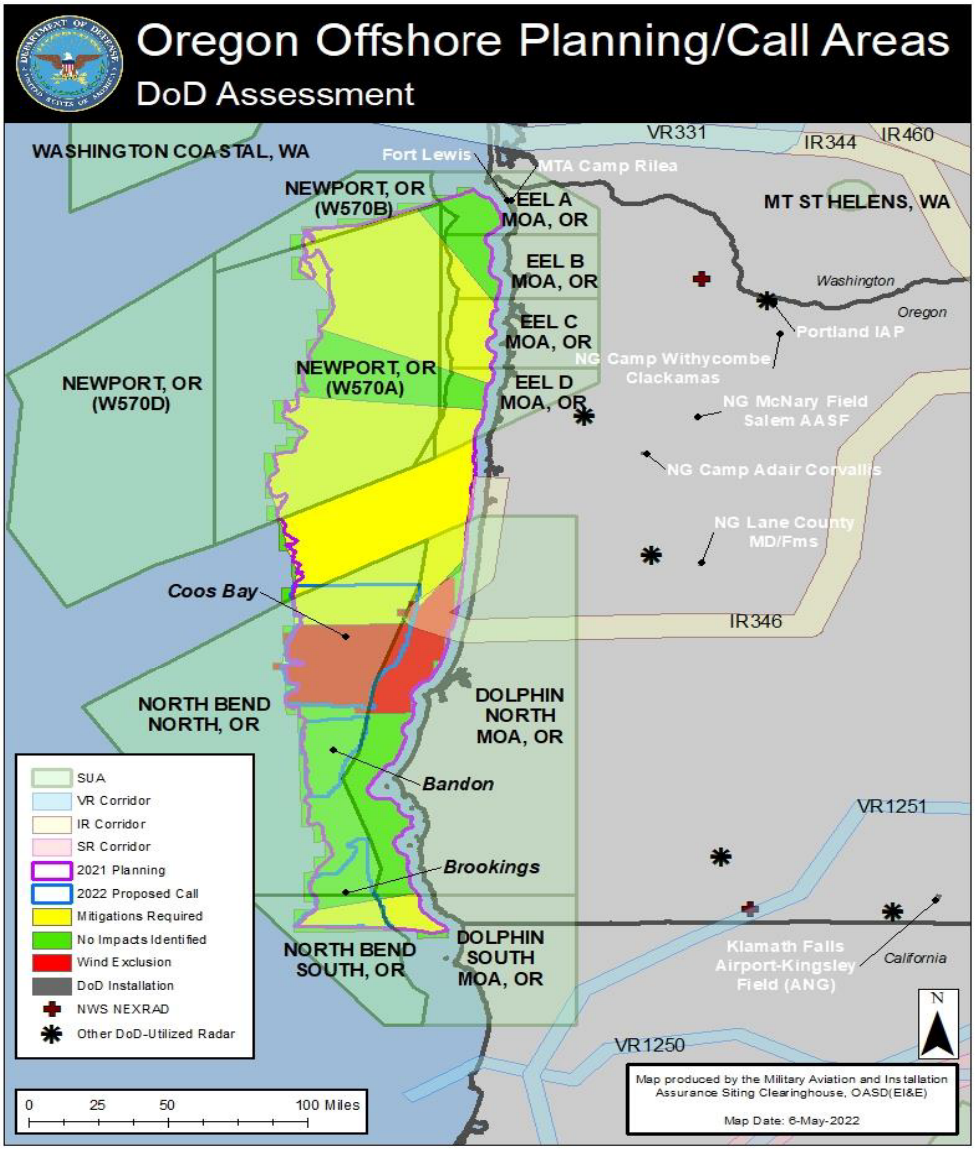
Thank you for the opportunity to coordinate on the Oregon Offshore Planning and Call Areas. We are providing the contact information for the affected missions to facilitate open mitigation discussions, but the Clearinghouse retains ovesight when official DoD input is required. If you have any questions, please contact me at steven.j.sample4.civ@mail.mil or at 703-571-0076.

Sincerely,

Steven J. Sample
Executive Director
Military Aviation and Installation
Assurance Siting Clearinghouse

**Attachment (1)**

DOD Assessment Map of the Oregon Offshore Planning and Call Areas



## C-4. References

Carlton J, Jossart JA, Pendleton F, Sumait N, Miller J, Thurston-Keller J, Reeb D, Gilbane L, Pereksta D, Schroeder D, Morris Jr JA. 2024. A wind energy area siting analysis for the Oregon Call Areas. Camarillo (CA): U.S. Department of the Interior, Bureau of Ocean Energy Management. 237 p. Report No.: BOEM 2024-15.

# Appendix D: Typical Best Management Practices for Operations on the Pacific Outer Continental Shelf

## Contents



## D-1. Introduction

Best Management Practices are schedules of activities, prohibitions of practices, general good housekeeping practices, pollution prevention and educational practices, maintenance procedures, and other management practices to prevent or reduce impacts to resources. This section lists the Typical Best Management Practices (BMPs) developed by the Bureau of Ocean Energy Management (BOEM) from oil and gas operations in the Pacific Ocean and prior consultations with State of Oregon and Federal agencies. BOEM directs operators to follow these BMPs when conducting actions on or near the Pacific Outer Continental Shelf (OCS). The BMPs minimize or eliminate potential impacts to protected species, including Endangered Species Act (ESA)-listed species of marine mammals and sea turtles. Resources, Potential Impacts, and Associated Best Management Practices with relative Impact-Producing Factors (IPF), meaning important cause-and-effect relationships between renewable energy projects and potentially affected resources, are summarized in the table below by resource **(Table D-1)**.

**Table D-1. Resources, Potential Impacts, and Associated Best Management Practices**

| Resource and Potential Impacts | Impact-Producing Factors | Best Management Practices to Avoid or Minimize Impacts from the Proposed Action |
|---|---|---|
| **Water Quality** Impacts to water quality from Proposed Action discharges | Discharges Debris | Under the Clean Water Act (CWA), it is unlawful for any person to discharge any pollutant from a point-source into navigable waters without a permit under its provisions. The Environmental Protection Agency (EPA) regulates discharges incidental to the normal operation of all non-recreational, non-military vessels greater than 24 m (79 ft) in length into U.S. waters, under Section 402 of the CWA (EPA 2013 Vessel General Permit (VGP)).<br><br>Small vessels and fishing vessels of any size must follow ballast water discharge requirements established in the EPA 2013 VGP and the United States Coast Guard (USCG) ballast water regulations at 33 Code of Federal Regulations (CFR) 151.10.<br><br>Adherence to applicable permits and regulatory requirements for vessel discharges by local authorities, State of Oregon, USCG, and EPA.<br><br>Vessel operators will comply with pollution regulations outlined in 33 CFR 151.51-77 so only accidental loss of trash and debris is anticipated. |
| **Marine and Coastal Habitats and Associated Biotic Assemblages** Bottom disturbance | Metocean buoy emplacement Sampling methods | Hard Bottom Avoidance and Metocean Buoy Anchoring Plan. Lessees shall avoid intentional contact within hard substrate, rock outcroppings, seamounts, or deep-sea coral/sponge habitat and submit an Anchoring Plan to BOEM as part of any survey plan that requires vessel anchoring. This Plan shall describe how these activities will avoid disturbing sensitive seafloor habitats during buoy deployment, operations, and retrieval.<br><br>Lessees will not use bottom trawling to either characterize site-specific parameters within the WEAs to inform their site assessment plan or to generally describe local conditions. |

| Resource and Potential Impacts | Impact-Producing Factors | Best Management Practices to Avoid or Minimize Impacts from the Proposed Action |
|---|---|---|
| **Marine Mammals and Sea Turtles**<br>Disturbance of marine mammals by vessel traffic and noise | Noise<br>Vessel strikes<br>Entanglement | Minimize interactions during Geophysical Survey Operations including, but not limited to, the following measures for every vessel operating boomer, sparker, bubble gun, and chirp sub-bottom profiler categories of equipment, or multi-beam echosounders operating at frequencies below 180kHz:<br>• Use of third-party, NOAA-approved protected species observers;<br>• 500 m clearance zone for all protected species;<br>• 500 m shutdown zone for ESA-listed whale species;<br>• When technically feasible, a "ramp up" of the survey equipment occurs at the start or re-start of geophysical survey activities; and<br>• Submission of an Alternative Monitoring Plan detailing monitoring methodology that will be used during nighttime and low-visibility conditions.<br><br>Use of Vessel Strike Avoidance Measures including, but not limited to, the following measures:<br>• Maintain a vigilant watch for all protected marine species and slow down, stop, or alter course;<br>• Minimum separation distance of 500 m from all ESA-listed marine mammal species, and 100 m from any sea turtle, around all vessels; and<br>• All crew members responsible for navigation duties must receive site-specific training on protected species sighting/reporting and vessel strike avoidance measures.<br><br>Prevent entanglement of protected species including, but not limited to, the following measures:<br>• Use of best available mooring systems;<br>• Reduce entanglement risk by using shortest practicable line length, rubber sleeves, weak-links, chains, cables, or similar equipment types that prevent lines from looping, wrapping, or entrapping protected species; and<br>• Prompt reporting of entanglement events. |

