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Final Programmatic Environmental Impact Statement

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Appendix

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Appendix A: Impacts Not Expected to Be Significant

In this appendix, the Bureau of Ocean Energy Management (BOEM) addresses impacts from the 2024–2029 National Outer Continental Shelf Oil and Gas Leasing Program (2024–2029 Program) that are not expected to be significant and provides a rationale for that determination.

Section 1502.1 of the Council on Environmental Quality (CEQ) regulations implementing the National Environmental Policy Act directs Federal agencies to "focus on significant environmental issues." The scoping process, including early public involvement and opportunity to comment, aids in identifying these significant environmental issues. Section 1500.4(g) of the CEQ regulations states that scoping should be completed "…not only to identify significant environmental issues deserving of study, but also to deemphasize insignificant issues."

For the purposes of this analysis, impacts on affected resources by impact-producing factors (IPFs) are categorized as defined in **Table A-1**.

Table A-1. Definitions and examples of direct and indirect effects of IPFs on resources

Impact	Definition	Example	Refer to
Potentially significant	An IPF may affect the particular resource in question and is generally considered to be unavoidable. This category includes impacts that are potentially irreversible but may be removed or reduced through mitigation, regulation, or remedial action. This assessment considers impacts on individual animals (Endangered Species Act-listed species), as well as populations, as appropriate.	I.1 **NOISE** and R.9 **MARINE MAMMALS**	**Sections 4.1.3 and 4.1.6–4.1.9**
Not expected to be significant	An IPF interacts with a resource but is not expected to affect the particular resource in question, or, if impacts do occur, the resource would most likely recover without mitigation once the impacting factor is removed.	I.1 **NOISE** and R.4 **MARINE BENTHIC COMMUNITIES**	**Appendix A**
Does not interact	An IPF does not interact with a specific resource.	I.1 **NOISE** and R.1 **AIR QUALITY**	n/a

BOEM's determinations in the final programmatic environmental impact statement (Final Programmatic EIS) regarding potentially significant impacts are based on evaluations in previous Bureau environmental documents, public scoping information, and the professional judgment of BOEM subject matter experts who applied and interpreted current scientific and technical information. **Section 1.6** describes how BOEM addressed incomplete and unavailable information in this document.

This Final Programmatic EIS considers the potential for significance at a broad geographic scale, as appropriate for the scope of a national leasing program. BOEM prepares more detailed lease sale and site-specific environmental documents to evaluate potential impacts at each subsequent stage of the leasing process. These subsequent environmental reviews address any new or additional information available at those stages and evaluate appropriate protective measures.

This appendix is organized first by IPFs and then by resources. The discussion provides the rationale for IPF/resource combinations that are not expected to be significant. For potentially significant impacts, see **Chapter 4**. Unless indicated otherwise, the determinations in this appendix apply to all Outer Continental Shelf (OCS) regions or planning areas. The numbering of the IPFs and resources is consistent with the rest of the Final Programmatic EIS for easy identification.

I.1 NOISE

R.1 AIR QUALITY: Noise does not interact with air quality.

R.2 WATER QUALITY: Noise does not interact with water quality.

R.3 PELAGIC COMMUNITIES: Noise is not expected to significantly impact pelagic communities, particularly planktonic organisms. Little research has been conducted on the physiological impacts of noise to eggs, zooplankton, and fish larvae. Although it is possible that high-intensity noises could irreversibly damage internal anatomy and physiology of planktonic organisms if they are close enough to a sound source (de Soto et al. 2013; Govoni et al. 2003; Govoni et al. 2008), or such noises may cause them to swim out of harm's way (Dalen and Knutsen 1987), most of the work that has been done on small spatial scales (i.e., 10s of meters) has shown minimal effects at these distances (Bolle et al. 2012; Booman et al. 1996; Govoni et al. 2008; Holliday et al. 1987; Kostyuchenko 1973; Pearson et al. 1994; Saetre and Ona 1996). McCauley et al. (2017) sampled zooplankton in the vicinity of the track of a seismic airgun and demonstrated elevated mortality rates at much larger distances than previous studies had shown (> 3,280 ft [1,000 m]). A follow-up modeling study found that, even if such high mortality rates were to occur, zooplankton populations would recover quickly, due to a combination of rapid turnover and natural mixing from ocean circulation (Richardson et al. 2017). More recently, Fields et al. (2019) showed an increase in mortality for copepods that were exposed to an airgun at distances up to 32.8 ft (10 m) but not at a distance of 65.6 ft (20 m), a stark contrast to McCauley et al. (2017). The discrepancy between these findings underscores the need for additional research in this area. Taken together, the results from research in this area indicates that seismic airguns may affect plankton on very small spatial scales and would not significantly increase mortality rates in planktonic organisms, which already have very high natural levels of mortality.

Behavioral impacts from low-intensity sound sources (e.g., distant vessels, construction) may also be possible but would likely occur over small spatial scales and therefore have no or insignificant impacts. For example, some fish larvae use acoustic signals to maintain group cohesion (Staaterman et al. 2014b) or to navigate toward appropriate settlement habitat (Montgomery and Coombs 2011; Montgomery et al. 2006; Radford et al. 2011; Simpson et al. 2005). Therefore, some continuous sounds from drilling or

vessel transit, for example, could mask biologically relevant sounds (Holles et al. 2013), but these effects would be transient and localized in nature and are unlikely to have long-term, population-level effects.

R.4 MARINE BENTHIC COMMUNITIES: Noise is not expected to significantly impact marine benthic communities, particularly invertebrates. Invertebrate bioacoustics is a rapidly expanding field of research (Mooney et al. 2016; Normandeau Associates Inc. 2012; Popper and Hawkins 2018). It is generally understood that marine invertebrates are sensitive to particle motion and not acoustic pressure. For information about hearing in marine invertebrates, see **Appendix B** and Popper and Hawkins (2018). Impacts are expected to occur within a few wavelengths of a sound source, where the particle motion component of a sound wave is dominant, but not be significant (Kalmijn 1988; Popper and Hawkins 2018; Urick 1983). In addition to waterborne particle motion, noise from seismic airguns, drilling, or trenching may propagate through the substrate and could also affect some burrowing invertebrates (Roberts and Elliott 2017; Solan et al. 2016). Several studies have examined impacts of high-intensity sounds on benthic invertebrates and have generally found sublethal effects. Day et al. (2017) found that airgun exposure changed blood chemistry and altered normal behaviors in burrowing scallops within several hundred meters of the source. Rock lobsters exposed to seismic airguns exhibited reflex impairment, long-term statocyst (balance sensory receptor) damage, and changes in blood chemistry, but mass mortality did not occur (Day et al. 2016; 2019). Payne et al. (2007) observed sublethal effects to blood biochemistry in American lobster exposed to airguns but no obvious mortality or physiological changes. Alarm and startle responses have been observed in squid (Fewtrell and McCauley 2012; Jones et al. 2021) and cuttlefish (Samson et al. 2014), and increased vessel noise has increased metabolic rates in shore crabs (Wale et al. 2013). A series of field studies on adult snow crabs showed no serious impacts on behavior or health when exposed to seismic airguns (Christian et al. 2003; Cote et al. 2020; Morris et al. 2020). Taken together, this research suggests that marine benthic organisms could experience some behavioral or sublethal physiological effects when exposed to noise from seismic airguns, but wide-scale mortality is not expected. Because results thus far have shown differing effects across species, noise impacts on marine mammals continues to be an important area of scientific research.

R.5 COASTAL & ESTUARINE HABITATS: Noise is potentially significant for coastal and estuarine habitats in some Alaska planning areas where caribou are present (**Section 4.1**). Noise is not expected to significantly impact coastal and estuarine habitats in other regions or the remaining Alaska planning areas, largely because of the physics of sound propagation in shallow waters. In coastal areas, noise could be produced as a byproduct of onshore construction, pipeline trenching, or vessel traffic. Impacts are expected to be highly localized because low-frequency sounds do not propagate well through shallow water (low-frequency cutoff) (Urick 1983). The most common species in coastal areas (such as crabs, oysters, mussels, and shrimp) can perceive the particle motion component (**Appendix B**) of low-frequency sounds (Charifi et al. 2017; de Soto et al. 2013; Roberts et al. 2015). Larval stages of some estuarine species may use acoustic cues to navigate toward appropriate settlement habitat or to initiate metamorphosis (Lillis et al. 2015; Lillis et al. 2013; Stanley et al. 2015). Although these animals may use natural acoustic cues for basic life functions, the particle motion signal from anthropogenic noise

sources would propagate only a few wavelengths from the sound source and therefore would not likely affect most coastal and estuarine species (Kalmijn 1988; Popper and Hawkins 2018; Urick 1983).

R.6 **FISH & ESSENTIAL FISH HABITAT:** Noise is potentially significant for fish and essential fish habitat (EFH) in all planning areas (**Section 4.1**).

R.7 **BIRDS:** Noise is not expected to significantly impact birds. Birds have a relatively restricted hearing range for airborne noise. Hearing sensitivity seems most acute in the range of 1 to 5 kHz (Dooling and Popper 2007). These data, albeit limited, suggest that seabirds are not particularly sensitive to sounds below 1 kHz, the frequency range in which the most acute OCS-associated noise occurs (**Appendix B**). Despite this low sensitivity, birds could detect and be disturbed by some OCS-related noise. Noise from seismic surveys could temporarily disturb or displace pelagic diving birds from foraging habitat (Pichegru et al. 2017). Underwater noise from seismic surveys, drilling, production, trenching, or vessel traffic could affect seabirds and waterfowl that dive below the water surface to forage or escape predators. Other underwater sounds (e.g., vessel noise) also have dominant acoustic energy below the hearing range of diving birds; therefore, impacts from these sources would be minimal and would only occur very close to the source. Although drilling and production operations generate noise, some seabirds are attracted to offshore structures and use them for resting or foraging (Baird 1990; Montevecchi 2006; Russell 2005; Tasker et al. 1986).

Species that are in close proximity to platforms may experience disturbance or possible temporary displacement from airborne sounds around the platforms (Russell 2005; Tasker et al. 1986). Aircraft noise would be short term with transient effects. Studies of birds exposed to frequent, low-level military jet aircraft overflights and simulated mid- to high-altitude sonic booms have shown some short-term behavioral responses but little effect on reproductive success (Ellis et al. 1991). Additionally, birds have been shown to return to pre-disturbance behavior within 5 minutes of aircraft disturbance (Komenda-Zehnder et al. 2003).

Finally, noise from onshore construction and other OCS activities could temporarily mask bird vocalization and communication and cause localized disturbance and temporary displacement of some species from the immediate area of activity. Some species may avoid the noisy area but return to the area after construction ends, while others may become acclimatized to the noise. In general, impacts could be avoided or minimized onshore through careful placement of facilities, such as by locating pipeline corridors and construction projects away from nesting aggregations or by scheduling activities to avoid the nesting period.

R.8 **SEA TURTLES:** Noise is potentially significant for sea turtles in the Pacific, Gulf of Mexico (GOM), and Atlantic Regions—and in the Gulf of Alaska Planning Area when sea turtles occur there (**Section 4.1**). Noise is not expected to be significant for sea turtles in the remaining Alaska planning areas, where sea turtles are not present.

R.9 **MARINE MAMMALS:** Noise is potentially significant for marine mammals in all planning areas (**Section 4.1**).

R.10 COMMERCIAL & RECREATIONAL FISHERIES: Noise is not expected to significantly impact commercial and recreational fisheries. Research on the impacts of seismic airguns on commercial catch rates generally have focused on short-term impacts and have shown that some fish species do vacate areas during and immediately following seismic surveys, but the fish usually return within hours to days (Engås et al. 1996; Hirst and Rodhouse 2000; Løkkeborg and Soldal 1993). Although catch rates may be temporarily affected by a displacement of animals, it is unlikely to have long-lasting impacts on an entire fishery. Other noise sources from OCS activity are not expected to have significant impacts on fisheries. Ship noise may cause localized, temporary behavioral disturbance or masking of biologically important sounds (impacts of acoustic masking are discussed in **Section 4.1**). Unless masking persistently occurs at the site and timing of a key spawning aggregation, it is unlikely to have a significant impact on fisheries. Similarly, drilling and trenching noise are transient in nature and are not expected to displace fishing activity or significantly impact this resource. Overall, although individuals of some economically important target species may be affected by noise, the impacted fish would constitute an immeasurably small portion of potential landings.

R.11 ARCHAEOLOGICAL & CULTURAL RESOURCES: Noise does not interact with archaeological and cultural resources.

R.12 LAND USE: Noise is not expected to significantly impact land use. Onshore noise impacts from construction (e.g., new landfalls, port expansion) are anticipated to be temporary. Noise impacts relating to marine seismic surveys and geohazard surveys; vessel noise (e.g., propeller cavitation, propeller singing, propulsion); drilling and production operations; offshore construction; and platform removal would be restricted to the offshore environment.

R.13 CULTURE: Noise is potentially significant for culture in the Alaska, Atlantic, and Pacific Regions and the Eastern GOM Planning Area (**Section 4.1**). In the Western and Central GOM Planning Areas, noise is not expected to have a significant impact on culture, because the additional OCS oil and gas activity would not have a noticeable effect on baseline noise levels. Significant impacts that may already exist could be prolonged by any activities authorized under the 2024–2029 Program, but additional impacts are not expected. Noise from aircraft and ships is short term and transient.

R.14 VULNERABLE COASTAL COMMUNITIES: Noise is potentially significant for vulnerable coastal communities in the Alaska, Atlantic, and Pacific Regions and the Eastern GOM Planning Area (**Section 4.1**). In the Western and Central GOM Planning Areas, noise is not expected to have a significant impact on vulnerable coastal communities because the additional OCS oil and gas activity would not have a noticeable effect on baseline noise levels. Significant impacts that may already exist could be prolonged by any activities authorized under the 2024–2029 Program, but additional impacts are not expected. Noise from aircraft and ships is short term and transient.

R.15 RECREATION & TOURISM: Noise is potentially significant for recreation and tourism in the Alaska, Pacific, and Atlantic Regions and the Eastern GOM Planning Area (**Section 4.1**)**.** Noise impacts on recreation and tourism from OCS-related oil and gas activities are not expected to be significant in the Western and Central GOM Planning Areas due to the baseline level of industrial noise that already exists

in these areas. Significant impacts that may already exist could be prolonged by any activities authorized under the 2024–2029 Program, but additional impacts are not expected.

I.2 TRAFFIC

R.1 AIR QUALITY: Traffic does not interact with air quality, because this IPF considers only the physical presence of aircraft, vessel, and onshore traffic, not the emissions they produce.

R.2 WATER QUALITY: Traffic is not expected to significantly impact water quality. Vessel wake, propeller "wash," bottom scour from ship or vessel traffic, and channel dredging may lead to temporary and localized increases in turbidity, but these potential impacts are not expected to be significant due to their localized and temporary nature.

R.3 PELAGIC COMMUNITIES: Traffic is not expected to significantly impact pelagic communities. Aircraft would have no effect on pelagic communities. Ship traffic transiting through an area may affect local circulation and increase turbulence (e.g., ship wake), which may cause mortality or injury to some planktonic organisms in close proximity to the moving vessels (Bickel et al. 2011). However, this impact would not be significant because of the naturally high rates of mortality and growth in planktonic organisms and the localized nature of ship wakes.

R.4 MARINE BENTHIC COMMUNITIES: Traffic is not expected to significantly impact marine benthic communities. Traffic can interact with marine benthic communities, particularly in shallower waters, as a result of vessel wake, propeller "wash," bottom scour from ships or vessels, and channel dredging to allow for ships and vessels to pass through. These potential impacts are not expected to be significant due to the short-duration and/or small, localized footprints of these occurrences, should they occur.

R.5 COASTAL & ESTUARINE HABITATS: Vessel and onshore traffic may significantly impact coastal and estuarine habitats in all planning areas (**Section 4.1**).

R.6 FISH & ESSENTIAL FISH HABITAT: Traffic is not expected to significantly impact fish and EFH. Traffic can interact with fish and EFH, particularly in shallower waters, as a result of vessel wake, propeller "wash," bottom scour from ships or vessels, and channel dredging to allow for ships and vessels to pass through; traffic may potentially disrupt, injure, or destroy these resources. These potential impacts are not expected to be significant due to the short-duration and/or small, localized footprints of these occurrences.

R.7 BIRDS: Traffic may significantly impact birds in all planning areas (**Section 4.1**).

R.8 SEA TURTLES: Vessel traffic may significantly impact sea turtles in the Pacific, GOM, and Atlantic Regions—and in the Gulf of Alaska Planning Area when sea turtles occur there (**Section 4.1**). Traffic is not expected to be significant for sea turtles in the remaining Alaska planning areas, where sea turtles are not present.

R.9 MARINE MAMMALS: Traffic may significantly impact marine mammals in all planning areas (**Section 4.1**).

R.10 COMMERCIAL & RECREATIONAL FISHERIES: Traffic is not expected to significantly impact commercial or recreational fisheries. Although traffic may cause commercial and recreational fishing vessels to change their course or speed while traveling to or from fishing grounds or while fishing, standard maritime communication and well-established planning processes easily resolve any chance overlap of traffic with fisheries activities. Vessel traffic may also damage fishing gear, although these incidences are expected to be isolated.

R.11 ARCHAEOLOGICAL & CULTURAL RESOURCES: Traffic does not interact with archaeological and cultural resources.

R.12 LAND USE: Traffic may significantly impact land use in the Alaska, Pacific, and Atlantic Regions and the Eastern GOM Planning Area (**Section 4.1**). In the Western and Central GOM Planning Areas, traffic would not have a significant impact on land use, because the traffic increase likely would not be measurably different from the baseline due to the current level of oil and gas activity. Some coastal lands have already been converted to support offshore oil and gas activity, and an incremental addition of activities from additional OCS oil and gas activity is not likely to change established traffic patterns and levels. Significant impacts that may already exist could be prolonged by any activities authorized under the 2024–2029 Program, but additional impacts are not expected.

R.13 CULTURE: Traffic may significantly impact culture in the Alaska, Atlantic, and Pacific Regions and the Eastern GOM Planning Area (**Section 4.1**). In the Western and Central GOM Planning Areas, traffic is not expected to have a significant impact on regional culture because the traffic increase would not be measurably different than the baseline of current oil and gas activity. The incremental addition of activities from OCS oil and gas activity is not likely to change established traffic patterns and levels. Significant impacts that may already exist could be prolonged by any activities authorized under the 2024–2029 Program, but additional impacts are not expected.

R.14 VULNERABLE COASTAL COMMUNITIES: Traffic may significantly impact vulnerable coastal communities in the Alaska, Atlantic, and Pacific Regions and the Eastern GOM Planning Area (**Section 4.1**). In the Western and Central GOM Planning Areas, traffic is not expected to have a significant impact on vulnerable coastal communities because traffic increase would not be measurably different than the baseline of current oil and gas activity. The incremental addition of activities from OCS oil and gas activity is not likely to change established traffic patterns and levels. Significant impacts that may already exist could be prolonged by any activities authorized under the 2024–2029 Program, but additional impacts are not expected.

R.15 RECREATION & TOURISM: Traffic is not expected to have a significant impact on recreation and tourism in any planning area. Increased road, air, or marine traffic could occur but would be temporary in nature or have a small or insignificant incremental contribution to existing traffic.

I.3 ROUTINE DISCHARGES

R.1 AIR QUALITY: Routine discharges do not interact with air quality.

R.2 WATER QUALITY: Routine discharges may significantly impact water quality in all planning areas (**Section 4.1**).

R.3 PELAGIC COMMUNITIES: Routine discharges are not expected to significantly impact pelagic communities. Elevated turbidity may reduce the amount of light available for photosynthesis by phytoplankton and may impair feeding opportunities for visual-foraging zooplankton (including larval fishes). In addition, suspended material in the water may clog and abrade appendages and feeding structures on some zooplankton species (Kjelland et al. 2015; Wilber and Clarke 2001). However, impacts from routine discharges would not significantly impact pelagic communities, because routine discharges would be localized, minimal, and rapidly dispersed and diluted. Additionally, compliance with National Pollution Discharge Elimination System (NPDES) permit requirements would reduce or prevent most impacts on nearby waters.

R.4 MARINE BENTHIC COMMUNITIES: Routine discharges may significantly impact marine benthic communities in all planning areas (**Section 4.1**).

R.5 COASTAL & ESTUARINE HABITATS: Routine discharges do not interact with coastal and estuarine habitats.

R.6 FISH & ESSENTIAL FISH HABITAT: Routine discharges are not expected to significantly impact fish and EFH. Permitted routine discharges, such as produced water, are not expected to persist in the water column after discharge. Discharged muds and cuttings settle or disperse rapidly. Cuttings discharged at the surface spread over a greater area than those shunted to the seafloor, but protective buffers are used to distance drilling activities from potentially sensitive habitat and fish communities. Site-specific reviews would be conducted, and additional mitigations could be applied as appropriate. Routine discharges that affect the seafloor may have similar effects as those from bottom/land disturbance (**Section 4.1**).

R.7 BIRDS: Routine discharges are potentially significant for birds in the Alaska Region (**Section 4.1**). In all other regions, routine discharges are not expected to significantly impact birds. Operational discharges that produce oil sheens (e.g., produced water) may impact seabirds through contact with feathers at sea (Fraser et al. 2006). However, the impact of routine discharges on birds is not expected to be significant, because compliance with NPDES permit requirements and U.S. Coast Guard (USCG) regulations should reduce or prevent most impacts. Permitted routine discharges are not expected to persist in the water column after discharge. Depending upon the habitat type at the drill site, there may be some temporary loss of benthic foraging habitat from permitted drilling muds and cutting discharges.

R.8 SEA TURTLES: Routine discharges are not expected to significantly impact sea turtles, because compliance with NPDES permit requirements and USCG regulations should reduce or prevent most

impacts. These permitted discharges may be localized in areas not often frequented by sea turtles and likely would not persist long enough to have a measurable effect on these animals.

R.9 **MARINE MAMMALS:** Routine discharges may significantly impact marine mammals in the Alaska Region (**Section 4.1**). In all other regions, benthic-feeding marine mammals do not occur in, or their foraging areas do not overlap with, the expected areas of OCS activity. For example, in the Pacific Region, sea otters forage in nearshore benthic habitats, typically in waters 65 ft (20 m) in depth or less (Bodkin et al. 2004), and northern elephant seals forage in deep waters off the continental margin (Le Boeuf et al. 2000). Gray whales do not feed during their annual migration along the Pacific Coast. In the Atlantic and GOM Regions, the only benthic-feeding marine mammal is the West Indian manatee, which forages very close to shore. Furthermore, compliance with NPDES permit requirements and USCG regulations during normal operations may reduce or prevent most impacts.

R.10 **COMMERCIAL & RECREATIONAL FISHERIES:** Routine discharges are not expected to significantly impact commercial and recreational fisheries due to existing discharge water quality regulations in place to uphold water quality standards (USEPA 2019). Existing NPDES permit requirements and USCG regulations are designed to minimize potential impacts on water quality. Depending upon the habitat type at the drill site, there may be some temporary loss of benthic foraging habitat until re-colonization occurs.

R.11 **ARCHAEOLOGICAL & CULTURAL RESOURCES:** Most routine discharges, such as produced water, are not expected to significantly impact archaeological and cultural resources. Drilling muds and cuttings may impact archaeological sites, either directly or by hindering detection of sites due to magnetic interference. However, known archaeological and cultural resources are likely to be avoided, and potential impacts are not expected to be significant.

R.12 **LAND USE:** Routine discharges are potentially significant for land use in the Eastern GOM Planning Area, Pacific Region (except for the Southern California Planning Area), Alaska Region (except for the Beaufort Sea and Cook Inlet Planning Areas), and Atlantic Region (**Section 4.1**). Routine discharges are not expected to significantly impact areas currently producing oil and gas (Cook Inlet, Beaufort Sea, Southern California, Western GOM, and Central GOM Planning Areas), because operations requiring waste storage have already been permitted, and natural salt domes can be used for storage (Dismukes 2014). Some routine discharges are treated in the offshore environment through dilution or reinjection. Waste disposal is regulated by the U.S. Environmental Protection Agency (USEPA) and by individual state governments. Waste that cannot be diluted or reinjected must be processed onshore and land farmed, recycled, or landfilled in designated containment areas under ground (Dismukes 2011).

R.13 **CULTURE:** Routine discharges are potentially significant for culture in the Alaska Region and the Pacific Region (except for the Southern California Planning Area) (**Section 4.1**). In all other planning areas, routine discharges are not expected to be significant for culture.

R.14 **VULNERABLE COASTAL COMMUNITIES:** Routine discharges are potentially significant for vulnerable coastal communities in the Alaska Region and the Pacific Region (except for the Southern California

Planning Area) (**Section 4.1**). In all other planning areas, routine discharges are not expected to be significant for vulnerable coastal communities.

R.15 RECREATION & TOURISM: Routine discharges do not interact with recreation and tourism.

I.4 BOTTOM/LAND DISTURBANCE

R.1 AIR QUALITY: Bottom/land disturbance does not interact with air quality.

R.2 WATER QUALITY: Bottom/land disturbance is not expected to significantly impact water quality. Although impacts from bottom/land disturbance activities would likely increase turbidity within the area of disturbance, these impacts would be localized and temporary. Any suspended sediments, nutrients, or low-level concentrations of trace metals or other contaminants may be rapidly mixed and dispersed by prevailing ocean currents.

R.3 PELAGIC COMMUNITIES: Bottom/land disturbance is not expected to significantly impact pelagic communities. Although bottom/land disturbance may introduce turbidity, which may interfere with photosynthesis in phytoplankton and feeding and respiration in zooplankton, these impacts would be temporary and localized. The scale and frequency of disturbance would not significantly impact pelagic organisms at the population level.

R.4 MARINE BENTHIC COMMUNITIES: Bottom/land disturbance is potentially significantly for marine benthic communities in all planning areas (**Section 4.1**).

R.5 COASTAL & ESTUARINE HABITATS: Bottom/land disturbance is potentially significantly for coastal and estuarine habitats in all planning areas (**Section 4.1**).

R.6 FISH & ESSENTIAL FISH HABITAT: Bottom/land disturbance is not expected to significantly impact fish and EFH. Bottom/land disturbance may displace benthic fishes from areas used for foraging or resting; this displacement is expected to be localized and temporary. Disturbance is not expected to result in loss of habitat or other serious impact. Trenching, dredging, or other construction generate turbidity, which may impair respiration, feeding, or reproduction in individuals relying on visual cues (Kjelland et al. 2015; Wilber and Clarke 2001). Some fish simply move away from turbid waters. Small or less mobile species may be impaired by high turbidity, although effects vary by species (De Robertis et al. 2014). Such effects would likely be temporary (hours to days) and are not expected to have population-level effects. Onshore construction is not expected to impact this resource. Decommissioning may affect fish assemblages, some of which are commercially important and utilize these platforms as habitat (Carr et al. 2003); however, population-level effects are not expected (Gitschlag et al. 2001).

R.7 BIRDS: Bottom/land disturbance is potentially significant for birds in all planning areas (**Section 4.1**).

R.8 SEA TURTLES: Bottom/land disturbance is potentially significant for sea turtles in the GOM Region and Straits of Florida, South Atlantic, and Mid-Atlantic Planning Areas (**Section 4.1**), where sea turtles

nest. Bottom/land disturbance is not expected to impact sea turtles in the remaining planning areas because they do not nest in those areas.

R.9 **MARINE MAMMALS:** Bottom disturbance is potentially significant for marine mammals in the Alaska and Atlantic Regions (**Section 4.1**). Bottom/land disturbance is not expected to significantly impact marine mammals in the Pacific and GOM Regions. Benthic-feeding marine mammals and marine mammals utilizing haul-out areas (e.g., seals and walrus) on shore may be significantly impacted. The GOM Region does not have benthic-feeding or semi-aquatic marine mammals, except for manatees, which feed very close to shore and therefore are not expected to be significantly impacted. In the Pacific Region, no benthic-feeding marine mammals forage in areas where OCS activities are expected to take place. Although the Pacific Coast is home to several large rookeries for semi-aquatic mammals (e.g., Steller sea lions, northern elephant seals, California sea lions, and Pacific harbor seals) (Carretta et al. 2011; NOAA 2015a; 2015b; 2016g), most of these areas fall within national parks, monuments, or National Marine Sanctuaries and are not expected to be significantly impacted by OCS activity.

R.10 **COMMERCIAL & RECREATIONAL FISHERIES:** Bottom/land disturbance is not expected to significantly impact commercial and recreational fisheries. Effects on fish are not expected, so changes in economically important fish abundance or distribution are not expected to affect fisheries effort or landings. Once a structure is in place, it could serve as additional habitat and open up opportunities for other fishing types (White et al. 2012). Removal of structures may then affect fishing activity, but impacts are expected to be highly localized. Seafloor or subsea structures have the potential to snag or damage fishing gear, but this impact is expected to affect only a small subset of fishermen.

R.11 **ARCHAEOLOGICAL & CULTURAL RESOURCES:** Bottom/land disturbance may significantly impact archaeological and cultural resources in all planning areas (**Section 4.1**).

R.12 **LAND USE:** Bottom/land disturbance (particularly onshore construction) may significantly impact land use in the Alaska, Pacific, and Atlantic Regions and the Eastern GOM Planning Area (**Section 4.1**). Impacts from drilling, infrastructure emplacement, anchoring, pipeline trenching, onshore construction, routine maintenance, and structure removal on land use would not be significant in the Western and Central GOM Planning Areas, where the incremental effect of additional OCS activities would not significantly alter the current baseline. Expected increases in OCS activities are not expected to impact onshore land use and infrastructure, as existing infrastructure in the Western and Central GOM Planning Areas would likely be able to accommodate additional needs. Significant impacts that may already exist could be prolonged by any activities authorized under the 2024–2029 Program, but additional impacts are not expected.

R.13 **CULTURE:** Bottom/land disturbance is potentially significant for culture in the Alaska and Atlantic Regions and the Washington/Oregon, Northern California, Central California, and Eastern GOM Planning Areas (**Section 4.1**). In all other planning areas, bottom/land disturbance is not expected to significantly impact culture, because onshore construction would not cause a measurable change in existing conditions.

R.14 **VULNERABLE COASTAL COMMUNITIES:** Bottom/land disturbance is potentially significant for vulnerable coastal communities in the Alaska and Atlantic Regions and the Washington/Oregon, Northern California, Central California, and Eastern GOM Planning Areas (**Section 4.1**). In all other planning areas, bottom/land disturbance is not expected to significantly impact vulnerable coastal communities because drilling and pipeline trenching would have localized impacts, and onshore construction would not cause a measurable change in existing conditions.

R.15 **RECREATION & TOURISM:** Bottom/land disturbance is not expected to significantly impact recreation and tourism. Offshore disturbance to shipwrecks used for recreational activities like scuba diving is possible, but highly unlikely. Water depth limits the number of sites available to scuba divers, and mitigations would be applied at most sites that are used. Onshore disturbance also may affect recreation and tourism but would depend on intensity, location, and timing of activities. In most cases, impacts from onshore construction would be localized and temporary in nature, and alternative recreational opportunities would be available. Recreation and tourism activities associated with wildlife viewing may be particularly sensitive to land disturbance, although impacts would depend on the extent of habitat alteration. These impacts should be evaluated in more detail when there is more information about the location and nature of proposed oil and gas activities.

I.5 EMISSIONS

R.1 **AIR QUALITY:** Emissions are potentially significant for air quality in the Southern California and Central GOM Planning Areas (**Section 4.1**). Emissions are not expected to significantly impact air quality in the Alaska and Atlantic Regions and the Washington/Oregon, Northern California, Central California, Eastern GOM, and Western GOM Planning Areas due to steady vertical and horizontal air motion throughout these areas (Wang and Angell 1999), which would rapidly disperse pollutants. The relatively few facilities and few new mobile sources that would support those facilities, as well as the new onshore facilities, are unlikely to contribute to excessive pollution in nearby Class I areas or result in new nonattainment areas.

R.2 **WATER QUALITY:** Emissions do not interact with water quality on the OCS.

R.3 **PELAGIC COMMUNITIES:** Emissions do not interact with pelagic communities.

R.4 **MARINE BENTHIC COMMUNITIES:** Emissions do not interact with marine benthic habitats.

R.5 **COASTAL & ESTUARINE HABITATS:** Emissions do not interact with coastal and estuarine communities.

R.6 **FISH & ESSENTIAL FISH HABITAT:** Emissions do not interact with fish or EFH.

R.7 **BIRDS:** Emissions are not expected to significantly impact bird species, because emissions would be localized and dissipate quickly.

R.8 **SEA TURTLES:** Emissions are not expected to significantly impact sea turtles because emissions would be localized and would dissipate quickly.

R.9 **MARINE MAMMALS:** Emissions are not expected to significantly impact marine mammals because emissions would be localized and would dissipate quickly.

R.10 **COMMERCIAL & RECREATIONAL FISHERIES:** Emissions do not interact with commercial and recreational fisheries.

R.11 **ARCHAEOLOGICAL & CULTURAL RESOURCES:** Emissions do not interact with archaeological and cultural resources.

R.12 **LAND USE:** Emissions are not expected to have a significant impact on how people use land onshore. Emissions may degrade materials of structures or alter how humans utilize land for activities such as agriculture. However, these impacts are dependent on where OCS oil and gas activities, including onshore support infrastructure, are located. Any potential impacts on land use should be evaluated in more detail when there is more information about the location and nature of proposed oil and gas activities.

R.13 **CULTURE:** Emissions are not expected to have a significant impact on culture because emissions would rapidly disperse. The relatively few facilities and few new mobile sources associated with OCS those facilities, as well as the new onshore facilities, are unlikely to contribute to excessive pollution in nearby communities or result in new nonattainment areas.

R.14 **VULNERABLE COASTAL COMMUNITIES:** Emissions are potentially significant for vulnerable coastal communities within and adjacent to the Southern California Planning Area (**Section 4.1**). Emissions are not expected to significantly impact vulnerable coastal communities in all other planning areas. Impacts from air pollution are expected to be site specific and are subject to USEPA requirements for the National Ambient Air Quality Standards. Air emissions from routine operations are not expected to have a measurable impact on most vulnerable coastal communities due to geography or meteorological conditions. BOEM and USEPA regulate air emissions on the OCS. Lease-specific plans are submitted for review, and best available control technology could be put in place if needed to minimize air quality impacts from activities in the offshore environment. Although there is the potential for air quality impacts in the Central GOM Planning Area, it is not likely that those impacts would occur for vulnerable coastal communities. The main areas of concern in the Central GOM are impacts on Class I areas (which are not inhabited) and isolated portions of the Louisiana Coast (which would require lease sale information to determine impacts).

R.15 **RECREATION & TOURISM:** Emissions are not expected to significantly impact recreation or tourism. Emissions resulting from OCS oil and gas activities would be localized to the area of operations and are not anticipated to reduce air quality sufficiently to impact tourism and recreational industries.

I.6 LIGHTING

R.1 **AIR QUALITY:** Lighting does not interact with air quality.

R.2 **WATER QUALITY:** Lighting does not interact with water quality.

R.3 **PELAGIC COMMUNITIES:** Lighting is not expected to significantly impact pelagic communities because effects would be localized. Zooplankton, fish larvae, and some invertebrates are attracted to artificial lights directed toward the water's surface at night (Keenan et al. 2007). Plankton attracted to lights could be eaten by fish and other species like squid, which are also attracted to the lights. Because platforms only illuminate a small area of water around the structure, limited effects on planktonic organisms are expected.

R.4 **MARINE BENTHIC COMMUNITIES:** Lighting is not expected to significantly impact marine benthic communities. Most lighting associated with oil and gas activities occurs at or above the surface of the ocean; thus, benthic communities, especially in deep water, would not generally be exposed to lighting. One exception is lighting that occurs as a result of underwater maintenance activities, which include the use of submersibles or other equipment with lighting. These activities may occur at or near the seafloor and therefore may potentially affect marine benthic communities; however, these impacts are not expected to be significant because they are limited in duration and the size of area impacted is minimal.

R.5 **COASTAL & ESTUARINE HABITATS:** Lighting does not interact with coastal and estuarine habitats. Coastal species (e.g., birds, sea turtles) that may be significantly impacted from lighting are analyzed separately.

R.6 **FISH & ESSENTIAL FISH HABITAT:** Lighting is not expected to significantly impact fish and EFH. Small areas of marine surface waters may be exposed to facility or vessel lighting. Some fish species are attracted to lights at night (Keenan et al. 2007), but because the effects would be confined to a small geographic area, few fishes are expected to be impacted with no population-level effects.

R.7 **BIRDS:** Lighting is potentially significant for birds in all planning areas (**Section 4.1**).

R.8 **SEA TURTLES:** Lighting is potentially significant for sea turtles in the GOM Region and Straits of Florida, South Atlantic, and Mid-Atlantic Planning Areas (**Section 4.1**), where sea turtles nest. Lighting is not expected to impact sea turtles in the remaining planning areas because they do not nest in those areas.

R.9 **MARINE MAMMALS:** Lighting is not expected to significantly impact marine mammals. Lighting is not expected to significantly impact the migratory, feeding, and breeding behaviors of cetaceans because they depend on acoustic rather than visual cues. Artificial light may increase the visibility of semi-aquatic marine mammals, such as seals and sea lions, to potential predators at night (Greer et al. 2010). However, the effects of facility or vessel lighting would be confined to a small area of marine surface water or coastal habitat, and population-level effects to marine mammals are not expected.

R.10 **COMMERCIAL & RECREATIONAL FISHERIES:** Lighting is not expected to significantly impact commercial and recreational fisheries. Some fish may be attracted to offshore surface lighting, resulting in congregations that may benefit some fishermen. Overall, effort and landings are not expected to change.

R.11 **ARCHAEOLOGICAL & CULTURAL RESOURCES:** Lighting does not interact with archaeological and cultural resources.

R.12 **LAND USE:** Lighting is not expected to have significant effects on land use in any planning area. Lighting from onshore facilities (e.g., ports, construction facilities, transportation facilities, processing facilities) would be localized and probably would be located in areas with existing industrial lighting effects. Lighting from offshore facilities (e.g., platform lighting, construction lighting, MODU) would mostly impact nighttime views as discussed in the visible infrastructure analysis of **Section 4.1**.

R.13 **CULTURE** and R.14 **VULNERABLE COASTAL COMMUNITIES:** Lighting may significantly impact culture and vulnerable coastal communities in the Alaska Region (except for the Cook Inlet Planning Area), Pacific Region (except for the Southern California Planning Area) and Atlantic Region (**Section 4.1**). Lighting is not expected to have significant impacts on cultural norms or vulnerable coastal communities in the GOM Region and the Cook Inlet and Southern California Planning Areas because of the amount of existing industrialization. Significant impacts that may already exist could be prolonged by any activities authorized under the 2024–2029 Program, but additional impacts are not expected.

R.15 **RECREATION & TOURISM:** Lighting may significantly impact recreation and tourism in the Alaska, Pacific, and Atlantic Regions and the Eastern GOM Planning Area (**Section 4.1**). Lighting is not expected to have significant impacts on recreation and tourism in the Western and Central GOM Planning Areas because of the incremental contribution to the existing baseline of oil and gas activities. Significant impacts that may already exist could be prolonged by any activities authorized under the 2024–2029 Program, but additional impacts are not expected.

I.7 VISIBLE INFRASTRUCTURE

R.1 **AIR QUALITY:** Visible infrastructure does not interact with air quality.

R.2 **WATER QUALITY:** Visible infrastructure does not interact with water quality.

R.3 **PELAGIC COMMUNITIES:** Visible infrastructure does not interact with pelagic communities.

R.4 **MARINE BENTHIC COMMUNITIES:** Visible infrastructure does not interact with marine benthic communities.

R.5 **COASTAL & ESTUARINE HABITATS:** Visible infrastructure does not interact with coastal and estuarine habitats.

R.6 **FISH & ESSENTIAL FISH HABITAT:** Visible infrastructure does not interact with fish or EFH.

R.7 **BIRDS:** Visible infrastructure does not interact with birds.

R.8 **SEA TURTLES:** Visible infrastructure does not interact with sea turtles.

R.9 **MARINE MAMMALS:** Visible infrastructure does not interact with marine mammals.

R.10 COMMERCIAL & RECREATIONAL FISHERIES: Visible infrastructure does not interact with commercial and recreational fisheries.

R.11 ARCHAEOLOGICAL & CULTURAL RESOURCES: Visible infrastructure may significantly impact archaeological and cultural resources (e.g., onshore historic properties or Traditional Cultural Properties) in all planning areas except the Western and Central GOM Planning Areas (**Section 4.1**). In the Western and Central GOM Planning Areas, visible infrastructure from additional offshore facilities is not likely to have a significant impact because of the number of existing facilities and their distance from shore, and it is unlikely that an onshore historic property would be significantly impacted (e.g., lose its *National Register* eligibility or be substantially altered). Additional OCS activities are also not expected to significantly alter the current baseline of onshore infrastructure. Existing infrastructure in the Western and Central GOM would likely be able to accommodate additional needs. Significant impacts that may already exist may be prolonged by any activities authorized under the 2024–2029 Program, but additional impacts are not expected.

R.12 LAND USE: Visible infrastructure may significantly impact land use in the Alaska, Pacific, and Atlantic Regions and the Eastern GOM Planning Area (**Section 4.1**). Based on existing levels of oil and gas activities in the Western and Central GOM Planning Areas, visible infrastructure is not expected to have a significant impact on land use. Significant impacts that may already exist could be prolonged by any activities authorized under the 2024–2029 Program, but additional impacts are not expected.

R.13 CULTURE and **R.14 VULNERABLE COASTAL COMMUNITIES:** Visible infrastructure may significantly impact culture and vulnerable coastal communities in the Alaska, Pacific, and Atlantic Regions and the Eastern GOM Planning Area (**Section 4.1**). Onshore visible infrastructure has existed in the Western and Central GOM Planning Areas for many years, and any additional oil and gas development is expected to tie into existing offshore visible infrastructure and therefore is not expected to significantly impact culture and vulnerable coastal communities. Significant impacts that may already exist could be prolonged by any activities authorized under the 2024–2029 Program, but additional impacts are not expected.

R.15 RECREATION & TOURISM: Visible infrastructure may potentially impact tourism in the Alaska, Pacific, and Atlantic Regions and the Eastern GOM Planning Area (**Section 4.1**). In the Western and Central GOM Planning Areas, visible infrastructure is not expected to have significant impacts on recreation and tourism given that the recreation and tourism industry has coexisted with an extensive and widespread OCS oil- and gas-related industry. Significant impacts that may already exist could be prolonged by any activities authorized under the 2024–2029 Program, but additional impacts are not expected.

I.8 SPACE-USE CONFLICTS

R.1 AIR QUALITY: Space-use conflicts do not interact with air quality.

R.2 WATER QUALITY: Space-use conflicts do not interact with water quality.

R.3 PELAGIC COMMUNITIES: Space-use conflicts do not interact with pelagic communities.

R.4 MARINE BENTHIC COMMUNITIES: Space-use conflicts do not interact with marine benthic communities.

R.5 COASTAL & ESTUARINE HABITATS: Space-use conflicts do not interact with coastal and estuarine habitats.

R.6 FISH & ESSENTIAL FISH HABITAT: Space-use conflicts do not interact with fish or EFH.

R.7 BIRDS: Space-use conflicts do not interact with birds.

R.8 SEA TURTLES: Space-use conflicts do not interact with sea turtles.

R.9 MARINE MAMMALS: Space-use conflicts do not interact with marine mammals.

R.10 COMMERCIAL & RECREATIONAL FISHERIES: Space-use conflicts may significantly impact commercial and recreational fisheries in all planning areas except in the Beaufort and Chukchi Seas Planning Areas (**Section 4.1**). Space-use conflicts are not expected to impact commercial and recreational fishing in the Beaufort and Chukchi Seas Planning Areas. In these areas, commercial fishing is currently prohibited. There is a relatively small amount of recreational fishing in the Beaufort and Chukchi Seas Planning Areas, and impacts on recreational fisheries from space-use conflicts are not expected.

R.11 ARCHAEOLOGICAL & CULTURAL RESOURCES: Space-use conflicts do not interact with archaeological and cultural resources.

R.12 LAND USE: Space-use conflicts may significantly impact land use in the Alaska, Pacific, and Atlantic Regions and the Eastern GOM Planning Area (**Section 4.1**). Given the history of oil and gas leasing activities in the Western and Central GOM Planning Areas and the well-established network of facilities to support OCS oil and gas activities, impacts on land use from space-use conflicts onshore and offshore are not expected to be significant. Significant impacts that may already exist could be prolonged by any activities authorized under the 2024–2029 Program, but additional impacts are not expected.

R.13 CULTURE: Space-use conflicts may significantly impact culture in the Alaska, Pacific, and Atlantic Regions and the Eastern GOM Planning Area (**Section 4.1**). Existing nearshore and offshore infrastructure in the Western and Central GOM Planning Areas makes it unlikely that there would be a noticeable change in social norms; therefore, impacts on culture are not expected to be significant. The impacts of onshore facilities in the Western and Central GOM would be localized near existing industrial areas and would not result in a significant impact to culture. Significant impacts that may already exist could be prolonged by any activities authorized under the 2024–2029 Program, but additional impacts are not expected.

R.14 VULNERABLE COASTAL COMMUNITIES: Space-use conflicts may significantly impact vulnerable coastal communities in the Alaska, Pacific, and Atlantic Regions and the Eastern GOM Planning Area

(**Section 4.1**). Existing nearshore and offshore infrastructure in the Western and Central GOM Planning Areas makes it unlikely that there would be a noticeable impact on vulnerable coastal communities in this area. The impacts of onshore facilities in the Western and Central GOM would be localized near existing industrial areas and would not result in significant impacts on vulnerable coastal communities. Significant impacts that may already exist could be prolonged by any activities authorized under the 2024–2029 Program, but additional impacts are not expected.

R.15 **RECREATION & TOURISM:** Space-use conflicts may significantly impact recreation and tourism for all planning areas except the Western and Central GOM Planning Areas (**Section 4.1**). Recreation and tourism activities are not expected to be significantly impacted by new leasing in the Western and Central GOM Planning Areas, where these industries have coexisted for many years. Significant impacts that may already exist could be prolonged by any activities authorized under the 2024–2029 Program, but additional impacts are not expected.

Appendix B: Acoustics

B.1 INTRODUCTION

Marine species live in an environment that is ideally suited for acoustic communication. Sound travels nearly five times faster in water than it does in air (Urick 1983). Most of the ocean is dark, and most marine organisms perceive their world through auditory cues.

Ocean sounds originate from a variety of sources. Some come from non-biological sources, such as wind and waves, while others come from the movements or vocalizations of marine life (Duarte et al. 2021). In addition, humans introduce sound into the ocean through activities like oil and gas exploration, construction, military sonars, and vessel traffic (Duarte et al. 2021). The acoustic environment or "soundscape" of a given ecosystem comprises all such sounds—biological, non-biological, and anthropogenic (Pijanowski et al. 2011). Soundscapes are highly variable across space, time, and water depth due to the properties of sound transmission and the types of sound sources present in each area. A soundscape may also be called an "acoustic habitat," as it is a vital attribute of a given area (i.e., habitat) where an animal may live (Hatch et al. 2016).

B.2 PHYSICAL PROPERTIES OF SOUND

This section briefly describes physical properties and transmission of sounds in the ocean. More detailed information can be found in Urick (1983) and Popper and Hawkins (2018).

B.2.1 Components of a Sound Wave

Sounds are created by the vibration of an object within its medium (**Figure B-1**). This movement generates kinetic energy, which travels as a propagating wave away from the sound source. As this wave moves through the medium, the particles undergo tiny back-and-forth movements ("particle motion") along the axis of propagation, but the particles themselves do not travel with the wave. Instead, the vibration is transferred to adjacent particles, which are pushed into areas of high pressure (compression) and low pressure (rarefaction). Acoustic pressure is a non-directional (scalar) quantity, whereas particle motion is an inherently directional quantity (a vector) taking place in the axis of sound transmission. The total energy of the sound wave includes the potential energy associated with the sound pressure as well as the kinetic energy from particle motion.

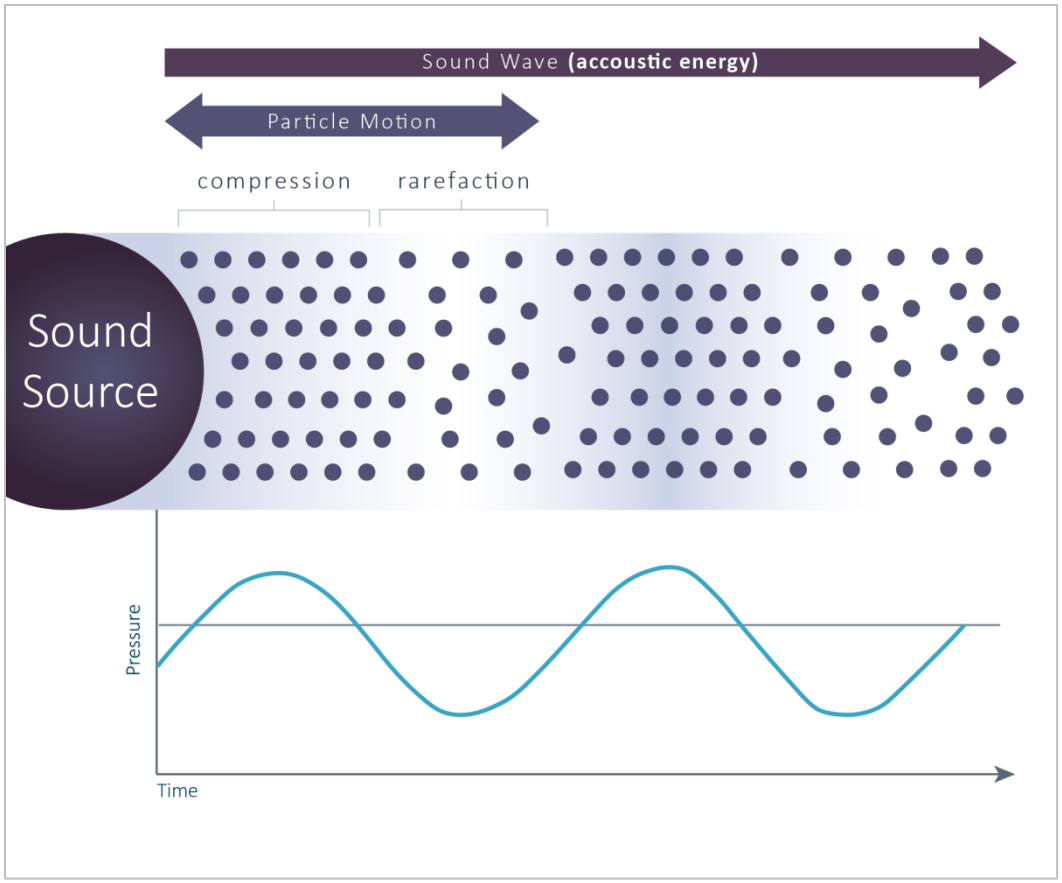

Figure B-1. Basic mechanics of a sound wave
Although acoustic energy travels in the form of a propagating sound wave away from the source, the particles of water or air move back and forth along the axis of sound propagation. Acoustic pressure is a non-directional quantity that changes over time or distance, depicted here as a sinusoidal wave; pressure is greatest when particles are compressed and lowest when they are spread out.

Although the physical properties of sound waves are well understood, most recordings of underwater sounds have measured acoustic pressure rather than particle motion, mainly because (1) it is easier to measure pressure with hydrophones (underwater microphones), and (2) particle motion is a relatively short-ranged cue (10s to 100s of meters). In addition, most of the research on effects of noise on wildlife have focused on animals that detect acoustic pressure (i.e., marine mammals; see section below on *Animal Hearing*). However, as researchers have learned more about the hearing sensitivity of fish and invertebrates (which primarily detect particle motion), more work has begun to measure particle motion from natural and anthropogenic sources and consider potential impacts from this component of sound.

B.2.2 Units of Measurement

Many metrics can be used to describe acoustic signals, and several metrics are defined in the glossary (**Appendix L**). For definitions and acoustic metrics not discussed in this document, see BOEM (2016d), Erbe et al. (2016), Southall et al. (2017), and International Organization for Standardization (2017). Briefly, the most relevant perceptual cues are listed below:

- **Amplitude:** perceptual meaning is “loudness”
- **Frequency:** perceptual meaning is “pitch”
- **Duration:** length of a signal
- **Energy:** total energy of an acoustic wave (kinetic energy + potential energy)

B.2.3 Propagation of Sound in the Ocean

Sound speed in water increases with increasing temperature, salinity, and pressure. When sound waves travel through the water, they encounter areas with different physical properties and are refracted, bending toward areas with lower speeds (Urick 1983). Due to higher temperatures near the ocean’s surface, sound speeds are relatively fast, but as temperature decreases with depth, sound speeds decrease. Ocean sound speeds are slowest at mid-latitude depths of about 1,000 m; sounds originating in this layer can travel great distances. Sounds can also be trapped in the mixed layer near the ocean’s surface (Urick 1983). Latitude, weather, and local circulation patterns influence the depth of the mixed layer, and the propagation of sounds near the surface is highly variable and difficult to predict.

At the boundaries near the sea surface and the sea floor, acoustic energy can be scattered, reflected, or attenuated. Fine-grain sediments tend to absorb sounds well, while hard bottom substrates reflect much of the acoustic energy back into the water column. The presence of ice on the ocean’s surface can either dampen sound levels when there is a continuous ice sheet that blocks surface winds, or increase sound levels when pieces of ice scrape together (Urick 1983). Therefore, as sound waves move from a source to a receiver (i.e., an animal), they can travel on direct, reflected, and refracted pathways, creating a complex pattern of transmission across range and depth. The patterns become even more complicated in shallow waters due to repeated interactions with the surface and the bottom. These variables contribute to the difficulty in predicting the soundscape of a given marine environment at any particular time.

B.3 OCEAN SOUND TYPES

B.3.1 Non-Biological Sounds

The types of sounds present in different areas of the ocean drives the site-specific nature of marine soundscapes. For example, near the surface, sound levels increase with increasing wind speed and wave height. Rain and thunderstorms can also elevate sound levels. In geologically active areas, noise from earthquakes, undersea volcanoes, and hydrothermal vent activity can contribute significant amounts of low-frequency energy to marine soundscapes (Hildebrand 2009; Wenz 1962). In coastal channels and estuaries, noise from water movement generated by tides, such as the sound of waves breaking on the shore, can be substantial (Cotter 2008). Although each of these non-biological sources contribute to marine soundscapes, it is important to note that they each have a distinct frequency composition, which means that they may be perceived differently by different types of animals. In addition, some of these sound sources have regular, periodic variations (e.g., tidal noise), while others are more irregular and unpredictable (e.g., volcanic explosions) (Wenz 1961; 1962).

B.3.2 Biological Sounds

Biological sounds are important components of most marine soundscapes. Some sounds are produced simply as a byproduct of animal movement (Coquereau et al. 2016; Di Iorio et al. 2012; Radford et al. 2008), while others are more deliberately produced for communication, foraging, or navigational purposes. For example, snapping shrimp (crustaceans that live in the structured bottoms of coastal ecosystems) produce a "snap" sound to stun prey, and the snapping of entire colonies creates a loud "crackling" sound present in many coastal habitats. In fact, much of the site-specific variability in coastal soundscapes is attributed to snapping shrimp, and crackling levels vary depending on time of day, season, tidal phase, and even habitat health (Butler et al. 2016; Kennedy et al. 2010; Lillis et al. 2014; Lillis and Mooney 2018; Ricci et al. 2016; Staaterman et al. 2014a).

Many fishes produce sounds for territory defense or for mate attraction (Kasumyan 2009; Lobel et al. 2010; Winn 1964). For example, male toadfish occupy nests in hard bottom habitats (e.g., the Gulf toadfish in the Gulf of Mexico [GOM]) and produce "hums" to attract females; these sounds are a key component of nighttime soundscapes in this region (Thorson and Fine 2002). Other fish like Atlantic cod (Hernandez et al. 2013), black drum (Rice et al. 2017), Gulf corvina (Erisman and Rowell 2017), Goliath grouper (Mann et al. 2009), and several croaker species (Luczkovich et al. 2008) generate sounds to coordinate spawning activities when they gather in large aggregations. Many of these activities occur on a lunar cycle, and fish sounds tend to dominate marine soundscapes during peak activity times (Cato and McCauley 2002; Rice et al. 2014).

Marine mammals also produce sounds for a variety of natural behaviors over a range of acoustic frequencies (Richardson et al. 1995). Seals, sea lions, and walrus produce sounds both in air and water; these sounds usually occur during the breeding season and are associated with territorial and mating behaviors. Bearded seals, for example, produce frequency-modulated trills, which are a major component of Arctic soundscapes in the spring (Richardson et al. 1995). Toothed whales use higher frequency echolocation clicks to navigate and track prey, as well as a variety of whistle types during social interactions (Richardson et al. 1995). Baleen whales produce low-frequency reproductive and social calls that can travel great distances, even across ocean basins (Clark and Gagnon 2002). Humpback whales, for example, sing complex songs that differ across oceans and evolve from year to year (Garland et al. 2017).

B.3.3 Anthropogenic Sounds

Noise generated by human activities (**Figure B-2B**) may serve a specific purpose, such as navigational sonar and seismic exploration, or may result as an indirect byproduct of activities such as shipping or construction. In the pelagic zone, shipping noise is the main anthropogenic component of marine soundscapes in low frequencies (Frisk 2012; Hildebrand 2009; McKenna et al. 2013; National Research Council 2003b), the range in which most baleen whales communicate (Richardson et al. 1995). In shallow coastal waters, the sounds of distant ships are not as far-reaching, because a large portion of the sound's intensity is absorbed by sands and mud on the seafloor, but small boat traffic can elevate local sound levels (Hermannsen et al. 2019). Marine geophysical surveys use a variety of tools and techniques to identify shallow hazards or characteristics of the seafloor as well as the geology below the

seabed. For example, 2-D and 3-D deep-penetration seismic surveys repeatedly produce high-energy, low-frequency, short-duration sounds to search for petroleum deposits below the seafloor, while sub-bottom profilers and side-scan sonars generally produce high-frequency sounds to locate geohazards or archaeological resources on the seabed. Sounds from seismic airguns are a major component of marine soundscapes where higher levels of oil and gas exploration exist, such as in the Western and Central GOM Planning Areas (Estabrook et al. 2016; Hildebrand 2009; Wiggins et al. 2016). Other anthropogenic sound sources include dynamic positioning systems, dredging and drilling operations, construction activities, fishing vessels, recreational vessels, and military preparedness exercises (e.g., sonar signals).

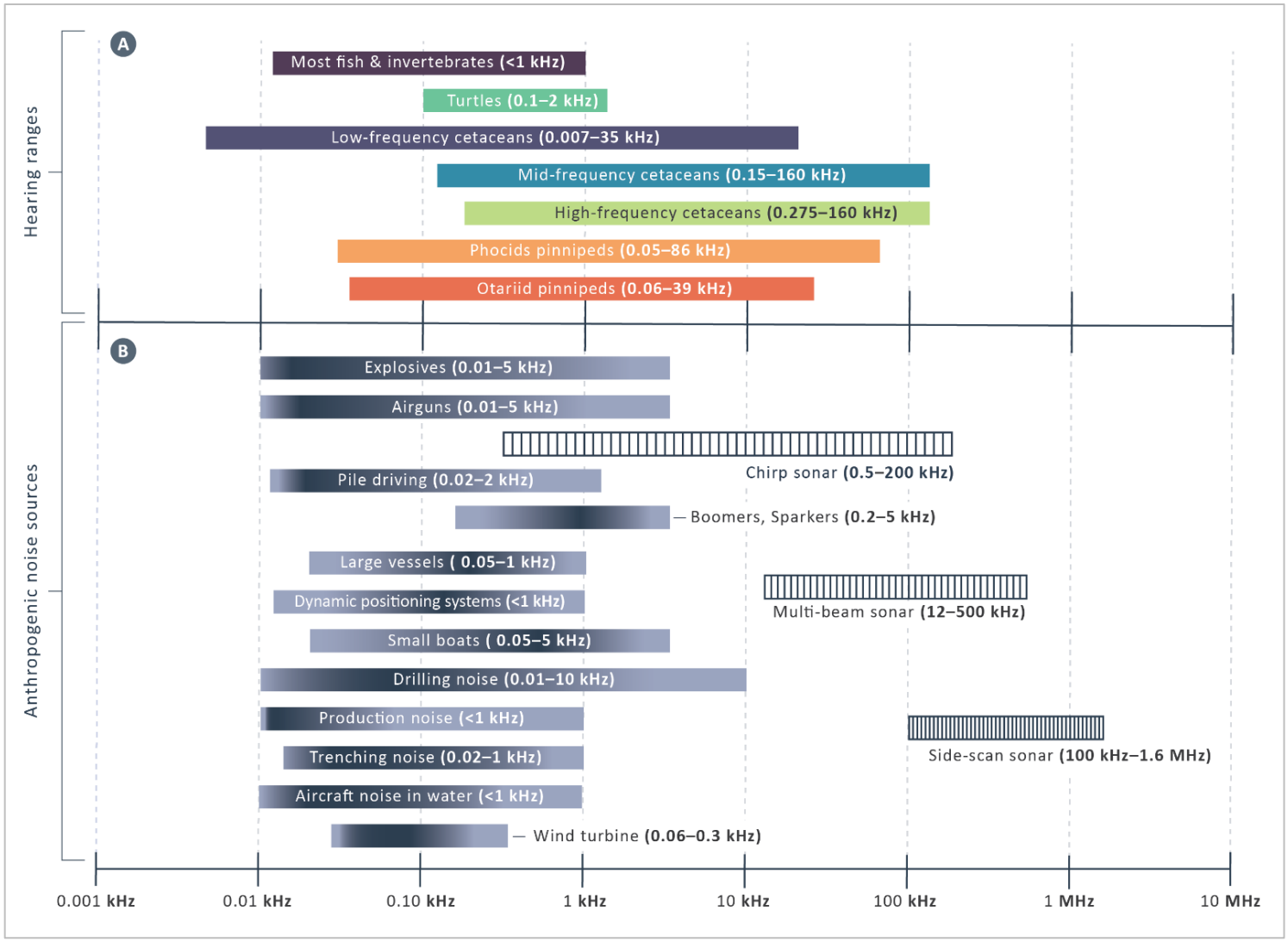

Figure B-2. A) Approximate hearing ranges of marine species; B) Frequency ranges of various anthropogenic sources

These ranges represent approximately 90% of the acoustic energy, and color shading roughly corresponds to the dominant energy band of each source. Dashed lines represent broadband sonars to depict the multi-frequency nature of these sounds. The frequency axis of both plots shows kHz in a logarithmic scale.
Sources: Popper et al. (2014), Richardson et al. (1995), and NMFS (2018a).

B.4 ANIMAL HEARING

Most of the ocean is dark, and because sound travels particularly well through water, it is reasonable to assume that all marine organisms can detect and use sounds for a variety of purposes. Detection of auditory cues is critically important for marine animals for navigating through the marine environment, maintaining vigilance against predators, and interacting with members of the same species. Sound-production mechanisms and hearing capabilities vary widely across taxonomic groups (Duarte et al. 2021). Different taxa have evolved mechanisms for sound detection that are suited to their environment and the type of acoustic signals they need to detect (Fay 2009). Salient perceptual cues include amplitude (loudness), frequency (pitch), and duration. Animals likely hear best within the same frequency range as their vocalizations.

A hearing "threshold" is the lowest amplitude sound that an animal can detect and is frequency dependent; when a series of hearing thresholds are plotted together as a function of frequency, they typically form a U-shaped curve called an audiogram. To measure hearing thresholds, investigators may use psychological methods, wherein they train captive animals and "ask" them whether they can detect a sound, much like an audiologist does for humans. Operant and Pavlovian conditioning techniques have been used to test hearing abilities of various fishes (Popper 1971) and marine mammals (Gales 1982). Alternatively, electrodes may be harmlessly placed on the skull (for mammals) or directly on the auditory nerves (for fish) so that neurological activity can be measured when a sound is detected. This method is only feasible for animals that can be trained and/or kept in captivity; as a result, there is a fundamental lack of understanding of hearing levels for many marine species.

B.4.1 Fish and Invertebrates

The most basic form of hearing—detection of particle motion—is evident in fish and invertebrates (**Figure B-2A**); for further detail, see Popper and Fay (2011), Popper and Hawkins (2018), and Greater Atlantic Regional Fisheries Office (2020). All fishes have inner ears with three bony structures (otoliths) that act like 3-D accelerometers. The density of a fish's body is similar to that of water, but its otoliths are denser. When a sound wave passes, the body of the fish moves back and forth with particle motion, but the denser otoliths lag behind. This lag generates a shearing force between the sensory epithelium and the otoliths, sending a signal to the brain. Because of the orientation of the otoliths and epithelia, fish can detect particle motion in three axes. Crustaceans and squid detect particle motion through their statocysts (internal organs with sensory hairs resembling the hair cells in vertebrate ears), while other marine invertebrates have other specialized hearing organs, or mechanoreceptors, on the outside of their body. Some fish invertebrates, especially those that live on or in the benthos, may also detect vibrations that travel through the sediment (Popper and Fay 2011; Popper and Hawkins 2018). Most fish and invertebrates can detect sounds below 1 kHz.

Fish that are limited to particle motion detection typically are referred to as "hearing generalists," but a more advanced form of hearing is also possible for fish that have a swimbladder. In this case, when the sound wave passes, it causes vibration in the swimbladder, generating particle motion inside the body of the fish. For fish with a swimbladder that is in close proximity to the ear, this signal can be substantial

and essentially enables an entirely new mechanism of hearing. These fish are called "hearing specialists." Hearing specialists usually can detect higher acoustic frequencies than generalists and may be able to detect sounds at a greater distance from the source (Popper and Fay 2011; Popper and Hawkins 2018; Wiernicki et al. 2020). A handful of herring-like fishes can even detect ultrasonic frequencies (above 20 kHz) (Higgs 2004; Mann et al. 1997).

Hearing specialists may be susceptible to behavioral disturbance or acoustic masking over larger spatial scales than hearing generalists. Fish with swimbladders are also more susceptible to barotrauma (tissue damage and auditory injury caused by sudden changes in pressure) from impulsive sources like pile driving, seismic airguns, or explosions. In fact, Goertner (1978) showed that the range from an explosive event in which damage may occur to a swimbladder fish is approximately 100 times greater than that for non-swimbladder fish.

B.4.2 Marine Mammals

The hearing structures of marine mammals are fundamentally similar to those of terrestrial mammals, but their hearing range is usually wider (National Research Council 2003b) (**Figure B-2A**). Mooney et al. (2012), NMFS (2018a), and Southall et al. (2019) reviewed marine mammal hearing in detail. Marine mammals can detect acoustic pressure. The outer ear collects sound, the middle ear filters and amplifies acoustic energy to the inner ear, and the inner ear converts acoustic energy to neural signals. The cochlea is the key organ in the inner ear that is tuned to vibrate at particular frequencies; this tuning determines an animal's hearing range. Marine mammals can hear sounds over a wider frequency range than fishes, invertebrates, or birds, but hearing sensitivity varies by species. For example, semi-aquatic mammals (pinnipeds) can detect sounds in air and water, as well as a broader range of frequencies in water. Fully aquatic mammals (cetaceans and manatees) have additional adaptations. They have no external ear, and their ear canals are plugged with wax and are not functional. It is believed that sounds are transmitted from the water to the inner ear through specialized fats in the jaw or cheekbones (Mooney et al. 2012). In addition, some cetaceans have sophisticated mechanisms for beam forming and sound localization (also called echolocation), which they utilize for hunting prey. Based on these differences in auditory physiology, it is now generally accepted that there are six marine mammal functional hearing groups: low-frequency cetaceans, high-frequency cetaceans, very high-frequency cetaceans, sirenians, phocid carnivores (in water and air), and other marine carnivores (in water and air) (Southall et al. 2019).

B.4.3 Sea Turtles

Sea turtles are sensitive to acoustic pressure. Their ear resembles most reptiles' ears, but with a few underwater specializations (Popper et al. 2014). They have no outer ear; the opening of their ear is covered by a thick skin with a fatty layer underneath. As in marine mammals, this fatty layer helps conduct sound to the middle and inner ear. There is relatively little data on sea turtle hearing; the current understanding is that their underwater hearing range is generally constrained to frequencies < 2 kHz (**Figure B-2A**), with a narrower frequency range in air (Bartol et al. 1999; Piniak et al. 2012; Popper et al. 2014). Compared to most fish and marine mammals, they have relatively low hearing sensitivity (Martin et al. 2012; Popper et al. 2014).

B.5 PREDICTING IMPACTS OF NOISE ON MARINE LIFE

Whether a particular sound is a noise or a meaningful signal is a matter of perspective. “Sounds” and “noise” represent the same physical phenomena and have the same units of measurement, but what is sound to one animal could be noise to another. For example, the crackling sounds of a coral reef may serve as an important navigational cue for larval organisms (Simpson et al. 2005; Vermeij et al. 2010), but these same sounds could be “noise” to a dolphin that is trying to communicate with its social group. Likewise, the sounds from seismic airguns provide important information for seismic operators looking for oil beneath the seabed, but these sounds could be unwanted “noise” for marine animals that use low-frequency signals to communicate.

The degree of impact of a sound depends on the hearing capabilities of a given species, qualities of the sound, and propagation of the sound from the source (**Figure B-3**). See **Section 4.1** for the description of the nature of potential impacts on marine organisms nationally and regionally. Additional detail can also be found in Appendices I and J in BOEM (2014) and BOEM (2017d).

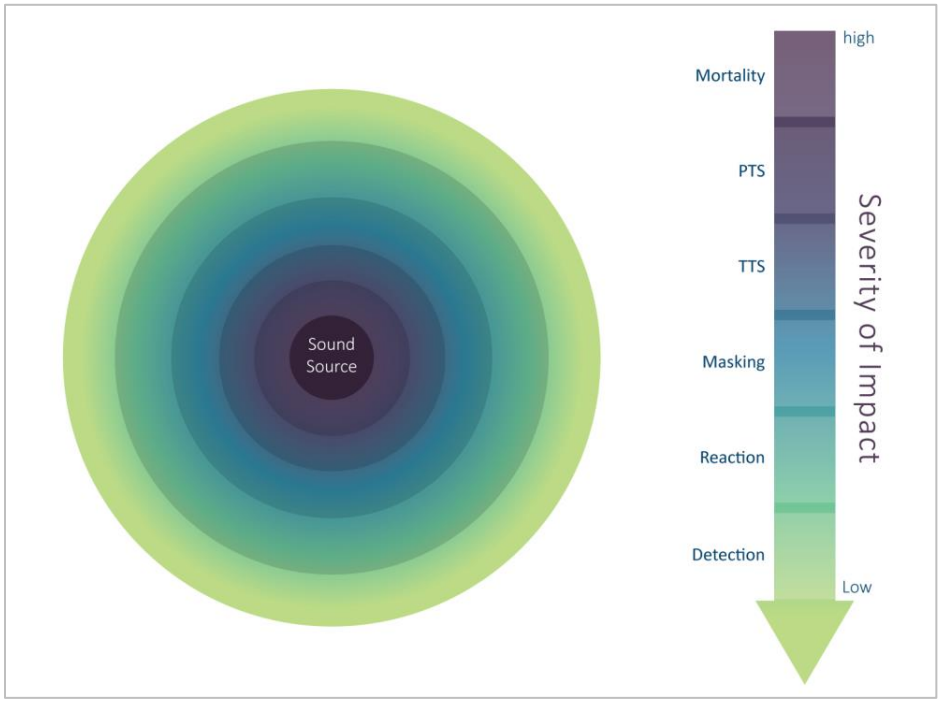

Figure B-3. Ways that noise can affect marine organisms
Physical properties of the environment—as well as the amplitude, duration, and frequency content of a signal—affect the propagation of a sound from the source. An animal’s perception depends upon its hearing abilities, its prior exposure, and the behavior in which an animal is engaged. The severity of impact ranges from simple detection (least impact) to mortality (most severe but least likely impact). Physical effects (e.g., permanent threshold shift [PTS] or temporary threshold shift [TTS]) generally occur closest to the source, and behavioral effects occur farther away.

To best protect marine life from potentially dangerous loud sounds, scientists and regulators have developed “acoustic criteria,” i.e., sound levels above which an animal should not be exposed. These criteria are derived from experimental work that exposes available species to varying sound levels. The National Marine Fisheries Service (NMFS) *2018 Revision to: Technical Guidance for Assessing the Effects*

of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0) (NMFS 2018a) outlines the acoustic criteria for five functional groups of marine mammals and is the standard used to protect marine mammals from auditory injury under the Marine Mammal Protection Act. It should be noted that there are still significant knowledge gaps in the field of marine mammal bioacoustics (e.g., hearing capabilities of baleen whales). In fact, Southall et al. (2019) revisited the existing data and reclassified some hearing groups, though the acoustic thresholds do not differ from the 2018 NMFS Guidance. Although not officially accepted as "acoustic criteria," Popper et al. (2014) completed a similar set of sound exposure guidelines on the sound levels at which auditory injury could occur for fish and sea turtles.

During later analyses (e.g., Endangered Species Act and Marine Mammal Protection Act) that may happen as a result of the 2024–2029 Program, BOEM will consult with NMFS and the U.S. Fish and Wildlife Service, as applicable, and may employ acoustic modeling and other methods to predict the number of acoustic exposures for different marine mammal species. An overview of the modeling process is explained in a BOEM video on acoustics (www.youtube.com/watch?v=ubgmZ6iTz80). This type of work looks at the overlap between the sound field (through acoustic propagation modeling), abundance of a given species in the affected area, and hearing capabilities of the species. This process utilizes the NMFS 2018 technical guidance (NMFS 2018a). In this way, it is possible to predict the number of individuals that may be affected. The next step is to integrate information about the species' life history and the status of the population to better interpret the severity of potential impacts.

In 2020, BOEM launched the Center for Marine Acoustics, which aims to advance methods in modeling, improve estimates of animal density, interpret behavioral reactions to sound, and broaden the understanding of hearing thresholds. Over the last several decades, BOEM's science program has supported scientific studies to fill key knowledge gaps in the field of marine acoustics. As new scientific data have become available, BOEM has been revising its approach for estimating acoustic exposures and is moving toward a more sophisticated risk assessment framework in the near future. For examples of this work, see Appendix D of BOEM (2017d) and Appendix E of BOEM (2014); for acoustic-based studies supported by BOEM, see www.boem.gov/sites/default/files/documents//Marine-Acoustics-Managing-Impacts.pdf.

Appendix C: Emissions

The Bureau of Ocean Energy Management (BOEM) estimates air emissions that may be released as a result of Outer Continental Shelf (OCS) activities expected to occur from the 2024–2029 National OCS Oil and Gas Leasing Program (2024–2029 Program) and from the substituted sources of energy should no leasing occur.