| Resource and Potential Impacts | Impact-Producing Factors | Best Management Practices to Avoid or Minimize Impacts from the Proposed Action |
|---|---|---|
| **Birds and Bats**<br>Disturbance or attraction of birds and bats by lighting, trash, and debris | Lighting<br>Trash and Debris Attraction | Minimize adverse impacts by managing the type of lighting used including, but not limited to, the following measures:<br>• Use only red flashing strobe-like lights for aviation obstruction lights; must ensure that these aviation obstruction lights emit infrared energy within 675–900 nanometers wavelength to be compatible with Department of Defense night vision goggle equipment;<br>• 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 (https://www.uscg.mil/forms/cg/CG_2554.pdf); and<br>• Use lighting only when necessary, and the lighting must be hooded downward and directed when possible to reduce upward illumination and illumination of adjacent waters.<br><br>Use of trash and debris reduction management practices including 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.<br><br>Use of anti-perching devices on metocean buoys.<br><br>Annual reporting of any dead birds or bats found on vessels and structures. |
| **Commercial Fishing**<br>Proposed Action activities may interfere with fishing | Debris<br>Pollution<br>Traffic | Removal of large marine debris objects and decommissioning of instrumentation at end of 5-year term.<br><br>Vessel operators are required to comply with pollution regulations outlined in 33 CFR 151.51-77.<br><br>To enhance navigational safety, lessees will develop a Site Assessment Plan (SAP) that will include site-specific measures including, but not limited to, a Local Notice to Mariners, vessel traffic corridors, lighting specifications, and incident contingency plans. |

| Resource and Potential Impacts | Impact-Producing Factors | Best Management Practices to Avoid or Minimize Impacts from the Proposed Action |
|---|---|---|
| **Historic Properties**<br>Impacts to historic properties on the seafloor | Disturbance | Use of high-resolution geotechnical (HRG) surveys prior to geotechnical testing and sediment sampling to avoid impacts on historical properties including, but not limited to:<br>• The geophysical surveys must meet BOEM's minimum standards (see BOEM Archaeological Survey Guidelines);<br>• Analysis 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; and<br>• This analysis must include a determination whether any potential archaeological resources are present in the area of potential effect and the geotechnical (sub-bottom) 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.<br>Observation of unanticipated finds requirement (30 CFR 585.802). |

## D-2. Typical Best Management Practices that Minimize Effects to Protected Marine Species and Habitats

The analysis in the EA assumes the following Best Management Practices will be implemented in Federal waters; however, the potential Finding of No Significant Impact (FONSI) is not predicated on their implementation.

Any survey monitoring plan must meet the following minimum requirements specified below, except when complying with these requirements would put the safety of the vessel or crew at risk.

Definitions:

1. "ESA-Listed Species": The term ESA-listed species means any threatened or endangered species (i.e., marine mammal, sea turtle, fish, or coral) listed by the National Marine Fisheries Service under the Endangered Species Act of 1973, as amended.
2. "Geophysical Survey": The term geophysical survey means the deployment of devices including any boomers, sparkers, bubble guns, or Chirp sub-bottom profilers that produce noise to record geophysical data to which the Project Design Criteria apply during the operation of these sound sources.
3. "Geotechnical Survey": The term "geotechnical survey" is used to collectively refer to any physical testing or sampling of the surface or sub-surface of the seafloor.
4. "Large Whale": The term "large whale" means baleen whales (North Atlantic right whales, fin whales, sei whales, blue whales, humpback whales, and minke whales); sperm whales; and any unidentified whale.
5. "Live Bottom Features": The term "live bottom features" means all sensitive live bottom habitats including submerged aquatic vegetation deep/cold-water coral reefs, and shallow/mesophotic reefs.
6. "Marine Debris": The term "marine debris" means any object or fragment of wood, metal, glass, rubber, plastic, cloth, paper, or any other man-made item or material that is lost or discarded in the marine environment.
7. "Protected Species": The term "protected species" means all threatened and endangered marine species listed under the Endangered Species Act and all marine mammals protected under the Marine Mammal Protection Act.
8. "Small Cetacean": The term small cetacean refers to any species of dolphin in the family Delphinidae and harbor porpoises in the family Phocoenidae.
9. "Small Delphinid": The term small delphinid refers to any species of dolphin of the following genera: *Delphinus*, *Lagenorhynchus*, *Stenella*, and *Tursiops*.
10. "Clearance Zone": The term "Clearance Zone" means the area around the sound source that must be cleared of protected species before the activity begins.
11. "Shutdown Zone": The term "Shutdown Zone" means the area to be monitored for shutdown. If a protected species is detected within or entering this zone, the lead Protected Species Observer (PSO) would call for an activity shutdown.

12. "Ramp-up": The term "ramp-up" means the process of incrementally increasing the acoustic source level of the survey equipment when conducting geophysical surveys until it reaches the operational setting.

## A. Measures to Minimize Vessel Interactions with Listed Species - Use of a Moon Pool

During times of year when sea turtles are known to occur in the survey area and there is an intention to utilize a moon pool for the required activities, the following BMPs need to be followed:

1. *Closure of the Hull Door*

a. Should the moon pool have a hull door that can be closed, the operator(s) should keep the doors closed as much as reasonably practicable when no activity is occurring within the moon pool, unless the safety of crew or vessel require otherwise. This will prevent protected species from entering the confined area during periods of non-activity.

b. Should the moon pool have a hull door that can be closed then prior to and following closure, the moon pool must be monitored continuously by a dedicated crew observer with no other tasks to ensure that no individual protected species is present in the moon pool area. If visibility is not clear to the hull door from above (e.g., turbidity or low light), 30 minutes of monitoring is required prior to hull door closure.

c. If a protected species is observed in the moon pool prior to closure of the hull door, the hull door must not be closed, to the extent practicable. If the observed animal leaves the moon pool, the operator may commence closure. If the observed animal remains in the moon pool, contact BSEE prior to closure of the hull doors according to reporting requirements (see below under Protected Species within an Enclosed Moon Pool Reporting).

*2. Movement of the vessel (no hull door) and equipment Deployment/retrieval*

a. Prior to movement of the vessel and/or deployment/retrieval of equipment, the moon pool must be monitored continuously for a minimum of 30 minutes, by a dedicated crew observer with no other tasks, to ensure no individual protected species is present in the moon pool area.

b. If a protected species is observed in the moon pool prior to movement of the vessel, the vessel must not be moved and equipment must not be deployed or retrieved, except for human safety considerations. If the observed animal leaves the moon pool, the operator may commence activities. If the observed animal remains in the moon pool, contact BSEE prior to planned movement of the vessel according to reporting requirements (see Reporting Requirements under Protected Species within an Enclosed Moon Pool Reporting).

## B. Measures to Minimize Interactions with Protected Species during Geophysical Survey Operations

To avoid injury of and minimize any potential disturbance to protected species, implement the following measures for all vessels using boomer, sparker, bubble gun, and chirp sub-bottom profiler categories of equipment, or multi-beam echosounders operating at frequencies below 160 kHz. The acoustic characteristics (frequency, narrow beam width, rapid attenuation) are such that no effects to protected species are anticipated from ultra short baselines, fathometers, parametric shallow penetration sub-bottom profilers, hull-mounted non-parametric sub-bottom profilers, side-scan sonars, pingers, acoustic releases, echosounders, and instruments attached to submersible vehicles (HOV/AUV/ROVs), and

therefore shutdown, pre-start clearance, and ramp-up procedures are not required during HRG survey operations using these sources.

The Clearance Zone is defined as the area around the sound source that needs to be visually cleared of protected species for 30 minutes before the sound source is turned on. The Clearance Zone is equivalent to a minimum visibility zone for survey operations to begin (See #1, below). The Shutdown Zone is defined as the area around the sound source that must be monitored for possible shutdown upon detection of ESA-listed whale species within or entering that zone. For both the Clearance and Shutdown Zones, these are minimum visibility distances, and for situational awareness, PSOs should observe beyond this area when possible.

1. For situational awareness of marine mammals and ESA-listed species that may be in the survey area, during times third-party protected species observers (PSOs) are on duty, they must monitor to the farthest extent practicable. At all times PSOs are on duty, any observed species must be recorded (see reporting requirements below).
2. Any observations of a marine mammal or ESA-listed species by crew members aboard any vessel associated with the survey must be relayed to the PSO on duty.
3. For autonomous surface vessels (ASV) that require remote PSO monitoring from the mother vessel, a dual thermal/HD camera must be installed on the mother vessel facing forward and angled in a direction to provide a field of view ahead of the vessel and around the ASV. PSOs must be able to monitor the real-time output of the camera on hand-held computer tablets. Images from the cameras must be able to be captured and reviewed to assist in verifying species identification. A monitor must also be installed in the bridge displaying the real-time images from the thermal/HD camera installed on the front of the ASV itself, providing a further forward view of the craft. In addition, night-vision goggles with thermal clip-ons and a handheld spotlight must be provided and used such that PSOs can focus observations in any direction around the mother vessel and/or the ASV.
4. A 500 m Clearance Zone must be established and monitored to be clear of all protected marine mammal species (100 m for sea turtles) for 30 minutes prior to operating boomer, sparker, bubble gun, and chirp sub-bottom profiler categories of equipment, or multi-beam echosounders operating at frequencies below 160 kHz.
5. If any protected species is observed within the Clearance Zone during the 30-minute pre-clearance period, the relevant acoustic sources must not be initiated until the ESA-listed whale (or unidentified whale or sea turtle) is confirmed by visual observation to have exited the relevant zone, or, until 30 minutes have elapsed with no further sighting of the animal.
6. A “ramp up” of the boomer, sparker, bubble gun, and chirp sub-bottom profiler categories of equipment, or multi-beam echosounders operating at frequencies below 160 kHz must occur at the start or re-start of geophysical survey activities when technically feasible. A ramp up must begin with the power for the geophysical survey equipment ramped up half power for 5 minutes, and then to full power.
7. To minimize exposure of protected marine mammal species to noise that could be disturbing, a 500 m Shutdown Zone for ESA-listed and unidentified whales (100 m for sea turtles) visible at the surface must be established around the sound source (i.e. operating boomer, sparker, bubble gun, and chirp sub-bottom profiler categories of equipment, or multi-beam echosounders operating at frequencies below 160 kHz). If the Shutdown Zone(s) cannot be adequately monitored for ESA-listed species presence (i.e., PSO discretion determines conditions, including night or other low visibility conditions, are such that listed species cannot

be reliably sighted within the Shutdown Zone(s) with the available monitoring equipment, no equipment that requires PSO monitoring can be deployed until such time that the Shutdown Zone(s) can be effectively monitored.