The air pollutants presented comprise two different pollution classes:

- **National Ambient Air Quality Standards (NAAQS) criteria pollutants** are identified and regulated by the U.S. Environmental Protection Agency under the Clean Air Act**.** The relevant directly emitted criteria pollutants are the following:
    - Nitrogen dioxide (NO_2)
    - Sulfur dioxide (SO_2)
    - Coarse particulate matter (PM_{10})
    - Fine particulate matter ($PM_{2.5}$)
    - Carbon monoxide (CO)
- **NAAQS precursor pollutants** form NAAQS criteria pollutants through photochemical reactions after release into the atmosphere, including ozone. For more about the NAAQS precursor and criteria pollutants, see **Chapter 2**. The relevant precursor pollutants are:
    - Volatile organic compounds (VOCs)

Tables C-1 to C-3 present the estimated offshore air emissions resulting from the 2024–2029 Program and substitute energy sources in the absence of a 2024–2029 Program. The substitution estimates assume that current patterns of energy consumption will continue. However, this assumption is uncertain given the national commitment to greenhouse gas (GHG) emissions reductions for 2030 and net zero for 2050. If the U.S. makes progress towards reducing its overall use of fossil fuels by replacing them with lower emitting sources of energy, then substitute sources of energy for OCS oil and gas production would also shift. This shift is anticipated to result in emissions that are lower than from the OCS oil and gas substitutions in **Tables C-1 to C-3**, which present substitute emissions estimates assuming current laws and policies continue. The criteria pollutant emissions listed in these tables are generated through the same combustion processes generating CO_2, and requirements reducing CO_2 emissions are likely to also reduce these pollutants as well.

The tables provide the estimates for different activity cases (high, mid, and low) as discussed in the *Final Economic Analysis Methodology for the 2024–2029 National Outer Continental Shelf Oil and Gas Leasing Program* (Final EAM) (BOEM 2023b). Most emissions from substituted sources would occur outside the OCS but are listed by planning area to show the lease sales being replaced. The Offshore Environmental Cost Model (OECM) generated this data as part of the overall cost-benefit analysis of the 2024–2029 Program. For more information on the OECM and cost-benefit analysis, see Chapter 5 in the *2024–2029 National OCS Oil and Gas Leasing Program Proposed Final Program* (PFP) (BOEM 2023a) and the

Final EAM. Lastly, note that these emissions are based on expected production for the 2024–2029 Program, and these estimates have been updated for this stage of the process, and so do not include areas that have been removed from consideration. At the Draft Programmatic EIS stage, estimates were provided for all planning areas that were being considered at that time (BOEM 2022a).

Tables C-1 to C-3 also contain information on the short-lived climate pollutants, $PM_{2.5}$ and O_3 precursors. For information on other GHG emissions, including additional analysis on the life cycle and foreign emissions discussed in this document, see the Final EAM.

Table C-1. Estimated air emissions from the 2024–2029 Program and substituted energy sources in the absence of a 2024–2029 Program (high activity case) in thousands of metric tons

Pollutant	Scope	Cook Inlet	GOM (5 Sales)	GOM (10 Sales)
NO_2	2024–2029 Program	36.29	182.37	356.74
NO_2	Substituted Energy Sources	8.74	149.83	295.58
SO_2	2024–2029 Program	0.84	5.23	10.29
SO_2	Substituted Energy Sources	0.22	3.98	7.93
PM_{10}	2024–2029 Program	3.91	4.31	8.40
PM_{10}	Substituted Energy Sources	8.07	136.12	266.03
$PM_{2.5}$	2024–2029 Program	0.50	4.10	7.99
$PM_{2.5}$	Substituted Energy Sources	0.17	3.01	5.93
CO	2024–2029 Program	8.93	36.92	71.08
CO	Substituted Energy Sources	2.11	37.98	74.99
VOC	2024–2029 Program	5.17	20.88	38.61
VOC	Substituted Energy Sources	23.63	456.87	907.41

Note: * = negligible

Table C-2. Estimated air emissions from the 2024–2029 Program and substituted energy sources in the absence of a 2024–2029 Program (mid activity case) in thousands of metric tons

Pollutant	Scope	Cook Inlet	GOM (5 Sales)	GOM (10 Sales)
NO_2	2024–2029 Program	31.10	116.71	158.88
NO_2	Substituted Energy Sources	5.22	96.19	128.24
SO_2	2024–2029 Program	0.72	3.54	4.76
SO_2	Substituted Energy Sources	0.19	2.56	3.14
PM_{10}	2024–2029 Program	3.22	2.76	3.74
PM_{10}	Substituted Energy Sources	2.59	87.00	115.98
$PM_{2.5}$	2024–2029 Program	0.43	2.62	3.55
$PM_{2.5}$	Substituted Energy Sources	0.10	1.93	2.57
CO	2024–2029 Program	7.49	21.59	30.92
CO	Substituted Energy Sources	1.43	24.48	32.63
VOC	2024–2029 Program	5.02	11.00	17.09
VOC	Substituted Energy Sources	23.29	296.66	395.37

Note: * = negligible

Table C-3. Estimated air emissions from the 2024–2029 Program and substituted energy sources in the absence of a 2024–2029 Program (low activity case) (in thousands of metric tons)

Pollutant	Scope	Cook Inlet	GOM (5 Sales)	GOM (10 Sales)
NO_2	2024–2029 Program	5.11	28.73	28.73
NO_2	Substituted Energy Sources	3.57	24.69	24.69
SO_2	2024–2029 Program	0.12	0.83	0.83
SO_2	Substituted Energy Sources	0.02	0.61	0.61
PM_{10}	2024–2029 Program	0.67	0.68	0.68
PM_{10}	Substituted Energy Sources	5.63	23.75	23.75
$PM_{2.5}$	2024–2029 Program	0.07	0.64	0.64
$PM_{2.5}$	Substituted Energy Sources	0.08	0.50	0.50
CO	2024–2029 Program	1.41	6.54	6.54
CO	Substituted Energy Sources	0.68	6.16	6.16
VOC	2024–2029 Program	0.15	4.57	4.57
VOC	Substituted Energy Sources	0.21	69.92	69.92

Note: * = negligible

Appendix D: Species Names

This final programmatic environmental impact statement (Final Programmatic EIS) considers the effects of the *2024–2029 National Outer Continental Shelf (OCS) Oil and Gas Leasing Proposed Final Program* (BOEM 2023a) on the marine and coastal environments in and around the Bureau of Ocean Energy Management (BOEM) planning areas, which include a high diversity of species. The Final Programmatic EIS does not list them all; rather, the description and analysis call out species groups, representative species, and particularly sensitive species. Several of these species are protected as threatened (T) or endangered (E) under the Endangered Species Act (ESA) and have critical habitat designated, which provides further protection of areas that contain features essential to the conservation of these species (**Figure D-1**). A full list of species referenced in the Final Programmatic EIS and the OCS region in which they are found is compiled in **Table D-1**, which also notes ESA status and any overlap of critical habitat with BOEM planning areas.

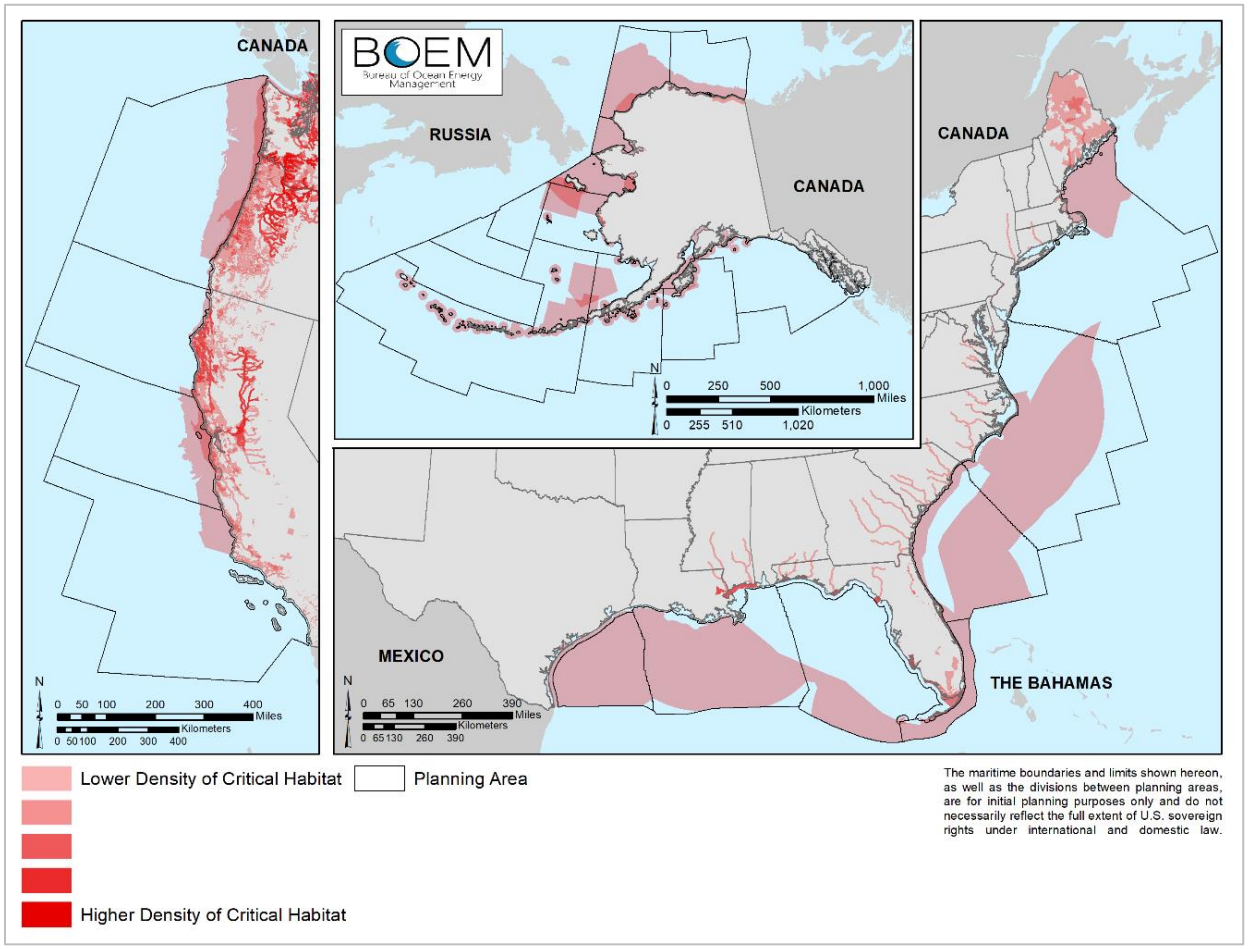

Figure D-1. Density of critical habitat within and adjacent to BOEM planning areas

Table D-1. Marine and coastal species of the Final Programmatic EIS

Notes: T= Threatened; E = Endangered; FR = *Federal Register*
[1]Likely extinct in U.S. range; [2]Not native to the U.S.

FISH

Common Name	Latin Name	Protected Species	Alaska Region	Pacific Region	GOM Region	Atlantic Region	ESA Status	Critical Habitat and FR Number	Planning Areas with Critical Habitat
Atlantic salmon	*Salmo salar*	✓	-	-	-	+	E: 65 FR 69459	74 FR 29300	None
Atlantic sturgeon	*Acipenser oxyrinchus*	✓	-	-	-	+	E: 77 FR 5914; T/E: 77 FR 5880	82 FR 39160	None
Eulachon	*Thaleichthys pacificus*	✓	+	+	-	-	T: 75 FR 13012	76 FR 65324	None
Giant manta ray	*Manta birostris*	✓	-	+	+	+	T: 83 FR 2916	None	-
Green sturgeon	*Acipenser medirostris*	✓	+	+	-	-	T: 72 FR 16284; 71 FR 17757	74 FR 52300	Central California, Northern California, Washington/Oregon
Gulf grouper	*Mycteroperca jordani*	✓	-	+	-	-	E: 81 FR 72545	None	-
Gulf sturgeon	*Acipenser oxyrinchus desotoi*	✓	-	-	+	-	T: 56 FR 49653	68 FR 13370	Central GOM, Eastern GOM
Largetooth sawfish[1]	*Pristis*	✓	-	-	+	+	E: 79 FR 73978	None	-
Nassau grouper	*Epinephelus striatus*	✓	-	-	+	+	T: 81 FR 42268	None	-
Oceanic whitetip shark	*Carcharhinus longimanus*	✓	-	-	+	+	T: 83 FR 4153	None	-
Salmon (coho, Chinook, sockeye, and chum)	*Oncorhynchus kisutch, O. tshawytscha, O. nerka, O. keta*	✓	+	+	-	-	T/E: 77 FR 19552; 73 FR 7816; 70 FR 37160; 64 FR 50394; 64 FR 14508; 64 FR 14528; 64 FR 14308; 62 FR 24588; 61 FR 56138; 59 FR 222; 57 FR 14653; 56 FR 58619; 55 FR 46515	81 FR 9252; 73 FR 7816; 70 FR 52630; 70 FR 52488; 65 FR 7764; 64 FR 57399; 64 FR 24049; 58 FR 68543; 58 FR 33212	None
Scalloped hammerhead shark	*Sphyrna lewini*	✓	-	+	+	+	T (Central & Southwest Atlantic), E (Eastern Atlantic, Eastern Pacific): 79 FR 38213	None	-
Shortnose sturgeon	*Acipenser brevirostrum*	✓	-	-	-	+	E: 32 FR 4001	None	-

Common Name	Latin Name	Protected Species	Alaska Region	Pacific Region	GOM Region	Atlantic Region	ESA Status	Critical Habitat and FR Number	Planning Areas with Critical Habitat
Smalltooth sawfish	*Pristis pectinata*	✓	-	-	+	+	E: 79 FR 73978	74 FR 45353	Eastern Gulf of Mexico (GOM), Straits of FL
Steelhead trout	*Oncorhynchus mykiss*	✓	+	+	-	+	T/E: 72 FR 26722; 71 FR 5248; 67 FR 21586; 65 FR 36074; 64 FR 14517; 63 FR 13347; 62 FR 43937	81 FR 9252; 70 FR 52630; 70 FR 52488	None
Tidewater goby	*Eucyclogobius newberryi*	✓	-	+	-	-	E: 59 FR 5494	78 FR 8745	None
Anchovies	Family Engraulidae	-	-	+	+	+	Not listed	-	-
Anglerfishes	Superfamily Ceratioidea	-	+	+	+	+	Not listed	-	-
Arctic cod	*Arctogadus glacialis*	-	+	-	-	-	Not listed	-	-
Atka mackerel	*Pleurogrammus monopterygius*	-	+	-	-	-	Not listed	-	-
Atlantic bluefin tuna	*Thunnus thynnus*	-	-	-	+	+	Not listed	-	-
Atlantic cod	*Gadus morhua*	-	-	-	-	+	Not listed	-	-
Atlantic croaker	*Micropogonias undulatus*	-	-	-	-	+	Not listed	-	-
Atlantic halibut	*Hippoglossus hippoglossus*	-	-	-	-	+	Not listed	-	-
Atlantic herring	*Clupea harengus*	-	-	-	-	+	Not listed	-	-
Atlantic mackerel	*Scomber scombrus*	-	-	-	-	+	Not listed	-	-
Atlantic menhaden	*Brevoortia tyrannus*	-	-	-	-	+	Not listed	-	-
Atlantic sailfish	*Istiophorus albicans*	-	-	-	+	+	Not listed	-	-
Bigeye tuna	*Thunnus obesus*	-	-	+	+	+	Not listed	-	-
Billfishes	Order Istiophoriformes	-	+	+	+	+	Not listed	-	-
Black drum	*Pogonias cromis*	-	-	-	+	+	Not listed	-	-
Black sea bass	*Centropristis striata*	-	-	-	-	+	Not listed	-	-
Blacknose shark	*Carcharhinus acronotus*	-	-	-	+	+	Not listed	-	-
Blacktip shark	*Carcharhinus limbatus*	-	-	-	+	+	Not listed	-	-
Blue marlin	*Makaira nigricans*	-	-	-	+	+	Not listed	-	-

Common Name	Latin Name	Protected Species	Alaska Region	Pacific Region	GOM Region	Atlantic Region	ESA Status	Critical Habitat and FR Number	Planning Areas with Critical Habitat
Blue shark	*Prionace glauca*	-	+	+	+	+	Not listed	-	-
Bluefish	*Pomatomus saltatrix*	-	-	-	+	+	Not listed	-	-
Bonnethead shark	*Sphyrna tiburo*	-	-	+	+	+	Not listed	-	-
Bristlemouths	Family Gonostomatidae	-	+	+	+	+	Not listed	-	-
Bull shark	*Carcharhinus leucas*	-	-	-	+	+	Not listed	-	-
Butterfish	*Peprilus triacanthus*	-	-	-	+	+	Not listed	-	-
Capelin	*Mallotus villosus*	-	+	+	-	+	Not listed	-	-
Cobia	*Rachycentron canadum*	-	-	-	+	+	Not listed	-	-
Cods	Family Gadidae	-	+	+	+	+	Not listed	-	-
Drums	Family Sciaenidae	-	-	+	+	+	Not listed	-	-
Flatfishes	Order Pleuronectiformes	-	+	+	+	+	Not listed	-	-
Giant kelpfish	*Heterostichus rostratus*	-	-	+	-	-	Not listed	-	-
Giant sea bass	*Stereolepis gigas*	-	-	+	-	-	Not listed	-	-
Goliath grouper	*Epinephelus itajara*	-	-	-	+	+	Not listed	-	-
Greenland turbot	*Reinhardtius hippoglossoides*	-	+	+	-	-	Not listed	-	-
Grenadiers	Subfamily Macrourinae	-	+	+	-	+	Not listed	-	-
Groupers	Family Serranidae	-	-	+	+	+	Not listed	-	-
Gulf corvina	*Cynoscion othonopterus*	-	-	-	-	-	Not listed	-	-
Gulf menhaden	*Brevoortia patronus*	-	-	-	+	-	Not listed	-	-
Gulf toadfish	*Opsanus beta*	-	-	-	+	-	Not listed	-	-
Gulper eel	*Eurypharynx pelecanoides*	-	+	+	+	+	Not listed	-	-
Haddock	*Melanogrammus aeglefinus*	-	-	-	-	+	Not listed	-	-
Hammerhead sharks	Family Sphyrnidae	-	-	-	+	+	Not listed	-	-
Hogfish	*Lachnolaimus maximus*	-	-	-	+	+	Not listed	-	-
Jack mackerel	*Trachurus symmetricus*	-	+	+	-	-	Not listed	-	-

Common Name	Latin Name	Protected Species	Alaska Region	Pacific Region	GOM Region	Atlantic Region	ESA Status	Critical Habitat and FR Number	Planning Areas with Critical Habitat
Jacks	Family Carangidae	-	-	+	+	+	Not listed	-	-
Kelp bass	*Paralabrax clathratus*	-	-	+	-	-	Not listed	-	-
King mackerel	*Scomberomorus cavalla*	-	-	-	+	+	Not listed	-	-
Lanternfishes	Family Myctophidae	-	+	+	+	+	Not listed	-	-
Lingcod	*Ophiodon elongatus*	-	+	+	-	-	Not listed	-	-
Lionfish[2]	*Pterois volitans, Pterois miles*	-	-	-	+	+	Not listed	-	-
Mackerels	Family Scombridae	-	-	+	+	+	Not listed	-	-
Mahi-mahi	*Coryphaena hippurus*	-	-	+	+	+	Not listed	-	-
Marlins	Family Instiophoridae	-	-	+	+	+	Not listed	-	-
Menhaden	Genus *Brevoortia*	-	-	-	+	+	Not listed	-	-
Nurse shark	*Ginglymostoma cirratum*	-	-	-	+	+	Not listed	-	-
Pacific barracuda	*Sphryaena argentea*	-	-	+	-	-	Not listed	-	-
Pacific bluefin tuna	*Thunnus orientalis*	-	-	+	-	-	Not listed	-	-
Pacific cod	*Gadus macrocephalus*	-	+	+	-	-	Not listed	-	-
Pacific hake	*Merluccius productus*	-	+	+	-	-	Not listed	-	-
Pacific halibut	*Hippoglossus stenolepis*	-	+	+	-	-	Not listed	-	-
Pacific herring	*Clupea pallasii*	-	+	+	-	-	Not listed	-	-
Pacific lamprey	*Entosphenus tridentatus*	-	+	+	-	-	Not listed	-	-
Pink salmon	*Oncorhynchus gorbuscha*	-	+	+	-	-	Not listed	-	-
Rattails	Family Macrouridae	-	+	+	+	+	Not listed	-	-
Rays	Superorder Batoidea	-	+	+	+	+	Not listed	-	-
Red drum	*Sciaenops ocellatus*	-	-	-	+	+	Not listed	-	-
Red snapper	*Lutjanus campechanus*	-	-	-	+	+	Not listed	-	-
Rockfishes	Genus *Sebastes*	-	+	+	-	-	Not listed	-	-
Sablefish	*Anoplopoma fimbria*	-	+	+	-	-	Not listed	-	-
Saffron cod	*Eleginus gracilis*	-	+	-	-	-	Not listed	-	-

Common Name	Latin Name	Protected Species	Alaska Region	Pacific Region	GOM Region	Atlantic Region	ESA Status	Critical Habitat and FR Number	Planning Areas with Critical Habitat
Salmon	Family Salmonidae	-	+	+	-	+	Listed as individual species	-	-
Sand lances	Genus *Ammodytes*	-	+	+	-	+	Not listed	-	-
Sand tiger shark	*Carcharias taurus*	-	-	-	+	+	Not listed	-	-
Sandbar shark	*Carcharhinus plumbeus*	-	-	-	+	+	Not listed	-	-
Sardine	*Sardinops sagax*	-	+	+	+	+	Not listed	-	-
Scup	*Stenotomus chrysops*	-	-	-	-	+	Not listed	-	-
Seatrouts	Genus *Cynoscion*	-	-	+	+	+	Not listed	-	-
Sharks	Class Chondrichthyes	-	+	+	+	+	Not listed	-	-
Shortspine thornyhead	*Sebastolobus alascanus*	-	+	+	-	-	Not listed	-	-
Silver hake	*Merluccius bilinearis*	-	-	-	-	+	Not listed	-	-
Skates	Order Rajiformes	-	+	+	+	+	Not listed	-	-
Smelts	Family Osmeridae	-	+	+	-	+	Not listed	-	-
Snapper/grouper complex	Family Lutjanidae, Family Serranidae	-	-	-	+	+	Not listed	-	-
Snowy grouper	*Hyporthodus niveatus*	-	-	-	+	+	Not listed	-	-
Spot	*Leiostomus xanthurus*	-	-	-	+	+	Not listed	-	-
Spotted seatrout	*Cynoscion nebulosus*	-	-	-	+	+	Not listed	-	-
Striped bass	*Morone saxatilis*	-	-	-	+	+	Not listed	-	-
Summer flounder	*Paralichthys dentatus*	-	-	-	-	+	Not listed	-	-
Surfperches	Family Embiotocidae	-	-	+	-	-	Not listed	-	-
Swordfish	*Xiphias gladius*	-	+	+	+	+	Not listed	-	-
Tarpon	*Megalops atlanticus*	-	-	-	+	+	Not listed	-	-
Tilefishes	Family Malacanthidae	-	-	+	+	+	Not listed	-	-
Tripod fish	*Bathypterois grallator*	-	+	+	+	+	Not listed	-	-
Trouts	Genera *Oncorhynchus*, *Salmo* and *Salvelinus*	-	+	+	-	+	Not listed	-	-
Tunas	Family Scombridae	-	+	+	+	+	Not listed	-	-

Common Name	Latin Name	Protected Species	Alaska Region	Pacific Region	GOM Region	Atlantic Region	ESA Status	Critical Habitat and FR Number	Planning Areas with Critical Habitat
Vermilion snapper	*Rhomboplites aurorubens*	-	-	-	+	+	Not listed	-	-
Viperfishes	Genus *Chauliodus*	-	+	+	+	+	Not listed	-	-
Wahoo	*Acanthocybium solandri*	-	-	+	+	+	Not listed	-	-
Walleye pollock	*Gadus chalcogrammus*	-	+	+	-	-	Not listed	-	-
Whale shark	*Rhincodon typus*	-	-	+	+	+	Not listed	-	-
White marlin	*Kajikia albida*	-	-	-	+	+	Not listed	-	-
White seabass	*Atractoscion nobilis*	-	+	+	-	-	Not listed	-	-
White sturgeon	*Acipenser transmontanus*	-	+	+	-	-	Not listed	-	-
Winter flounder	*Pseudopleuronectes americanus*	-	-	-	-	+	Not listed	-	-
Wrasses	Family Labridae	-	+	+	+	+	Not listed	-	-
Yellowtail flounder	*Limanda ferruginea*	-	-	-	-	+	Not listed	-	-

BIRDS

Common Name	Latin Name	Protected Species	Alaska Region	Pacific Region	GOM Region	Atlantic Region	ESA Status	Critical Habitat and FR Number	Planning Areas with Critical Habitat
Bermuda petrel	*Pterodroma cahow*	✓	-	-	-	+	E: 35 FR 8491	35 FR 8491	None
California least tern	*Sterna antillarum browni*	✓	-	+	-	-	E: 35 FR 8491	None	-
California Ridgway's rail	*Rallus longirostris obsoletus*	✓	-	+	-	-	E: 35 FR 16047	None	-
Hawaiian petrel	*Pterodroma sandwichensis*	✓	+	+	-	-	E: 32 FR 4001	None	-
Least tern	*Sternula antillarum*	✓	-	+	+	+	E: 50 FR 21784	None	-
Light-footed Ridgway's rail	*Rallus longirostris levipes*	✓	-	-	+	+	E: 35 FR 16047	None	-
Marbled murrelet	*Brachyramphus marmoratus*	✓	+	+	-	-	T: 57 FR 45328	81 FR 51348	Washington/Oregon, Northern California

Common Name	Latin Name	Protected Species	Alaska Region	Pacific Region	GOM Region	Atlantic Region	ESA Status	Critical Habitat and FR Number	Planning Areas with Critical Habitat
Piping plover	*Charadrius melodus*	✓	-	-	+	+	E (Great Lakes), T (Northeast): 50 FR 50726	74 FR 23476; 67 FR 57638	None
Roseate tern	*Sterna dougallii*	✓	-	-	+	+	E (Northeast), T (Southeast): 52 FR 42064	None	-
Rufa red knot	*Calidris canutus rufa*	✓	-	-	+	+	T: 79 FR 73705	None	-
Short-tailed albatross	*Phoebastria albatru*	✓	+	+	-	-	E: 35 FR 8491	None	-
Spectacled eider	*Somateria fischeri*	✓	+	-	-	-	T: 58 FR 27474	66 FR 9146	Chukchi Sea, Navarin Basin, Norton Basin, St. Matthew-Hall
Steller's eider	*Polysticta stelleri*	✓	+	-	-	-	T (Alaska breeding population): 62 FR 31748	66 FR 8850	St. Matthew-Hall
Western snowy plover	*Charadrius nivosus*	✓	-	+	+	+	T: 58 FR 12864	77 FR 36727	Washington/Oregon, Northern California, Central California, Southern California
Wood stork	*Mycteria americana*	✓	-	+	+	+	T: 49 FR 7332	None	-
Albatrosses	Family Diomedeidae	-	+	+	+	+	Not listed	-	-
Alcids	Family Alcidae	-	+	+	-	+	Not listed	-	-
Arctic tern	*Sterna paradisaea*	-	+	+	+	+	Not listed	-	-
Ashy storm-petrel	*Hydrobates homochroa*	-	-	+	-	-	Not listed	-	-
Atlantic puffin	*Fratercula arctica*	-	-	-	-	+	Not listed	-	-
Auklets	Genera *Aethia* and *Ptychoramphus*	-	+	+	-	-	Not listed	-	-
Black brant	*Branta bernicla nigricans*	-	+	+	-	-	Not listed	-	-
Black-bellied plover	*Pluvialis squatarola*	-	+	+	+	+	Not listed	-	-
Black-capped petrel	*Pterodroma hasitata*	-	-	-	+	+	Not listed	-	-
Black-legged kittiwake	*Rissa tridactyla*	-	+	-	-	-	Not listed	-	-
Boobies	Genus *Sula*	-	-	+	+	+	Not listed	-	-

Common Name	Latin Name	Protected Species	Alaska Region	Pacific Region	GOM Region	Atlantic Region	ESA Status	Critical Habitat and FR Number	Planning Areas with Critical Habitat
Brant	*Branta bernicla*	-	+	+	-	-	Not listed	-	-
Brown pelican	*Pelecanus occidentalis*	-	-	+	+	+	Not listed	-	-
Clapper rail	*Rallus crepitans*	-	-	-	+	-	Not listed	-	-
Common eider	*Somateria mollissima*	-	+	-	-	+	Not listed	-	-
Common loon	*Gavia immer*	-	+	+	+	+	Not listed	-	-
Common murre	*Uria aalge*	-	+	+	-	+	Not listed	-	-
Cormorants	Family Phalacrocoracidae	-	+	+	+	+	Not listed	-	-
Cory's shearwater	*Calonectris borealis*	-	-	-	+	+	Not listed	-	-
Cranes	Genus *Grus*	-	+	+	+	+	Not listed	-	-
Dovekie	*Alle*	-	+	-	-	+	Not listed	-	-
Eagles	Genus *Haliaeetus*	-	+	+	+	+	Not listed	-	-
Egrets	Family Ardeidae	-	+	+	+	+	Not listed	-	-
Eiders	Genus *Somateria*	-	+	-	-	+	Listed as individual species	-	-
Grebes	Family Podicipedidae	-	+	+	+	+	Not listed	-	-
Frigatebirds	Genus *Fregata*	-	-	+	+	+	Not listed	-	-
Fulmars	Genus *Fulmarus*	-	+	+	-	+	Not listed	-	-
Glaucous gull	*Larus hyperboreus*	-	+	+	+	+	Not listed	-	-
Glaucous-winged gull	*Larus glaucescens*	-	+	+	-	-	Not listed	-	-
Greater shearwater	*Puffinus gravis*	-	-	-	+	+	Not listed	-	-
Guillemots	Genus *Cepphus*	-	+	+	-	+	Not listed	-	-
Gulls	Suborder Lari	-	+	+	+	+	Not listed	-	-
Herons	Family Ardeidae	-	+	+	+	+	Not listed	-	-
Ibises	Genera *Eudocimus* and *Plegadis*	-	-	+	+	+	Not listed	-	-
Jaegers	Genus *Stercorarius*	-	+	+	+	+	Not listed	-	-
King eider	*Somateria spectabilis*	-	+	-	-	+	Not listed	-	-

Common Name	Latin Name	Protected Species	Alaska Region	Pacific Region	GOM Region	Atlantic Region	ESA Status	Critical Habitat and FR Number	Planning Areas with Critical Habitat
Kittiwakes	Genus *Rissa*	-	+	+	-	+	Not listed	-	-
Kittlitz's murrelet	*Brachyramphus brevirostris*	-	+	-	-	-	Not listed	-	-
Laughing gull	*Larus atricilla*	-	-	-	+	+	Not listed	-	-
Long-billed dowitcher	*Limnodromus scolopaceus*	-	+	+	+	+	Not listed	-	-
Long-tailed duck	*Clangula hyemalis*	-	+	+	-	+	Not listed	-	-
Loons	Genus *Gavia*	-	+	+	+	+	Not listed	-	-
Murres	Family Alcidae	-	+	+	-	+	Not listed	-	-
Northern fulmar	*Fulmarus glacialis*	-	+	+	-	+	Not listed	-	-
Northern gannet	*Morus bassanus*	-	-	-	+	+	Not listed	-	-
Oystercatchers	Genus *Haematopus*	-	+	+	+	+	Not listed	-	-
Petrels	Genus *Pterodroma*	-	+	+	+	+	Not listed	-	-
Phalaropes	Genus *Phalaropus*	-	+	+	-	+	Not listed	-	-
Plovers	Family Charadriidae	-	+	+	+	+	Not listed	-	-
Puffins	Genus *Fratercula*	-	+	+	-	+	Not listed	-	-
Rails	Family Rallidae	-	-	+	+	+	Not listed	-	-
Red knot	*Calidris canutus*	-	+	+	+	+	Not listed	-	-
Red phalarope	*Phalaropus fulicarius*	-	+	+	-	+	Not listed	-	-
Red-necked phalarope	*Phalaropus lobatus*	-	+	+	-	+	Not listed	-	-
Red-throated loon	*Gavia stellata*	-	+	+	-	+	Not listed	-	-
Roseate spoonbill	*Platalea ajaja*	-	-	-	+	+	Not listed	-	-
Royal tern	*Sterna maxima*	-	-	+	+	+	Not listed	-	-
Sabine's gull	*Xema sabini*	-	+	+	-	+	Not listed	-	-
Sandpipers	Family Scolopacidae	-	+	+	+	+	Not listed	-	-
Scoters	Genus *Melanitta*	-	+	+	+	+	Not listed	-	-
Scripps's murrelet	*Synthliboramphus scrippsi*	-	-	+	-	-	Not listed	-	-

Common Name	Latin Name	Protected Species	Alaska Region	Pacific Region	GOM Region	Atlantic Region	ESA Status	Critical Habitat and FR Number	Planning Areas with Critical Habitat
Sea ducks	Subfamily Merginae	-	+	+	+	+	Listed as individual species	-	-
Seaside sparrow	*Ammodramus maritimus*	-	-	-	+	+	Not listed	-	-
Shearwaters	Family Procellariidae	-	+	+	+	+	Not listed	-	-
South polar skua	*Stercorarius maccormicki*	-	+	+	-	+	Not listed	-	-
Stilts	Genus *Himantopus*	-	-	+	+	+	Not listed	-	-
Storm-petrels	Family Hydrobatidae	-	+	+	+	+	Not listed	-	-
Terns	Subfamily Sterninae	-	+	+	+	+	Not listed	-	-
Tropicbirds	Genus *Phaeton*	-	-	+	+	+	Not listed	-	-
Yellow-billed loon	*Gavia adamsii*	-	+	+	-	-	Not listed	-	-
White pelican	*Pelecanus erythrorhynchos*	-	-	+	+	+	Not listed	-	-

SEA TURTLES

Common Name	Latin Name	Protected Species	Alaska Region	Pacific Region	GOM Region	Atlantic Region	ESA Status	Critical Habitat and FR Number	Planning Areas with Critical Habitat
Green turtle	*Chelonia mydas*	✓	-	+	+	+	T: 81 FR 20057	None	-
Hawksbill turtle	*Eretmochelys imbricata*	✓	-	-	+	+	E: 35 FR 8492	64 FR 46693	None
Kemp's ridley turtle	*Lepidochelys kempii*	✓	-	-	+	+	E: 35 FR 18319	None	-
Leatherback turtle	*Dermochelys coriacea*	✓	-	+	+	+	E: 35 FR 8491	44 FR 17710	Central California, Northern California, Southern California, Washington/Oregon
Loggerhead turtle	*Caretta*	✓	-	+	+	+	E (North Pacific DPS), T (Northwest Atlantic DPS): 76 FR 58868	79 FR 39755	Central GOM, Eastern GOM, Western GOM, North/Mid/South Atlantic, Straits of FL

Common Name	Latin Name	Protected Species	Alaska Region	Pacific Region	GOM Region	Atlantic Region	ESA Status	Critical Habitat and FR Number	Planning Areas with Critical Habitat
Olive ridley turtle	*Lepidochelys olivacea*	✓	-	+	-	+	E (Mexico's Pacific Coast breeding colonies), T (all other areas): 43 FR 32800	None	-

MARINE MAMMALS

Common Name	Latin Name	Protected Species	Alaska Region	Pacific Region	GOM Region	Atlantic Region	ESA Status	Critical Habitat and FR Number	Planning Areas with Critical Habitat
Bearded seal	*Erignathus barbatus*	✓	+	-	-	-	T (Beringia DPS): 77 FR 76739	None	-
Beluga whale	*Delphinapterus leucas*	✓	+	-	-	-	E (Cook Inlet DPS): 73 FR 62919	76 FR 20180	Cook Inlet
Blue whale	*Balaenoptera musculus*	✓	+	+	+	+	E: 35 FR 18319	35 FR 18319	None
Bowhead whale	*Balaena mysticetus*	✓	+	-	-	-	E: 35 FR 18319	None	-
Bryde's whale	*Balaenoptera edeni brydei*	✓	-	+	-	-	E: 84 FR 15446	None	-
Fin whale	*Balaenoptera physalus*	✓	+	+	+	+	E: 35 FR 12222	None	-
Gray whale	*Eschrichtius robustus*	✓	+	+	-	-	E (Western North Pacific DPS): 35 FR 18319	None	-
Guadalupe fur seal	*Arctocephalus townsendi*	✓	-	+	-	-	T: 32 FR 4001	None	-
Humpback whale	*Megaptera novaeangliae*	✓	+	+	+	+	E (Central America and Western North Pacific DPSs), T (Mexico DPS): 81 FR 62259	None	-
Killer whale	*Orcinus orca*	✓	+	+	+	+	E (Southern resident DPS): 70 FR 69903	71 FR 69054	None
North Atlantic right whale	*Eubalaena glacialis*	✓	-	-	-	+	E: 73 FR 12024	81 FR 4837	North/Mid/South Atlantic
North Pacific right whale	*Eubalaena japonica*	✓	+	+	-	-	E: 73 FR 12024	73 FR 19000	Kodiak, North Aleutian, St. George Basin

Common Name	Latin Name	Protected Species	Alaska Region	Pacific Region	GOM Region	Atlantic Region	ESA Status	Critical Habitat and FR Number	Planning Areas with Critical Habitat
Northern sea otter	*Enhydra lutris kenyoni*	✓	+	+	-	-	T (Southwest Alaska DPS): 70 FR 46366	74 FR 51988	Aleutian Arc, Cook Inlet, Kodiak, North Aleutian, Shumagin
Polar bear	*Ursus maritimus*	✓	+	-	-	-	T: 73 FR 28212	75 FR 76086	Beaufort Sea, Chukchi Sea, Hope Basin, Norton Basin, St. Matthew-Hall
Rice's whale (previously Bryde's whale, Gulf of Mexico subspecies)	*Balaenoptera ricei*	✓	-	-	+	-	E: 84 FR 15446 (ESA status did not change with taxonomic change)	None	-
Ringed seal	*Pusa hispida*	✓	+	-	-	-	T: 79 FR 42687	None	-
Sei whale	*Balaenoptera borealis*	✓	+	+	+	+	E: 35 FR 12222	None	-
Southern sea otter	*Enhydra lutris nereis*	✓	+	+	-	-	T: 42 FR 2965	None	-
Sperm whale	*Physeter macrocephalus*	✓	+	+	+	+	E: 35 FR 18319	None	-
Spotted seal	*Phoca largha*	✓	+	-	-	-	T (foreign): 75 FR 65239	None	-
Steller sea lion	*Eumetopias jubatus*	✓	+	+	-	-	E (Western DPS): 55 FR 49203	64 FR 14052	Aleutian Arc
West Indian manatee	*Trichechus manatus*	✓	-	-	+	+	T: 32 FR 4001	42 FR 47840	None
Atlantic spotted dolphin	*Stenella frontalis*	-	-	-	-	+	Not listed	-	-
Atlantic white-sided dolphin	*Lagenorhynchus acutus*	-	-	-	-	+	Not listed	-	-
Beaked whales	Family Ziphiidae	-	+	+	+	+	Not listed	-	-
Bottlenose dolphin	*Tursiops truncatus*	-	-	+	+	+	Not listed	-	-
California sea lion	*Zalophus californianus*	-	-	+	-	-	Not listed	-	-
Dolphins	Family Delphinidae	-	+	+	+	+	Not listed	-	-
Gray seal	*Halichoerus grypus*	-	-	-	-	+	Not listed	-	-
Harbor porpoise	*Phocoena phocoena*	-	-	+	+	+	Not listed	-	-
Harbor seal	*Phoca vitulina*	-	+	+	-	+	Not listed	-	-

Common Name	Latin Name	Protected Species	Alaska Region	Pacific Region	GOM Region	Atlantic Region	ESA Status	Critical Habitat and FR Number	Planning Areas with Critical Habitat
Harp seal	*Pagophilus groenlandicus*	-	-	-	-	+	Not listed	-	-
Hooded seal	*Cystophora cristata*	-	-	-	-	+	Not listed	-	-
Ice seals	Family Phocidae	-	+	-	-	-	Not listed	-	-
Minke whale	*Balaenoptera acutorostrata*	-	+	+	+	+	Not listed	-	-
Northern elephant seal	*Mirounga angustirostris*	-	+	+	-	-	Not listed	-	-
Northern fur seal	*Callorhinus ursinus*	-	+	+	-	-	Not listed	-	-
Pacific walrus	*Odobenus rosmarus divergens*	-	+	-	-	-	Not listed	-	-
Ribbon seal	*Histriophoca fasciata*	-	+	-	-	-	Not listed	-	-
Risso's dolphin	*Grampus griseus*	-	+	+	+	+	Not listed	-	-
Seals	Suborder Pinnipedia	-	+	+	-	+	Not listed	-	-
Short-finned pilot whale	*Globicephala macrorhynchus*	-	+	+	+	+	Not listed	-	-
Striped dolphin	*Stenella coeruleoalba*	-	-	+	+	+	Not listed	-	-
Walrus	*Odobenus rosmarus*	-	+	-	-	-	Not listed	-	-
Whales	Infraorder Cetacea	-	+	+	+	+	Not listed	-	-

INVERTEBRATES

Common Name	Latin Name	Protected Species	Alaska Region	Pacific Region	GOM Region	Atlantic Region	ESA Status	Critical Habitat and FR Number	Planning Areas with Critical Habitat
Black abalone	*Haliotis cracherodii*	✓	-	+	-	-	E: 74 FR 1937	76 FR 66806	None
Boulder star coral	*Orbicella franksi*	✓	-	-	+	-	T: 79 FR 53852	None	-
Elkhorn coral	*Acropora palmata*	✓	-	-	+	+	T: 79 FR 53852	70 FR 14052	Eastern GOM, Straits of FL
Lobed star coral	*Orbicella annularis*	✓	-	-	-	+	T: 79 FR 53852	None	-

Common Name	Latin Name	Protected Species	Alaska Region	Pacific Region	GOM Region	Atlantic Region	ESA Status	Critical Habitat and FR Number	Planning Areas with Critical Habitat
Mountainous star coral	*Orbicella faveolata*	✓	-	-	+	+	T: 79 FR 53852	None	-
Orbicella star corals	Genus *Orbicella*	✓	-	-	+	+	T: 79 FR 53852	None	-
Pillar coral	*Dendrogyra cylindrus*	✓	-	-	+	+	T: 79 FR 53852	None	-
Rough cactus coral	*Mycetophyllia ferox*	✓	-	-	+	+	T: 79 FR 53852	None	-
Staghorn coral	*Acropora cervicornis*	✓	-	-	+	+	T: 79 FR 53852	70 FR 14052	Eastern GOM
White abalone	*Haliotis sorenseni*	✓	-	+	-	-	E: 66 FR 29046	None	-
Abalones	Family Haliotidae	-	+	+	-	-	Not listed	-	-
American horseshoe crab	*Limulus polyphemus*	-	-	-	-	+	Not listed	-	-
American lobster	*Homarus americanus*	-	-	-	-	+	Not listed	-	-
Amphipods	Order Amphipoda	-	+	+	+	+	Not listed	-	-
Anemones	Order Actiniaria	-	+	+	+	+	Not listed	-	-
Arrow squid	*Doryteuthis plei*	-	-	-	+	+	Not listed	-	-
Ascidians	Class Ascidiacea	-	+	+	+	+	Not listed	-	-
Atlantic surfclam	*Spisula solidissima*	-	-	-	-	+	Not listed	-	-
Basket stars	Order Euryalida	-	+	+	+	+	Not listed	-	-
Bivalves	Class Bivalvia	-	+	+	+	+	Not listed	-	-
Black corals	Order Antipatharia, Genera *Antipathes, Leiopathes*	-	+	+	+	+	Not listed	-	-
Blue crab	*Callinectes sapidus*	-	-	-	+	+	Not listed	-	-
Blue king crab	*Paralithodes platypus*	-	+	-	-	-	Not listed	-	-
Bristle worm	*Phragmatopoma lapidosa*	-	+	+	+	+	Not listed	-	-
Brittle stars	Class Ophiuroidea	-	+	+	+	+	Not listed	-	-
Calanoid copepods	Order Calanoida	-	+	+	+	+	Not listed	-	-
California spiny lobster	*Panulirus interruptus*	-	-	+	-	-	Not listed	-	-
Clams	Class Bivalvia	-	+	+	+	+	Not listed	-	-
Copepods	Subclass Copepoda	-	+	+	+	+	Not listed	-	-

Common Name	Latin Name	Protected Species	Alaska Region	Pacific Region	GOM Region	Atlantic Region	ESA Status	Critical Habitat and FR Number	Planning Areas with Critical Habitat
Corals	Class Anthozoa	-	+	+	+	+	Not listed	-	-
Crabs	Infraorder Brachyura	-	+	+	+	+	Not listed	-	-
Crinoids	Class Crinoidea	-	+	+	+	+	Not listed	-	-
Crustaceans	Subphylum Crustacea	-	+	+	+	+	Not listed	-	-
Cuttlefishes	Order Sepiida	-	-	-	-	+	Not listed	-	-
Deepsea red crab	*Chaceon quinquedens*	-	-	-	+	+	Not listed	-	-
Dumbo octopuses	Genus *Grimpoteuthis*	-	+	+	+	+	Not listed	-	-
Dungeness crab	*Metacarcinus magister, Cancer magister*	-	+	+	-	-	Not listed	-	-
Eastern oyster	*Crassostrea virginica*	-	-	+	+	+	Not listed	-	-
Echinoderms	Phylum Echinodermata	-	+	+	+	+	Not listed	-	-
Fiddler crabs	Genus *Uca*	-	-	+	+	+	Not listed	-	-
Fuzzy hermit crab	*Dardanus megistos*	-	+	-	-	-	Not listed	-	-
Gastropods	Class Gastropoda	-	+	+	+	+	Not listed	-	-
Ghost shrimp	*Callichirus islagrande*	-	-	-	+	-	Not listed	-	-
Giant squid	*Architeuthis dux*	-	+	+	+	+	Not listed	-	-
Golden crab	*Chaceon fenneri*	-	+	-	-	-	Not listed	-	-
Gorgonian corals	Class Anthozoa	-	+	+	+	+	Not listed	-	-
Green sea urchin	*Strongylocentrotus droebachiensis*	-	+	-	-	-	Not listed	-	-
Humboldt squid	*Dosidicus gigas*	-	-	+	-	-	Not listed	-	-
Hydroids	Class Hydrozoa	-	-	+	-	-	Not listed	-	-
Hydrozoans	Class Hydrozoa	-	+	+	+	+	Not listed	-	-
Jellyfishes	Phyla Cnidaria and Ctenophora	-	+	+	+	+	Not listed	-	-
Jonah crab	*Cancer borealis*	-	-	-	+	+	Not listed	-	-
Krill	Order Euphausiacea	-	+	+	+	+	Not listed	-	-

Common Name	Latin Name	Protected Species	Alaska Region	Pacific Region	GOM Region	Atlantic Region	ESA Status	Critical Habitat and FR Number	Planning Areas with Critical Habitat
Lace corals	Genus *Distichopora*	-	-	+	+	+	Not listed	-	-
Limpets	Order Patellogastropoda	-	+	+	+	+	Not listed	-	-
Longfin inshore squid	*Doryteuthis pealeii*	-	-	-	+	+	Not listed	-	-
Lophelia corals	Genus *Lophelia*	-	-	+	+	+	Not listed	-	-
Mole (sand) crabs	Genus *Emerita*	-	+	+	+	+	Not listed	-	-
Mollusks	Phylum Mollusca	-	+	+	+	+	Not listed	-	-
Mussels	Subclass Heterodonta	-	+	+	+	+	Not listed	-	-
Northern shortfin squid	*Illex illecebrosus*	-	-	-	-	+	Not listed	-	-
Octocorals	Subclass Octocorallia	-	+	+	+	+	Not listed	-	-
Octopuses	Order Octopoda	-	+	+	+	+	Not listed	-	-
Oculina corals	Family Oculinidae	-	-	-	+	+	Not listed	-	-
Oyster parasite	*Perkinsus marinus*	-	-	+	+	+	Not listed	-	-
Oysters	Family Ostreidae	-	+	+	+	+	Not listed	-	-
Pacific octopus	*Enteroctopus dofleini*	-	+	+	-	-	Not listed	-	-
Pacific razor clam	*Siliqua patula*	-	+	+	-	-	Not listed	-	-
Peanut worms	Phylum Sipuncula	-	+	+	+	+	Not listed	-	-
Pismo clam	*Tivela stultorum*	-	-	+	-	-	Not listed	-	-
Polychaetes	Class Polychaeta	-	+	+	+	+	Not listed	-	-
Purple-orange sea star	*Pisaster ochraceus*	-	+	+	-	-	Not listed	-	-
Quahog	*Mercenaria*	-	-	-	+	+	Not listed	-	-
Red king crab	*Paralithodes camtschaticus*	-	+	-	-	-	Not listed	-	-
Red rock crab	*Cancer productus*	-	+	+	-	-	Not listed	-	-
Rock scallop	*Crassodoma gigantea*	-	+	+	-	-	Not listed	-	-
Scallops	Family Pectinidae	-	+	+	+	+	Not listed	-	-
Scleractinian corals	Order Scleractinia	-	+	+	+	+	Not listed	-	-
Sea cucumbers	Class Holothuroidea	-	+	+	+	+	Not listed	-	-
Sea fans	Genus *Gorgonia*	-	+	+	+	+	Not listed	-	-

Common Name	Latin Name	Protected Species	Alaska Region	Pacific Region	GOM Region	Atlantic Region	ESA Status	Critical Habitat and FR Number	Planning Areas with Critical Habitat
Sea pens	Order Pennatulacea	-	+	+	+	+	Not listed	-	-
Sea scallop	*Placopecten magellanicus*	-	-	-	-	+	Not listed	-	-
Sea stars	Class Asteroidea	-	+	+	+	+	Not listed	-	-
Sea urchins	Class Echinoidea	-	+	+	+	+	Not listed	-	-
Sea whips	Order Gorgonacea	-	+	+	+	+	Not listed	-	-
Shore crabs	Family Varunidae	-	+	+	-	+	Not listed	-	-
Shrimps	Infraorder Caridea	-	+	+	+	+	Not listed	-	-
Snapping shrimps	Family Alpheidae	-	-	+	+	+	Not listed	-	-
Snow crabs	Genus *Chionoecetes*	-	+	+	-	+	Not listed	-	-
Soft corals	Order Alcyonacea	-	+	+	+	+	Not listed	-	-
Southern shortfin squid	*Illex coindetii*	-	-	-	+	-	Not listed	-	-
Spiny lobsters	Family Palinuridae	-	-	+	+	+	Not listed	-	-
Sponges	Phylum Porifera	-	+	+	+	+	Not listed	-	-
Squids	Order Teuthida	-	+	+	+	+	Not listed	-	-
Stone crab	*Menippe mercenaria*	-	-	-	+	-	Not listed	-	-
Stony coral	*Lophelia pertusa*	-	-	-	+	+	Not listed	-	-
Tanner crab	*Chionoecetes bairdi*	-	+	+	-	-	Not listed	-	-
Tubeworms	Family Siboglinidae	-	+	+	+	+	Not listed	-	-
Tunicates	Subphylum Tunicata	-	+	+	+	+	Not listed	-	-
Worms	Phylum Annelida	-	+	+	+	+	Not listed	-	-

OTHER

Common Name	Latin Name	Protected Species	Alaska Region	Pacific Region	GOM Region	Atlantic Region	ESA Status	Critical Habitat and FR Number	Planning Areas with Critical Habitat
Beach mice	*Peromyscus polionotus spp.*	✓	-	-	+	-	E: 49 FR 23794, 50 FR 23872, 63 FR 70053	71 FR 60238, 72 FR 4330	None
Algae	Kingdom Protista	-	+	+	+	+	Not listed	-	-
Arctic fox	*Vulpes lagopus*	-	+	-	-	-	Not listed	-	-
Arctic hare	*Lepus arcticus*	-	+	-	-	-	Not listed	-	-
Bears	Genus *Ursus*	-	+	+	+	+	Not listed	-	-
Brown algae	Genus *Desmarestia*	-	+	+	+	+	Not listed	-	-
Brown bear	*Ursus arctos gyas*	-	+	-	-	-	Not listed	-	-
Bryozoans	Phylum Bryozoa	-	+	+	+	+	Not listed	-	-
Caribou	*Rangifer tarandus*	-	+	-	-	-	Not listed	-	-
Coralline algae	*Lithothamnium*	-	+	+	+	+	Not listed	-	-
Eelgrass	*Zostera marina*	-	+	+	+	+	Not listed	-	-
Giant kelp	*Macrocystis pyrifera*	-	+	+	-	-	Not listed	-	-
Harmful algal bloom	*Pseudo-nitzschia spp., Karenia brevis*	-	+	+	+	+	Not listed	-	-
Kelps	Order Laminariales	-	+	+	-	+	Not listed	-	-
Mangroves	Genera *Avicennia, Laguncularia*, and *Rhizophora*	-	-	-	+	+	Not listed	-	-
Rabbits	Order Lagomorpha	-	+	+	+	+	Not listed	-	-
Sargassum	*Sargassum*	-	-	-	+	+	Not listed	-	-
Seagrasses	Order Astimatales	-	+	+	+	+	Not listed	-	-
Shoalweed	*Halodule wrightii*	-	-	-	+	-	Not listed	-	-
Widgeongrass	*Ruppia maritima*	-	+	+	+	+	Not listed	-	-

Appendix E: Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) (16 U.S.C. § 1801 *et seq*–1882, including reauthorizations) established eight regional fishery management councils. The MSFCMA mandates development of fishery management plans (FMPs) for responsible fish and invertebrate harvests in U.S. waters and designation of essential fish habitat (EFH) for managed species. EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity" (16 U.S.C. § 1802). Factors that may determine EFH include substrate type, temperature, currents, bottom features, and geography. When sufficient data are available, EFH is designated for each lifestage of a species or group (e.g., reef fish or corals) to indicate habitat areas important for survival and reproduction (**Figure E-1**). For example, EFH areas offshore of the Gulf of Mexico (GOM) and South Atlantic have been designated for highly migratory species, while many coastal species have EFH concentrated around southern Alaska. There is no commercial fishing in the Arctic, and only Arctic cod, which are harvested elsewhere, have EFH designated there. **Figure E-1** shows the density of designated EFH, but this figure does not necessarily correlate to number of species because some EFH are designated for a group of multiple species.

Areas designated as EFH must be described and identified in FMPs, have potential adverse effects identified, and have required actions identified that will conserve and enhance the EFH. Coordination and consultation must occur on any Federal and state actions that may adversely affect EFH. Designation as EFH does not confer specific protections or restrictions, but limitations on activities may be proposed as conservation recommendations as part of the consultation process. The National Marine Fisheries Service (NMFS) and the regional fishery management councils designate Habitat Areas of Particular Concern (HAPCs) to increase focus on specific areas for research purposes and conservation efforts, but this designation does not confer additional specific protections or restrictions (**Figure E-2**).

The Bureau of Ocean Energy Management (BOEM) consults with NMFS when planning or authorizing activities that could adversely affect EFH or HAPCs and implements measures to avoid, minimize, or mitigate impacts when appropriate. For oil and gas development, these consultations would occur during subsequent review and approval at the lease sale and plan stages. **Table E-1** lists the numbers of managed fish species or groups with designated EFH and HAPCs in each BOEM planning area.

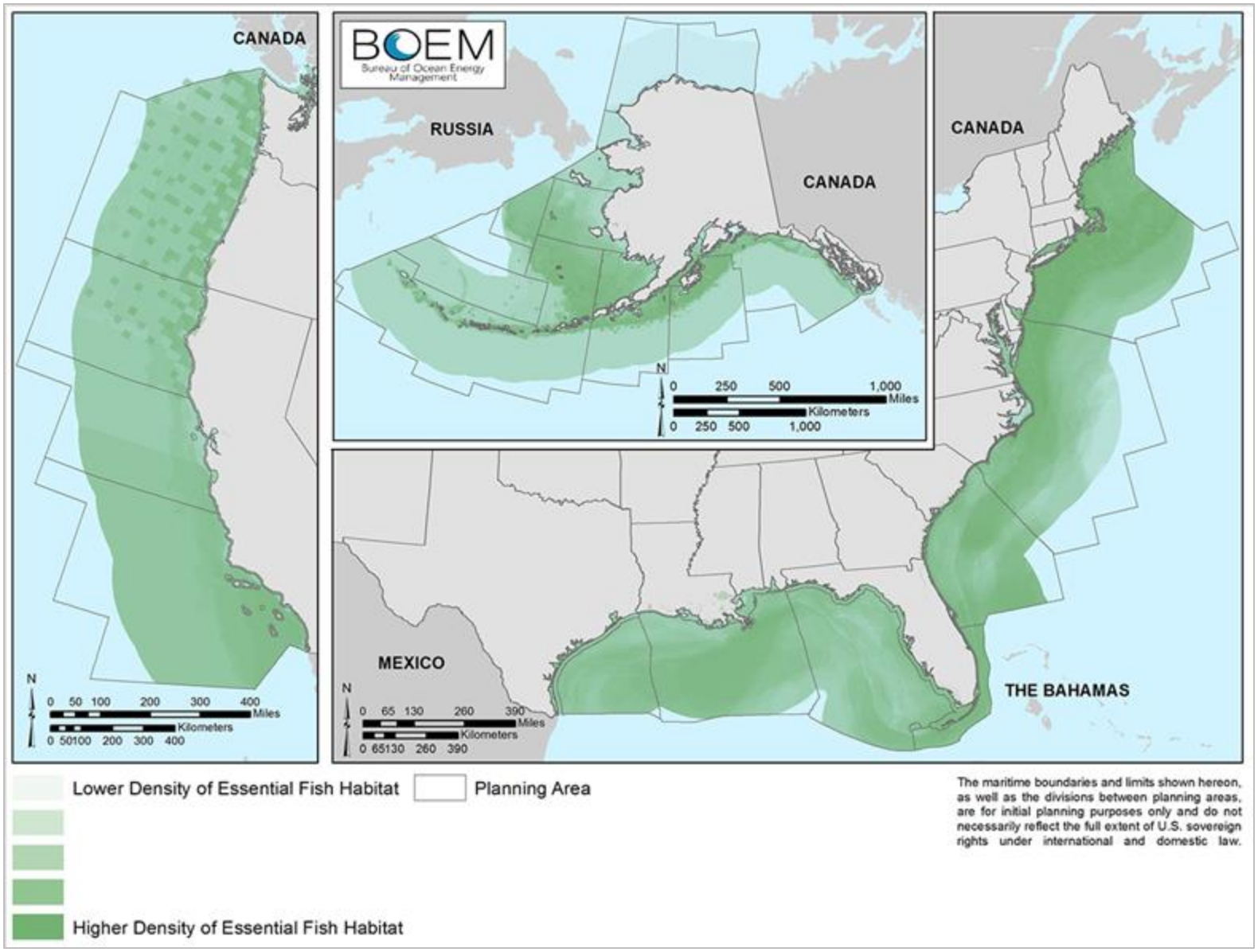

Figure E-1. Density of EFH in and adjacent to BOEM planning areas

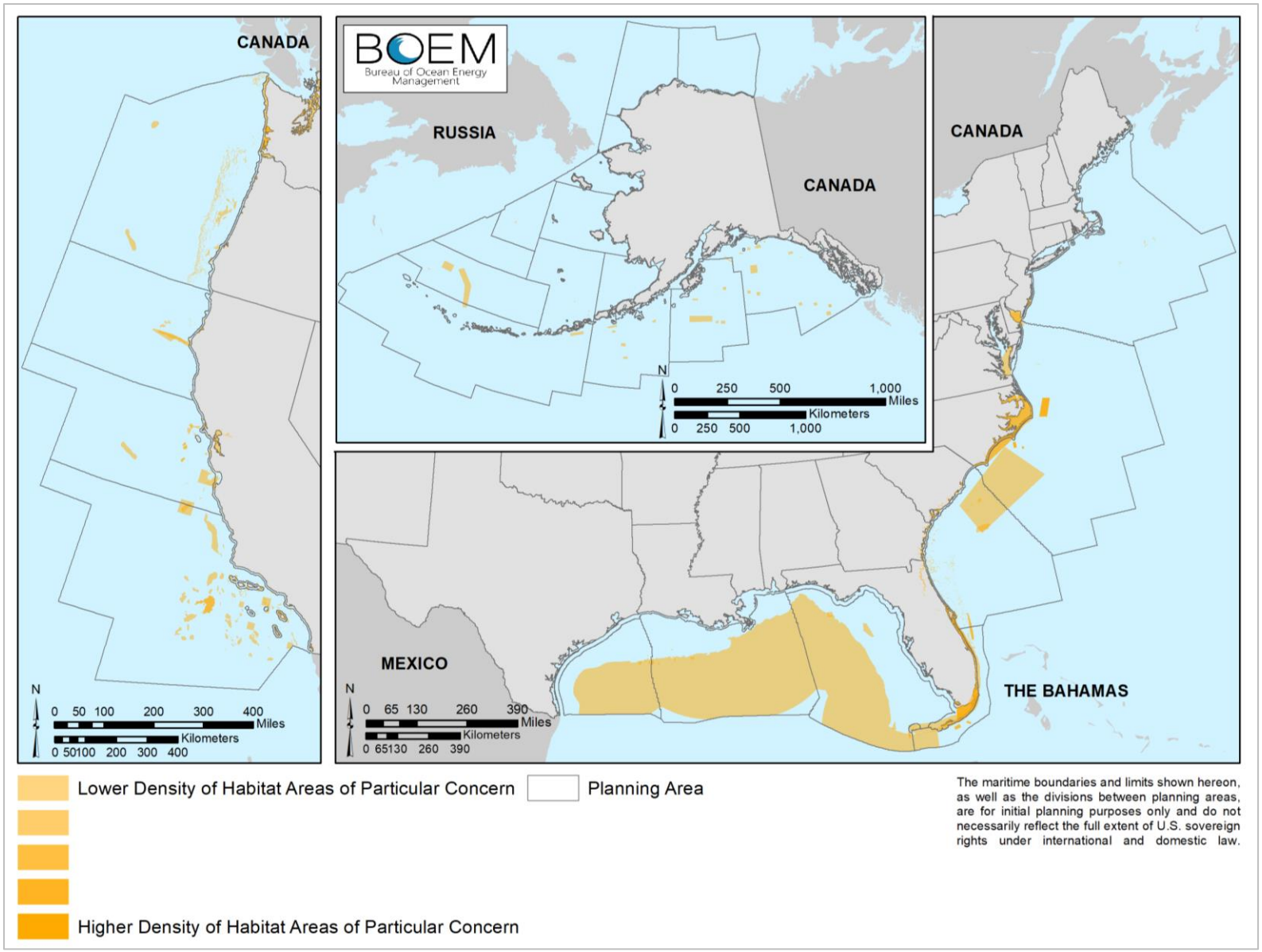

Figure E-2. Density of HAPCs in and adjacent to BOEM planning areas

Table E-1. Number of EFH and HAPCs in each BOEM planning area

Region	Planning Area	Number of Managed Fish Species or Groups with EFH	Number of HAPCs
Alaska	Aleutian Arc	28	1
Alaska	Aleutian Basin	24	0
Alaska	Beaufort Sea	1	0
Alaska	Bowers Basin	22	3
Alaska	Chukchi Sea	3	0
Alaska	Cook Inlet	27	0
Alaska	Gulf of Alaska	25	0
Alaska	Hope Basin	3	0
Alaska	Kodiak	27	0
Alaska	Navarin Basin	28	0
Alaska	North Aleutian Basin	29	0
Alaska	Norton Basin	14	0
Alaska	Shumagin	28	0
Alaska	St. George Basin	34	0
Alaska	St. Matthew-Hall	25	0
Pacific	Washington/Oregon	25	4
Pacific	Northern California	23	1
Pacific	Central California	21	7
Pacific	Southern California	17	16
GOM	Western GOM	34	6
GOM	Central GOM	35	8
GOM	Eastern GOM	40	4
Atlantic	Straits of Florida	42	17
Atlantic	South Atlantic	45	11
Atlantic	Mid-Atlantic	67	6
Atlantic	North Atlantic	66	3

Appendix F: Mitigations

This final programmatic environmental impact statement (Final Programmatic EIS) analyzes potential impacts that could result from activities associated with new leasing under the 2024–2029 National Outer Continental Shelf (OCS) Oil and Gas Leasing Program (2024–2029 Program). This appendix presents a sample of regulatory controls that the Bureau of Ocean Energy Management (BOEM) uses to minimize or avoid these potential impacts. With the exception of the topographic features and Pinnacle Trend stipulations, these mitigations are not being adopted as part of the decision and are examples of mitigations that have been used previously and may again be used in lease sales and conditions of approval on post-lease activities.

BOEM's lease stipulations, regulations, compliance with environmental laws, and other measures adopted pursuant to consultations or derived through BOEM's internal analysis of new research collectively provide a robust regulatory mechanism for ensuring that oil and gas development activities proceed in an environmentally responsible way. BOEM's Environmental Studies Program, as well as multiple Federal agencies and Tribal partners, support the analyses and monitoring programs that inform these regulatory controls.

All BOEM leases are subject to regulations prescribing environmental controls on prospective lessees, their operators, and subcontractors, as well as stipulations placed on a lease. BOEM and the Bureau of Safety and Environmental Enforcement (BSEE) maintain a series of Notices to Lessees (NTLs) that communicate additional recommendations for adhering to environmental protection standards and clarify certain regulatory requirements. Lease stipulations may be applied to BOEM leases sold in a particular lease sale.

BOEM works closely with the BSEE to achieve environmental protection goals. BSEE has broad regulatory, permitting, inspection, monitoring, and enforcement authority to ensure safe operations and environmental protection, including the authority to issue civil penalties. BSEE ensures use of the best available and safest technologies during exploration, development, production, and decommissioning; incorporates environmental protection conditions in permits; and enforces lease stipulation requirements and mitigation measures. BSEE monitors operations after drilling has begun and carries out periodic inspections of facilities (in certain instances, in conjunction with other Federal agencies, such as the U.S. Environmental Protection Agency [USEPA]) to ensure safe and clean operations throughout the life of a lease.

By implementing lease stipulations and other mitigating measures, potential impacts could be minimized or avoided. A representative sample of lease stipulations and other protective environmental measures typically applied at subsequent National OCS Program stages is presented below. The region or planning area in which leases may be subject to a given lease stipulation or NTL is noted in parentheses.

F.1 PROTECTIONS FOR ARCHAEOLOGICAL AND CULTURAL RESOURCES

F.1.1 Archaeological Resource Reports and Survey and Report Requirements (All Planning Areas)

BOEM issued the below NTLs to clarify when BOEM may require an archaeological resource report and to provide recommendations on how to prepare such a report and conduct archaeological surveys. These NTLs include a series of measures describing procedures for conducting archaeological surveys before bottom-disturbing activities can occur. The measures, when applied, avoid impacting potential historic properties, including pre-contact and historic period archaeological resources. These NTLs also remind lessees and operators that, if they discover any archaeological resource while conducting operations, they must immediately halt operations in the area of the discovery and notify BOEM of any discoveries so that the discovery can be protected. Refer to the following:

- BOEM NTL No. 05-A03—Archaeological Survey and Evaluation for Exploration and Development Activities: www.boem.gov/sites/default/files/documents/oil-gas-energy/BOEM%20NTL%20No.%202005-A03.pdf
- NTL No. 06-P03—Archaeological Survey and Report Requirements: www.boem.gov/Regulations/Notices-To-Lessees/2006/06-P03.aspx
- BOEM NTL No. 2005-G07—Archaeological Resource Reports and Surveys: www.boem.gov/Regulations/Notices-To-Lessees/2005/05-G07.aspx

F.1.2 Orientation to Alaska Native Community Cultures (Alaska Region)

This lease stipulation was designed to provide an increased understanding of, and appreciation for, local community values, customs, and lifestyles of Alaska Native communities. It requires that an orientation program must be designed in sufficient detail to inform individuals working on OCS projects of specific types of environmental, social, and cultural concerns in the area.

The orientation program must provide information to industry employees on protected species, biological resources used for commercial and subsistence purposes, and archaeological resources of the area. Information includes appropriate ways to protect them and reduce industrial noise and disturbance effects on marine mammals and marine and coastal birds. The program also must include information about avoiding conflicts with subsistence activities. Refer to the following:

- Cook Inlet Planning Area—Final Environmental Impact Statement for Lease Sale 244, Volume 1, Chapter 2, Section 2.6.1. Lease Stipulations, Stipulation No. 3—Orientation Program: www.boem.gov/Cook-Inlet-Lease-Sale-244-Final-EIS-Volume-1/
- Final Notice of Sale for Cook Inlet Oil and Gas Lease Sale 244: www.boem.gov/Sale-244-FNOS-Final/
- Lease Stipulations for Cook Inlet Oil and Gas Lease Sale 244: www.boem.gov/Sale-244-FNOS-Stipulations/

- Chukchi Sea Planning Area, Oil and Gas Lease Sale 193 in the Chukchi Sea, Alaska, Appendix D, Guide to Lease Stipulations, D-2.1.4. Stipulation No. 2. Orientation Program: www.boem.gov/sites/default/files/uploadedFiles/BOEM/About_BOEM/BOEM_Regions/Alaska_Region/Environment/Environmental_Analysis/LeaseSale_193_DraftSSEIS_Vol2.pdf
- Final Notice of Sale Package for Chukchi Sea Oil and Gas Lease Sale 193: www.boem.gov/sites/default/files/uploadedFiles/BOEM/About_BOEM/BOEM_Regions/Alaska_Region/Leasing_and_Plans/Leasing/Lease_Sales/Sale_193/Info.pdf
- Cook Inlet Planning Area—Final Environmental Impact Statement for Lease Sale 258, Section 3.3.1 Lease Stipulations, Stipulation No. 3—Orientation Program: https://www.boem.gov/sites/default/files/documents/oil-gas-energy/leasing/2022_1020%20LS%20258%20FEIS.pdf
- Final Notice of Sale for Cook Inlet Oil and Gas Lease Sale 258: https://www.boem.gov/sites/default/files/documents/regions/alaska-ocs-region/Final%20Notice%20of%20Sale%20LS258.pdf
- Lease Stipulations for Cook Inlet Oil and Gas Lease Sale 258: https://www.boem.gov/sites/default/files/documents/regions/alaska-ocs-region/Lease%20Stipulations%20LS258.pdf

F.2 PROTECTIONS FOR BENTHIC RESOURCES

F.2.1 Protection of Benthic Communities (Gulf of Mexico [GOM] Region)

The topographic features lease stipulation designates a “No Activity Zone” around numerous underwater topographic features commonly called “banks,” the crests and flanks of which host ecologically important benthic communities, such as corals. The No Activity Zone is designed to protect the biota of these features from adverse effects of routine offshore oil and gas activities by preventing the emplacement of platforms or the anchoring of service vessels or mobile drilling units directly on the banks and requiring that drilling discharges be shunted in such a manner that they do not settle on the biota. NTL No. 2009-G39, *Biologically-Sensitive Underwater Features and Areas*, provides additional guidance for operators to plan proposed activities in the vicinity of such biologically sensitive features in a manner consistent with applicable regulations and to avoid or lessen potential impacts on benthic communities. Review of proposed activities may also result in the application of further conditions of approval to a plan or permit to ensure operator and contractor compliance with specific mitigation measures. **Section 4.5.3** discusses the topographic features stipulation was chosen by the Secretary in the *2024–2029 National OCS Oil and Gas Leasing Program Proposed Final Program* (PFP) (BOEM 2023a) as a mitigation measure to be applied at the programmatic level. With this stipulation selected for application at the programmatic stage, any lease issued in the GOM Region under the 2024–2029 Program would include these required mitigation measures. In practice, the stipulation has consistently been applied to leases in the affected OCS blocks. Refer to the following:

- NTL No. 2009-G39—Biologically-Sensitive Underwater Features and Areas: www.boem.gov/Regulations/Notices-To-Lessees/2009/09-G39.aspx

F.2.2 Protection of Live Bottom (Pinnacle Trend and Low Relief; GOM Region)

These live bottom stipulations are intended to protect the Pinnacle Trend area and the associated live bottom areas in the GOM, as well as other live bottom areas not associated with bathymetric features on the seafloor, from damage from oil and gas activities. For this stipulation, "live bottom areas" are defined as seagrass communities; areas that contain biological assemblages consisting of sessile invertebrates, such as sea fans, sea whips, hydroids, anemones, ascidians, sponges, bryozoans, or corals living upon and attached to naturally occurring hard or rocky formations with rough, broken, or smooth topography; or areas whose lithotope favors the accumulation of turtles, fishes, and other fauna. If the required live bottom survey report determines that the live bottom may be adversely impacted by the proposed activity, certain measures, such as relocation or monitoring, may be required. The live bottom (Pinnacle Trend) stipulation was chosen by the Secretary in the PFP as a mitigation measure to be applied at the programmatic level and is discussed in **Section 4.5.3**; with this stipulation selected, any lease issued in the GOM Region under the 2024–2029 Program would include these required mitigation measures. In practice, the stipulation has consistently been applied to leases in the affected OCS blocks. Refer to the following:

- NTL No. 2009-G39—Biologically-Sensitive Underwater Features and Areas: www.boem.gov/Regulations/Notices-To-Lessees/2009/09-G39.aspx

F.2.3 Protection of Deepwater Benthic Communities (GOM Region)

This category includes mitigation measures to avoid impacts on deepwater benthic communities (which include chemosynthetic communities) in deepwater areas of the GOM. NTL No. 2009-G40, *Deepwater Benthic Communities*, provides additional guidance for operators to plan proposed activities in the vicinity of such biologically sensitive habitats and communities in a manner consistent with applicable regulations and to avoid or lessen potential impacts on deepwater benthic communities. Refer to the following:

- NTL No. 2009-G40—Deepwater Benthic Communities: www.boem.gov/Regulations/Notices-To-Lessees/2009/09-G40.aspx

F.3 PROTECTIONS FOR BIOLOGICAL RESOURCES

F.3.1 Biological Survey and Report Requirements (Pacific Region)

This stipulation requires that a lessee conduct and submit results of biological surveys in the area of proposed operations. The purpose of a biological survey is to describe the habitat and key species within the survey area that may be affected by the proposed operations. Refer to the following:

- NTL No. 2006-P02—Biological Survey and Report Requirements: www.boem.gov/sites/default/files/uploadedFiles/BOEM/Regulations/Notices_To_Lessees/2006/06-P02.pdf

F.3.2 Additional Mitigation Measures for the Protection of Biological Resources (GOM Region)

Several additional mitigation measures apply to oil spill preparedness, seismic surveys, protected species, essential fish habitat (EFH), and other issues. Refer to the following:

- BOEM NTL No. 2009-G34—Ancillary Activities: www.boem.gov/Regulations/Notices-To-Lessees/2009/09-G34.aspx
- Protected Species Lease Stipulation:

  This lease stipulation requires lessees and their operators to:

  1. Comply with the reasonable and prudent measures and implementing terms and conditions of the Biological Opinion issued by the National Marine Fisheries Service (NMFS) on March 13, 2020 (NMFS 2020a).
  2. Immediately report all sightings and locations of injured or dead protected species (e.g., marine mammals and sea turtles) to the appropriate hotlines.
  3. Unless previously approved by BOEM or BSEE through a plan or permit issued under this lease, notify BOEM at least 15 days prior to any proposed vessel transit of the Rice's whale area and receive prior approval for that transit from BOEM.

  Certain post-lease approvals (e.g., for activities proposing new and unusual technologies, seismic surveys, use of equipment presenting entanglement risks) require step-down review by NMFS, as provided by NMFS (2020a), and additional mitigations to protect ESA-listed species may be applied at that time. At the lessee's option, the lessee and its operators, personnel, and contractors may comply with the most current measures to protect species in place at the time an activity is undertaken under this lease, including but not limited to, new or updated versions of NMFS (2020a), its appendices, or through new or activity-specific consultations. The most current applicable terms and conditions and reasonable and prudent measures from NMFS (2020a) or other relevant consultations will be applied to post-lease approvals. The lessee and its operators, personnel, and subcontractors will be required to comply with the mitigation measures identified in NMFS (2020a) (including appendices) and additional measures in the conditions of approvals for their plans or permits.