8. The Shutdown Zone(s) must be monitored by third-party PSOs at all times when boomer, sparker, bubble gun, and chirp sub-bottom profiler categories of equipment, or multi-beam echosounders operating at frequencies below 160 kHz are being operated and all observed ESA-listed species must be recorded (see reporting requirements below).
9. If an ESA-listed whale or sea turtle is detected within or entering the respective Shutdown Zone, any boomer, sparker, bubble gun, and chirp sub-bottom profiler categories of equipment, or multi-beam echosounders operating at frequencies below 160 kHz that requires PSOs must be shut off until the minimum separation distance is re-established, and the Clearance Zone measures are carried out.
10. A PSO must notify the survey crew that a shutdown of all active acoustic boomer, sparker, bubble gun, and chirp sub-bottom profiler categories of equipment, or multi-beam echosounders operating at frequencies below 160 kHz is immediately required. The vessel operator and crew must comply immediately with any call for a shutdown by the PSO. Any disagreement or discussion must occur only after shutdown.
11. Following a shutdown for any reason, ramp up of the equipment may begin immediately only if: (a) the shutdown is less than 30 minutes, (b) visual monitoring of the Shutdown Zone(s) continued throughout the shutdown, (c) the animal(s) causing the shutdown was visually followed and confirmed by PSOs to be outside of the Shutdown Zone(s) (500 m for ESA-listed whale species, 100 m for sea turtles) and heading away from the vessel, and (d) the Shutdown Zone(s) remains clear of all ESA-listed species. If all (a, b, c, and d) the conditions are not met, the Clearance Zone (500 m for all marine mammal species, 100m for sea turtles) must be monitored for 30 minutes of pre-clearance observation before noise-producing equipment can be turned back on.
12. No geophysical surveys may be conducted at night or during low-visibility conditions unless PSOs are able to effectively monitor the full extent of the Clearance and Shutdown Zone(s).
13. An Alternative Monitoring Plan (AMP) must be included with a Survey Plan detailing the monitoring methodology that will be used during nighttime and low visibility conditions. The AMP must demonstrate how it will support effective monitoring for the presence of whales and sea turtles in the Clearance and Shutdown Zone(s). The AMP should include information about the distances that whales can be effectively detected using the identified technology/equipment, and any limitations posed by sea state(s) or vessel equipment (e.g., deck lights) that may inhibit the field of view.
14. The AMP must include technologies that have the technical feasibility to detect all ESA-listed species in the Clearance and Shutdown Zone(s). Low-light equipment (i.e., night-vision goggles and/or infrared technology) must be available for use during low visibility (e.g., inclement weather, nighttime) monitoring.
15. PSOs should be trained and experienced with the proposed alternative monitoring technology.
16. The AMP must describe how calibration will be performed, for example, by including observations of known objects at set distances and under various lighting conditions. This calibration should be performed during mobilization and periodically throughout the survey operation.

17. PSOs shall make nighttime observations from a platform with no visual barriers, due to the potential for the reflectivity from bridge windows or other structures to interfere with the use of the night vision optics.
18. At times when multiple survey vessels are operating within a lease area, adjacent lease areas, or exploratory cable routes, a minimum separation distance (to be determined on a survey specific basis, dependent on equipment being used) must be maintained between survey vessels to ensure that sound sources do not overlap.
19. During good visibility conditions (e.g., daylight hours; Beaufort scale 3 or less) when survey equipment is not operating, to the maximum extent practicable, PSOs must conduct observations for protected species for comparison of sighting rates and behavior with and without use of active geophysical survey equipment. Any observed ESA-listed species must be recorded regardless of any mitigation actions required.

## C. Measures to Minimize Vessel Interactions with Protected Species

All vessels associated with any survey activities (transiting [i.e., travelling between a port and the survey site] or actively surveying) must comply with the vessel strike avoidance measures specified below. The only exception is when the safety of the vessel or crew necessitates deviation from these requirements. If any such incidents occur, they must be reported as outlined below under Reporting Requirements. The Vessel Strike Avoidance Zone is defined as 500 m or greater from any sighted ESA-listed whale species or other unidentified large marine mammal and 100 m from any sea turtle.

Lessees are directed to the National Marine Fisheries Service's Marine Life Viewing Guidelines, which highlight the importance of these measures for avoiding impacts to mother/calf pairs (https://www.fisheries.noaa.gov/topic/marine-life-viewing-guidelines#guidelines-&-distances).

1. Vessel captain and crew must maintain a vigilant watch for all protected marine species and slow down, stop their vessel, or alter course, as appropriate, regardless of vessel size, to avoid striking any protected species. The presence of a single individual at the surface may indicate the presence of submerged animals in the vicinity; therefore, precautionary measures should always be exercised. If pinnipeds or small delphinids of the following genera: *Delphinus, Lagenorhynchus, Stenella, Tursiops,* and *Phocoena* are visually detected approaching the vessel (i.e., to bow ride) or towed equipment, vessel strike avoidance and shutdown are not required.

1. Anytime a survey vessel is underway (transiting or surveying), the vessel must maintain a 500 m minimum separation distance (Vessel Strike Avoidance Zone) from any sighted ESA-listed marine mammal species or other unidentified large marine mammal, and 100 m from any sea turtle. Trained PSOs must be on board monitoring this vessel strike avoidance zone to ensure detection of that animal in time to take necessary measures to avoid striking the animal. If the survey vessel does not require a PSO for the type of survey equipment used, crew may be used as a Trained Lookout to meet this requirement, unless other State requirements are more restrictive (see B9).

3. For monitoring around the ASVs controlled from a manned vessel[1], regardless of the equipment it may be operating, a dual thermal/HD camera must be installed on the mother vessel facing forward and angled in a direction so as to provide a field of view ahead of the vessel and around

[1] Lessees must discuss ASV deployment with BOEM prior to contracting to understand what measures may be necessary for the ASV system under consideration.

the ASV. A dedicated operator must be able to monitor the real-time output of the camera on hand-held computer tablets. Images from the cameras must be able to be captured and reviewed to assist in verifying species identification. A monitor must also be installed in the bridge displaying the real-time images from the thermal/HD camera installed on the front of the ASV itself, providing a further forward view of the craft.

4. Survey plans must include identification of vessel strike avoidance measures, including procedures for equipment shut down and retrieval, communication between PSOs/Trained Lookouts, equipment operators, and the captain, and other measures necessary to avoid vessel strike while maintaining vessel and crew safety. If any circumstances are anticipated that may preclude the implementation of this requirement, they must be clearly identified in the survey plan and alternative procedures outlined in the plan to ensure minimum distances are maintained and vessel strikes can be avoided.
5. All vessel crew members must be briefed in the identification of protected marine species that may occur in the survey area and in regulations and best practices for avoiding vessel collisions. Reference materials must be available aboard all project vessels for identification of ESA-listed species. The expectation and process for reporting of protected species sighted during surveys must be clearly communicated and posted in highly visible locations aboard all project vessels, so that there is an expectation for reporting to the designated vessel contact (such as the lookout or the vessel captain), as well as a communication channel and process outlined for crew members to do so.
6. If a large whale is identified within 500 m of the forward path of any vessel, the vessel operator must steer a course away from the whale until the 500 m minimum separation distance has been established. Vessels may also shift to idle if feasible.
7. If a large whale is sighted within 200 m (656 ft) of the forward path of a vessel, the vessel operator must reduce speed and shift the engine to neutral. Engines must not be engaged until the whale has moved outside of the vessel's path and beyond 500 m (1,640 ft). If stationary, the vessel must not engage engines until the large whale has moved beyond 500 m.
8. If a sea turtle is sighted within the operating vessel's forward path, the vessel operator must slow down to 4 knots (unless unsafe to do so) and steer away as possible. The vessel may resume normal operations once the vessel has passed the individual.
9. Vessels must avoid transiting through areas of visible jellyfish aggregations. If operational safety prevents avoidance of such areas, vessels must slow to 4 knots while transiting through these areas.
10. Any observations of a marine mammal or ESA-listed species by crew members aboard any vessel associated with the survey must be relayed to the PSO on duty and/or captain of the vessel.
11. To monitor the minimum separation distance, a PSO (or Trained Lookout if PSOs are not required) must be posted during all times a vessel is underway (transiting or surveying) to monitor for protected species within a 180-degree direction of the forward path of the vessel (90 degrees port to 90 degrees starboard).
12. If the trained lookout is a vessel crew member, this must be their designated role and primary responsibility on shift. Any crew designated as Trained Lookouts must receive training on protected species identification, vessel strike minimization procedures, how and when to

communicate with the vessel captain, and reporting requirements. All observations must be recorded per reporting requirements.