F.3.3 Modifying Operations to Protect Unique Biological Populations (Cook Inlet Planning Area)

This lease stipulation provides for identifying and protecting previously unknown important or unique biological populations or habitats that may occur in a lease area. If previously unknown sensitive biological resources are identified during activity approved under a Plan of Exploration or Development and Production Plan, the lessee will be required to modify operations, if necessary, to minimize adverse impacts on those biological populations or habitats. Refer to the following:

- Cook Inlet Planning Area—Final Environmental Impact Statement for Lease Sale 244, Volume 1, Chapter 2, Section 2.6.1. Lease Stipulations, Stipulation No. 2—Protection of Biological Resources: www.boem.gov/Cook-Inlet-Lease-Sale-244-Final-EIS-Volume-1/
- Final Notice of Sale for Cook Inlet Oil and Gas Lease Sale 244: www.boem.gov/Sale-244-FNOS-Final/
- Lease Stipulations for Cook Inlet Oil and Gas Lease Sale 244: www.boem.gov/Sale-244-FNOS-Stipulations/
- Chukchi Sea Planning Area, Oil and Gas Lease Sale 193 in the Chukchi Sea, Alaska, Appendix D, Guide to Lease Stipulations, D-2.1.4. Stipulation No. 1. Protection of Biological Resources: www.boem.gov/sites/default/files/uploadedFiles/BOEM/About_BOEM/BOEM_Regions/Alaska_Region/Environment/Environmental_Analysis/LeaseSale_193_DraftSSEIS_Vol2.pdf
- Final Notice of Sale Package for Chukchi Sea Oil and Gas Lease Sale 193: www.boem.gov/sites/default/files/uploadedFiles/BOEM/About_BOEM/BOEM_Regions/Alaska_Region/Leasing_and_Plans/Leasing/Lease_Sales/Sale_193/Info.pdf
- Cook Inlet Planning Area—Final Environmental Impact Statement for Lease Sale 258, Section 3.3.1 Lease Stipulations, Stipulation No. 2—Protection of Biological Resources: https://www.boem.gov/sites/default/files/documents/oil-gas-energy/leasing/2022_1020%20LS%20258%20FEIS.pdf
- Final Notice of Sale for Cook Inlet Oil and Gas Lease Sale 258: https://www.boem.gov/sites/default/files/documents/regions/alaska-ocs-region/Final%20Notice%20of%20Sale%20LS258.pdf
- Lease Stipulations for Cook Inlet Oil and Gas Lease Sale 258: https://www.boem.gov/sites/default/files/documents/regions/alaska-ocs-region/Lease%20Stipulations%20LS258.pdf

F.3.5 Protection of Northern Sea Otter Critical Habitat (Cook Inlet Planning Area)

This lease stipulation is designed to protect northern sea otters when they are most likely to be present and distributed across the Cook Inlet Planning Area. The lessee, its operators, and subcontractors are prohibited from discharging drilling fluids and cuttings and from conducting seafloor-disturbing activities, including anchoring and placement of bottom-founded structures, within 1,000 m of areas designated as northern sea otter critical habitat. Except for when a waiver or variance is granted by BOEM, this prohibition remains in force regardless of whether the lessee(s), its operators or subcontractors have received a permit or authorization under the Endangered Species Act (16 U.S.C. 1531–1544), Marine Mammal Protection Act (16 U.S.C. 1361–1423h), or other state or Federal statute for such activities. Refer to the following:

- Cook Inlet Planning Area—Final Environmental Impact Statement for Lease Sale 244, Volume 1, Chapter 2, Section 2.2.4. Alternative 4B—Northern Sea Otter Critical Habitat Mitigation: www.boem.gov/Cook-Inlet-Lease-Sale-244-Final-EIS-Volume-1/

- Final Notice of Sale for Cook Inlet Oil and Gas Lease Sale 244: www.boem.gov/Sale-244-FNOS-Final/
- Lease Stipulations for Cook Inlet Oil and Gas Lease Sale 244: www.boem.gov/Sale-244-FNOS-Stipulations/
- Cook Inlet Planning Area—Final Environmental Impact Statement for Lease Sale 258, Section 2.4 Alternatives 4A and 4B—Northern Sea Otter SW Alaska DPS Critical Habitat Exclusion or Mitigation: https://www.boem.gov/sites/default/files/documents/oil-gas-energy/leasing/2022_1020%20LS%20258%20FEIS.pdf
- Final Notice of Sale for Cook Inlet Oil and Gas Lease Sale 258: https://www.boem.gov/sites/default/files/documents/regions/alaska-ocs-region/Final%20Notice%20of%20Sale%20LS258.pdf
- Lease Stipulations for Cook Inlet Oil and Gas Lease Sale 258: https://www.boem.gov/sites/default/files/documents/regions/alaska-ocs-region/Lease%20Stipulations%20LS258.pdf

F.4 PROTECTIONS FOR SUBSISTENCE PRACTICES

F.4.1 Monitoring Program for Marine Mammal Subsistence Resources (Chukchi Sea and Beaufort Sea Planning Areas)

This lease stipulation requires industry to perform site-specific monitoring to determine when marine mammals are present in the vicinity of exploration operations, including ancillary seismic surveys, during periods of subsistence use. The monitoring program and review process required for Marine Mammal Protection Act authorization will satisfy the requirements of this stipulation. The monitoring plan must provide for reports on marine mammal sightings and the extent of observed behavioral effects because of lease activities. It also provides a formal mechanism for the oil and gas industry to coordinate logistics activities with the BOEM Bowhead Whale Aerial Survey Program. The stipulation provides for an opportunity for recognized co-management organizations to review and comment on the proposed monitoring plan before BOEM approval. The stipulation also requires the lessee to fund an independent peer review of the proposed monitoring plan and draft reports on results of the monitoring program. No monitoring program will be required if the BOEM Alaska Regional Supervisor for Office of Leasing and Plans, in consultation with the appropriate agencies and co-management organizations, determines that a monitoring program is not necessary based on the size, timing, duration, and scope of the proposed operations. Refer to the following:

- Chukchi Sea Planning Area, Oil and Gas Lease Sale 193 in the Chukchi Sea, Alaska, Appendix D, Guide to Lease Stipulations, D-2.1.4. Stipulation No. 4. Industry Site-Specific Monitoring Program for Marine Mammal Subsistence Resources: www.boem.gov/sites/default/files/uploadedFiles/BOEM/About_BOEM/BOEM_Regions/Alaska_Region/Environment/Environmental_Analysis/LeaseSale_193_DraftSSEIS_Vol2.pdf

- Final Notice of Sale Package for Chukchi Sea Oil and Gas Lease Sale 193: www.boem.gov/sites/default/files/uploadedFiles/BOEM/About_BOEM/BOEM_Regions/Alaska_Region/Leasing_and_Plans/Leasing/Lease_Sales/Sale_193/Stips.pdf

F.4.2 Protection of Whaling and Other Marine Mammal Subsistence Activities (Chukchi Sea and Beaufort Sea Planning Areas)

This lease stipulation is designed to reduce disturbance effects on Alaska Native subsistence practices from OCS oil and gas industry activities by requiring the industry to make reasonable efforts to conduct all aspects of their operations in a manner that recognizes Alaska Native subsistence requirements and avoids conflict with local subsistence-harvest activities. The stipulation applies to both on-lease operations and support activities, such as vessel and aircraft traffic. The stipulation requires industry to consult with directly affected subsistence communities, the North Slope Borough, and the recognized co-management organizations to discuss possible siting and timing conflicts and to assure that exploration, development, and production activities do not result in unreasonable conflicts with subsistence whaling and other subsistence harvests. The stipulation also provides a mechanism to address unresolved conflicts between the oil and gas industry and subsistence activities. Refer to the following:

- Chukchi Sea Planning Area, Oil and Gas Lease Sale 193 in the Chukchi Sea, Alaska, Appendix D, Guide to Lease Stipulations, D-2.1.5. Stipulation No. 5. Conflict Avoidance Mechanisms to Protect Subsistence Whaling and Other Marine Mammal Subsistence-Harvesting Activities: www.boem.gov/sites/default/files/uploadedFiles/BOEM/About_BOEM/BOEM_Regions/Alaska_Region/Environment/Environmental_Analysis/LeaseSale_193_DraftSSEIS_Vol2.pdf
- Final Notice of Sale Package for Chukchi Sea Oil and Gas Lease Sale 193: www.boem.gov/sites/default/files/uploadedFiles/BOEM/About_BOEM/BOEM_Regions/Alaska_Region/Leasing_and_Plans/Leasing/Lease_Sales/Sale_193/Stips.pdf

F.5 OTHER ENVIRONMENTAL PROTECTIONS

This category includes mitigation measures and background information that apply to offshore exploration, development, and pipeline activities.

F.5.1 Air Quality (GOM and Alaska Region)

NTL No. 2009-N11, *Air Quality Jurisdiction on the Outer Continental Shelf*, originally effective December 4, 2009, and reissued on June 19, 2020, is applicable in all OCS regions where BOEM has air quality jurisdiction. Refer to the following:

- BOEM NTL No. 2009-N11—Air Quality Jurisdiction on the Outer Continental Shelf: www.boem.gov/Regulations/Notices-To-Lessees/2009/09-N11.aspx
- BOEM NTL No. 2020-N03—2021 OCS Emissions Inventory, Western Gulf of Mexico and Adjacent to the North Slope Borough of the State of Alaska: www.boem.gov/sites/default/files/documents/about-boem/NTL-2020-N03.pdf

F.5.2 Transportation and Transfer of Fuels and Hydrocarbons

F.5.2.1 Transportation of Hydrocarbons (Alaska Region)

This lease stipulation informs lessees that BOEM reserves the right to require the placement of pipelines only in certain designated management areas, that those pipelines must be designed and constructed to withstand the hazardous conditions that may be encountered in the lease sale area, and that pipeline construction and associated activities must comply with regulations.

This stipulation requires the use of pipelines for transportation of oil and gas, if pipeline rights-of-way can be determined and obtained, laying such pipelines is technologically feasible and environmentally preferable, and, in the opinion of the lessor, pipelines can be laid without net social loss, taking into account any incremental costs of pipelines over alternative methods of transportation and any incremental benefits in the form of increased environmental protection or reduced multiple-use conflicts. Refer to the following:

- Cook Inlet Planning Area—Final Environmental Impact Statement for Lease Sale 244, Volume 1, Chapter 2, Section 2.6.1. Lease Stipulations, Stipulation No. 4—Transportation of Hydrocarbons: www.boem.gov/Cook-Inlet-Lease-Sale-244-Final-EIS-Volume-1/
- Final Notice of Sale for Cook Inlet Oil and Gas Lease Sale 244: www.boem.gov/Sale-244-FNOS-Final/
- Lease Stipulations for Cook Inlet Oil and Gas Lease Sale 244: www.boem.gov/Sale-244-FNOS-Stipulations/
- Cook Inlet Planning Area—Final Environmental Impact Statement for Lease Sale 258, Section 3.3.1 Lease Stipulations, Stipulation No. 4—Transportation of Hydrocarbons: https://www.boem.gov/sites/default/files/documents/oil-gas-energy/leasing/2022_1020%20LS%20258%20FEIS.pdf
- Final Notice of Sale for Cook Inlet Oil and Gas Lease Sale 258: https://www.boem.gov/sites/default/files/documents/regions/alaska-ocs-region/Final%20Notice%20of%20Sale%20LS258.pdf
- Lease Stipulations for Cook Inlet Oil and Gas Lease Sale 258: https://www.boem.gov/sites/default/files/documents/regions/alaska-ocs-region/Lease%20Stipulations%20LS258.pdf
- Chukchi Sea Planning Area, Oil and Gas Lease Sale 193 in the Chukchi Sea, Alaska, Appendix D, Guide to Lease Stipulations, D-2.1.4. Stipulation No. 3. Transportation of Hydrocarbons: www.boem.gov/sites/default/files/uploadedFiles/BOEM/About_BOEM/BOEM_Regions/Alaska_Region/Environment/Environmental_Analysis/LeaseSale_193_DraftSSEIS_Vol2.pdf
- Final Notice of Sale Package for Chukchi Sea Oil and Gas Lease Sale 193: www.boem.gov/sites/default/files/uploadedFiles/BOEM/About_BOEM/BOEM_Regions/Alaska_Region/Leasing_and_Plans/Leasing/Lease_Sales/Sale_193/Stips.pdf

F.5.2.2 Requirements for Fuel Transfers (Chukchi Sea and Beaufort Sea Planning Areas)

This lease stipulation requires the placement of a protective boom during fuel transfers to reduce the potential impacts of a fuel spill, should one occur during fuel transfer. Refer to the following:

- Chukchi Sea Planning Area, Oil and Gas Lease Sale 193 in the Chukchi Sea, Alaska, Appendix D, Guide to Lease Stipulations, D-2.1.7. Stipulation No. 6. Pre-booming Requirements for Fuel Transfers: www.boem.gov/sites/default/files/uploadedFiles/BOEM/About_BOEM/BOEM_Regions/Alaska_Region/Environment/Environmental_Analysis/LeaseSale_193_DraftSSEIS_Vol2.pdf
- Final Notice of Sale Package for Chukchi Sea Oil and Gas Lease Sale 193: www.boem.gov/sites/default/files/uploadedFiles/BOEM/About_BOEM/BOEM_Regions/Alaska_Region/Leasing_and_Plans/Leasing/Lease_Sales/Sale_193/Stips.pdf

F.5.3 Coastal Zone Management (GOM Region)

NTL No. 2009-G27, *Submitting Exploration Plans and Development Coordination Documents*, explains the four types of changes that can be made to an approved or pending exploration plan (EP) or Development Operations Coordination Document (DOCD) and when a lessee must revise or supplement its EP or DOCD. The NTL clarifies the policy regarding revising OCS plans when a lessee proposes to change approved anchor patterns or anchor areas, provides guidance for wells the lessee plans to sidetrack, makes minor administrative changes, and includes a guidance document statement (providing some guidance on Coastal Zone Management review). It also clarifies BOEM's policy regarding revising OCS plans when a lessee proposes to change approved anchor patterns or anchor areas and provides guidance for wells the lessee plans to sidetrack. This NTL also specifies the number of copies of EPs and DOCDs needed for state Coastal Zone Management review, as well as the cost recovery fees charged by BOEM and the various states for review of the EPs and DOCDs. Refer to the following:

- NTL No. 2009-G27—Submitting Exploration Plans and Development Operations Coordination Documents: www.boem.gov/sites/default/files/regulations/Notices-To-Lessees/2009/09-G27.pdf

F.6 MITIGATIONS TO ADDRESS SPACE-USE CONFLICTS

F.6.1 Protection of Fisheries (Cook Inlet Planning Area)

This lease stipulation is designed to minimize spatial conflicts between OCS activities and commercial, sport, and subsistence fishing activities. If determined necessary by the BOEM Alaska Regional Supervisor for Office of Leasing and Plans, lease-related uses will be restricted to prevent unreasonable conflicts with fishing operations. The stipulation requires the lessee to review planned exploration and development activities (including plans for seismic surveys, drilling rig transportation, or other vessel traffic) with potentially affected fishing organizations, subsistence communities, and port authorities to prevent unreasonable fishing gear conflicts. Refer to the following:

- Cook Inlet Planning Area—Final Environmental Impact Statement for Lease Sale 244, Volume 1, Chapter 2, Section 2.6.1. Lease Stipulations, Stipulation No. 1—Protection of Fisheries: www.boem.gov/Cook-Inlet-Lease-Sale-244-Final-EIS-Volume-1/
- Final Notice of Sale for Cook Inlet Oil and Gas Lease Sale 244: www.boem.gov/Sale-244-FNOS-Final/
- Lease Stipulations for Cook Inlet Oil and Gas Lease Sale 244: www.boem.gov/Sale-244-FNOS-Stipulations/
- Cook Inlet Planning Area—Final Environmental Impact Statement for Lease Sale 258, Section 3.3.1 Lease Stipulations, Stipulation No. 1—Protection of Fisheries: https://www.boem.gov/sites/default/files/documents/oil-gas-energy/leasing/2022_1020%20LS%20258%20FEIS.pdf
- Final Notice of Sale for Cook Inlet Oil and Gas Lease Sale 258: https://www.boem.gov/sites/default/files/documents/regions/alaska-ocs-region/Final%20Notice%20of%20Sale%20LS258.pdf
- Lease Stipulations for Cook Inlet Oil and Gas Lease Sale 258: https://www.boem.gov/sites/default/files/documents/regions/alaska-ocs-region/Lease%20Stipulations%20LS258.pdf

F.6.2 Protection of Gillnet Fishery (Cook Inlet Planning Area)

This lease stipulation is designed to avoid conflicts with the drift gillnet fishery. The lessee, its operators, and subcontractors are prohibited by the Alaska Department of Fish and Game from conducting on-lease marine seismic surveys during the drift gillnet fishing season as designated each year from approximately mid-June to mid-August. The lessee is required to notify the United Cook Inlet Drift Association of any temporary or permanent structures in place or planned to be emplaced during the drift gillnet fishing season. The lessee must coordinate with the association to attempt to resolve and avoid any conflicts to the maximum extent practicable. Refer to the following:

- Cook Inlet Planning Area—Final Environmental Impact Statement for Lease Sale 244, Volume 1, Chapter 2, Section 2.6.1. Lease Stipulations, Stipulation No. 1—Protection of Fisheries: www.boem.gov/Cook-Inlet-Lease-Sale-244-Final-EIS-Volume-1/
- Final Notice of Sale for Cook Inlet Oil and Gas Lease Sale 244: www.boem.gov/Sale-244-FNOS-Final/
- Lease Stipulations for Cook Inlet Oil and Gas Lease Sale 244: www.boem.gov/Sale-244-FNOS-Stipulations/
- Cook Inlet Planning Area—Final Environmental Impact Statement for Lease Sale 258, Section 2.5 Alternative 5—Gillnet Fishery Mitigation: https://www.boem.gov/sites/default/files/documents/oil-gas-energy/leasing/2022_1020%20LS%20258%20FEIS.pdf

- Final Notice of Sale for Cook Inlet Oil and Gas Lease Sale 258: https://www.boem.gov/sites/default/files/documents/regions/alaska-ocs-region/Final%20Notice%20of%20Sale%20LS258.pdf
- Lease Stipulations for Cook Inlet Oil and Gas Lease Sale 258: https://www.boem.gov/sites/default/files/documents/regions/alaska-ocs-region/Lease%20Stipulations%20LS258.pdf

F.6.3 Military Areas (GOM Region)

This lease stipulation has three sections: hold harmless, electromagnetic emissions, and operational. The hold harmless section serves to protect the U.S. Government from liability in the event of an accident involving a lessee and military activities. The electromagnetic emissions section requires the lessee and its agents to reduce and curtail the use of equipment emitting electromagnetic energy in certain areas. This reduces the impact of offshore oil and gas activities on military communications and missile testing. The operational section requires prior notification of the military when offshore oil and gas activities are scheduled within a military use area to assist in scheduling activities and to prevent potential conflicts. The operational section also requires the evacuation, upon the receipt of a directive from the BSEE Regional Director, of all personnel from all structures on the lease and the shutting in and securing of all wells and other equipment, including pipelines, on the lease. Refer to the following:

- NTL No. 2014-G04—Military and Water Test Areas: /www.boem.gov/BOEM-NTL-No-2014-G04/
- JOINT NTL No. 2009-G26—U.S. Air Force Communication Towers: www.boem.gov/Regulations/Notices-To-Lessees/2009/09-G26.aspx

Additional stipulations are applied to leases in the Eastern GOM Planning Area only. In cooperation with the U.S. Air Force, defined periods for conducting exploratory drilling operations (“drilling windows”) in the active leases east of the Military Mission Line are established. These drilling windows allow military operations to proceed without being disrupted by oil and gas activities and provide defined periods to safeguard drilling and lease operations.

F.7 SHALLOW HAZARDS REQUIREMENTS (ALL PLANNING AREAS)

These stipulations require a lessee to conduct an analysis of seafloor and subsurface geologic and man-made hazards of all areas considered for production platforms and pipelines. Hazards analysis is the process of identifying and evaluating conditions that may affect the safety of proposed operations or conditions that may be affected by the proposed operations. Potentially hazardous shallow conditions, features, or processes include seismicity, subsurface faults, fault scarps, shallow gas, steep-walled canyons and slopes, buried channels, current scour, migrating sedimentary bedforms, ice gouging, permafrost, gas hydrates, unstable soil conditions, pipelines, anchors, ordnance, shipwrecks, and other geological or man-made features.

The stipulations and various NTLs provide guidance for how to perform shallow hazards geophysical surveys, evaluations, and reporting procedures for the appropriate OCS region. Refer to the following:

- NTL No. 05-A01—Shallow Hazards Survey and Evaluation for OCS Exploration and Development Drilling: www.boem.gov/Regulations/Notices-To-Lessees/2005/05-a01.aspx
- NTL No. 05-A02—Shallow Hazards Survey and Evaluation for Alaska OCS Pipeline Routes and Rights-of-Way: www.boem.gov/Regulations/Notices-To-Lessees/2005/05-a02.aspx
- NTL No. 2008-G05—Shallow Hazards Program: www.boem.gov/NTL-No-2008-G05/

F.8 INFORMATION TO LESSEES (ITL)

ITLs are formal documents used to communicate additional information or clarification of OCS standards and regional requirements to bidders during a lease sale. BOEM and BSEE may use ITLs to communicate with lessees and operators about new environmental, social, or cultural concerns and related mitigation.

F.9 OTHER PROTECTIVE MEASURES APPLIED THROUGH LAWS AND REGULATIONS (ALL PLANNING AREAS)

Other protective measures applied through laws and regulations could reduce potential impacts on resources as analyzed in the Final Programmatic EIS. BOEM assumes OCS activities will occur in compliance with all laws, regulations, and associated protective measures. The following is a list of measures commonly applicable to the resource areas analyzed in this Final Programmatic EIS. For more information on the related laws and regulations, see **Appendix H**.

- National Ambient Air Quality Standards as required by the Clean Air Act where USEPA has air quality jurisdiction and BOEM does not
- Prevention of Significant Deterioration Program for air pollutant concentrations where USEPA has air quality jurisdiction and BOEM does not
- National Pollutant Discharge Elimination System permitting as administered by the USEPA
- Liability and compensation for oil spill-related damages as required by the Oil Pollution Act
- Mitigation measures, as applied through ESA consultations with U.S. Fish and Wildlife Service and the NMFS, are designed to ensure the protection of endangered or threatened species and their designated critical habitat. Examples of protective measures for OCS oil and gas activities include (but are not limited to) the following:
    - Pre-activity survey requirements
    - Activity ramp-up procedures
    - Vessel speed restrictions
    - Activity exclusion zones
    - Seasonal and time-area closures
    - Protected species observers

    - Vessel distance restrictions
    - Flight restrictions
- Archaeological survey and mitigation as required by the National Historic Preservation Act and BOEM and BSEE regulations
- EFH conservation recommendations developed with NMFS and implemented by BOEM through Magnuson-Stevens Fishery Conservation and Management Act consultation

Appendix G: Oil Spill Estimates

The Bureau of Ocean Energy Management (BOEM) estimates the occurrence of offshore oil spills (small [less than 1,000 barrels (bbl)] and large [1,000 bbl or more]) from the Outer Continental Shelf (OCS) activities expected to occur from the 2024–2029 National OCS Oil and Gas Leasing Program (2024–2029 Program). Oil spill estimates are calculated using estimated oil production for each planning area, the source or assumed mode of transportation, and a spill rate constant.

A catastrophic discharge event (CDE) references a very large (typically over 1 million bbl) but very unlikely spill that could result from OCS exploration, development, and production activities involving rigs, facilities, pipelines, tankers, or support vessels. For further analysis of the impacts of a low-probability CDE, see the *Gulf of Mexico Catastrophic Spill Event Analysis* (BOEM 2021), the *Beaufort Sea: Hypothetical Very Large Oil Spill And Gas Release* (BOEM 2020), and the 2024–2029 National OCS Oil and Gas Leasing Program Proposed Final Program (PFP) (BOEM 2023a).

Historical OCS spill data provide the most relevant basis for use in estimating the number of future oil spills. Spill rates are calculated using spill data and the volume of annual oil production from 1974 to 2015 (ABS Consulting Inc 2016) (**Tables G-1 and G-2**). Spills from platforms are assumed to occur within or adjacent to planning areas. Spills from pipelines are assumed to occur along their respective routes from production platform to destination. For additional information on accidental oil spills, including CDEs, see the *Gulf of Mexico Catastrophic Spill Event Analysis* (BOEM 2021), *Liberty Development and Production Plan Final Environmental Impact Statement* (BOEM 2018c), and the PFP.

Table G-1. Estimated number of accidental spills that could occur from the 2024–2029 Program

Region or Volume	Planning Area	Large[a] ≥ 1,000 bbl Platform	Large[a] ≥ 1,000 bbl Pipeline	Small < 1,000 bbl	Small < 1,000 bbl
Assumed spill volume (bbl)	Any	3,283	3,750	≥ 1 to < 50	≥ 50 to < 1,000
Alaska	Beaufort Sea	0–1	0–3	0–283	0–53
	Chukchi Sea	0–1	0–5	0–424	0–79
	Cook Inlet	0–1	0–1	16–52	3–10
	Gulf of Alaska	0–1	0–1	4–31	1–6
Pacific	Washington/Oregon	0–1	0–1	0–4	0–1
	Northern California	0–1	0–1	0–14	0–3
	Central California	0–1	0–1	9–21	2–4
	Southern California	0–1	0–1	7–89	0–11
Gulf of Mexico (GOM)	Western, Central, and Eastern GOM	0–2	1–7	45–574	8–107
	Central/Eastern GOM[b]	0–1	0–1	4–54	0–10
Atlantic	South Atlantic	0–1	0–1	0–41	0–8
	Mid-Atlantic	0–1	0–1	0–86	0–16
	North Atlantic	0–1	0–1	0–38	0–7

[a] Large spill is defined as ≥ 1,000 bbl. Large spills are reported separately for platforms and pipelines. Four platform spills ≥ 1,000 bbl occurred from 1974–2015, including the *Deepwater Horizon* oil spill and 16 pipeline spills. The ongoing Taylor Energy oil spill was not included in the ABS Consulting Inc (2016) report but will be included in future spill rate updates.
[b] This area includes only portions of the Central and Eastern GOM Planning Areas within the Gulf of Mexico Energy Security Act moratorium.
Notes: bbl = barrel(s)
Planning areas not listed in the table have spill estimates < 1.
Spills from tankers carrying oil from OCS production were not included in this table because spill estimates are < 1.
Source: ABS Consulting Inc (2016)

Table G-2. Spill rates and sizes for different spill classes

Description of Spill Class	Spill Rate (spills/Bbbl)	Median Spill Size (bbl)[a]	Source of Spill Rate	Source of Spill Size
Platform spills ≥ 1,000 bbl	0.22	3,283	ABS Consulting Inc (2016)	ABS Consulting Inc (2016)
Pipeline spills ≥ 1,000 bbl	0.89	3,750	ABS Consulting Inc (2016)	ABS Consulting Inc (2016)
Platform spills 1–50 bbl	75.64	25	ABS Consulting Inc (2016)	Calculated[b]
Platform spills 50–1,000 bbl	14.13	525	ABS Consulting Inc (2016)	Calculated[b]

[a] Rounded to the nearest hundred barrel; [b] Calculated from ABS Consulting Inc (2016)
Notes: Bbbl = billion barrels, bbl = barrel(s)

SPILL RESPONSE

The Bureau of Safety and Environmental Enforcement (BSEE) is tasked with a number of oil spill planning and response duties as required by the Oil Pollution Act of 1990. Within BSEE, the Oil Spill Preparedness Division addresses all aspects of offshore oil spill prevention, planning, preparedness, and response. More information about the Oil Spill Preparedness Division can be found on BSEE's website at www.bsee.gov/what-we-do/oil-spill-preparedness.

For more than 25 years, BSEE and its predecessors have maintained a comprehensive long-term research program to improve oil spill response knowledge and technologies. The focus of the program is to improve the methods and technologies used for oil spill detection, containment, treatment, recovery, and cleanup. The BSEE Oil Spill Response Research Program is a cooperative effort bringing together funding and expertise from research partners in state and Federal Government agencies, industry, academia, and the international community. The funded projects cover numerous spill-response-related issues, such as chemical treating agents; in situ burning of oil; research conducted at BSEE's Oil Spill Response Research and Renewable Energy Test Facility; behavior of oil; decision-making support tools; mechanical containment; and remote sensing.

Recently awarded oil spill response research contracts can be found on BSEE's website at www.bsee.gov/what-we-do/research/oil-spill-preparedness/oil-spill-response-research.

Appendix H: Federal Laws, Executive Orders, and Secretary's Orders

The Bureau of Ocean Energy Management (BOEM) is required to comply with Federal laws, Executive Orders (EOs), and Secretary's Orders (SOs) when developing a National Outer Continental Shelf (OCS) Oil and Gas Leasing Program and Programmatic Environmental Impact Statement. Additionally, BOEM must consult with other Federal agencies that have the authority to govern and manage ocean resources pursuant to other Federal laws.

The Gulf of Mexico (GOM) Regional Office developed the *OCS Regulatory Framework* (Cameron Jr. and Matthews 2016) to serve as an appendix in BOEM National Environmental Policy Act (NEPA) documents. *OCS Regulatory Framework* describes Federal laws and EOs in place as of March 2016; it is hereby incorporated by reference and available at www.boem.gov/OCS-Regulatory-Framework/.

EOs and SOs that have been issued after the *OCS Regulatory Framework* and that are relevant to the National OCS Program are presented below.

EO 13751: Safeguarding the Nation from the Impacts of Invasive Species

On December 5, 2016, President Obama signed EO 13751 to serve as an amendment to EO 13112 (*Invasive Species*, signed February 3, 1999) and to direct actions to continue coordinated Federal prevention and control efforts related to invasive species. This order maintains the National Invasive Species Council (Council) and the Invasive Species Advisory Committee; expands the membership of the Council; clarifies the operations of the Council; incorporates considerations of human and environmental health, climate change, technological innovation, and other emerging priorities into Federal efforts to address invasive species; and strengthens coordinated, cost-efficient Federal action.

EO 13990: Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis

On January 20, 2021, President Biden signed EO 13990 to direct a review of certain national monument boundaries; restore Arctic withdrawals established in EO 13754 and the Presidential Memorandum of December 20, 2016; direct Federal agencies to realign their policies, research, and analyses towards addressing climate change; and revoke EO 13766, EO 13778, EO 13783, EO 13792, and EO 13795.

EO 14008: Tackling the Climate Crisis at Home and Abroad

On January 27, 2021, President Biden signed EO 14008, reengaging the U.S. with international efforts to address climate change, including rejoining the Paris Agreement. In combination with EO 13990, this order directs a government-wide approach to addressing the climate crisis, calls for a greater emphasis

on environmental justice when addressing climate change, and directs the Secretary of the Interior to conduct a comprehensive review of Federal oil and gas leasing and permitting practices.

EO 14096: Revitalizing Our Nation's Commitment to Environmental Justice for All

On April 21, 2023, President Biden signed EO 14096, *Revitalizing Our Nation's Commitment to Environmental Justice for All*, committing to pursuing a whole-of-government approach to environmental justice. The Executive Order builds upon EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, and tasks agencies to continue efforts to advance environmental justice in ways that complement and deepen prior work. Among other goals, the EO aims to better protect overburdened communities from pollution and environmental harms; strengthen engagement with communities; confront existing and legacy barriers and injustices; and promote the latest science, data, and research, including on cumulative impacts.

SO 3398: Revocation of Secretary's Orders Inconsistent with Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis

SO 3398, signed April 16, 2021, implements the review of U.S. Department of the Interior actions as directed by EO 13990 and revokes the following SOs: 3348, 3349, 3350, 3351, 3352, 3354, 3355, 3358, 3360, 3380, 3385, and 3389. This order is intended to improve the internal management of the Department.

SO 3399: Department-Wide Approach to the Climate Crisis and Restoring Transparency and Integrity to the Decision-Making Process

SO 3399, signed on April 16, 2021, was issued to (1) establish a Climate Task Force with the goal of reducing climate pollution, improving adaptation and resilience to climate change, addressing environmental justice, protecting public health, and conserving Department lands, (2) restore transparency and integrity to the Department's decision-making process, including changes to the Department's approach to greenhouse gas emissions, climate impacts, Tribal consultations, and environmental justice in NEPA documents.

Appendix I: Potential Exclusions in Withdrawn Areas

This final programmatic environmental impact statement (Final Programmatic EIS) analyzes all planning areas and potential exclusions included in the *2019–2024 National Outer Continental Shelf (OCS) Oil and Gas Leasing Draft Proposed Program* (DPP) (BOEM 2018a). Many of the potential exclusions included in the DPP (**Table I-1**) are within areas later withdrawn under Section 12(a) of the OCS Lands Act, 43 U.S.C. § 1341(a). This appendix provides the analysis of potential exclusions that fall within withdrawn areas; see **Section 4.5** for the analysis of potential exclusions from areas available for leasing under the 2024–2029 Program.

Table I-1. Areas analyzed as potential exclusions in this Final Programmatic EIS

Region	Area	Included in a Withdrawal*	DPP Subarea Option	Analysis Location
Alaska	Chukchi Sea Subsistence Use Area	✔	✔	Appendix I
Alaska	15-mi Chukchi Sea coastal buffer	✔	-	Appendix I
Alaska	25-mi Chukchi Sea coastal buffer	✔	✔	Appendix I
Alaska	50-mi Chukchi Sea coastal buffer	✔	-	Appendix I
Alaska	Hanna Shoal	✔	✔	Appendix I
Alaska	Expanded Hanna Shoal	✔	-	Appendix I
Alaska	Barrow Whaling Area	✔	✔	Appendix I
Alaska	Expanded Barrow Whaling Area	✔	-	Appendix I
Alaska	Barrow Canyon Biologically Focused Area (BFA)	✔	-	Appendix I
Alaska	Harrison Bay BFA	✔	-	Appendix I
Alaska	Cross Island BFA	-	-	Appendix I
Alaska	Camden Bay BFA	✔	-	Appendix I
Alaska	Kaktovik Whaling Area	✔	✔	Appendix I
Alaska	Kaktovik Bowhead Whaling Area	✔	-	Appendix I
Alaska	Kaktovik BFA	✔	-	Appendix I
GOM	Topographic Features and Pinnacle Trend Stipulations	-	-	Section 4.5
GOM	Baldwin County buffer	-	✔	Section 4.5
GOM	50-, 75-, 100-, 125-mi Eastern GOM coastal buffers	✔	✔	Appendix I
Atlantic	25-nmi Coastal Buffer	Partial	✔	Section 4.5
Atlantic	Biodiversity Strip	Partial	-	Section 4.5
Atlantic	Gulf of Maine	-	-	Section 4.5
Atlantic	Georges Bank	-	-	Section 4.5
Atlantic	Atlantic canyons	-	✔	Section 4.5

* Areas included in a withdrawn area are not available for leasing.
Note: GOM = Gulf of Mexico; areas that fall completely within a withdrawn portion of the OCS are analyzed in this appendix.

POTENTIAL EXCLUSIONS IN THE ALASKA REGION

In Alaska, a number of potential exclusions overlay geologic plays in the Chukchi Sea and Beaufort Sea Planning Areas but fall entirely within withdrawn areas (**Table I-2**).

Table I-2. Potential exclusions that fall entirely within withdrawn portions of the OCS that overlay geologic plays in the Alaska Region

Exclusions	Exclusion Size (Million Acres)	Planning Area Acreage (Million Acres)	Percent Planning Area Acreage (Size/Planning Area Acreage)	Number of Geologic Plays Overlapping Exclusion
Chukchi Sea Planning Area	-	-	-	-
Subsistence Use Area*	2.4	62.6	3.9%	7
15-mi coastal buffer	3.5	62.6	5.5%	12
25-mi coastal buffer*	6.6	62.6	10.6%	12
50-mi coastal buffer	13.0	62.6	20.8%	18
Hanna Shoal*	1.6	62.6	2.6%	11
Expanded Hanna Shoal	6.5	62.6	10.4%	15
Beaufort Sea Planning Area	-	-	-	-
Barrow Whaling Area*	0.23	65.1	0.4%	5
Expanded Barrow Whaling Area	0.5	65.1	0.7%	5
Barrow Canyon BFA	1.8	65.1	2.8%	9
Harrison Bay BFA	0.7	65.1	1.0%	8
Camden Bay BFA	0.13	65.1	0.2%	5
Kaktovik Whaling Area*	0.12	65.1	0.2%	2
Kaktovik Bowhead Whaling Area	0.7	65.1	1.0%	4
Kaktovik BFA	0.5	65.1	0.7%	2
Cross Island BFA	n/a	65.1	n/a	n/a

* DPP Subarea Option

Chukchi Sea Planning Area

The potential exclusions considered in the Chukchi Sea Planning Area include the Chukchi Sea Subsistence Use Area, a coastal buffer (**Figure I-1**), and Hanna Shoal. The 2017–2022 Final Programmatic EIS (BOEM 2016d) provides additional analysis on the coastal buffer and Hanna Shoal. This analysis considers a range of coastal buffers: 15, 25, and 50 mi (24, 40, and 80 km). Although these areas are analyzed in this Final Programmatic EIS, they are currently withdrawn under Section 12(a) of the OCS Lands Act.