13. Regardless of monitoring duties, all crew members responsible for navigation duties must receive site-specific training on protected species sighting/reporting and vessel strike avoidance measures.

12. Vessels underway must not divert their course to approach any marine mammal species.

13. Wherever available, the Lessee must 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.

## D. Measures to Minimize Entanglement Risk During ROV Usage, Buoy Deployment, Operations, and Retrieval

Any mooring systems used during survey activities must prevent any potential entanglement of listed species, and in the unlikely event that entanglement does occur, ensure proper reporting of entanglement events according to the measures specified below.

1. Tethered ROVs: A Clearance Zone (500 m for marine mammal species, and 100m for sea turtles) must be monitored for 30 minutes of pre-clearance observation by PSOs before ROVs are deployed. If any ESA-listed species is observed within the Clearance Zone during the 30-minute pre-clearance period, the 30-minute clock must be paused. If the PSO confirms the animal has exited the zone and headed away from the survey vessel, the 30-minute clock that was paused may resume. The pre-clearance clock will reset to 30 minutes if the animal dives or visual contact is otherwise lost.

2. The Lessee must ensure that any buoys attached to the seafloor use the best available mooring systems. Buoys, lines (chains, cables, or coated rope systems), swivels, shackles, and anchor designs must prevent any potential entanglement of listed species while ensuring the safety and integrity of the structure or device.

3. All mooring lines and ancillary attachment lines must use one or more of the following measures to reduce entanglement risk: shortest practicable line length, rubber sleeves, weak-links, chains, cables, or similar equipment types that prevent lines from looping, wrapping, or entrapping protected species.

4. Any equipment must be attached by a line within a rubber sleeve for rigidity. The length of the line must be as short as necessary to meet its intended purpose.

5. When practicable, buoys should be lowered and raised slowly to minimize risk to listed species and benthic habitat. No buoys should be deployed or retrieved if large whales or sea turtles are sighted within 500 m of the buoy being deployed/retrieved.

6. If a live or dead marine protected species becomes entangled, the Lessee must immediately contact the applicable stranding network coordinator using the reporting contact details (see Reporting Requirements section below) and provide any on-water assistance requested.

7. All buoys must be properly labeled with owner and contact information.

## E. Requirements for Protected Species Observers (PSOs)

The Lessee must use qualified third-party PSOs to observe Clearance, and Shutdown Zones, and implement mitigation measures as outlined in the conditions above.

1. All PSOs must have received NMFS approval to act as a PSO for geophysical surveys. The Lessee must provide to BOEM, upon request, documentation of NMFS approval as PSOs for geophysical activities in the Pacific and copies of the most recent training certificates of individual PSOs' successful completion of a commercial PSO training course with an overall examination score of 80% or greater. Instructions and application requirements to become a NMFS-approved PSO can be found at: https://www.fisheries.noaa.gov/new-england-mid-atlantic/careers-and-opportunities/protected-species-observers.

2. For situations where Trained Lookouts are used when PSOs are not required, training must include protected species identification, vessel strike minimization procedures, how and when to communicate with the vessel captain, and reporting requirements.

3. PSOs deployed for mitigation, monitoring, and reporting of geophysical survey activities must be employed by a third-party observer provider. While the vessel is underway, they must have no other tasks other than to conduct observational effort, record data, and communicate with and instruct relevant vessel crew to the presence of protected species and implement mitigation requirements. PSOs on duty must be clearly listed on daily data logs for each shift.

    a. Non-third-party observers may be approved by NMFS on a case-by-case basis for limited, specific duties in support of approved third-party PSOs.

4. The Lessee must ensure that the observers have the authority to stop any activity that could result in harm to a marine mammal or sea turtle, except under extraordinary circumstances when complying with this requirement would put the safety of the vessel or crew at risk.

5. A minimum of one PSO (assuming condition 6 is met) must be observing for protected marine mammal species at all times when noise-producing equipment operating boomer, sparker, bubble gun, and chirp sub-bottom profiler categories of equipment, or multi-beam echosounders operating at frequencies below 160 kHz, or the survey vessel is actively transiting. The Lessee must include a PSO schedule showing that the number of PSOs used is sufficient to effectively monitor the affected area for the project (e.g., surveys) and record the required data. PSOs must not be on watch for more than 4 consecutive hours, with at least a 2-hour break after a 4-hour watch. PSOs must not work for more than 12 hours in any 24-hour period.

6. Visual monitoring must occur from the most appropriate vantage point on the associated operational platform that allows for 360-degree visual coverage around the vessel. If 360-degree visual coverage is not possible from a single vantage point, multiple PSOs must be on watch to ensure both geophysical survey and vessel strike avoidance requirements for ESA-listed species can be implemented.

7. The Lessee must ensure that suitable equipment is available to each PSO to adequately observe the full extent of the minimum separation distance, Clearance and Shutdown Zones prior to and during all geophysical survey activity and meet all reporting requirements. The following equipment must be available:

a. Visual observations must be conducted using binoculars and the naked eye while free from distractions and in a consistent, systematic, and diligent manner. This applies to Trained Lookouts as well.

b. Rangefinders (at least one per PSO, plus backups) or reticle binoculars (e.g., 7 x 50) of appropriate quality (at least one per PSO, plus backups) to estimate distances to ESA-listed species located in proximity to the Clearance and Shutdown Zones.

c. Digital full frame cameras with a telephoto lens that is at least 300 mm or equivalent on a full-frame single lens reflex (SLR). The camera or lens should also have an image stabilization system. The camera system must be used to record sightings and verify species identification whenever possible.

d. A laptop or tablet to collect and record data electronically.

e. Global Positioning System (GPS) Units if data collection/reporting software does not have built-in positioning functionality.

f. PSO data must be collected in accordance with standard data reporting software tools, and electronic data submission standards approved by BOEM and NMFS for the particular activity.

g. Any other tools deemed necessary to adequately perform PSO tasks.

## F. Reporting Requirements

To ensure compliance and evaluate effectiveness of mitigation measures, regular reporting of survey activities and information on listed species will be required as follows. Only vessel surveys which require third-party PSOs will be required to meet reporting requirements 1-4. Reporting requirements 5 and 6 must be completed, if applicable, regardless of survey type or type of observer.

1. Monthly reporting of raw PSO data of geophysical survey activities must be submitted to BOEM and BSEE (details to be provided) by the PSO provider on the 15th of each month for each vessel conducting survey work. Any editing, review, and quality assurance checks must be completed only by the PSO provider prior to submission to BOEM and ensure use of standard field codes and formats applicable to the Pacific. Monthly data reporting from all PSO observations must be recorded based on standard PSO collection and reporting requirements. PSOs must use standardized electronic data forms to record data. The PSOs may record data electronically in data collection software, but the data fields listed below must be recorded and exported to an Excel file for submittal. Alternatively, BOEM has developed an Excel spreadsheet with all the necessary data fields that is available upon request.

2. Final survey reports must be submitted to BOEM in coordination with PSOs within 90 calendar days following completion of a survey. Final reports must contain all survey activity included under each submitted survey plan, but include individual vessel departure and return ports, PSO names and training certifications, the PSO provider contact information, dates of the survey, a vessel track, a summary of all PSO documented sightings of protected species, survey equipment shutdowns that occurred, any vessel strike-avoidance measures taken, takes of protected species that occurred, and any observed injured or dead protected species. The DOI

will work with the Lessee to ensure that DOI does not release confidential business information found in the monitoring reports.