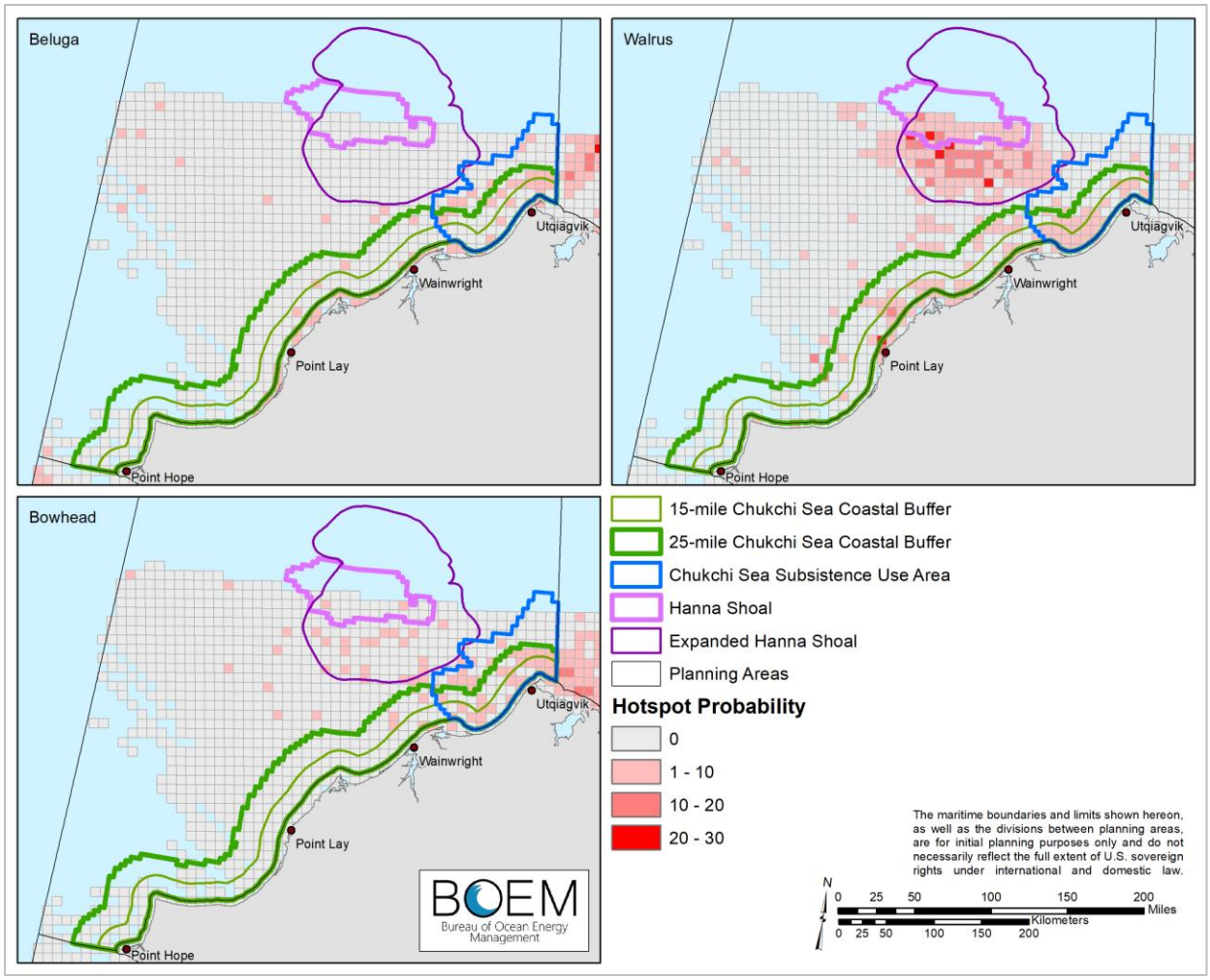

Figure I-1. Locations of potential exclusions in the Chukchi Sea Planning Area in relation to hotpots for belugas, walrus, and bowhead whales

Chukchi Sea Subsistence Use Area & Chukchi Sea Coastal Buffer (DPP Subarea Options)

Figure I-1 shows the location of a 25-mi coastal buffer and the Chukchi Sea Subsistence Use Area north of Utqiaġvik. The Chukchi Sea Subsistence Use Area was included as a subarea option for analysis in the DPP and encompasses high and medium subsistence use offshore areas where Alaska Native peoples from Utqiaġvik target whales, walrus, seals, and migratory waterfowl (Stephen R. Braund & Associates 2010).

The coastal buffer, also a DPP subarea option, overlaps with this area (**Figure I-1**), and the overlap increases with increasing buffer width. A 50-mi buffer almost subsumes the entire Chukchi Sea Subsistence Use Area; a buffer of this width would largely obviate the need to consider separately excluding the Subsistence Use Area. A 15-mi coastal buffer would also overlap this area, although to a considerably lesser extent. The nearshore areas of the Chukchi Sea Planning Area that are included in these potential exclusions contain important seasonal habitat for many species, including marine mammals and birds, as well as important subsistence use areas and spring ice lead systems (narrow,

linear cracks in the ice that form when ice floes diverge). The Chukchi Sea coast includes haulouts for walrus, nearshore feeding areas for bearded and ringed seals, and designated critical habitat for polar bears (FWS 2010; Jay et al. 2012; Thomas 2018). Ledyard Bay southwest of Point Lay is designated critical habitat for the spectacled eider, which is listed under the Endangered Species Act (ESA). A coastal buffer of 15 mi (24 km) or more would afford protection to these species and their habitats.

Many studies highlight the ecological importance of Chukchi Sea coastal waters. Kuletz et al. (2015) identified "hotspots" for marine mammals and seabirds all along the Chukchi Sea coast. Hauser et al. (2014) identified core areas for the Eastern Chukchi Sea stock of beluga whales offshore of Utqiaġvik and off Kasegaluk Lagoon during July and August. A coastal buffer out to 50 mi (80 km) overlaps important feeding habitat for gray whales and the spring migration route for beluga and bowhead whales (Clarke et al. 2017). Wilson et al. (2014) identified areas of expected preferential use for non-denning polar bears within the southwestern portion of the coastal buffer and expanding slightly beyond it, noting that use is most likely to occur during periods of sea-ice retreat and expansion. Areas of high benthic biomass are located offshore Point Lay from Ledyard Bay to Kasegaluk Lagoon, offshore Utqiaġvik and northwest of Wainwright. **Figure I-1** shows hotspot locations of walrus, beluga, and bowhead whales based on distribution and abundance data collected by aerial surveys These three species are not only ecologically important in this area but also important species for subsistence activities. The persistent hotspot maps represent detected hotspots through time (2000–2019). Each cell on the map provides a probability of detecting a species-specific hotspot through time at a specific location bounded by each individual cell. The Chukchi Sea coast and, to a lesser extent, the Chukchi Sea Subsistence Use Area continually attract elevated densities of multiple species.

Exclusion of a 25-mi coastal buffer would provide protection for the nearshore lead system, which many species transit during spring migration. Beluga and bowhead whales, walrus, and various seabird and sea duck species all use this area. Gray whales migrate up the coast later in the open-water season, and fin and humpback whales occur nearshore in the Chukchi Sea. Seals and polar bears use the lead system extensively while foraging in late winter and spring. A 50-mi coastal buffer would protect this same area and may reduce spatial conflict between industrial activities and subsistence activities, which tend to occur primarily within 35 to 50 mi (56 to 80 km) of shore. A 15-mi coastal buffer would reduce the area potentially impacted by oil and gas activity but may be less effective in protecting species and reducing space-use conflicts than a larger buffer.

Table I-2 provides more detail on the Chukchi Sea Subsistence Use Area and 25-mi coastal buffer, including the percent area and overlapping geologic plays, which encompass areas of high and medium petroleum potential. The portions of the Chukchi Sea Subsistence Use Area seaward of the 25-mi coastal buffer overlap almost entirely with medium resource potential areas. There are no historical or active leases in the Chukchi Sea Subsistence Use Area, and there are eight historical leases to the NNW of Point Lay within a 25-mi coastal buffer. A 50-mi coastal buffer would exclude more areas of high resource potential, as well as additional areas where leasing has occurred in the past; a 15-mi coastal buffer would exclude less of the potential hydrocarbon resource. A coastal buffer of 15 to 50 mi (24 to 80 km) from shore would cover places used by a distinct concentration of species and subsistence hunters within a relatively small footprint along the coast compared with the rest of the planning area (Stephen

R. Braund & Associates 2010) (**Figure I-1**). Furthermore, medium to high resource potential would still be available in other parts of the planning area.

Hanna Shoal (DPP Subarea Option) and Expanded Hanna Shoal

The Hanna Shoal and Expanded Hanna Shoal exclusion areas host high benthic biomass and provide primary foraging habitat for walrus, gray whales, and various seabird species during the open-water season (Brueggeman 2009; Kuletz et al. 2015) (**Figure I-1**). Sea-ice remnants grounded on the shoal remain after sea ice retreats from most of the shelf area into the summer, providing resting habitat for walrus and seals between foraging attempts. Walrus begin hauling out on land once the remnant ice melts. In recent low-ice years, as many as 35,000 walrus have been hauling out near Point Lay (also a persistent hotspot identified in **Figure I-1**) and traveling to Hanna Shoal to feed (Fischbach et al. 2016; Jay et al. 2012). In addition, bowhead whales migrate over Hanna Shoal from August to December (Quakenbush et al. 2013).

The Hanna Shoal and Expanded Hanna Shoal exclusion areas were identified largely to avoid or minimize impacts on the Pacific walrus, an important subsistence resource for Alaska Native communities along the Chukchi Coast. Walrus are benthic feeders. Activities that disturb the seafloor and impact the benthos, such as exploration drilling, may impact walrus by reducing available prey species, even if the activities are conducted when walrus are not present (**Section 4.1.6**).

Hanna Shoal and Expanded Hanna Shoal encompass high-use areas for walrus, as defined by foraging and occupancy use distributions from June through December (Jay et al. 2012). **Figure I-1** also shows numerous areas of persistent high density of walrus within the Hanna Shoal area and throughout portions of the Expanded Hanna Shoal, indicating that walrus are using this area consistently over time. The 40-m isobath roughly delineates the plateau of Hanna Shoal; however, positive effects of Hanna Shoal on the ecosystem extend beyond this feature. Persistent walrus foraging hotspots occur in portions of the Expanded Hanna Shoal exclusion area (**Figure I-1**), indicating that walrus respond to abundant benthic prey and feed in this area consistently over time. Results from walrus tagging studies conducted by USGS identified foraging and resting areas that corroborate with hotspots in **Figure I-1** (Clarke et al. 2017; Jay et al. 2012).

Exclusion of this area may avoid or minimize impacts on walrus and other species that use Hanna Shoal and Expanded Hanna Shoal, as well as those human communities that rely on subsistence use of these animals. Potential exclusion of this area may not align exactly with the areas shown in **Figure I-1**. Additional analysis and public input prior to approval of the 2024–2029 National OCS Oil and Leasing Program (2024–2029 Program) could help determine whether exclusion is appropriate and the extent of an exclusion area.

Table I-2 provides more detail on Hanna Shoal and Expanded Hanna Shoal, including the percent area and associated geologic plays implicated, which encompass substantial areas of high petroleum potential, especially with an expanded footprint. There are numerous historical leases in the Hanna Shoal and Expanded Hanna Shoal area.

Beaufort Sea Planning Area

Nine potential exclusion areas along the coast of the Beaufort Sea fall within withdrawn portions of the OCS and are analyzed in this appendix (**Figure I-2**, **Table I-2**). These analyses are based on identification in the DPP, ecological importance, human use, and precedent for exclusion or deferral from leasing in previous oil and gas leasing programs.

- Barrow Whaling Area (DPP Subarea Option)
- Expanded Barrow Whaling Area
- Barrow Canyon BFA
- Harrison Bay-Colville River (Harrison Bay BFA)
- Camden Bay BFA
- Kaktovik Area: Kaktovik Whaling Area (DPP Subarea Option), Kaktovik Bowhead Whaling Area, and Kaktovik BFA
- Cross Island BFA

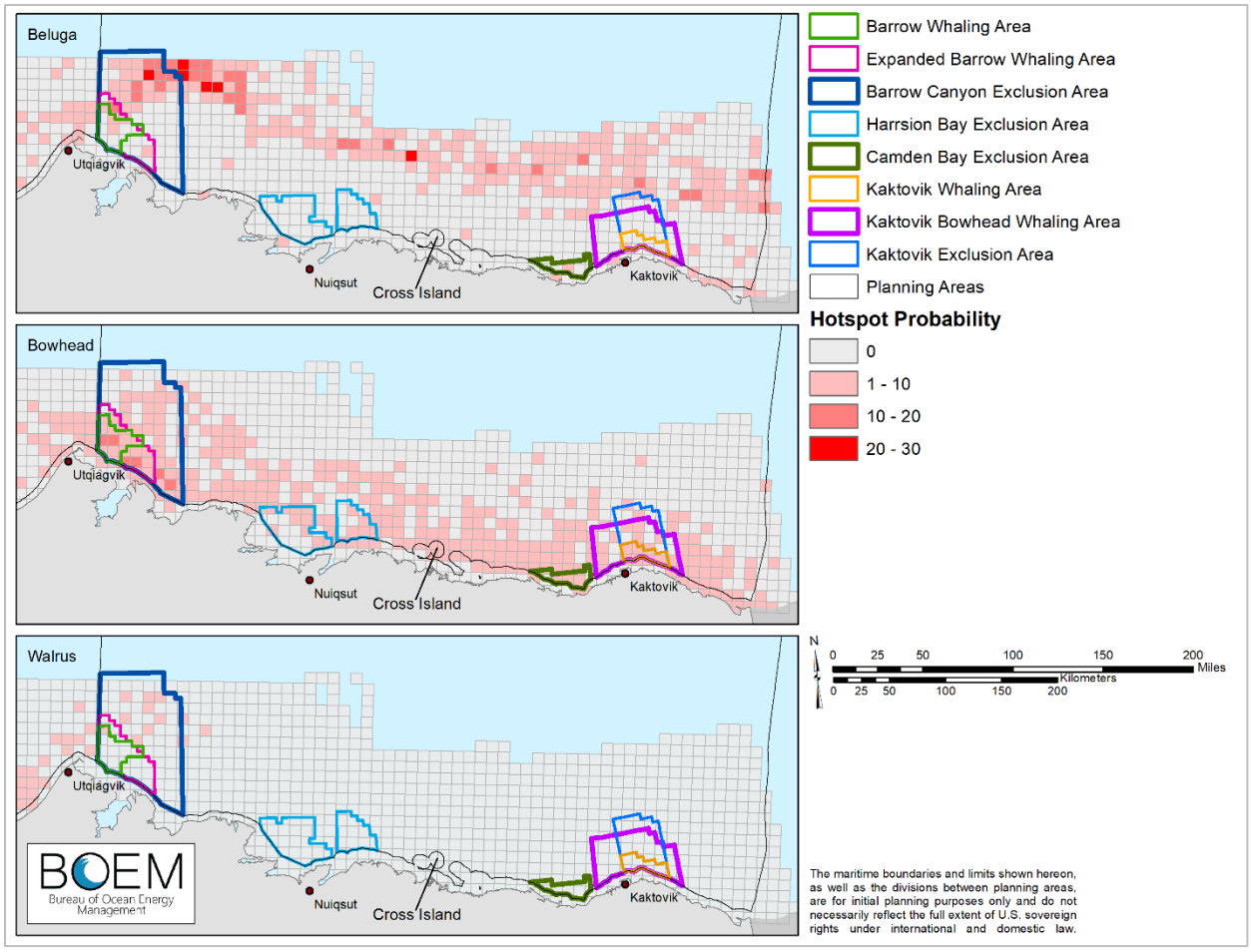

Figure I-2. Locations of potential exclusions in the Beaufort Sea Planning Area in relation to hotspots for bowhead whales, belugas, and walrus

Utqiaġvik (Barrow) Area (DPP Subarea Option)

Three potential exclusion areas overlap in the Beaufort Sea Planning Area north of Utqiaġvik (Barrow) and fall within withdrawn portions of the OCS: Barrow Whaling Area, Expanded Barrow Whaling Area, and Barrow Canyon BFA. The smaller Barrow Whaling Area that was included in the DPP and a larger area called the Expanded Barrow Whaling Area are both encompassed in the Barrow Canyon BFA.

Barrow Canyon is a highly productive and nutrient-rich area supporting high benthic biomass and large concentrations of zooplankton prey (CSA Ocean Sciences Inc et al. 2019). These rich foraging grounds attract large numbers of marine mammals and birds (Citta et al. 2015; Dunton et al. 2005; Grebmeier et al. 2006; Grebmeier and Dunton 2000). The presence of marine mammals makes the area important for subsistence hunting (Stephen R. Braund & Associates 2010), hence the overlap of the Barrow Canyon BFA with the Barrow Whaling Area and Expanded Barrow Whaling Area. Large numbers of bowhead whales congregate in Barrow Canyon in summer, spring, and fall (**Figure I-2**) and use the area during their westward migration (Citta et al. 2015; Clarke et al. 2017; Hauser et al. 2014; Kuletz et al. 2015). The area is also important for migrating and foraging beluga whales, gray whales, and many species of birds (Clarke et al. 2017; Clarke et al. 2015; Hauser et al. 2014; Kuletz et al. 2015; Wong et al. 2014). The southern portions of the Barrow Canyon BFA have especially high densities of birds during summer (June to September), including brant and king eider (Drew and Piatt 2020; Kuletz et al. 2015; Smith et al. 2017b).

The Barrow Canyon BFA is adjacent to Smith Bay. Smith Bay and adjacent waters from Dease Inlet to Cape Halkett contain important estuarine and shallow-water habitat and support a wide range of fishes, birds, and marine mammals (Warnock et al. 2018). Smith Bay is also a crucial part of the bowhead whale feeding area in summer and fall (Citta et al. 2015; Clarke et al. 2015) and an important component of the fall migration corridor (Clarke et al. 2017; Quakenbush et al. 2013). It is a hotspot for pinnipeds in summer (Kuletz et al. 2015) and an Important Bird Area for many species, including yellow-billed loon, Arctic tern, black-legged kittiwake, glaucous gull, king eider, long-tailed duck, red phalarope, and Sabine's gull (Smith et al. 2014). Smith Bay is a fall staging area for thousands of shorebirds (Taylor et al. 2010) and an important denning area for polar bears (Durner et al. 2020); it also provides forage fish habitat and nursery habitat for Arctic cod (Craig 1984).

Exclusion of these areas may avoid or minimize impacts on bowhead whale and other species that rely on the ecologically rich habitats around Utqiaġvik, as well as on those communities with cultural and subsistence practices that depend upon these animals. The Barrow Whaling Area represents a minimum area of subsistence use; the surrounding Expanded Barrow Whaling Area also captures important subsistence use. The Barrow Canyon BFA is larger than these areas because it would include additional ecologically important areas where upwelling and high primary productivity from Barrow Canyon serve to congregate numerous species (**Figure I-2**).

The residents of Utqiaġvik harvest, consume, and share substantial amounts of bowhead whale from these areas, which is critically important for villages along Alaska's northern coast. Whaling captains harvest 40–50 bowhead whales per year, providing 500–1,000 tons (454–907 metric tons) of meat to

thousands of Native people in the region and throughout the state (Hopson Jr. 2018). Bowhead whales use Beaufort Sea shelf waters consistently from year to year, especially within the Expanded Barrow Whaling Area (**Figure I-2**). Residents also harvest ringed and bearded seals in that area.

Seasonal restrictions or other mitigation measures for activities near Utqiaġvik may reduce potential impacts in lieu of exclusion, although seasonal restrictions would not address impacts once production begins. **Table I-2** provides more detail on the Utqiaġvik (Barrow) Area, including the percent area and overlapping geologic plays, which encompass areas of high and medium petroleum potential. Areas of high petroleum potential are closer to shore, and there is historical leasing activity in both areas.

Harrison Bay BFA

The Harrison Bay BFA includes Federal waters offshore of Cape Halkett east of Teshekpuk Lake, adjacent to the Colville River Delta (**Figure I-2**). This area of high productivity is a seabird "hotspot" (Kuletz et al. 2015) due to its shallow depth, sheltered waters, and nutrient supply from the Colville River. Harrison Bay provides important habitat for many bird species, including long-tailed ducks, eiders, loons, Arctic terns, scoters, and glaucous gulls (Alexander et al. 1975; Fischer et al. 2002; Lysne et al. 2004; Smith et al. 2014). Red-throated and yellow-billed loons use the area to stage summer and fall migration, and king eiders and ESA-listed spectacled eiders use it in spring and fall.

Exclusion of this area may benefit species other than birds. For example, Harrison Bay is an important nearshore area for ringed and spotted seals during the open-water season and a feeding and denning area for polar bears (Durner et al. 2009; Durner et al. 2010). Polar bear dens have been identified in the Harrison Bay area between 1910 and 2018, and this area of the Beaufort Sea coast is expected to remain one of several important denning and feeding habitat areas for polar bears during winter as the sea-ice extent continues to change (Durner et al. 2020; Durner et al. 2009; Durner et al. 2010).

Harrison Bay BFA overlies areas of high petroleum potential (**Table I-2**) and numerous historical leases, and it is adjacent to active leases in state waters. The footprint of Harrison Bay, as shown in **Figure I-2**, captures important bird habitat and persistent bowhead whale hotspots.

Camden Bay BFA

Camden Bay is a hotspot for seabirds and marine mammals (Kuletz et al. 2015) (**Figure I-2**). The bay provides nesting habitats for colonial bird species (e.g., common eiders and glaucous gulls) and foraging habitat for Arctic tern and black guillemot. Benthic-feeding seabirds concentrate in Camden Bay in fall. The bay contains feeding grounds for bowhead and beluga whales, as well as ringed, bearded, and spotted seals (Huntington 2013). Whalers from Kaktovik and Nuiqsut identify Camden Bay as an important ecological and subsistence area.

Excluding Camden Bay may help protect migrating and foraging bowhead whales (Clarke et al. 2017) and benefit subsistence hunters. It may also help protect beluga whales, seals, and birds that nest, feed, and gather there in significant numbers. The bay's important benthic habitats may also benefit from this exclusion. Camden Bay overlies areas of high petroleum potential and covers 0.2% of the Beaufort Sea Planning Area (**Table I-2**). There are historical leases offshore of the exclusion area.

Kaktovik Area: Kaktovik Whaling Area (DPP Subarea Option), Kaktovik Bowhead Whaling Area, and Kaktovik BFA

Three potential exclusion areas overlap in the Beaufort Sea Planning Area north of Kaktovik (**Figure I-2**). These include two areas designed to avoid or minimize impacts on subsistence hunting, particularly whaling: the smaller Kaktovik Whaling Area (DPP Subarea Option), and a larger area called the Kaktovik Bowhead Whaling Area, which encompasses the smaller Kaktovik Whaling Area and includes much of the remaining core subsistence whaling area.

Bowhead whaling occurs between late August and early October, with the exact timing depending on ice and weather conditions. The region east of Kaktovik is an important feeding area for bowhead whales during the westward fall migration (Clarke et al. 2017). Whaling crews generally hunt bowhead within 10 mi (16 km) of shore but occasionally range to 20 mi (32 km) from the coast. Residents of Kaktovik also hunt seals and beluga whales in this area (Kofinas et al. 2015). Impacts from oil and gas development and related activities, such as seismic surveys or vessel noise, may impact the timing of migration, alter the migration routes, and/or disturb the feeding patterns of marine mammals.

The third potential exclusion near Kaktovik is the Kaktovik BFA (**Figure I-2**). This area extends north from the Kaktovik Whaling Area and captures important habitat for bowhead whales during their fall migration nearshore (Clarke et al. 2017). The eastern portion of the BFA overlaps with marine mammal "hotspots" identified by Kuletz et al. (2015) and in this analysis (**Figure I-2**). The BFA also includes waters used for subsistence hunting of bowhead whales (Wolfe 2013). The areas around Kaktovik are important habitats for birds, including brants, eiders, gulls, and loons (Drew and Piatt 2020; Smith et al. 2014). Polar bears have denned in the area for over a century and are expected to continue to use it despite expected changes in sea-ice extent (Durner et al. 2009; Durner et al. 2010).

An exclusion in this area may protect marine mammals, polar bears, seals, seabirds, and benthic habitats from nearly all IPFs. Additional analysis and public input before approval of the 2024–2029 Program could help define the area's boundaries. **Table I-2** provides more detail on the Kaktovik Area, including the percent area and overlapping geologic plays, which encompass areas of primarily high petroleum potential. Leasing has previously occurred in all three Kaktovik potential exclusion areas.

Cross Island BFA

The coastal waters near Cross Island in the Beaufort Sea Planning Area include persistent marine mammal "hotspots," especially for migrating bowhead whales (Clarke et al. 2017) (**Figure I-2**). The area is also an important feeding and denning habitat for polar bears during winter and spring (Durner et al. 2009; Durner et al. 2010). The nearshore areas east of Cross Island have relatively high densities of birds such as brants, eiders, gulls, and loons (Audubon Alaska 2015; Drew and Piatt 2020). The "Boulder Patch" in Stefansson Sound, adjacent to Cross Island, is biologically rich and complex relative to the majority of the Alaska OCS seafloor (Dunton and Schonberg 2000).

Exclusion of the Cross Island BFA or the application of seasonal activity restrictions may reduce potential impacts on migrating bowhead whales. However, the Nuiqsut whaling area on Cross Island is just

offshore of Prudhoe Bay and West Dock, a primary loading and unloading area for vessel traffic associated with the oil and gas industry. Excluding this area from leasing would not decrease the amount of vessel traffic or noise appreciably. There are numerous historical and active leases around Cross Island, and the entire area overlies high petroleum potential.

POTENTIAL EXCLUSIONS IN THE PACIFIC REGION

There are no areas analyzed for potential exclusion in the Pacific Region. See **Section 4.5.2** for more information.

POTENTIAL EXCLUSIONS IN THE GOM REGION

Areas for potential exclusion in the GOM Region (**Table I-3, Figure I-3**) include areas subject to Topographic Features and Live Bottom lease stipulations, a Baldwin County buffer, and an Eastern GOM coastal buffer. The first two potential exclusions—Topographic Features and Live Bottom areas and a Baldwin County buffer—are analyzed in **Section 4.5**.

Table I-3. Potential exclusions that fall entirely within withdrawn portions of the OCS that overlay geologic plays in the GOM Region

Exclusion	Exclusion Size (Million Acres)	Planning Area Acreage (Million Acres)	Percent Planning Area Acreage (Size/Planning Area Acreage)	Number of Geologic Plays Overlapping Exclusion
50-mi Eastern GOM coastal buffer*	20.7	159.3	13.0%	7
75-mi Eastern GOM coastal buffer*	31.0	159.3	19.5%	12
100-mi Eastern GOM coastal buffer*	39.5	159.3	24.8%	13
125-mi Eastern GOM coastal buffer*	46.5	159.3	29.2%	13

* DPP Subarea Option

Exclusion areas associated with topographic and Pinnacle Trend features are shown in **Figure I-3**. Because these areas are relatively small and distributed throughout the Western and Central GOM Planning Areas, they are not included in this table.

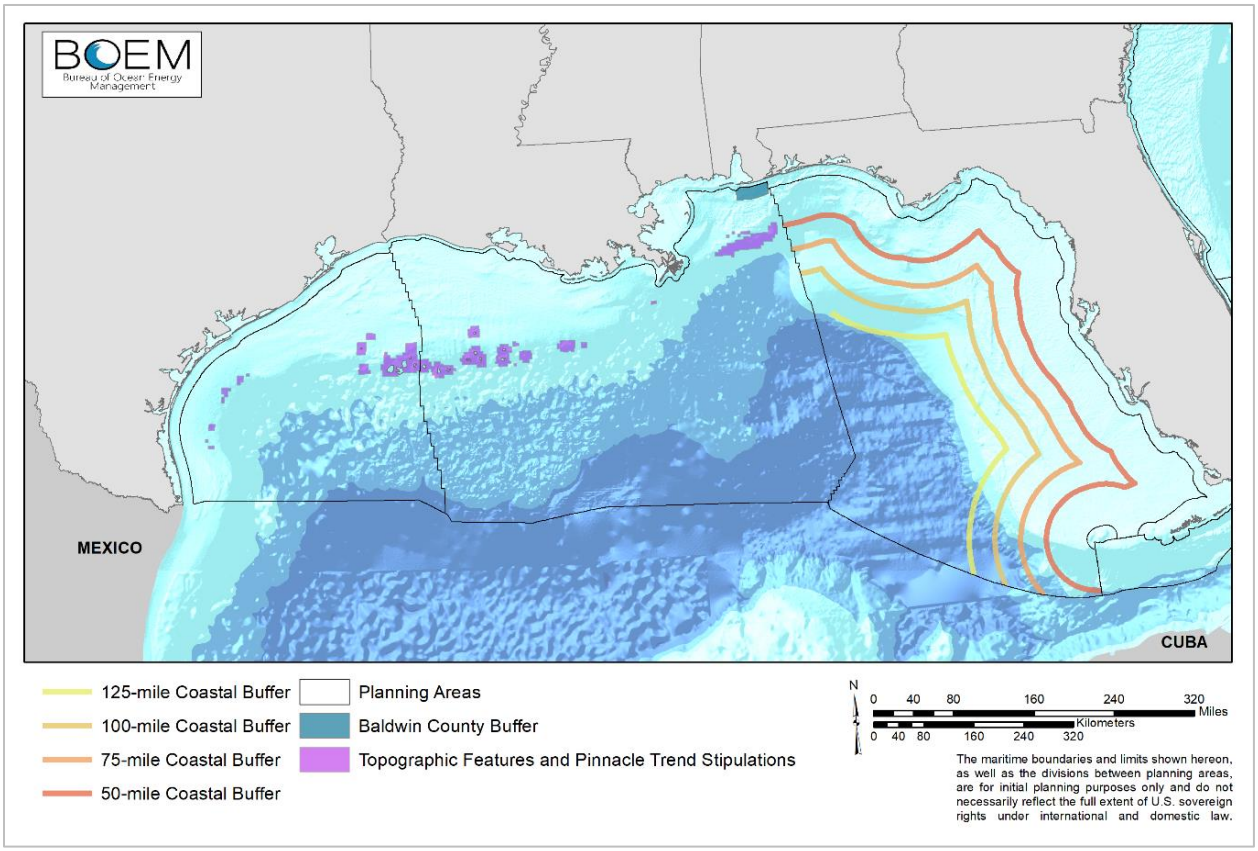

Figure I-3. Locations of potential exclusions in the GOM Region

Eastern GOM Coastal Buffer (DPP Subarea Option)[1]

Coastal buffers of 50, 75, 100, or 125 mi (80, 120, 160, or 200 km, respectively) off Florida's Gulf Coast may directly protect coastal, offshore, and human resources that may be impacted by OCS oil and gas activities (**Section 2.8**).

The Eastern GOM provides important coastal and estuarine habitat for a wide variety of species, including numerous species that are ESA-listed and would receive greater protection from a buffer exclusion. The beaches in this area make up 90% of the nesting habitat for the ESA-listed Northwest Atlantic population of the loggerhead sea turtle (Ceriani and Meylan 2017). The ESA-listed Kemp's ridley sea turtle also uses this coastal habitat for nesting (Valverde and Holzwart 2017). Staghorn and elkhorn coral, both ESA-listed species, have critical habitat that runs along the Straits of Florida and into the Eastern GOM. Shallow-water, coastal seagrass habitats along the coast are important habitat for ESA-listed sea turtles and the Florida subspecies of the West Indian manatee (Byrnes et al. 2017). Furthermore, riverine and coastal habitats of Florida's Gulf Coast have critical habitat for anadromous species, including ESA-listed Atlantic shortnose and Gulf sturgeon and the smalltooth sawfish (**Appendix D**). Development on the coast may reduce essential dune habitat for ESA-listed beach mice.

[1] The vast majority of the Eastern GOM has since been withdrawn from consideration for leasing until June 2032.

Barrier islands lining the west coast of Florida are key resting areas for migratory birds traveling the Atlantic Flyway.

Mangrove and wetland habitats are found along the west Florida Coast. These habitats serve important ecological functions, such as providing key habitat and protected nursery grounds for many commercially important fish species, and habitat for terrestrial fauna and birds. These habitats also play an important role in improving water quality in coastal areas and providing protection from storms (NOAA 2019a). Additionally, estuarine habitats along the Florida Coast serve as habitat for oysters, which are commercially and recreationally harvested.

The continental shelf of the Eastern GOM, particularly off west Florida, is wide and extends farther out than in other areas of the GOM. Most of the nearshore waters and waters extending out into the continental shelf are essential fish habitat (EFH) for dozens of species of reef fish, multiple species of shrimp, spiny lobster, corals, coastal migratory pelagic species (e.g., fish such as mackerels), and several species of sharks (e.g., bonnethead, blacktip, nurse, blacknose, and bull) (NOAA 2020d). Shallower areas of the Eastern GOM—which include 2 National Marine Sanctuaries, 1 National Research Reserve, and 10 National Wildlife Refuges—host high abundances of sessile invertebrates (e.g., corals, sponges, crinoids), demersal fishes (fish that live or feed near the bottom), and numerous protected species. The shelf has abundant calcareous sediment and ideal surface temperatures and salinity, which create optimal conditions for coral reef production (Hine et al. 2008). These shallow, hard bottom reefs occur as benthic features in depths less than 984 ft (300 m). Areas of the central West Florida Shelf, known as the “Sticky Grounds,” include extensive hard bottom habitat that is important for benthic species and serves as EFH for reef fish and fisheries species (Locker et al. 2016). There are also areas of reef and banks Habitat Areas of Particular Concern (HAPCs) along other areas of the shelf, particularly toward the edge of the shelf off the southwestern Florida Coast.

A 50-mi coastal buffer may reduce or eliminate potential impacts on nearshore coastal and marine resources because it may avoid impacts related to oil and gas activities and limit other impacting factors, such as vessel traffic. A 75-mi coastal buffer option would include additional protection further out onto the shelf and would expand protection for resources in those areas. The West Florida Shelf and Florida Middle Grounds, which are distinct submerged features made of carbonate accretions serving as habitat for coral, would be included in the extended buffer (Hine et al. 2008). The DeSoto Canyon is critical habitat for loggerhead sea turtles, especially near the shelf edge (Mullin and Hoggard 2000), and is habitat for the ESA-listed Rice’s whale. Rice’s whale is unique to the Eastern GOM Planning Area and has a small, year-round population there (Hayes et al. 2018; Roberts et al. 2016; Rosel et al. 2016). Recent limited evidence shows that the Rice’s whale may be present in the area between the 100-m and 400-m isobaths across the northern GOM (Soldevilla et al. 2022), which extends beyond any coastal buffer. DeSoto Canyon and its resources would have more protection under an extended buffer. The 75-mi buffer also includes areas such as Steamboat Lumps and the Edges Marine Reserves west of the Florida Middle Grounds, which are essential areas for fish spawning.

In addition to the benefits listed in the 50-mi and 75-mi coastal buffers, a 100-mi coastal buffer would provide additional protection to marine habitat and associated resources. This buffer would extend

protections into Atlantic bluefin tuna spawning areas, EFH for adults, and HAPCs for the species, which is important for this species because it already faces increasing challenges from climate change and other stressors. A 125-mi coastal buffer would extend further protection for Rice's whale habitat off the continental shelf break and expand coverage of key habitat and spawning areas for Atlantic bluefin tuna. Pulley Ridge Reef, a coral habitat to the west of the Florida Keys would also receive protection under this extended buffer.

Deeper waters of the Eastern GOM Planning Area contain many areas that provide ideal conditions for deep-sea coral habitat, including those made up of stony corals, black corals, and soft corals like gorgonians. Black and soft corals are found at a range of depths that may receive some limited protection from a 50- or 75-mi buffer; however, additional protection would be more likely from a buffer that extends out further onto the shelf. Stony corals such as *Lophelia pertusa* are typically found in deeper waters and would receive the greatest protection from an Eastern GOM buffer that extends further than 100 mi (160 km). Recent models of 28 genera of habitat structure-forming sensitive deepwater corals have shown widespread predicted distribution throughout the continental shelf waters of the GOM, with the Eastern GOM containing particularly important coral habitat (**Figure I-4**). Different genera are found at varying depths, locations, and abundances throughout the Eastern GOM (**Figure I-4**). The 50- and 75-mi buffer options would offer protection for shallower water coral and hard bottom habitat, as well as some areas of deepwater habitats. The 100- and 125-mi buffer options would expand protection of those habitats that extend out further into the deeper water of the continental shelf, with the 125-mi buffer offering the greatest protection.

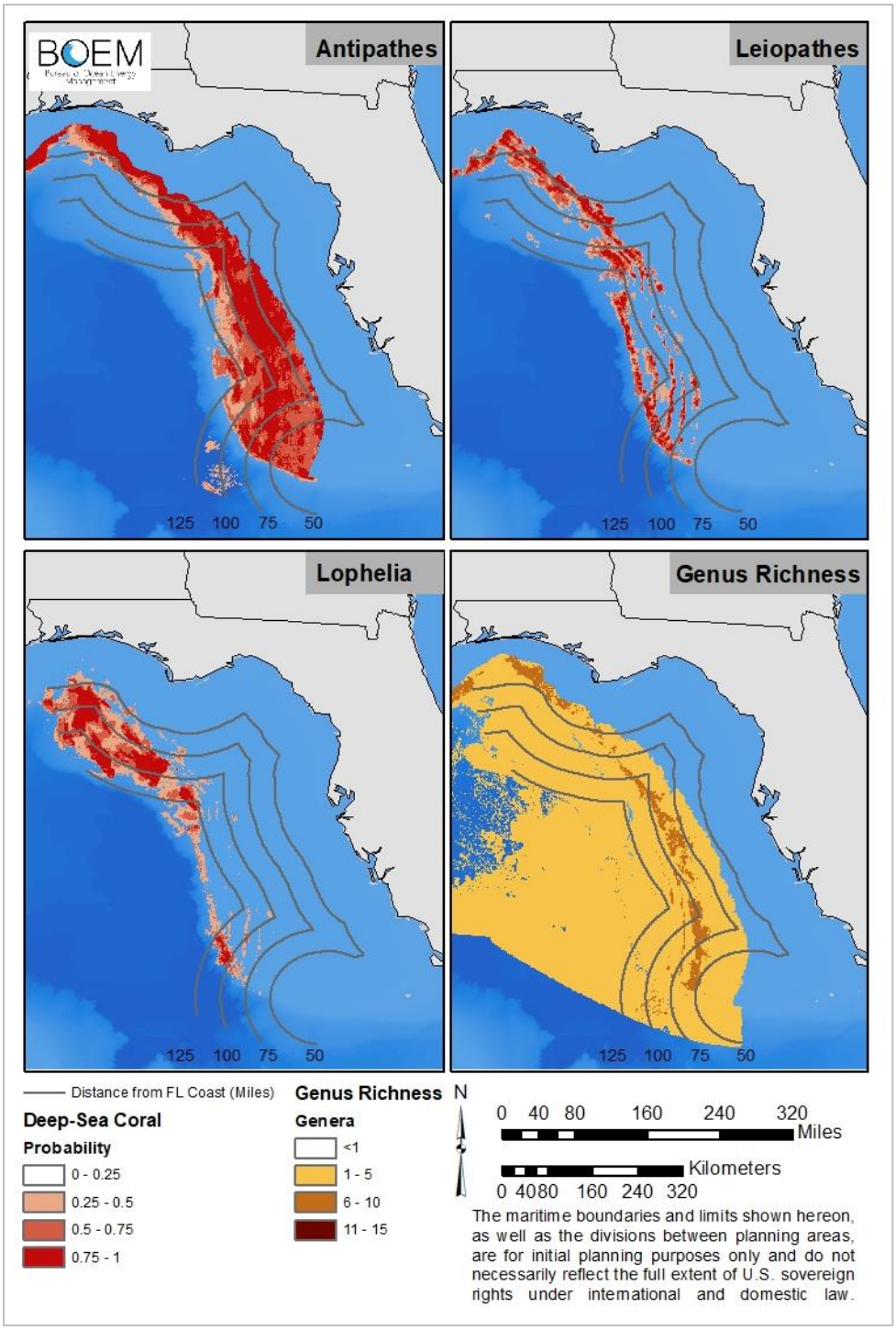

Figure I-4. Distributions of deep-sea coral habitat-forming genera (*Antipathes*, *Leiopathes*, and *Lophelia*) and overall genus richness along potential Eastern GOM buffer exclusion areas

An Eastern GOM buffer option may reduce or eliminate potential impacts on recreation and tourism, which are dependent on beach nourishment from the OCS. A buffer would also protect vulnerable coastal communities from potential impacts from noise, traffic, emissions, lighting, visible infrastructure,

and space-use conflicts. Some of these communities rely on subsistence harvesting, including fishing and hunting.

A coastal buffer may also reduce space-use conflicts between the oil and gas industry and commercial and recreational fisheries, military, shipping, and other uses. It is expected that many oil-and-gas-related activities that would be needed to support new OCS activities in the Eastern GOM Planning Area would take place in the Western and Central GOM Planning Areas, where such activities are already occurring.

Table I-3 shows the area of each buffer as a percentage of the total planning area, as well as the number of geologic plays that overlap each buffer option.

POTENTIAL EXCLUSIONS IN THE ATLANTIC REGION

None of the areas analyzed for exclusion in the Atlantic Region fall entirely within a withdrawn portion of the OCS. See **Section 4.5.4** for more information.

Appendix J: Relevant Environmental Studies Program Research

J.1 INTRODUCTION

Section 20 of the Outer Continental Shelf (OCS) Lands Act mandates scientific research to inform decisions on the development of energy and mineral resources on the OCS. Research topics of BOEM's Environmental Studies Program (ESP) include physical oceanography, atmospheric sciences, biology, protected species, social sciences, economics, submerged cultural resources, and environmental fates and effects. The ESP-funded studies included in this appendix informed the National OCS Oil and Gas Leasing Program Final Programmatic Environmental Impact Statement analysis. All studies are available online at www.boem.gov/studies.

J.2 RESOURCES

Air Quality

Brashers et al. 2015-049: Arctic air quality modeling study meteorological model performance evaluation: 2009-2013 BOEM Arctic WRF dataset

Davis-Noland et al. 2009-055: Synthesis, analysis, and integration of meteorological and air quality data for the Gulf of Mexico Region Volume I: user's manual for the Gulf of Mexico air quality database (Version 1.0)

Davis-Noland et al. 2009-056: Synthesis, analysis, and integration of meteorological and air quality data for the Gulf of Mexico Region Volume II: technical reference manual for the Gulf of Mexico air quality database

Do et al. 2017-029: Arctic air quality modeling study; final near-field dispersion modeling report

Do et al. 2017-040: Arctic air quality modeling study; evaluation of the emissions exemption thresholds

Douglas et al. 2014-008: Synthesis, analysis, and integration of meteorological and air quality data for the Atlantic coast region

Douglas et al. 2009-057: Synthesis, analysis, and integration of meteorological and air quality data for the Gulf of Mexico Region Volume III: data analysis

Douglas and Hudischewskyj 2008-029: Five-year meteorological datasets for CALMET/CALPUFF and OCD5 modeling of the Gulf of Mexico (GOM) region

Douglas et al. 2009-058: Synthesis, analysis, and integration of meteorological and air quality data for the Gulf of Mexico Region Volume IV: CART analysis of modeling episode days

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Ruiz-Cooley and Engelhaupt 2010-016: Trophic aspects of sperm whales (*Physeter macrocephalus*) in the northern Gulf of Mexico using stable isotopes of carbon and nitrogen

Salisbury et al. 2019-007: Understanding marine mammal presence in the Virginia offshore wind energy area

Southam et al. 2022-009: Comprehensive synthesis of effects of oil and gas activities on marine mammals on the Alaska Outer Continental Shelf, volume 1

Topp and Okkonen 2015-039: Arctic currents: a year in the life of a bowhead whale

Vate et al. 2018-022: Arctic Whale Ecology Study (ARCWEST): use of the Chukchi Sea by endangered baleen and other whales (westward extension of the BOWFEST); final report

Wiese et al. 2017-017: Marine Arctic Ecosystem Study; pilot program: marine mammals tagging and tracking

Commercial & Recreational Fisheries

Collie and King 2016-073: Spatial and temporal distributions of lobsters and crabs in the Rhode Island/Massachusetts Wind Energy Area

Gitschlag et al. 2000-087: Estimation of fisheries impacts due to underwater explosions used to sever and salvage petroleum platforms in the Gulf of Mexico, final report

Hardy 2011-060: Defining genetic structure in Alaskan populations of the snow crab (*Chionoecetes opilio*)

Haulsee et al. 2020-020: Occurrence of commercially important and endangered fishes in Delaware Wind energy areas using acoustic telemetry

Hutchison et al. 2018-003: Electromagnetic field (EMF) impacts on elasmobranch (shark, rays, and skates) and American lobster movement and migration from direct current cables

Iafrate et al. 2019-043: Behavior, seasonality, and habitat preferences of mobile fishes and sea turtles within a large sand shoal complex: insights from traditional sampling and emerging technologies

Iken and Bluhm 2015-029: Population assessment of snow crab, *Chionoecetes opilio*, in the Chukchi and Beaufort Seas including oil and gas lease areas

Continental Shelf Associates, Inc. et al. 2002-078: Deepwater program: bluewater fishing and OCS activity: interactions between the fishing and petroleum industries in deepwaters of the Gulf of Mexico, final report

Kirkpatrick et al. 2017-012: Socio-economic impact of Outer Continental Shelf wind energy development on fisheries in the U.S. Atlantic, Volume I; Report narrative

McDonough and Cowan 2013-0123: Short-term movement, home range, and behavior of red snapper around petroleum platforms in the northern Gulf of Mexico, as determined by high resolution acoustic telemetry

Nishimoto et al. 2007-008: Assessing the fate of juvenile rockfish at offshore petroleum platforms and natural reefs in the Santa Barbara Channel

O'Connell et al. 2019-037: Abundance and distribution of commercially important estuarine dependent species populations within the Gulf of Mexico

Page and Dugan 99-0018: Effect of offshore oil platform structures on the distribution patterns of commercially important benthic crustaceans, with emphasis on the rock crab

Peabody and Wilson 2006-005: Fidelity of red snapper (*Lutjanus campechanus*) to petroleum platforms and artificial reefs in the northern Gulf of Mexico

Petterson and Glazier 2004-038: A study of the drift gillnet fishery and oil/gas industry interactions and mitigation possibilities in Cook Inlet

Secor et al. 2020-030: Movement and habitat selection by migratory fishes within the Maryland wind energy area and adjacent reference sites

Snyder et al. 2019-049: Evaluation of potential EMF effects on fish species of commercial or recreational fishing importance in southern New England

Tomlinson and Petterson 2006-065: Investigation of dredging impacts on commercial and recreational fisheries and analysis of available measures to protect and preserve resources

Tyler et al. 2001-059: Feeding ecology of maturing sockeye salmon (*Oncorhynchus nerka*) in nearshore waters of the Kodiak Archipelago

Wilson et al. 2017-066: Genomics of Arctic cod

Archaeological & Cultural Resources

Ball et al. 2015-047: A guidance document for characterizing Tribal cultural landscapes

Brooks et al. 2012-106: Exploration and research of northern Gulf of Mexico deepwater natural and artificial hard-bottom habitats with emphasis on coral communities: reefs, rigs, and wrecks - Lophelia II interim report

Coastal Mapping Laboratory et al. 2015-048: Developing protocols for reconstructing submerged paleocultural landscapes and identifying ancient Native American archaeological sites in submerged environments: summary report of the initial project workshop

Caccioppoli et al. 2018-056: Developing protocols for reconstructing submerged paleocultural landscapes and identifying ancient Native American archaeological sites in submerged environments; field report: 2013-2016

Carrier et al. 2018: Atlantic Outer Continental Shelf collaborative archaeological surveys

Davis et al. 2013-0115: Inventory and analysis of coastal and submerged archaeological site occurrence

DeLong et al. 2020-034: Investigation of an ancient bald cypress forest in the northern Gulf of Mexico

Evans 2016-015: Examining and testing potential prehistoric archaeological features on the Gulf of Mexico Outer Continental Shelf

Evans et al. 2013-011110: Archaeological analysis of submerged sites on the Gulf of Mexico Outer Continental Shelf

Heinrich, et al. 2020-004: Response of Later Quaternary Valley systems to Holocene sea level rise on the continental shelf offshore Louisiana: preservation potential of paleolandscapes

Hoffman et al. 2020-016: North Carolina collaborative archaeological survey: Wilmington east and west wind energy areas

King et al. 2020-023: Developing protocols for reconstructing submerged paleocultural landscapes and identifying ancient Native American archaeological sites in submerged environments

Rees et al. 2019-025: Assessment of the effects of an oil spill on coastal archaeological sites in Louisiana

TRC Environmental Corporation 2012-008: Inventory and analysis of archaeological site occurrence on the Atlantic Outer Continental Shelf

Watts et al. 2019-013: Analyzing the potential impacts to cultural resources at significant sand extraction areas. Volume I: technical report

Land Use

Jayawardana and Hochstein 2004-047: Supply network for deepwater oil and gas development in the Gulf of Mexico: an empirical analysis of demand for port services

Keithly 2001-019: Lafourche Parish and Port Fourchon, Louisiana: effects of the Outer Continental Shelf petroleum industry on the economy and public services, part 1

Ohlmann 2006-009: Transport over the inner-shelf of the Santa Barbara Channel

Whitney et al. 2016-034: The identification of port modifications and the environmental and socioeconomic consequences

Wicker et al. 89-0051: Pipelines, navigation channels, and facilities in sensitive coastal habitats, coastal Gulf of Mexico, Volume I: technical narrative

Culture and Vulnerable Coastal Communities

Bamberger et al. 2007-062: Potential impacts of OCS activities on bowhead whale hunting activities in the Beaufort Sea

Carothers 2013-0015: Subsistence use and knowledge of salmon in Barrow and Nuiqsut, Alaska

Central 1990: Annotated bibliography and summary of current social impact analysis publications relevant to evaluating impacts of OCS activity on Washington and Oregon Indian Tribes

Downs et al. 2009-030: Researching technical dialogue with Alaskan coastal communities: analysis of the social, cultural, linguistic, and institutional parameters of public /agency communication patterns

Galginaitis and Funk 2005: Annual assessment of subsistence bowhead whaling near Cross Island: ANIMIDA Task 4

Galginaitis 2013-218: Monitoring Cross Island whaling activities, Beaufort Sea, Alaska: 2008-2012 final report, incorporating ANIMIDA and cANIMIDA (2001-2007)

Hemmerling 2003-038: Environmental justice considerations in Lafourche Parish, Louisiana

Hemmerling et al. 2017-068: Environmental justice: a comparative study in Louisiana

Hoelting and Burkardt 2017-052: Human dimensions of climate change in coastal Oregon

Holen 2019-031: Coastal community vulnerability index and visualizations of change in Cook Inlet, Alaska

Kofinas et al. 2015-023: Subsistence sharing networks and cooperation: Kaktovik, Wainwright, and Venetie, Alaska

Kruse and Johnson 2009-003: Subsistence mapping of Nuiqsut, Kaktovik, and Barrow

McCartney et al. 2018-027: Northern Alaska sea ice project jukebox: phase III

Pulsipher et al. 2018-009: Geographic units for socioeconomic impact analysis in the Gulf of Mexico Region

Reedy-Maschner and Maschner 2012-109: Subsistence study for the North Aleutian Basin

Stephen R. Braund and Associate 2013-212: Aggregate effects of oil industry operations on Iñupiaq subsistence activities, Nuiqsut, Alaska: a history and analysis of mitigation and monitoring

Stephen R. Braund and Associate 2013-211: COMIDA: impact monitoring for offshore subsistence hunting, Wainwright and Point Lay, Alaska

Recreation & Tourism

Brittany et al. 2020-035: Economic and geomorphic comparison of Outer Continental Shelf sand and nearshore sand for coastal restoration projects

Garcia et al. 2012-085: Atlantic region wind energy development: recreation and tourism economic baseline development

Nadeau et al. 2014-660: Measuring county-level tourism and recreation in the Gulf of Mexico region: data, methods, and estimates

Nadeau et al. 2014-661: Assessing the impacts of the *Deepwater Horizon* oil spill on tourism in the Gulf of Mexico Region

Parsons and Firestone 2018-013: Atlantic offshore wind energy development: values and implications for recreation and tourism

Smythe et al. 2018-068: Analyzing the effects of Block Island Wind Farm on tourism and recreation

Snyder et al. 2021-006: Use and limits of ecosystem services valuations in the Gulf of Mexico

J.3 EXCLUSIONS

Hanna Shoal

Berchok et al. 2019-024: Chukchi sea acoustics, oceanography, and zooplankton study: Hanna Shoal Extension (CHAOZ-X) and Arctic Whale Ecology Study (ARCWEST) supplemental report

Boveng and Cameron 2013-01150: Pinniped movements and foraging: seasonal movements, habitat selection, foraging and haul-out behavior of adult bearded seals in the Chukchi Sea

Dunton et al. 2016-047: Chukchi Sea offshore monitoring in drilling area (COMIDA): Hanna Shoal ecosystem study

MBC Applied Environmental Sciences 2007-002: Proceedings of a workshop on Chukchi Sea offshore monitoring in drilling area

Mocklin and Friday 2018-008: Chukchi Sea Acoustics, Oceanography, and Zooplankton Study: Hanna Shoal Extension (CHAOZ-X)

Mueter et al. 2017-077: Arctic Ecosystem Integrated Survey final report on distribution of fish, crab, and lower trophic communities in the Northeastern Bering Sea and Chukchi Sea

Quakenbush et al. 2016-053: Pinniped movements and foraging: village-based walrus habitat use studies in the Chukchi Sea from 2009-2016

Weingartner et al. 2012-079: Application of high frequency radar to potential hydrocarbon development areas in the northeast Chukchi Sea

Weingartner et al. 2017-065: Characterization of the circulation on the continental shelf areas of the Northeastern Chukchi and Western Beaufort Seas

Wooller et al. 2019-030: Identifying sources of organic matter to benthic organisms in the Beaufort and Chukchi Outer Continental Shelves

Chukchi Sea Subsistence Use Area

Kofinas et al. 2015-023: Subsistence sharing networks and cooperation: Kaktovik, Wainwright, and Venetie, Alaska

Quakenbush and Huntington 2009-063: Traditional knowledge regarding bowhead whales in the Chukchi Sea near Wainwright, Alaska

Stephen R. Braund and Associates 2013-211: COMIDA: Impact monitoring for offshore subsistence hunting, Wainwright and Point Lay, Alaska

Chukchi Sea Coastal Buffer

Johnson et al. 90-0028: Use of Kasegaluk Lagoon, Chukchi Sea, Alaska by marine birds and mammals, draft report of 1989-1990 studies

Nuka et al. 2014-657: ShoreZone mapping of the north slope of Alaska final report

Schmutz 2012-078: Monitoring marine birds of concern in the eastern Chukchi nearshore area (loons)

Vollenweider et al. 2016-066: Arctic coastal ecosystems: evaluating the functional role and connectivity of lagoon and nearshore habitats

Point Barrow Area

Bamberger 2007-062: Potential impacts of OCS activities on bowhead whale hunting activities in the Beaufort Sea

Carothers 2013-0015: Subsistence use and knowledge of salmon in Barrow and Nuiqsut, Alaska

Mahoney et al. 2021-019: Measuring wave forces along Alaska's coastal sea ice

Harrison Bay

Hartwell et al. 2017-072: Alaska monitoring and assessment program 2015 National Petroleum Reserve - Alaska estuary survey

Konar and Ravelo 2013-01148: Epibenthic community variability on the Alaskan Beaufort Sea continental shelf

MBC Applied Environmental Sciences 2004-033: Proceedings of a workshop on the variability of Arctic cisco (Qaaktaq) in the Colville River, November 18, 19, and 20, 2003

Murphy et al. 2007-042: Variation in the abundance of Arctic cisco in the Colville River: analysis of existing data and local knowledge: volume 1

Powell 2005-057: Importance of the Alaskan Beaufort Sea to king eiders (*Somateria spectabil*is)

Cross Island

Galginaitis 2005-025: Annual assessment of subsistence bowhead whaling near Cross Island, 2003: ANIMIDA Task 4 annual report

Galginaitis and Funk 2004-030: Annual assessment of subsistence bowhead whaling near Cross Island, 2001 and 2002: ANIMIDA Task 4 final report

Galginaitis 2013-218: Monitoring Cross Island whaling activities, Beaufort Sea, Alaska: 2008-2012 final report, incorporating ANIMIDA and cANIMIDA (2001-2007)

Miller et al. 2006-014: Demographics and behavior of polar bears feeding on bowhead whale carcasses at Barter and Cross Islands, Alaska, 2002-2004

Stephen R. Braud and Associates 2013-212: Aggregate effects of oil industry operations on Iñupiaq subsistence activities, Nuiqsut, Alaska: a history and analysis of mitigation and monitoring

Camden Bay / Kaktovic Area

Dickins et al. 2009-017: Mapping sea ice overflood using remote sensing: Smith Bay to Camden Bay

Kruse and Johnson 2009-003: Subsistence mapping of Nuiqsut, Kaktovik, and Barrow

Powell et al. 2015-045: Sediment characteristics and infauna of deltaic mudflats along the Alaskan Beaufort Sea

Sensitive Underwater Biologic Features

Brooks et al. et al. 2016-021: Exploration and research of northern Gulf of Mexico deepwater natural and artificial hard-bottom habitats with emphasis on coral communities: reefs, rigs, and wrecks - Lophelia II final report, volume I: technical report

Carney 2015-002: Digitization and re-analysis of northern Gulf of Mexico continental slope study seafloor photographs

Carney et al. 2015-051: Biomass and mass balance isotope content of seep populations on the upper slope of Gulf of Mexico determined from archived samples

Carney and Roberts 2015-004: Digital conversion of dive video from fifteen dive seasons

Continental Shelf Associates, Continental Shelf Associates, Inc. 2001-080: Mississippi/Alabama pinnacle trend ecosystem monitoring, final synthesis report

Continental Shelf Associates, Inc. et al. 2007-044: Characterization of northern Gulf of Mexico deepwater hard bottom communities with emphasis on Lophelia coral

Hughes and Locker 2021-069: Identifying sensitive, hardbottom habitat in shallow Federal waters of the Gulf of Mexico: final report

MacDonald 2002: Stability and change in Gulf of Mexico chemosynthetic communities, Volume I: executive summary

Roberts 2001-050: Improved geohazards and benthic habitat evaluations: digital acoustic data with ground truth calibrations

Roberts 2013-222: Improving the predictive capability of 3-D seismic surface amplitude data for identifying chemosynthetic communities

Roberts et al. 2005-067: Mapping areas of hard bottom and other important bottom types: Outer Continental Shelf and upper continental slope

Sammarco 2017-024: Deepwater reconnaissance of potentially sensitive biological features surrounding shelf-edge topographic banks in the northern Gulf of Mexico

Baldwin County Buffer

Carroll et al. 2016-020: An analysis of the impacts of the *Deepwater Horizon* on the seafood industry

Jochens et al. 2002-055: Northeastern Gulf of Mexico chemical oceanography and hydrography: synthesis report

MacDonald et al. 2017-030: Remote sensing assessment of surface oil transport and fate during spills in the Gulf of Mexico

Morandi et al. 2018-031: Environmental sensitivity and associated risk to habitats and species offshore Central California and Hawaii from offshore floating wind technologies--volume 1: final report

Plater 2000-065: Coastal Alabama offshore natural gas economic projection model

Pulsipher et al. 2018-009: Geographic units for socioeconomic impact analysis in the Gulf of Mexico Region

Scott et al. 2001-063: Spatial and temporal variability of plankton stocks on the basis of acoustic backscatter intensity and direct measurements in the northeastern Gulf of Mexico

Simms et al. 2022-021: Social impacts of the *Deepwater Horizon* oil spill on coastal communities along the US Gulf of Mexico

Eastern Gulf of Mexico Coastal Buffer

Luke et al. et al. 2002-024: Socioeconomic baseline and projections of the impact of an OCS onshore base for selected Florida panhandle communities, Volume I: final report

Schroeder and Wood 2000-074: Physical/biological oceanographic integration workshop for the Desoto Canyon and adjacent shelf, October 19-21, 1999

Sturges et al. 2001-103: Northeastern Gulf of Mexico inner shelf circulation study

Zarillo 2008-005: Biological characterization/numerical wave model analysis within borrow sites offshore of the west Florida Coast

Georges Bank

Battelle and Woods Hole 1985-9: Georges Bank benthic infauna monitoring program. Executive summary report for three years of sampling. (July 1981–June 1984)

Bryden and Butman 1983: Seasonal biological observations near the ocean bottom on the southern side of Georges Bank: December 1976 - September 1977

Maciolek-Blake et al. 1985-1: Georges Bank benthic infauna monitoring program. Final report for third year of sampling. Volume 1, final executive summary

Neff et al. 1989: Impacts of exploratory drilling for oil and gas on the benthic environment of Georges Bank

Policansky et al. 1991: The adequacy of environmental information for Outer Continental Shelf oil and gas decisions: Georges Bank

Atlantic Canyons / Biodiversity Strip

CSA Ocean Sciences, Inc. 2019-066: Large submarine canyons of the United States Outer Continental Shelf atlas

Palka and Johnson 2007-033: Cooperative research to study dive patterns of sperm whales in the Atlantic Ocean

Ross et al. 2017: Exploration and research of mid-Atlantic deepwater hard bottom habitats and shipwrecks with emphasis on canyons and coral communities: Atlantic deepwater canyons study, volume I: final technical report

Appendix K: Response to Comments on the Draft Programmatic Environmental Impact Statement

Introduction

BOEM is preparing the next National Outer Continental Shelf (OCS) Oil and Gas Leasing Program (National OCS Program, or Program). On July 8, 2022, the U.S. Department of Interior (USDOI) Bureau of Ocean Energy Management (BOEM) announced the availability of, and requested comments on, the *2023–2028 National OCS Oil and Gas Leasing Program Proposed Program* (Proposed Program) (BOEM 2022b), as well as the *2023–2029 National Outer Continental Shelf Oil and Gas Leasing Program Draft Programmatic Environmental Impact Statement* (Draft Programmatic EIS) (BOEM 2022a). The comment period closed on October 6, 2022.

BOEM received a total of 762,859 public comment submissions in response to the notice (Docket BOEM-2022-0031).[2] This total includes comments received via regulations.gov and public comments submitted by other means (i.e., public meeting, public affairs email, email, or paper). Of the total submissions, 5,283 have been identified as unique (443[3] substantive and 4,840 non-substantive); 748,723 submissions were associated with form letter campaigns; 5,972 were duplicate or not germane; and 2,881 were incomplete.[4]

Of the substantive submissions with unique content, 184 discussed issues related to the Draft Programmatic EIS. The discussions provided by these 184 substantive submissions and form letter campaigns are reflected in this thematic summary report.

Comments were provided from a variety of stakeholders including Federal, state, and local government commenters; elected officials; energy industry; non-energy industry; environmental advocacy groups; and individual commenters. The themes and arguments discussed by the commenters are summarized in this report by issue topic. The footnotes following summary statements provide representative examples of commenters providing particular arguments related to Draft Programmatic EIS issues and are not meant to be exhaustive of each commenter providing a similar argument.

ICF, on behalf of BOEM, analyzed public comments utilizing ICF's CommentWorks® software. As a first step, ICF downloaded and processed electronic copies of the comments submitted to regulations.gov and received via email or mail to import into CommentWorks®. A hierarchical outline was developed to

[2] The total comments reported on regs.gov (762,679) is slightly lower than ICF's total because ICF includes comments from public meetings and the count of signatures in submission BOEM-2022-0031-6564 that is not included in the regs.gov total.
[3] Several substantive commenters submitted 46 additional submissions that only contained reference or supporting material, with no additional comment text. These comments were flagged for "Cites data, reference or publications" but do not appear in this report as they are not coded to an issue. The total count of substantive comments with text included in this report is 397.
[4] A total of 2,881 incomplete submissions containing only the text "A comment" were withheld from posting to www.regulations.gov and not accepted by BOEM.

include key issues provided by BOEM staff on the National OCS Program and the Programmatic EIS. ICF staff reviewed the comment letters, identified the substantive excerpts within each submission ("bracketing"), and used the issue outline to associate each excerpt to the issue(s) to which it applies ("coding"). The product of the bracketing and coding analysis is this comment "excerpt-by-issue report"—a report that is generated in CommentWorks® and includes the *verbatim text* of substantive comment excerpts sorted by issue.

Table K-1 lists the commenters who commented on Programmatic EIS issues.

Table K-1. Index of submissions by commenter name

Submission Number	Commenter Name	Commenter Type
BOEM-2022-0031-DRAFT-5029	Anonymous	Anonymous
BOEM-2022-0031-DRAFT-334017	Alaska Marine Conservation Council (form letter campaign)	Public Interest Groups
BOEM-2022-0031-DRAFT-333760	Alaska Marine Conservation Council	Public Interest Groups
BOEM-2022-0031-DRAFT-282581	Alaska Oil and Gas Association	Energy Exploration & Production Industry and Associations
BOEM-2022-0031-DRAFT-310876	Alaska Survival	Public Interest Groups
BOEM-2022-0031-DRAFT-326138	Alaska Wilderness League (form letter campaign)	General Public
BOEM-2022-0031-TRANS-040	Alaskan Environment	General Public
BOEM-2022-0031-DRAFT-202818	Alliance for Affordable Energy	Public Interest Groups
BOEM-2022-0031-DRAFT-307512	American Petroleum Institute	Energy Exploration & Production Industry and Associations
BOEM-2022-0031-DRAFT-0001	Andrew Isoda	General Public
BOEM-2022-0031-DRAFT-299733	Ann Hill	General Public
BOEM-2022-0031-DRAFT-327510	Aquarium Conservation Partnership	Non-energy Exploration & Production Industry and Associations
BOEM-2022-0031-DRAFT-193310	Ashé Cultural Arts Center and Efforts of Grace, Inc.	Non-energy Exploration & Production Industry and Associations
BOEM-2022-0031-DRAFT-321790	Azul	Public Interest Groups
BOEM-2022-0031-DRAFT-172213	Barbara Albrecht	General Public
BOEM-2022-0031-DRAFT-50276	Beacon Offshore Energy	Energy Exploration & Production Industry and Associations
BOEM-2022-0031-DRAFT-325724	Benjamin Zycher	General Public
BOEM-2022-0031-DRAFT-325652	Biloxi MS National Association for the Advancement of Colored People (NAACP)	Public Interest Groups
BOEM-2022-0031-DRAFT-325572	Boat People SOS Biloxi, MS	Public Interest Groups
BOEM-2022-0031-DRAFT-321362	Boat People SOS Gulf Coast	Public Interest Groups

Submission Number	Commenter Name	Commenter Type
BOEM-2022-0031-DRAFT-326430	bp America Inc.	Energy Exploration & Production Industry and Associations
BOEM-2022-0031-DRAFT-16409	Bruce Northridge	General Public
BOEM-2022-0031-DRAFT-5101	Carrizo Comecrudo Tribe of Texas	Tribes and Tribal Organizations
BOEM-2022-0031-DRAFT-321806	Carroll Campbell	General Public
BOEM-2022-0031-1145	Catawba Indian Nation	Tribes and Tribal Organizations
BOEM-2022-0031-DRAFT-332526	Center for Biological Diversity	Public Interest Groups
BOEM-2022-0031-DRAFT-11009	Chambers County Commissioner Precinct 4	Local Governments
BOEM-2022-0031-DRAFT-321477	Cherokee Concerned Citizens	Public Interest Groups
BOEM-2022-0031-DRAFT-299628	Chevron	Energy Exploration & Production Industry and Associations
BOEM-2022-0031-DRAFT-48922	Chispa TX	General Public
BOEM-2022-0031-DRAFT-304440	Christopher Lish	General Public
BOEM-2022-0031-DRAFT-253651	Clean Water Action	Public Interest Groups
BOEM-2022-0031-TRANS-066	Climate Action California	General Public
BOEM-2022-0031-TRANS-053	CO_2 Coalition	General Public
BOEM-2022-0031-DRAFT-326233	Coastal Coordination Program, The Ocean Foundation	Public Interest Groups
BOEM-2022-0031-DRAFT-296765	Consumer Energy Alliance	Public Interest Groups
BOEM-2022-0031-DRAFT-329723	Cook Inletkeeper	Public Interest Groups
BOEM-2022-0031-DRAFT-328006	Cook Inletkeeper (form letter campaign)	General Public
BOEM-2022-0031-DRAFT-13822	CT General Assembly 146th District	State-level Elected Officials
BOEM-2022-0031-DRAFT-8855	CT General Assembly's 146th House District	State-level Elected Officials
BOEM-2022-0031-DRAFT-307417	Deandra Holcomb	General Public
BOEM-2022-0031-DRAFT-311078	Defenders of Wildlife	Public Interest Groups
BOEM-2022-0031-DRAFT-320923	Delaware Department of Natural Resources and Environmental Control	Governors and State Agencies
BOEM-2022-0031-DRAFT-0351	Denise Keeton (form letter campaign)	General Public
BOEM-2022-0031-DRAFT-0111	Donald Sutherland	General Public
BOEM-2022-0031-DRAFT-70658	Donna Aderhold	General Public
BOEM-2022-0031-DRAFT-257440	Dr. R. Dean Grubbs	General Public
BOEM-2022-0031-DRAFT-297090	Earth Ethics, Inc.	Public Interest Groups
BOEM-2022-0031-DRAFT-2953	Earthjustice	Public Interest Groups
BOEM-2022-0031-DRAFT-327495	Earthjustice, et al.	Public Interest Groups
BOEM-2022-0031-6280	Education, Economics, Environmental, Climate and Health Organization (EEECHO)	Public Interest Groups

Submission Number	Commenter Name	Commenter Type
BOEM-2022-0031-DRAFT-24530	Edward Inman (form letter campaign)	General Public
BOEM-2022-0031-DRAFT-326675	Ella Holmes Hines	Local Governments
BOEM-2022-0031-DRAFT-274314	Environment America	Public Interest Groups
BOEM-2022-0031-DRAFT-274112	Environment America (form letter campaign)	Public Interest Groups
BOEM-2022-0031-DRAFT-326472	U.S. Environmental Protection Agency (USEPA)	Federal Agencies
BOEM-2022-0031-DRAFT-328005	Equinor Gulf of Mexico LLC	Energy Exploration & Production Industry and Associations
BOEM-2022-0031-DRAFT-323658	Erin Hazel	General Public
BOEM-2022-0031-DRAFT-323670	Evergreen Action	Public Interest Groups
BOEM-2022-0031-DRAFT-181452	Florida Department of Environmental Protection	Governors and State Agencies
BOEM-2022-0031-DRAFT-269361	Florida Offshore Drilling Coalition et al. (form letter campaign)	Public Interest Groups
BOEM-2022-0031-DRAFT-326964	FracTracker Alliance	Public Interest Groups
BOEM-2022-0031-DRAFT-1390	Friends of Casco Bay	Public Interest Groups
BOEM-2022-0031-DRAFT-302317	Friends of the Earth	Public Interest Groups
BOEM-2022-0031-DRAFT-298587	Friends of the Earth U.S.	Public Interest Groups
BOEM-2022-0031-DRAFT-334016	Gene Yaw	General Public
BOEM-2022-0031-DRAFT-57999	Glass Half Full	General Public
BOEM-2022-0031-DRAFT-325517	Global Energy Institute - U.S. Chamber of Commerce	Non-energy Exploration & Production Industry and Associations
BOEM-2022-0031-DRAFT-7083	Grant Bixby	General Public
BOEM-2022-0031-DRAFT-297890	Greater Lafourche Port Commission/Port Fourchon	Local Governments
BOEM-2022-0031-DRAFT-321096	Gregory Mitchell	General Public
BOEM-2022-0031-DRAFT-298603	Gulf Economic Survival Team (GEST)	Public Interest Groups
BOEM-2022-0031-DRAFT-327203	Gulf Energy Alliance	Energy Exploration & Production Industry and Associations
BOEM-2022-0031-DRAFT-327779	Healthy Gulf (form letter campaign)	Public Interest Groups
BOEM-2022-0031-DRAFT-326727	Helena Moreno	Local Governments
BOEM-2022-0031-DRAFT-321802	Hess Corporation	Energy Exploration & Production Industry and Associations
BOEM-2022-0031-DRAFT-295328	Hornbeck Offshore	Non-energy Exploration & Production Industry and Associations
BOEM-2022-0031-DRAFT-283019	Innisfree Hotels	Non-energy Exploration & Production Industry and Associations

Submission Number	Commenter Name	Commenter Type
BOEM-2022-0031-DRAFT-322476	Institute for Energy Research	Public Interest Groups
BOEM-2022-0031-DRAFT-326674	Institute for Policy Integrity at New York University School of Law	Public Interest Groups
BOEM-2022-0031-DRAFT-282467	International Marine Mammal Project of Earth Island Institute	Public Interest Groups
BOEM-2022-0031-DRAFT-93244	Island Operating	Non-energy Exploration & Production Industry and Associations
BOEM-2022-0031-6299	Jane Smith	General Public
BOEM-2022-0031-6292	Jayme Kusyk	General Public
BOEM-2022-0031-DRAFT-237091	Jennifer Brahier	Local Governments
BOEM-2022-0031-DRAFT-186608	Jewish Youth Climate Movement	Non-energy Exploration & Production Industry and Associations
BOEM-2022-0031-DRAFT-322840	John Beard Jr.	General Public
BOEM-2022-0031-DRAFT-77537	John Locke Foundation	Public Interest Groups
BOEM-2022-0031-DRAFT-323701	John Nixon	General Public
BOEM-2022-0031-6668	John White, Cheyenne Fouts Hope Hyde	General Public
BOEM-2022-0031-DRAFT-321575	Johnny DuPree	General Public
BOEM-2022-0031-DRAFT-275316	Joint sign-on comment from coastal business alliances across the country	Non-energy Exploration & Production Industry and Associations
BOEM-2022-0031-DRAFT-5035	Julianna Garreffa	General Public
BOEM-2022-0031-DRAFT-0017	Julie Dugan	Public Interest Groups
BOEM-2022-0031-DRAFT-304587	K. T.	General Public
BOEM-2022-0031-DRAFT-88122	Kenaitze Indian Tribe	Tribes and Tribal Organizations
BOEM-2022-0031-DRAFT-57473	Kevin Soter (form letter campaign)	General Public
BOEM-2022-0031-DRAFT-307284	Kristen Schlemmer	General Public
BOEM-2022-0031-DRAFT-110448	Laila Myksvoll	General Public
BOEM-2022-0031-TRANS-142	Lisa Scharin	General Public
BOEM-2022-0031-6308	Lois Gray	General Public
BOEM-2022-0031-DRAFT-276273	Louisiana Just Recovery Network	Public Interest Groups
BOEM-2022-0031-DRAFT-298586	Louisiana Mid-Continent Oil & Gas Association	Energy Exploration & Production Industry and Associations
BOEM-2022-0031-TRANS-144	Lower Cook Inlet	General Public
BOEM-2022-0031-DRAFT-172322	Luke Metzger	General Public
BOEM-2022-0031-DRAFT-53012	Marc Huysmans	General Public
BOEM-2022-0031-DRAFT-325741	Marine Mammal Commission (MMC)	Federal Agencies
BOEM-2022-0031-TRANS-108	Marissa Wilson	General Public