3. PSOs must be approved by NMFS prior to the start of a survey, and the Lessee must submit documentation of NMFS' approval upon request to BOEM and BSEE (details to be provided). Application requirements to become a NMFS-approved PSO for geological and geophysical surveys can be obtained by sending an inquiry to nmfs.psoreview@noaa.gov

4. Instructions for Geophysical Survey Reports. The following data fields for PSO reports of geological and geophysical surveys must be reported in Excel format (.xml file) along with metadata defining all data fields:

   Survey Information:
   - Project name
   - Lease number
   - State Coastal Zones
   - Survey Contractor
   - Survey Type
   - Reporting start and end dates
   - Visual monitoring equipment used (e.g., bionics, magnification, IR cameras, etc.);
   - Distance finding method used
   - PSO names (last, first), training certification, and affiliation
   - PSO location and observation height above sea surface

   Operations Information:
   - Vessel name(s)
   - Sound sources including equipment type, power levels, and frequencies used
   - Greatest RMS source level
   - Dates of departures and returns to port with port name

   Monitoring Effort Information:
   - Date (YYYY-MM-DD)
   - Source status at time of observation (on/off)
   - Number of PSOs on duty
   - Start time of observations for each shift in UTC (YY-MM-DDT HH:MM )
   - End time of observations for each shift in UTC (YY-MM-DDT HH:MM )
   - Duration of visual observations of protected species
   - Weather
   - Wind speed (knots), direction (cardinal direction)
   - Beaufort sea state
   - Water depth (meters)
   - Visibility (km)
   - Glare severity related to monitoring area (none, slight, moderate, extreme)
   - Time pre-clearance visual monitoring began in UTC (YY-MM-DDT HH:MM )
   - Time pre-clearance monitoring ended in UTC (YY-MM-DDT HH:MM )
   - Duration of pre-clearance visual monitoring
   - Time of day of pre-clearance began (day/night)
   - Time power-up/ramp-up began
   - Time equipment full power was reached

- Duration of power-up/ramp-up (if conducted)
- Time survey activity began (equipment on) in UTC
- Time survey activity ended (equipment off) in UTC
- Survey Duration
- Did a shutdown/power-down occur?
    - Time shutdown was called for (UTC)
    - Time equipment was shut down (UTC)
- Vessel location (latitude/longitude, decimal degrees) when survey effort begins and ends; vessel location at beginning and end of visual PSO duty shifts; recorded at :30 intervals if obtainable from data collection software
- Habitat or prey observations (narrative)
- Marine debris sightings (narrative)

Detection Information (in addition to the Survey, Operation, and Monitoring fields)

- Date (YYYY-MM-DD)
- Sighting ID (multiple sightings of the same animal or group should use the same ID)
- Time at first detection in UTC (YY-MMDDT HH:MM)
- Time at last detection in UTC (YY-MM-DDT HH:MM)
- PSO name(s) (Last, First) on duty
- Observer location
- Number of observes on duty
- Watch Status (On effort PSO, off effort PSO, opportunistic, crew, alternate vessel/platform)
- Effort (ON=Device On; OFF=Device Off)
- Start time of observations
- End time of observations
- Location of vessel when detection occurs: Latitude and Longitude (decimal degrees)
- Compass heading of vessel (degrees)
- Beaufort sea state
- Wind speed (knots/direction)
- Swell Height (meters)
- Weather/Precipitation
- Visibility (kilometers)
- Cloud coverage (%)
- Glare severity related to monitoring area (none, slight, moderate, extreme)
- Species (Species Code)
- Certainty of identification
- Number of adults (high, low, best)
- Number of juveniles (high, low, best)
- Total number of animals or estimated group size
- Sighting cue (Blow, Breach, White water, Flukes, Body)
- Bearing to animal(s) when first detected (ship heading in degrees + clock face direction to animal)
- Distance determination method (use code)
- Distance from vessel (e.g., reticle distance in meters)
- Description of unidentified animals (include features such as overall size; shape of head; color and pattern; size, shape, and position of dorsal fin; height, direction, and shape of blow, etc.)

- Detection narrative (note behavior, especially changes in relation to survey activity and distance from source vessel)
- Direction of travel/first approach (relative to vessel)
- Behaviors observed: indicate behaviors and behavioral changes observed in sequential order (use behavioral codes)
- If any bow-riding behavior observed, record total duration during detection (YY-MM-DDT HH:MM )
- Initial heading of animal(s) (ship heading in degrees + clock face direction to animal)
- Final heading of animal(s) (ship heading in degrees + clock face direction to animal)
- Shutdown zone size during detection (meters)
- Was the animal inside the shutdown zone? (Y/N)
- Closest distance to vessel (reticle distance in meters)
- Time at closest approach (UTC YY-MM-DDT HH:MM )
- Time animal entered shutdown zone (UTC YY-MM-DDT HH:MM )
- Time animal left shutdown zone (UTC YY-MM-DDT HH:MM )
- If observed/detected during ramp-up/power-up: first distance (reticle distance in meters), closest distance (reticle distance in meters), last distance (reticle distance in meters), behavior at final detection
- Did a shutdown/power-down occur? (Y/N)
- Time shutdown was called for (UTC)
- Time equipment was shut down (UTC)

5. Protected Species Incident Reporting. Regardless of survey type or the need to provide a dedicated Trained Lookout or PSO, any potential take, strikes, or dead/injured protected species caused by Project activities must be reported to BOEM Office of Environment, Pacific Region, and BSEE (details to be provided), NMFS Long Beach Office, Protected Species Division (details to be provided), and the NOAA West Coast Region Stranding Hotline at 1-866-767-6114 and 562-506-4315 as soon as practicable, but no later than 24 hours from the time the incident took place (Protected Species Incident Report). The Protected Species Incident Report must include the following information:

    - Contact info for the person providing the report;
    - Time, date, and location (latitude/longitude) of the incident;
    - Species identification (if known) or description of the animal(s) involved;
    - Condition of the animal(s) (e.g., live, injured, dead);
    - Observed behaviors of the animal(s), if alive;
    - If available, photographs or video footage of the animal(s); and
    - General circumstances (e.g. vessel speed/direction of travel, sound sources in use) under which the animal was impacted.

6. Dead or Injured Protected Species Reporting. All dead or injured protected species, must be reported regardless of whether they were observed during operations or directly due to Lessee activities. In the event that an injured or dead marine mammal or sea turtle is sighted, regardless of the cause, the Lessee must report the incident to BOEM Office of Environment, Pacific Region (details to be provided), NMFS Long Beach Office, Protected Species Division (details to be provided), and the NOAA West Coast stranding hotline at 1-866-767-6114 and 562-506-4315. If an entangled whale is sighted, the Lessee must ensure that NOAA is contacted

at 1-877-767-9425 or hail the USCG on Channel 16 as soon as practicable (considering crew and vessel safety), but no later than 24 hours from the sighting (Dead or Injured Protected Species Report). Staff responding to the hotline call will provide any instructions for the handling or disposing of any injured or dead protected species by individuals authorized to collect, possess, and transport sea turtles. The Protected Species Incident Report must include the following information:

- Time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable);
- Species identification (if known) or description of the animal(s) involved;
- Condition of the animal(s) (including carcass condition if the animal is dead);
- Observed behaviors of the animal(s), if alive;
- If available, photographs or video footage of the animal(s); and
- General circumstances under which the animal was discovered.

7. Protected Species within an Enclosed Moon Pool Reporting. If a protected species is observed within an enclosed moon pool and does not demonstrate any signs of distress or injury or an inability to leave the moon pool of its own volition, measures described in this section must be followed (only in cases where they do not jeopardize human safety). Although this particular situation may not require immediate assistance and reporting, a protected species could potentially become disoriented with their surroundings and may not be able to leave the enclosed moon pool of their own volition. In order for operations requiring use of a moon pool to continue, the following reporting measures must be followed:

   **Within 24 hours of any observation, and daily after that** for as long as an individual protected species remains within a moon pool (i.e., in cases where an ESA listed species has entered a moon pool but entrapment or injury has not been observed). The following information must be reported to BSEE (contact details to be provided):

   a. For an initial report, all information described above should be included.
   b. For subsequent daily reports:
      - Describe the animal's status to include external body condition (e.g., note any injuries or noticeable features), behaviors (e.g., floating at surface, chasing fish, diving, lethargic, etc.), and movement (e.g., has the animal left the moon pool and returned on multiple occasions?);
      - Description of current moon pool activities, if the animal is in the moon pool (e.g., drilling, preparation for demobilization, etc.);
      - Description of planned activities in the immediate future related to vessel movement or deployment of equipment;
      - Any additional photographs or video footage of the animal, if possible;
      - Guidance received and followed from NMFS liaison or stranding hotline that was contacted for assistance;
      - Whether activities in the moon pool were halted or changed upon observation of the animal; and
      - Whether the animal remains in the pool at the time of the report, or if not, the time/date the animal was last observed.

   *BOEM does not advocate the lowering of crew members into the moon pool to free protected species and NMFS should be contacted if protected species are encountered in the moon pool.*

**ATTACHMENT A. STANDARD FIELD CODES AND UNITS**

**BEAUFORT SCALE**

| BEAUFORT | DESCRIPTION OF SEA STATE |
|---|---|
| 0 | Windless: Glassy sea surface, 0 knot winds, 0-meter swell |
| 1 | Calm, light air: Ripples, no white caps, 1-3 knot winds, 0.1-meter swells |
| 2 | Light breeze: Short, small wavelets that don't break, 4-6 knot winds, 0.2-0.3-meter swells |
| 3 | Gentle breeze: Large wavelets that begin to break, 7-10 knot winds, 0.6-1-meter swells |
| 4 | Moderate breeze: Small waves with frequent white caps, 11-16 knot winds, 1-1.5-meter swells |
| 5 | Fresh breeze: Long, moderate waves with many white caps, 17-21 knot winds, 2-2.5-meter swells |
| 6 | Strong breeze: Large waves with extensive foaming and some spray, 22-27 knot winds, 3-4-meter swells |
| 7 | Near gale: Sea heaps up, waves breaking, streaks forming, 28-33 knot winds, 4-4.5-meter swells |
| 8 | Gale: Moderately high waves of great length, well-marked streaks, 34-40 knot winds, 5.5-7.5-meter swells |
| 9 | Severe gale: High waves, dense streaking, spray may affect visibility, 41-47 knot winds, 7-10-meter swells |
| 10 | Storm: Very high waves with long over-hanging crests, sea becoming white with streaks, 48-55 knot winds, 9-12.5-meter swells |
| 11 | Violent storm: Exceptionally high waves, sea completely covered with foam, 56-63 knot winds, 11.5-12.5-meter swells |
| 12 | Hurricane: Air filled with foam and spray, sea completely white, no visibility, 63+ knot winds, 16+ meter swells |

**UNITS**

| | |
|---|---|
| Date | YYYY-MM-DD |
| Durations (e.g., start and end times) (Coordinated Universal Time, UTC) | YY-MM-DDT HH:MM |
| Wind Speed | Knots (kt) |
| Distance, height, and depth | Meters (m) or kilometers (km) |
| Position in Latitude and longitude | Decimal degrees (North American Datum of 1983 (NAD83)); e.g., dd.ddddd, dd.ddddd |
| Bearing or direction of travel | Ship heading + clock face to animal |

**SKY**

| CLOUD COVER CODE | Percent (%) of sky covered with clouds: |
|---|---|
| 1 | <10% |
| 2 | 10–50% |
| 3 | 50–90% |
| 4 | >90% |

**MONITORING EQUIPMENT**

| CODE | EQUIPMENT | CODE | EQUIPMENT |
|---|---|---|---|
| HB | Hand-held Binoculars | IG | Infrared Goggles |
| BE | Big Eyes | CR | Crew Reported (any method) |
| NE | Naked Eye | PT | Passive Acoustic Towed Array |
| IC | Infrared Camera | PA | Passive Acoustic Moored/Stationary |

**DISTANCE FINDING**

| CODE | DISTANCE FINDING METHOD |
|---|---|
| EST | Eye estimation |
| RET | Reticle |
| LAS | Laser range-finder |
| RFS | Range-finding stick or calipers |

**SPECIES IDENTIFICATION**

*Marine Mammals*

| CODE | ITIS | WoRMS APHIA | COMMON NAME | SCIENTIFIC NAME |
|---|---|---|---|---|
| ASDO | 552460 | 137108 | Atlantic spotted dolphin | *Stenella frontalis* |
| WSDO | 180443 | 137100 | Atlantic white-sided dolphin | *Lagenorhynchus acutus* |
| BLBW | 180517 | 137122 | Blainville's beaked whale | *Mesoplodon densirostris* |
| BLWH | 180528 | 137090 | Blue whale | *Balaenoptera musculus* |
| BODO | 180426 | 137111 | Bottlenose dolphin | *Tursiops truncatus* |
| BRWH | 180525 | 242603 | Bryde’s whale | *Balaenoptera edeni* |
| GOBW | 180498 | 137127 | Cuvier's beaked whale | *Ziphius cavirostris* |
| DSWH | 180492 | 159025 | Dwarf sperm whale | *Kogia sima* |
| FKWH | 180463 | 137104 | False killer whale | *Pseudorca crassidens* |
| FIWH | 180527 | 137091 | Fin whale | *Balaenoptera physalus* |
| BEBW | 180509 | 137123 | Gervais' beaked whale | *Mesoplodon europaeus* |
| HAPO | 180473 | 137117 | Harbor Porpoise | *Phocoena phocoena* |
| HUWH | 180530 | 137092 | Humpback whale | *Megaptera novaeangliae* |
| KIWH | 180469 | 137102 | Killer whale | *Orcinus orca* |
| MANA | 180684 | 159504 | Manatee | *Trichechus manatus* |
| MHWH | 180459 | 137103 | Melon-headed whale | *Peponocephala electra* |
| MIWH | 180524 | 137087 | Minke whale | *Balaenoptera acutorostrata* |
| RIWH | 180537 | 159023 | North Atlantic right whale | *Eubalaena glacialis* |
| NBWH | 180504 | 343899 | Northern bottlenose whale | *Hyperoodon ampullatus* |
| SPDO | 180430 | 137105 | Pantropical spotted dolphin | *Stenella attenuata* |
| SFPW | 552461 | 137097 | Pilot whale (shortfinned) | *Globicephala macrorhynchus* |
| LFPW | 180466 | 137096 | Pilot whale (longfinned) | Globicephala melas |
| PYKW | 180461 | 137095 | Pygmy killer whale | *Feresa attenuata* |
| PSWH | 180491 | 137113 | Pygmy sperm whale | *Kogia breviceps* |
| GRAM | 180457 | 137098 | Risso's dolphin | *Grampus griseus* |

| CODE | ITIS | WoRMS APHIA | COMMON NAME | SCIENTIFIC NAME |
|---|---|---|---|---|
| RTDO | 180417 | 137110 | Rough-toothed dolphin | *Steno bredanensis* |
| SEWH | 180526 | 137088 | Sei whale | *Balaenoptera borealis* |
| SADO | 180438 | 137094 | Short-beaked common dolphin | *Delphinus delphis* |
| SOBW | 180515 | 137121 | Sowerby's beaked whale | *Mesoplodon bidens* |
| SPWH | 180488 | 137119 | Sperm whale | *Physeter macrocephalus* |
| STDO | 180434 | 137107 | Striped dolphin | *Stenella coeruleoalba* |
| TRBW | 180508 | 137126 | True's beaked whale | *Mesoplodon mirus* |
| WBDO | 180442 | 137101 | White-beaked dolphin | *Lagenorhynchus albirostris* |

*Seals*

| CODE | ITIS | WoRMS APHIA | COMMON NAME | SCIENTIFIC NAME |
|---|---|---|---|---|
| GRSE | 180653 | 137080 | Gray seal | *Halichoerus grypus* |
| HASE | 180649 | 137084 | Harbor seal | *Phoca vitulina* |
| HGSE | 622022 | 159019 | Harp seal | *Pagophilus groenlandicus* |
| HOSE | 180657 | 137078 | Hooded seal | *Cystophora cristata* |

*Sea Turtles*

| CODE | ITIS | WoRMS APHIA | COMMON NAME | SCIENTIFIC NAME |
|---|---|---|---|---|
| LHST | 173833 | 137206 | Loggerhead sea turtle | *Caretta caretta* |
| LBST | 173836 | 137207 | Leatherback sea turtle | *Dermochelys coriacea* |
| KRST | 551770 | 137208 | Kemp's ridley sea turtle | *Lepidochelys kempii* |
| HBST | 173843 | 137209 | Hawksbill sea turtle | *Eretmochelys imbricata* |
| GRST | 173830 | 137205 | Green sea turtle | *Chelonia mydas* |

*Fish*

| CODE | ITIS | WoRMS APHIA | COMMON NAME | SCIENTIFIC NAME |
|---|---|---|---|---|
| MARA | — | 1026118 | Giant manta ray | *Manta birostris* |
| STUR | — | — | Atlantic sturgeon | *Acipenser oxyrinchus oxyrinchus* |

*Unidentified Species*

| CODE | ITIS | WoRMS APHIA | COMMON NAME | SCIENTIFIC NAME |
|---|---|---|---|---|
| UNID | — | — | Unidentified animal | — |
| UNBA | 180403 | 2688 | Unidentified baleen whale | — |
| UNBW | 180493 | 136986 | Unidentified beaked whale | — |
| UNTU | 173828 | 136999 | Unidentified turtle | — |
| UNLW | 180403 | 2688 | Unidentified large whale | — |
| UNTW | 180404 | 148723 | Unidentified odontocete | — |
| UNSE | — | — | Unidentified seal | — |
| KOGI | 180490 | 159024 | Unidentified Kogia spp. | — |
| PIWH | 180464 | 137017 | Unidentified pilot whale | — |

**BEHAVIORAL/STATE**

| CODE | BEHAVIOR/STATE | CODE | BEHAVIOR/STATE |
|---|---|---|---|
| 14 | acrobatic | 78 | milling |
| 25 | blowing | 22 | motionless at surface |
| 12 | bow riding | 11 | porpoising |
| 13 | breaching | 90 | SAG |
| 05 | injured (e.g., visible wound) | 21 | spy hopping |
| 00 | dead | 19 | surfacing |
| 03 | dead in fishing gear | 17 | swimming at surface (non-travel) |
| 23 | diving (mammal) | 18 | swimming below surface |
| 69 | diving (turtle) | 20 | tail slapping (lobtailing) |
| 07 | diving fluke up | 16 | travel (slow < 1 kt) |
| 92 | entangled in lines, ropes, gear | 07 | travel (moderate 1-10 kt) |
| 54 | feeding | 06 | fast travel >10 kt |
| 22 | logging | 94 | undetermined |

## D-3. Best Management Practices 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 will require the Lessee to comply with these measures 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 Department of Defense night vision goggle equipment.

a. 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 (https://www.uscg.mil/forms/cg/CG_2554.pdf).

b. 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.

c. An annual report shall be provided to BOEM documenting any dead birds or bats found on vessels and structures during construction, operations, and decommissioning of a meteorological tower or buoys. 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/.

d. Anti-perching devices must be installed on the metocean buoys in order to minimize the attraction of birds.

## D-4. Best Management Practices to Minimize Potential Adverse Impacts to Historic Properties

a. 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 must meet BOEM's minimum standards (see BOEM 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 archaeological resources are present in the area and the geotechnical (sub-bottom) sampling activities must avoid 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 an archaeological resource without BOEM's prior approval

b. BOEM requires that the Lessee observe the unanticipated finds requirements stipulated in 30 CFR 585.802. If the Lessee, while conducting activities, discovers an 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, 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, and conduct any additional investigations as directed by BOEM to determine if the resources is eligible for listing in the National Register of Historic Places (30 CFR 585.802(b)).

## D-5. Best Management Practices to Minimize Impacts to Sensitive Seafloor Habitats

a. BOEM will require further data gathering and evaluation of seafloor habitats and expects to place restrictions on disturbance of sensitive seafloor habitats during COP review. As part of any plan, the lessee shall submit to BOEM the details of how these activities will avoid sampling activities or placement of anchors and other equipment on sensitive ocean floor habitats and shall include the following information: 1) Detailed maps showing proposed anchoring sites that are located with a sufficient distance from sensitive habitats, hazards, and other anthropogenic features (e.g. power cables), if present; 2) A description of the navigation equipment that would be used to ensure anchors and seafloor equipment are accurately set; and 3) equipment handling procedures that would be followed to prevent or minimize bottom disturbance, such as placing and removing all anchors vertically.
b. Conservation recommendations to avoid or minimize adverse effects on essential fish habitat may be incorporated in the lease and must be adhered to by the applicant. BOEM may require additional surveys to define boundaries and avoidance distances [from 30 CFR 585.703].
c. Lessees will characterize site-specific parameters to inform their plans and describe local conditions, including biological attributes. Lessees and their contractors may employ a range of methods to accomplish these goals but may not employ bottom trawling methodology to conduct these activities.

## D-6. Best Management Practices to Minimize Marine Trash and Debris

"Marine trash and debris" is defined as any object or fragment of wood, metal, glass, rubber, plastic, cloth, paper or any other solid, man-made item or material that is lost or discarded in the marine environment by the Lessee or an authorized representative of the Lessee (collectively, the "Lessee") while conducting activities on the OCS in connection with a lease, grant, or approval issued by the Department of the Interior (DOI). To understand the type and amount of marine debris generated, and to minimize the risk of entanglement in and/or ingestion of marine debris by protected species, lessees must implement the following measures.

a. The Lessee must practice trash and debris reduction and 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 or other extruded polystyrene foam, 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.

b. Training: All vessel operators, employees, and contractors performing OCS survey activities on behalf of the Lessee (collectively, "Lessee Representatives") must complete marine trash and debris awareness training annually. The training consists of two parts: (1) viewing a marine trash and debris training video or slide show (described below); and (2) receiving an explanation from management personnel that emphasizes their commitment to the requirements. The marine trash and debris training videos, training slide packs, and other marine debris related educational material may be obtained at https://www.bsee.gov/debris. The training videos, slides, and related material may be downloaded directly from the website. Lessee Representatives engaged in OCS survey activities must continue to develop and use a marine trash and debris awareness training and certification process that reasonably assures that they, as well as their respective

employees, contractors, and subcontractors, are in fact trained. The training process must include the following elements:

i. Viewing of either a video or slide show by the personnel specified above;

ii. An explanation from management personnel that emphasizes their commitment to the requirements;

iii. Attendance measures (initial and annual); and

iv. Recordkeeping and availability of records for inspection by DOI. By January 31 of each year, the Lessee must submit to DOI an annual report signed by the Lessee that describes its marine trash and debris awareness training process and certifies that the training process has been followed for the previous calendar year. The Lessee must send the reports via email to *marinedebris@bsee.gov*.

c. Marking: Materials, equipment, tools, containers, and other items used in OCS activities which are of such shape or configuration that they are likely to snag or damage fishing devices, and could be lost or discarded overboard, must be clearly marked with the vessel or facility identification, and properly secured to prevent loss overboard. All markings must clearly identify the owner and must be durable enough to resist the effects of the environmental conditions to which they may be exposed.

d. Recovery: Lessees must recover marine trash and debris that is lost or discarded in the marine environment while performing OCS activities when such incident is likely to: (a) cause undue harm or damage to natural resources, including their physical, atmospheric, and biological components, with particular attention to those that could result in the entanglement of or ingestion by marine protected species; or (b) significantly interfere with OCS uses (e.g., are likely to snag or damage fishing equipment, or present a hazard to navigation). Lessees must notify DOI when recovery activities are (i) not possible because conditions are unsafe; or (ii) not practicable because the marine trash and debris released is not likely to result in any of the conditions listed in (a) or (b) above. The Lessee must recover the marine trash and debris lost or discarded if DOI does not agree with the reasons provided by the Lessee to be relieved from the obligation to recover the marine trash and debris. If the marine trash and debris is located within the boundaries of a potential archaeological resource/avoidance area, or a sensitive ecological/benthic resource area, the Lessee must contact DOI for approval prior to conducting any recovery efforts.

Recovery of the marine trash and debris should be completed immediately, but no later than 30 days from the date in which the incident occurred. If the Lessee is not able to recover the marine trash or debris within 48 hours (See # F. Reporting), the Lessee must submit recovery plan to DOI explaining the recovery activities to recover the marine trash or debris ("Recovery Plan"). The Recovery Plan must be submitted no later than 10 calendar days from the date in which the incident occurred. Unless otherwise objected by DOI within 48 hours of the filing of the Recovery Plan, the Lessee can proceed with the activities described in the Recovery Plan. The Lessee must request and obtain approval of a time extension if recovery activities cannot be completed within 30 days from the date in which the incident occurred. The Lessee must enact steps to prevent similar incidents and must submit a description of these actions to BOEM and BSEE within 30 days from the date in which the incident occurred.

e. Reporting: The Lessee must report all marine trash and debris lost or discarded to DOI (using the email address listed on DOI's most recent incident reporting guidance). This report applies to all marine trash and debris lost or discarded, and must be made monthly, no later than the fifth day of the following month. The report must include the following:

   i. Project identification and contact information for the Lessee, operator, and/or contractor;

   ii. The date and time of the incident;

   iii. The lease number, OCS area and block, and coordinates of the object's location (latitude and longitude in decimal degrees);

   iv. A detailed description of the dropped object to include dimensions (approximate length, width, height, and weight) and composition (e.g., plastic, aluminum, steel, wood, paper, hazardous substances, or defined pollutants);

   v. Pictures, data imagery, data streams, and/or a schematic/illustration of the object, if available;

   vi. Indication of whether the lost or discarded item could be a magnetic anomaly of greater than 50 nanoTesla (nT), a seafloor target of greater than 0.5 meters (m), or a sub-bottom anomaly of greater than 0.5m when operating a magnetometer or gradiometer, side scan sonar, or sub-bottom profile in accordance with DOI's applicable guidance;

   vii. An explanation of how the object was lost; and

   viii. A description of immediate recovery efforts and results, including photos.

f. In addition to the foregoing, the Lessee must submit a report within 48 hours of the incident ("48-hour Report") if the marine trash or debris could (a) cause undue harm or damage to natural resources, including their physical, atmospheric, and biological components, with particular attention to those that could result in the ingestion by or entanglement of marine protected species; or (b) significantly interfere with OCS uses (e.g., are likely to snag or damage fishing equipment, or present a hazard to navigation). The information in the 48-hour Report would be the same as that listed above, but just for the incident that triggered the 48-hour Report. The Lessee must report to DOI if the object is recovered and, as applicable, any substantial variation in the activities described in the Recovery Plan that were required during the recovery efforts. Information on unrecovered marine trash and debris must be included and addressed in the description of the site clearance activities provided in the decommissioning application required under 30 CFR § 585.906. The Lessee is not required to submit a report for those months in which no marine trash and debris was lost or discarded.

g. At the end of the 5-year term data collection instrumentation will be decommissioned, and large marine debris objects removed.

h. Vessel operators will comply with pollution regulations outlined in 33 CFR 151.51-77.

# Appendix E: Responses to Public Comments on the Draft EA

*Placeholder for the Final EA public comment summary and agency responses.*

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# Appendix F: Additional Survey Technical Specification and Examples

## F-1. Overview

This appendix summarizes technical information for Autonomous Underwater Vehicles (AUV) used to perform High Resolution Geophysical (HRG) surveys. Examples of representative, available technology are provided. Related technologies are also summarized, such as underwater transponder positionings (UTPs), which are equivalent to Ultra-short Baseline positioning systems, with very narrow beam widths, operating at low power, producing very short pings only when interrogated.

## F-2. Autonomous Underwater Vehicles (AUV)

Kongsberg's Hugin AUV was developed in the late 1990s to perform deepwater surveys where traditional methods were no longer feasible (Figure F-1). The Hugin AUV has now become the industry standard AUV used for hydrographic and geophysical surveys within the petroleum and renewable industries. The early systems used an aluminum hydrogen peroxide 'fuel cell' battery and quickly changed to lithium-ion battery. Over the past decades the battery and sensor technology has improved considerably along with computer and software advancements which have resulted in major developments in the AUV capabilities, increasing the survey endurance (e.g., longer missions underwater) and higher resolution and more precisely georeferenced data. Other advances in technology allow the AUV's to operate independently of direct support from a vessel and allow a single vessel to support multiple AUV systems simultaneously. Table F-1 describes representative payloads that an AUV can carry.

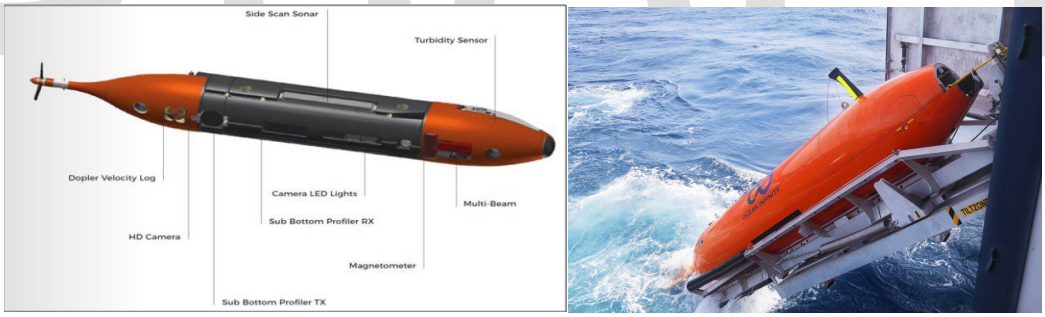


**Figure F-1: A representative HUGIN 6000 AUV (left) and HUGIN AUV being deployed (right)**

**Table F-1: Representative AUV - Kongsberg Hugin 6000, Summary of Specifications**

| AUV | Characteristic |
|---|---|
| Physical Dimensions | 19.7 ft (6 m) long 2.5 ft (0.75 m) diameter |
| Weight | 3,307 pounds (1,500 kilograms) (in air) neutrally buoyant (in water) |
| Endurance | 60–80 hours<br>Rechargeable Li-Ion Polymer Batteries |
| Speed range | 2–6 knots (operational speed ~ 3.5 knots) |
| Depth rating | 19,685 ft (6,000 m) |

**Table F-2: Representative AUV Payload including Navigation Equipment**

| AUV Payload / Equipment | Make/ Model | Acoustic Information (if acoustic) | Intent / Coverage | Lateral Distance (m) to Level B threshold |
|---|---|---|---|---|
| Multi Beam Echo Sounder (MBES) | Kongsberg EM2040 | Frequency 200-400 kHz<br>Operational Power: 150W<br>Source Level: 218 dB re 1 µPa<br>Beam Width: 0.4° x 0.7° (400kHz) a/ | Bathymetric mapping. | N/A |
| Sidescan Sonar (SSS) | Edgetech 2205 | Frequency 230/410 kHz<br>Operational Power: 200W<br>Source Level 226 dB re 1 µPa<br>Beam Width: 0.2° x 0.2° a/ | Target identification, seabed sediment delineation. | N/A |
| Sub-bottom Profiler (SBP) | Edgetech DW216 | Frequency: 2-16 kHz<br>Operational Power: 200W<br>Source Level: 176 to 180 dB | Seabed structure imaging. | 8.7 |

| AUV Payload / Equipment | Make/ Model | Acoustic Information (if acoustic) | Intent / Coverage | Lateral Distance (m) to Level B threshold |
|---|---|---|---|---|
| Magnetometer | OFG Self Compensating Magnetometer | b/ | Detection of ferrous materials. | N/A |
| Forward looking Sonar | Imagenex 837A Delta T – 120°V x 10°H | Frequency: 260 kHz a/<br>Operational Power: 22 to 32 Volts DC at less than 5 W<br>Source Level: c/<br>Beam Width: 3°, 1.5°, 0.75° | Obstacle avoidance multibeam sonar. | N/A |
| Conductivity, Temperature, and Density Profiler | SAIV AS CTD Profiler 208 | b/ | Critical for MBES data quality and improves subsea positioning. | N/A |
| Doppler Velocity Log | Nortek DVL | Frequency: 500 kHz a/<br>Operational Power: 4 W average<br>Source Level: c/<br>Beam Width: 4° | Bottom tracking, provides information on currents experienced by AUV for navigation. | N/A |
| Depth Sensor | Paroscientific Digiquartz D50 | b/ | Provides accurate depth values for navigation. | N/A |
| Digital Altimeter | Kongsberg Mesotech Ltd. | Frequency: 200 kHz or 675 kHz a/<br>Operational Power: 22 to 28 Volts DC external power source<br>Source Level: c/<br>Beam Width: 2.7° (675 kHz), 10° (200 kHz) | Provides accurate altitudes above seabed to assist in maintaining required AUV flight altitude. | N/A |

| AUV Payload / Equipment | Make/ Model | Acoustic Information (if acoustic) | Intent / Coverage | Lateral Distance (m) to Level B threshold |
|---|---|---|---|---|
| Inertial Motion Unit | Honeywell HG9900 | b/ | Provides motion information for navigation. | N/A |
| AUV Novatel GNSS System | NovAtel | b/ | For surface navigation.<br>State of the art system with sub-meter accuracy, uncertainty conforming to IHO special order. | N/A |
| HD Camera + lights [Optional] | CathX Ocean M12 A1000 UHD stills camera | b/ | Stills camera - supplemental AUV system (not required for planned survey activities but may be used for data collection). | N/A |
| Turbidity, Fluorescence, DO | FLNU (RT)D | b/ | Water quality sensors - supplemental AUV system (not required for planned survey activities but may be used for data collection). | N/A |
| cNODE Ultra-Short Baseline (USBL) Beacon | Kongsberg TDR30V or TD40V USBL Transponder 206dB TX x 85dB Rx | Frequency: 21-31 kHz<br>Operational Power: Battery-powered (charger is 110 or 120 W)<br>Source level: 206 dB<br>Beamwidth: 30° horizontal and vertical<br>Ping Rate: between 1 and 10 seconds | Underwater positioning to communicate with the surface system deployed from the surface support vessel. | 45-48 |
| cNODE Modem Explorer | Kongsberg Modem Explorer 34 with TDR40V Transponder | Frequency 21-31 kHz<br>Operational Power: 100W<br>Beamwidth: +/- 20° Vertical<br>Duty cycle: 50% | Acoustic modem between survey vessel and AUV. Transmits vehicle health and decimated HRG data. Receives navigation updates and survey commands. | 45-48 |

| AUV Payload / Equipment | Make/ Model | Acoustic Information (if acoustic) | Intent / Coverage | Lateral Distance (m) to Level B threshold |
|---|---|---|---|---|
| Underwater Transponder Positioning (UTP) Array on seabed | Kongsberg cNODE Maxi | Further details in Table 2. | Further details in Table 2. | 45-48 |
| Survey Support Ship USBL System | Kongsberg HiPAP 502 | Frequency: 21-31 kHz<br>Operational Power: 15 W<br>Source Level: c/<br>Beam Width: The system dynamically alters the beam using electronic beam control<br>Ping Rate: 1-10 Hz<br>b/ c/ | Mounted on the survey support vessel. Provides accurate subsea positioning of cNODE UTP and cNODE USBL beacons, enabling accurate subsea navigation.<br>The USBL will be used to directly position the AUV during operations in the export cable siting corridors and may also assist in AUV positioning in the Lease Area. | 31.20 |

Notes:
a/ Operating frequencies are above all relevant marine mammal hearing thresholds and therefore are not possible sources of disturbance to marine mammals.
b/ Proposed equipment is non-acoustic or otherwise not a possible source of disturbance to marine mammals.
c/ Information not specified by the manufacturer.

# F-3. Underwater Transponder Positioning (UTP)

Sound travels four times faster in water than in air. As a result of this characteristic, underwater sound has been used to support the positioning of vessels and systems under the water for decades in the form of Ultra short or long baseline positioning systems. The use of Autonomous Underwater Vehicles (AUVs) required improved accuracy and robustness. As such, researchers at Kongsberg Marine developed underwater transponder positioning (UTP) to be used in tandem with the HUGIN AUV (Hegrenæset al. 2009). Weighted transponders (with or without a floatation collar) are placed on the seafloor (Figure F-2) and transmit a location signal only when interrogated by the AUV. Table F-3 describes representative specifications and acoustic characteristics of typical UTPs.


**Figure F-2: Example of Underwater Positioning Transponder with Floatation Collar attached to a Weight**



**Table F-3: UTP Support Equipment Details for AUV**

| UTP | Characteristic |
|---|---|
| Physical Dimensions | **Weighted Deployment (est. up to 27 deployments)**<br>The UTP transponder will comprise a 132-pound (60-kilogram) steel clump weight, 16-33 ft (5-10 m) rope, and the UTP transponder. The UTP transponder will be in a flotation collar suspended 19-36 ft (5-11 m) above the seabed.<br>The footprint of each UTP transponder weight is less than 15 $ft_2$ (1.4 $m_2$).<br>**Frame Deployment (est. up to 13 deployments)**<br>Alternatively, to the weight, line, and floatation collar, a steel frame 8.2 ft (2.5 m) tall with and weighing up to 300 pounds (136 kilograms) may be used. The footprint of each steel frame is approximately 6.5 $ft_2$ (2 $m_2$).<br>The total area of seabed impacted is conservatively (highest reasonable case) estimated at 27 x 15 $ft_2$ (1.4 $m_2$) plus 13 x 6.5 $ft_2$ (2$m_2$), a total area of 490 $ft_2$ (64 $m_2$). |
| Acoustic Characteristics | Frequency: 21-31 kHz<br>Operational Power: Battery-powered 10-14.4 volts DC Source level: 206 dB<br>Beamwidth: 30° horizontal and vertical<br>Ping rate: 1 to 10 Hz. |