Submission Number	Commenter Name	Commenter Type
BOEM-2022-0031-DRAFT-228384	Maryland Ornithological Society	Public Interest Groups
BOEM-2022-0031-TRANS-025	Matthew Mrkustic	General Public
BOEM-2022-0031-DRAFT-275336	Melissa Martin	General Public
BOEM-2022-0031-DRAFT-205698	Michigan Manufacturer's Association	Non-energy Exploration & Production Industry and Associations
BOEM-2022-0031-DRAFT-320792	Mid-Atlantic Regional Council on the Ocean	State-level Elected Officials
BOEM-2022-0031-DRAFT-322843	Miriam Goldstein	General Public
BOEM-2022-0031-DRAFT-270957	Mississippi Rising Coalition	Public Interest Groups
BOEM-2022-0031-DRAFT-325448	Mississippi State Conference NAACP Environmental and Climate Justice Committee	Public Interest Groups
BOEM-2022-0031-6286	Multiple Scientists (form letter campaign)	Other
BOEM-2022-0031-DRAFT-306353	Mystic Aquarium	Other
BOEM-2022-0031-DRAFT-299495	National Ocean Industries Association	Energy Exploration & Production Industry and Associations
BOEM-2022-0031-DRAFT-325821	National Parks Conservation Association	Public Interest Groups
BOEM-2022-0031-DRAFT-4210	National Youth for the Climate Emergency	General Public
BOEM-2022-0031-DRAFT-327225-02	Natural Resources Defense Council	Public Interest Groups
BOEM-2022-0031-DRAFT-327225	Natural Resources Defense Council	Public Interest Groups
BOEM-2022-0031-DRAFT-204706	Neil McQueen	General Public
BOEM-2022-0031-6282	Neil McQueen	General Public
BOEM-2022-0031-6279	National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS)	Federal Agencies
BOEM-2022-0031-DRAFT-0063	Nora Coyle	General Public
BOEM-2022-0031-DRAFT-322078	North Gulfport Community Land Conservancy	Public Interest Groups
BOEM-2022-0031-DRAFT-328463	NRDC	Public Interest Groups
BOEM-2022-0031-DRAFT-328456	Ocean Conservancy	Public Interest Groups
BOEM-2022-0031-DRAFT-325963	Oceana	Public Interest Groups
BOEM-2022-0031-6284	OCS Governors Coalition	Governors and State Agencies
BOEM-2022-0031-DRAFT-273054	Offshore Operators Committee	Energy Exploration & Production Industry and Associations
BOEM-2022-0031-6310	Pat McCarthy	General Public
BOEM-2022-0031-DRAFT-201631	Pennsylvania Petroleum Association	Non-energy Exploration & Production Industry and Associations

Submission Number	Commenter Name	Commenter Type
BOEM-2022-0031-DRAFT-182574	QuarterNorth Energy LLC	Energy Exploration & Production Industry and Associations
BOEM-2022-0031-DRAFT-86472	Red Willow Offshore, LLC / Southern Ute Indian Tribe	Tribes and Tribal Organizations
BOEM-2022-0031-DRAFT-322055	Rethink Energy Florida	Public Interest Groups
BOEM-2022-0031-DRAFT-303612	Ridgewood Energy Corporation	Energy Exploration & Production Industry and Associations
BOEM-2022-0031-DRAFT-192211	Rio Grande Foundation	Non-energy Exploration & Production Industry and Associations
BOEM-2022-0031-DRAFT-0264	Ruth Kastner	General Public
BOEM-2022-0031-DRAFT-24749	Ryan Maxwell	General Public
BOEM-2022-0031-DRAFT-58155	San Antonio Bay Estuarine Waterkeeper	Public Interest Groups
BOEM-2022-0031-DRAFT-0079	Sandra Couch	General Public
BOEM-2022-0031-DRAFT-326404	Sanibel-Captiva Conservation Foundation	Public Interest Groups
BOEM-2022-0031-TRANS-072	Sanibel-Captiva Conservation Foundation	Public Interest Groups
BOEM-2022-0031-TRANS-097	Satchel Pondolfino	General Public
BOEM-2022-0031-DRAFT-321532	Sea Turtle Conservancy	Public Interest Groups
BOEM-2022-0031-DRAFT-125627	Seattle Aquarium	Non-energy Exploration & Production Industry and Associations
BOEM-2022-0031-TRANS-064	Seldovia Nature Tours	General Public
BOEM-2022-0031-DRAFT-326186	Shell Offshore Inc.	Energy Exploration & Production Industry and Associations
BOEM-2022-0031-DRAFT-322214	Ship Island Excursions	Non-energy Exploration & Production Industry and Associations
BOEM-2022-0031-DRAFT-274203	Society of Native Nations	Tribes and Tribal Organizations
BOEM-2022-0031-DRAFT-246261	South Louisiana Economic Council	Public Interest Groups
BOEM-2022-0031-DRAFT-328775	Southern Alliance for Clean Energy	Public Interest Groups
BOEM-2022-0031-DRAFT-326454	Southern Environmental Law Center et al.	Public Interest Groups
BOEM-2022-0031-DRAFT-15742	St. Mary Parish Economic Development Agency	Public Interest Groups
BOEM-2022-0031-DRAFT-329760	State of Alaska	Governors and State Agencies
BOEM-2022-0031-DRAFT-325695	Steps Coalition, Gulfport MS	Public Interest Groups
BOEM-2022-0031-DRAFT-325718	Stone County MS NAACP	Public Interest Groups
BOEM-2022-0031-TRANS-055	Stop Offshore Drilling in the Atlantic	General Public
BOEM-2022-0031-DRAFT-327337	Surfrider Foundation (form letter campaign)	Public Interest Groups
BOEM-2022-0031-DRAFT-326131	Surfrider Foundation	Public Interest Groups

Submission Number	Commenter Name	Commenter Type
BOEM-2022-0031-DRAFT-324233	Surfrider Foundation FL Chapter Network	Public Interest Groups
BOEM-2022-0031-DRAFT-300125	Susitna River Coalition	Public Interest Groups
BOEM-2022-0031-DRAFT-323668	Talos Energy Inc.	Energy Exploration & Production Industry and Associations
BOEM-2022-0031-DRAFT-327439	Tania Spurkland	General Public
BOEM-2022-0031-DRAFT-321883	Taproot Earth	Public Interest Groups
BOEM-2022-0031-1149	Taproot Earth, The Center for Biological Diversity, et al.	Public Interest Groups
BOEM-2022-0031-DRAFT-10729	Terrebonne Parish Government	Local Governments
BOEM-2022-0031-DRAFT-5121	Terrebonne Port Commission (form letter campaign)	Non-energy Exploration & Production Industry and Associations
BOEM-2022-0031-DRAFT-328712	Texas Caucus on Climate, Environment & Energy	State-level Elected Officials
BOEM-2022-0031-DRAFT-159078	Texas NAACP State Conference	Public Interest Groups
BOEM-2022-0031-DRAFT-325500	The Center for Biological Diversity, et al. (form letter campaign)	Public Interest Groups
BOEM-2022-0031-DRAFT-202385	The Gas and Oil Association of WV, Inc.	Energy Exploration & Production Industry and Associations
BOEM-2022-0031-DRAFT-326379	The Heritage Foundation	General Public
BOEM-2022-0031-DRAFT-0121	The Rachel Carson Council (form letter campaign)	Public Interest Groups
BOEM-2022-0031-DRAFT-15652	Tim Maurer (form letter campaign)	General Public
BOEM-2022-0031-DRAFT-317872	True Transition	Public Interest Groups
BOEM-2022-0031-DRAFT-91569	Turtle Island Restoration Network	Public Interest Groups
BOEM-2022-0031-6301	Village of Cimarron	Local Governments
BOEM-2022-0031-DRAFT-192238	Voces Unidas Rio Grande Valley	Public Interest Groups
BOEM-2022-0031-DRAFT-77369	West Virginia Manufacturers Association (form letter campaign)	Non-energy Exploration & Production Industry and Associations
BOEM-2022-0031-DRAFT-64307	William Strader (form letter campaign)	General Public

Section 28 – Comments Related to the Draft Programmatic EIS

Cross references **in bold** refer to text, figures, and tables in this Final Programmatic EIS.

Section 28.1 – General Draft Programmatic EIS Comments

Summary of Comments

A couple commenters made general comments on the Draft Programmatic EIS, including one commenter who described what must be included in a Programmatic EIS and its mandatory requirements.[5] Another commenter critiqued BOEM's Draft Programmatic EIS analysis, asserting that BOEM failed to analyze the full costs associated with its Proposed Program by omitting key factors from its analysis. According to the comment, these factors include consideration of

- How climate change will impact various OCS resources
- The costs of all greenhouse gas (GHG) emissions caused by more leasing
- The cumulative impacts of all Federal oil and gas leasing
- Significant methane emissions from offshore drilling operations in the Gulf of Mexico (GOM)

The commenter also said that BOEM failed to

- Properly account for the extinction crisis that is exacerbated by more fossil fuel development
- Properly consider or analyze the risks of catastrophic oil spills and other accidents
- Consider costs associated with onshore infrastructure that supports OCS oil and gas activity
- Properly consider the costs of carbon capture and sequestration (CCS)
- Properly consider or analyze the increased harmful impacts from offshore fracking and other well stimulation techniques that increase the numerous harms inherent in offshore oil and gas drilling

The commenter concluded that BOEM's Draft Programmatic EIS greatly underestimates the significant harms of the proposed offshore oil and gas development, particularly given the scale of acreage proposed.[6]

Source of Comments

- *Public Interest Group*

Response to Comments

BOEM prepared the Draft Programmatic EIS using the format of the National Environmental Policy Act (NEPA) to inform decisions pursuant to Section 18 of the OCS Lands Act. The Draft Programmatic EIS included detailed analysis of potential impacts of the Proposed Action and alternatives. Additional

[5] Oceana
[6] Center for Biological Diversity

information on the topics identified by the commenter can be found in the locations indicated below in the Final Programmatic EIS:

- Climate change is discussed in detail in **Section 2.2**.
- Greenhouse gas emissions, including methane, are discussed in detail in **Sections 2.2** and **4.1.3**.
- The analyses in the Draft Programmatic EIS and Final Programmatic EIS were conducted in accordance with current NEPA regulations and the Council on Environmental Quality (CEQ) guidance. As such, cumulative impacts consider the contribution of the potential impacts of the Proposed Action to the past, present, and reasonably foreseeable future activities in the action area. Cumulative impacts are described in **Section 4.3**.
- BOEM is concerned about the potential impacts of oil spills on the environment and human uses of the environment. Oil spills are discussed in **Section 4.6**.
- General impacts of onshore infrastructure were analyzed throughout the Draft Programmatic EIS and Final Programmatic EIS under the lighting and bottom/land disturbance impact-producing factors (IPFs). Specific detail on onshore development, such as locations of ports and support, construction, and processing facilities, would require details that are unknown at the programmatic level and would be analyzed at the lease sale stage EIS.
- The primary IPF of concern related to well stimulation activities, including offshore fracking, under the 2024–2029 National OCS Oil and Gas Leasing Program (2024–2029 Program) would be discharges of well completion and enhanced recovery fluids, which are discussed under the routine discharges IPF in **Section 4.1.3**.
- CCS is considered a reasonably foreseeable activity on the OCS and is discussed **in Section 2.4.2** but is not subject to the decisions on oil and gas leasing being made here. Available information regarding processes, facilities, and supporting activities presently is insufficient to assess the potential impacts of CCS activities and how they might interact with stressors and activities and IPFs resulting from the 2024–2029 Program. BOEM will continue to monitor new information developed on potential CCS activities on the OCS and incorporate it into subsequent analyses as appropriate.

Section 28.1.1 – NEPA

Summary of Comments

Approximately 15 submissions provided comments on NEPA generally. A few commenters affirmed BOEM's obligations under NEPA.[7]

NEPA Analysis

A couple commenters stated that a Programmatic EIS is not necessary because the Proposed Program does not have significant impacts. One of the commenters agreed with the Draft Programmatic EIS

[7] USEPA; Oceana; Surfrider Foundation

assertion that BOEM is not legally required to perform a NEPA review for the National OCS Program under the OCS Lands Act.[8]

On the other hand, one commenter asserted BOEM has failed to comply with the legal requirements of NEPA, citing legal decisions. The commenter stated that the cumulative impacts analysis provided by BOEM was not sufficiently comprehensive.[9] Specifically, the commenter said that BOEM has "not identified the amount of threatened and endangered species habitat that will be temporarily and permanently impacted by the Program," consisting of habitat affected by oil and gas infrastructure assets, "including but not limited to drilling platforms, terminals, pipelines, storage facilities, and processing plants." The commenter added that the Draft Programmatic EIS failed to adequately evaluate the direct, indirect, and cumulative impacts of "oil spills to marine mammals, fish, migratory birds, and invertebrates."[10]

On the topic of oil and gas infrastructure, another commenter remarked that, although NEPA analysis assumes an equilibrium of activity, meaning that as new infrastructure is installed, old infrastructure is removed, the Government Accountability Office has "revealed that there has actually been an accumulation" of this infrastructure. To rectify this, the commenter recommended that BOEM require that "all pipelines be removed and operators clear the seafloor of all obstructions created by the lease and the pipeline right-of-way operations."[11]

A couple commenters asserted that BOEM did not fully consider vulnerable species in the Draft Programmatic EIS. The commenters stated that the Rice's whale is neither referenced in the Proposed Program nor in the impacts analysis, alternatives analysis, cumulative effects analysis, or analysis of potential exclusions.[12] A commenter added that noise pollution was not adequately analyzed in the Draft Programmatic EIS, explaining that "[s]ound disturbances during the exploration and operation phases are indirect effects of the Program" and, as such, require a NEPA analysis.[13]

The commenter suggested that BOEM "discuss acoustic modeling techniques in later analyses, but not too far into subsequent stages such that the findings are rendered unserviceable to marine species." The group said that the EIS should include "the effects of seismic surveys, infrastructure construction, vessel traffic and other activities associated with implementing the Program." The commenter listed several specific recommendations, adding that BOEM should perform the following:

- Analyze each distinct activity that will contribute to noise pollution in each programmatic area
- Assess these activities cumulatively, which includes comparing the proximity and timing of frequencies, together with similar offshore wind development-related activities
- Survey and analyze the best available scientific data on the sound-sensitivity of specific marine mammal populations, such as Rice's whale

[8] Chevron; American Petroleum Institute
[9] Natural Resources Defense Council; Center for Biological Diversity
[10] Natural Resources Defense Council
[11] True Transition
[12] Natural Resources Defense Council; Oceana
[13] Natural Resources Defense Council

- Combine these analyses to create conclusions about the impacts noise pollution will have on specific marine mammal species[14]

A couple commenters concluded that BOEM did not sufficiently consider reasonable alternatives under NEPA.[15]

Other NEPA Requirements and Comments

A couple commenters asserted that the public notice period provided for the Draft Programmatic EIS was insufficient under NEPA,[16] and opportunities for public participation were insufficient under NEPA. Specifically, a commenter requested that BOEM extend the comment period for both the Proposed Program and the Draft Programmatic EIS by at least 45 days to fulfill BOEM's duty under NEPA to "encourage and facilitate public involvement in decisions which affect quality of the human environment."[17] Another commenter urged BOEM to re-issue the Draft Programmatic EIS for further public comment.[18] A different commenter agreed with this sentiment, adding that a supplemental Draft Programmatic EIS should be reissued to allow the public to adequately comment on significant new information, including Federal action such as the Inflation Reduction Act (IRA), as required by NEPA.[19]

Similarly, a commenter stated that BOEM did not properly consult with Tribes, fishers, and other affected users as required by NEPA.[20] A group of commenters likewise asserted that BOEM did not adequately involve the public, adding that holding "only four virtual hearings in the proposed format" is not sufficient.[21]

A couple commenters asserted that the Draft Programmatic EIS improperly relied on the social cost of carbon because there are "legal and procedural problems with the metric," citing several reports and legal decisions.[22] [Refer to **Section 28.1.11** for further discussion of the social cost of greenhouse gases (SC-GHG).]

A couple commenters asserted that BOEM's decision to exclude estimates of upstream and midstream GHG emissions resulting from higher foreign oil production is arbitrary and capricious, citing several legal decisions and discussing Executive Order (EO) 13990.[23]

Another commenter argued that, to comply with the Administrative Procedure Act (APA), BOEM must consider the negative environmental impacts that will result from "limiting leasing in the OCS." The commenter concluded that, because oil and gas leasing funds the Land and Water Conservation Fund

[14] Natural Resources Defense Council
[15] Natural Resources Defense Council; Oceana
[16] Natural Resources Defense Council; Earthjustice
[17] Earthjustice
[18] Natural Resources Defense Council
[19] Oceana
[20] Coastal Coordination Program, The Ocean Foundation
[21] Taproot Earth, The Center for Biological Diversity, et al. (Form Letter Master)
[22] Global Energy Institute - U.S. Chamber of Commerce; Chevron
[23] Natural Resources Defense Council; J. White & C. Fouts & H. Hyde

(LWCF), which supports the protection of Federal public lands and waters, "restricting" lease sales could limit funding to the LWCF.[24]

Sources of Comments

- *Federal Agencies*
- *Public Interest Groups*
- *Energy Exploration & Production Industry and Associations*
- *Non-energy Exploration & Production Industry and Associations*

Response to Comments

Public Engagement: BOEM's Draft Programmatic EIS and Final Programmatic EIS were prepared under the framework of NEPA to inform decisions pursuant to the OCS Lands Act. BOEM conducted the analyses and public comment period in accordance with NEPA regulations and CEQ guidance.[25] As such, cumulative impacts consider the contribution of the potential impacts of the Proposed Action to the past, present, and reasonably foreseeable future activities in the action area. Although 40 CFR 1506.11 requires a public comment period of at least 45 days, BOEM held a 90-day public comment period for the Draft Programmatic EIS. Additionally, BOEM held public meetings on the Draft Programmatic EIS, established a public website, and provided notice on the BOEM website as well as through the USEPA and the *Federal Register*. **Section 5.3** outlines the steps BOEM took to notify interested parties of the opportunity to comment.

BOEM regularly engages and invites government-to-government consultation with federally recognized Tribes on agency activities that may have Tribal implications. BOEM further encourages all community members, including non-federally recognized Tribes and other Indigenous groups, to engage in the NEPA process by participating in public meetings and submitting oral or written comments. BOEM also conducts community-specific outreach with communities potentially affected by the Proposed Action to hear concerns and answer questions. The established NEPA and consultation processes are BOEM's best avenue for identifying specific concerns. Additionally, for future actions that may affect historic properties eligible for listing on the National Register of Historic Places, BOEM welcomes additional Tribal input as interested parties through the Section 106 process of the National Historic Preservation Act.

NEPA Adequacy: To inform the Secretary of the Interior's (Secretary) decision on the size, timing, and location of leasing for the upcoming National OCS Program, the Final Programmatic EIS provides a high-level analysis of the types of impacts that may occur as a result of oil and gas activities. Potential impacts from leases issued during a given five-year period are not expected to change based on the timing of a sale within that timeframe. Therefore, the alternatives in the Final Programmatic EIS are focused on where leasing could occur (size and location). In addition, the analysis includes consideration of potential exclusion areas where appropriate. The alternatives are reasonable and appropriate to the

[24] Global Energy Institute - U.S. Chamber of Commerce
[25] The Notice of Intent for this Programmatic EIS was issued prior to revisions to the CEQ regulations in 2020 and 2022; therefore, the 1978 regulations in 40 CFR Chapter V, as amended in 1986 and 2005, apply to this Final Programmatic EIS.

decision at hand. Subsequent NEPA analyses will consider additional spatial or temporal measures that could serve to reduce impacts based on site-specific information that is not known at this stage of the National OCS Program.

IRA and Re-Issuing the Draft Programmatic EIS & Proposed Program: BOEM finds that the available information regarding the IRA does not justify BOEM re-issuing the Draft Programmatic EIS and a revised Proposed Program analysis. NEPA does not apply to Congressional decisions. The IRA was signed into law on August 16, 2022, after publication of the Draft Programmatic EIS. BOEM has since updated the Final Programmatic EIS analysis to integrate the Energy Information Administration's (EIA) *2023 Annual Energy Outlook* (AEO), which published in March 2023 (EIA 2023a). The 2023 AEO accounts for the impacts from many, but not all, aspects of the IRA provisions on energy market projections.

The timing of the Draft and Final Programmatic EIS preparation is driven by legislation and decisions made prior to the IRA. The timing of the sales under the National OCS Program being considered by the Final Programmatic EIS is potentially impacted by requirements within the IRA itself, but timing has limited consequence on the onset and duration of expected impacts. The OCS Lands Act requires the Secretary to schedule lease sales over five-year periods that best meet national energy needs for that period. Lastly, the IRA requires that, as conditions for issuing any "lease for offshore wind development," the Department hold "an offshore [oil and gas] lease sale during the 1-year period ending on the date of the issuance of the lease for offshore wind development" and "the sum total of acres offered for lease in offshore [oil and gas] lease sales during the 1-year period ending on the date of the issuance of the lease for offshore wind development is not less than 60,000,000 acres" (IRA, Section 50265(b)(2)). In general, therefore, the IRA does not preclude the consideration of the Proposed Program. Rather, it predicates continued OCS offshore wind leasing on a particular rate of OCS oil and gas leasing. Thus, the IRA makes continued OCS oil and gas leasing over the next 10 years a prerequisite to continue implementing OCS renewable energy leasing.

SC-GHG: BOEM notes that its analysis meets the *National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change* (CEQ interim guidance; 88 Fed. Reg. 1196) issued January 9, 2023, on the consideration of GHG emissions and climate change. The guidance recommends that

> "…agencies provide additional context for GHG emissions, including through the use of the best available social cost of GHG (SC-GHG) estimates, to translate climate impacts into the more accessible metric of dollars, allow decision makers and the public to make comparisons, help evaluate the significance of an action's climate change effects, and better understand the tradeoffs associated with an action and its alternatives."

Foreign Oil's Midstream and Downstream Emissions: BOEM presents extensive discussion of gaps in the foreign emissions analysis in the Final Programmatic EIS. BOEM provides expert reasoning as to why the gaps exist, the hurdles to closing those gaps, and a developed approach to narrow those gaps. The final analysis is presented in Chapter 2 of the *Economic Analysis Methodology for the 2024–2029 National Outer Continental Shelf Oil and Gas Leasing Program* (Final EAM) (BOEM 2023b). BOEM

continues to advance and refine its foreign emissions analysis and will use updated methodology as appropriate for future analyses.

Leasing Revenue and Support of LWCF: Revenue from oil and gas leasing on the OCS supports many specific communities and programs, and adds to the general fund of the Treasury. The Great American Outdoors Act, signed into law in August 2020, authorized $900 million annually in permanent funding for the LWCF. The LWCF also receives additional funding through the Gulf of Mexico Energy Security Act (GOMESA) revenue sharing. Not holding lease sales would result in an end to bonus bids, and rental receipts would steadily decline as existing leases expire or transition into production status, where they no longer generate rental income (leases in production would generate royalties). However, royalties constitute the largest share of OCS revenues, and BOEM expects these would experience only a slight-to-moderate decrease in the short term given the length of time before production begins on new leases. BOEM received over $6 billion in royalty revenue in fiscal year (FY) 2022.

Impacts to Threatened and Endangered Species Habitat and Oil Spills: The level of detail requested be included in the Final Programmatic EIS by the commenter for threatened and endangered species habitat and impacts from oil spills is not available at the national program stage. The Final Programmatic EIS discusses the types of impacts that could occur both to threatened and endangered species and associated habitat if oil and gas activities were to occur. The exact location of leasing and the potential levels of activity will be analyzed in detail at subsequent NEPA stages. Similarly, the Final Programmatic EIS discusses the types of impacts that could occur as a result of an oil spill but additional information and analysis about where oil may spread and the direct, indirect, and cumulative impacts of an oil spill to marine mammals, fish, migratory birds, and invertebrates is analyzed in additional detail in subsequent NEPA stages where more specific information about the location and level of activity is available.

Rice's Whale: In the Draft Programmatic EIS, BOEM referred to the Gulf of Mexico whale as Rice's whale, the primary common name used by NMFS. BOEM updated the document to reflect that the species may also be known as the Gulf of Mexico whale. Rice's whale is discussed specifically in Final Programmatic EIS in the impacts and alternatives analysis and is generally addressed as part of the larger category of "marine mammals" in the cumulative analysis. The exclusion relevant to the Rice's whale is found in **Appendix I**. As defined by NMFS, the core distribution area of this species is found within the Eastern GOM. Based on a compilation of 181 sightings from NMFS marine mammal vessel and aerial survey sightings, the Rice's whale primary core habitat is considered to be in the northeastern GOM, centered over the De Soto Canyon in waters between 150 m and 410 m depth (Farmer et al. 2022; Patricia E. Rosel et al. 2021). The core distribution area is almost entirely encompassed by the area withdrawn from consideration for leasing under Section 12(a) of the OCS Lands Act. Further consideration of this species is conducted in regional environmental analyses and in consultation with NMFS, which allows for subject matter experts to consider *2024–2029 National Outer Continental Shelf Oil and Gas Leasing Proposed Final Program* (PFP) (BOEM 2023a) activities and species in greater detail. The analysis in the PFP considers factors related to environmental impacts cross-referenced in the Final Programmatic EIS and used by the decision maker when considering the Section 18 analysis in total.

Noise Pollution and Acoustic Modeling: The Final Programmatic EIS analyzes IPFs, including noise, that could occur throughout the lifecycle of a lease, including during the exploration and operation phases. **Table 2-11** of the Final Programmatic EIS provides an overview of the types of noise that could occur as a result of oil and gas leasing. The Final Programmatic EIS considers the high-level pathways through which impact to marine animals could occur but is not activity specific. Given that the specific location of leasing is not known as this stage, BOEM does not conduct acoustic modeling during program development at the national level. The Programmatic EIS does discuss the types of activities that can produce noise impacts and considers the impacts of noise from ongoing and planned activities in addition to the those that could result from program activities. BOEM's Environmental Studies Program (ESP) funds research related to information gaps, including any related to acoustic impacts to marine mammals such as Rice's whale. Finally, the consideration of species-by-species impact is appropriate at subsequent stages of NEPA review when the level and location of leasing activities are better known.

Pipeline Removal Requirements: Consideration of a requirement to remove pipelines and clear the seafloor of all obstructions is not within the scope of this Final Programmatic EIS, which is to identify the timing and location of leasing for a given five-year period. The potential impacts associated with pipeline emplacement, removal, or abandonment will be addressed at subsequent lease sale stages.

Section 28.1.2 – Presentation and Formatting

Summary of Comments

Three submissions provided comments regarding the Draft Programmatic EIS presentation and formatting.

One commenter[26] generally commented that many of the references in the Draft Programmatic EIS "seem to be outdated" and asked BOEM to replace them with more current references to ensure the citations contain accurate and up-to-date information. Specifically, the commenter recommended using updated numbers in Section 2.5.5 on page 79 either from 2019 reports or Marine Economy Satellite Account 2020 data, providing links.

The commenter provided the following suggestions, linking data where indicated:

- Section 2.6.5 Human Environment: "R. 13 Culture: Discussion of subsistence activities in the Gulf of Alaska should include marine mammals (Steller sea lions, harbor seals), not just subsistence fishing. Subsistence fishing is also important in the Eastern Bering Sea ecoregion."
- Page 99, Current Conditions (Figure 3-2): Recommend updating to most recent data (2019)
- Page 102, paragraph 3: Replace Alliutiiq with Alutiiq: (Alutiiq Museum c2020)
- Section 2.7.5, page 116, Current Conditions (Figure 3-6): Recommend updating to 2019 data
- Section 2.8.3, page 127, paragraph 1: Replace habit with habitat, i.e., "provide important habitat"

[26] NOAA NMFS

- Section 2.8.5, Current Conditions (Figure 3-10): Recommend updating data
- Section 2.9.5, page 148, R.15 **RECREATION & TOURISM**: Recommend updating data

Other commenters said that, going forward, "the simplified treatment of areas of significant uncertainty may create the impression of greater certainty regarding impacts (or lack thereof) than is possible and risks an uneven presentation of impacts."[27] One of the commenters specified that "in Appendix G, Table G-1, the last two columns on the right side of the table are in the wrong order. The table (from left to right) shows decreasing release volumes with increasing probability of occurrence." The commenter requested that BOEM correct the order of the columns to avoid misinterpretation.[28]

Source of Comments

- *Federal Agencies*
- *Energy Exploration & Production Industry and Associations*

Response to Comments

BOEM checked the references in the Draft Programmatic EIS and updated them, when appropriate, for the Final Programmatic EIS.

Section 28.1.3 – Purpose and Need

Summary of Comments

Three submissions provided comments regarding the Draft Programmatic EIS purpose and need statement.

A couple commenters concluded that the Draft Programmatic EIS purpose and need statement was flawed because it is too narrow to satisfy NEPA, citing *Carmel-by-the-Sea v. U.S. Department of Transportation*.[29] One of the commenters elaborated that the purpose and need is inadequate because BOEM "considered an unreasonably narrow range of alternatives."[30] Another commenter contended that it is "arbitrarily narrow" and "based on an irrational assumption about the nation's energy needs," concluding that BOEM should broaden its purpose and need statement to allow for net-zero energy alternatives.[31] Similarly, a different commenter recommended that BOEM provide a more robust and accurate discussion in the purpose and need statement of the economic analysis, "particularly its long-term demand for offshore oil and gas development consistent with existing Federal and state policy," to reflect the most recent U.S. EIA projections for oil and gas as well as renewables.[32]

Source of Comments

- *Public Interest Groups*
- *Federal Agencies*

[27] Chevron; American Petroleum Institute
[28] American Petroleum Institute
[29] Natural Resources Defense Council; Center for Biological Diversity
[30] Center for Biological Diversity
[31] Natural Resources Defense Council
[32] USEPA

Response to Comments

The development of the National OCS Program and its proposed schedule of lease sales are driven by the OCS Lands Act. They are further informed by the IRA, the agenda of the Administration, and various stakeholders. The purpose of the action is to fulfill portions of the requirement to conduct an analysis under Section 18 of the OCS Lands Act. The analyses in the Programmatic EIS provide information and context to the Secretary to meet her need to analyze identified factors and inform her decision on whether, where, and when to schedule oil and gas leases for an upcoming five-year period. The onus on the Secretary is to balance her decision in light of the information presented in the PFP and the Final Programmatic EIS in order to best meet the Nation's energy needs.

The OCS Lands Act requires the Secretary to develop a schedule of oil and gas lease sales over five-year periods to best meet national energy needs for that period. Refer to Section 1.3 of the PFP for more detail.

With regard to net-zero goals, BOEM has included an analysis of net-zero pathways in Chapter 4 of the Final EAM. This net-zero analysis is incorporated by reference in the PFP. This chapter also includes results of a sensitivity analysis considering how progress towards net-zero goals might impact BOEM's other analyses. The chapter provides context to the Secretary and stakeholders of how OCS leasing fits into a future aligned with net-zero goals beyond those provisions included in the IRA.

Section 28.1.4 – Alternatives and Impact Comparison

Summary of Comments

Approximately 10 submissions provided comments regarding the Draft Programmatic EIS alternatives and impact comparison.

Alternative A (No Action Alternative): Several commenters expressed support for Alternative A, the No Action Alternative,[33] because it aligns with the Administration's net-zero carbon emissions goals.[34] One commenter concurred, suggesting that BOEM encourage utilization of existing leases instead of offering up new areas.[35]

Other commenters critiqued BOEM's analysis of the No Action Alternative compared to the analysis of the other alternatives, with one commenter calling the Draft Programmatic EIS analysis "faulty" in this regard.[36] Another commenter asserted that BOEM failed to perform a quantitative net benefits analysis that assumes a net-zero pathway, instead assuming a "business-as-usual" scenario. The commenter remarked that the Draft Programmatic EIS underestimation of renewables transition affects the alternative impacts by assuming that oil and gas would be imported instead. The commenter exhorted BOEM to factor in the IRA and other recent laws and policies that point to an expedited transition to

[33] Mystic Aquarium; A. Isoda
[34] Surfrider Foundation FL Chapter Network; Surfrider Foundation; Sanibel Captiva Conservation Foundation
[35] Sanibel Captiva Conservation Foundation
[36] Oceana

renewables in the near-term in the U.S.[37] One commenter also recommended that BOEM consider and discuss whether the IRA's link between offshore wind and oil and gas development would necessitate an updated alternatives analysis or different choice of preferred alternative. The commenter suggested the Programmatic EIS may need clarification on how any oil and gas leasing requirements, such as those in Section 50264 of the IRA, relate to the alternatives proposed.[38]

Along those lines, a couple commenters specifically critiqued BOEM's MarketSim analysis, which, they wrote, assumes the current trajectory of oil and gas production and GHGs will continue through 2050. The commenters characterized this assumption as unrealistic.[39] One of the commenters recommended that BOEM "clarify whether it is using the most up-to-date EIA reference case for predictions of future energy consumption, or if current consumption patterns are fixed for the modeling."

Citing legal decisions, a commenter remarked that BOEM failed to consider a reasonable range of alternatives as required by NEPA, explaining that a renewable energy alternative is necessary. The commenter remarked that the assumption in the Draft Programmatic EIS that GHG emissions "would occur at a similar rate for both the leasing and no leasing scenarios is arbitrary and capricious."[40] A different commenter agreed, adding that BOEM did not include in its analysis the potential for renewable energy jobs created by projects "that do not industrialize the coast, impede access to our coast, or for projects that develop wetlands, an effective nature-based, carbon sequestration tool."[41]

Alternative B: A couple commenters expressed support for Alternative B or B(a).[42] One of the commenters criticized BOEM's assumption that more lease sales will necessarily equal more environmental impacts, reasoning that lease sales do not always translate to successful exploration and development, and do not always lead to environmental impact.[43]

A commenter also criticized the Draft Programmatic EIS for not providing adequate distinction between Alternative B and Alternative B(a), which the commenter described as similar—the former including 6 planning areas while the second includes 11.[44]

Other Comments on Alternatives and Alternatives Analysis: A couple commenters urged BOEM to consider revisions they proposed as necessary to provide a complete understanding of the costs and benefits of all alternatives. The commenters suggested that, if this is not possible, BOEM should omit the cost-benefit analysis entirely in order to present more well-balanced information. As an example, the commenters described the Draft Programmatic EIS as treating vessel traffic as a significant environmental impact for leasing alternatives and faulted the analysis for not acknowledging that vessel

[37] Surfrider Foundation
[38] USEPA
[39] USEPA; Center for Biological Diversity
[40] Natural Resources Defense Council
[41] Azul
[42] Chevron; American Petroleum Institute
[43] American Petroleum Institute
[44] Natural Resources Defense Council

traffic would remain significant even under the No Action Alternative. Both commenters urged BOEM to disclose to the public "severe economic and social impacts of the no action alternative."[45]

Source of Comments

- *General Public*
- *Public Interest Groups*
- *Energy Exploration & Production Industry and Associations*
- *Federal Agencies*

Response to Comments

Alternative A (No Action Alternative): BOEM has noted the commenter's support for Alternative A, the No Action Alternative.

Cost-Benefit Analysis: BOEM revised the cost-benefit discussion in the Final Programmatic EIS to articulate more clearly its relationship to the alternatives and to the decision on the size, timing, and location of leasing.

Energy Markets Modeling, Renewables, Energy Transition, and the IRA: For those areas of the Final Programmatic EIS that rely on EIA data for the No Action Alternative, BOEM's analysis has been updated in the Final Programmatic EIS to be based on the 2023 AEO (EIA 2023a). The projections of the 2023 AEO account for certain provisions within the IRA. Previously available AEOs were produced prior to the IRA being passed. This Final Programmatic EIS is the first opportunity for BOEM to incorporate the IRA into its baseline.

BOEM has also performed analysis of potential net-zero pathways in Chapter 4 of the Final EAM, which is incorporated by reference within this Final Programmatic EIS where appropriate. Chapter 4 of the Final EAM provides a qualitative discussion on domestic net-zero pathways and trends in energy transition. In addition, the chapter also describes results of sensitivity testing performed by BOEM as to how BOEM's net benefits and GHG modeling might differ as the U.S. makes progress towards its net-zero goals.

The alternatives included in the Final Programmatic EIS relate specifically to the decision being made, which is the size, timing, and location of oil and gas leasing during a specified five-year period. Scheduling a wind sale does not meet that purpose and need and therefore is not an alternative requiring analysis. The link between offshore wind leasing and offshore oil and gas leasing does not affect the potential environmental effects of oil and gas leasing as analyzed in the Final Programmatic EIS. The alternatives and associated impact analysis disclose the effects of either no new oil and gas leasing or leasing on the OCS.

Claim of Arbitrary and Capricious: BOEM undertakes significant analysis outlined in Chapter 2 of the Final EAM to consider the potential GHG emissions from the leasing and no leasing scenarios. Given the modeled energy market substitutions and the potential emissions from upstream, midstream, and

[45] Chevron; American Petroleum Institute

downstream, these emissions do not result in a substantial difference between alternatives domestically. However, as noted in the Final Programmatic EIS, at a global scale, Alternative A results in fewer GHG emissions.

BOEM also recognizes some uncertainty in the calculation of these estimates and the impact of several different assumptions in the final model results. BOEM makes clear that there is the potential for significant changes in the future. BOEM has no ability to account for all the potential changes that might impact future energy consumption and acknowledges the analytical baseline. BOEM includes more information about uncertainties that could impact the analysis in Chapter 4 of the Final EAM, as well as a sensitivity analysis regarding how future energy use may impact the modeling results.

Renewable Energy Jobs: BOEM finds this comment out of scope of the Final Programmatic EIS. The alternatives included in the Final Programmatic EIS relate specifically to the decision being made, which is the location of oil and gas leasing during a specified five-year period.

Alternative B: BOEM acknowledges in the Final Programmatic EIS that leasing activities do not always occur as result of a lease sale. However, the Alternative B analysis considers the impact of a scenarios where all lease sales lead to successful exploration and development activities because if there is more leasing, then there would be commensurate additional impacts.

The commenter mischaracterized the number of planning areas in Alternative B(a) in the Draft Programmatic EIS. Alternative B included six planning areas, and Alternative B(a) included a subset (four planning areas) of Alternative B—the Western, Central, and a small portion of the Eastern GOM Planning Areas as well as a portion of the Cook Inlet Planning Area. Although Alternatives B and B(a) were similar, Alternative B included a larger geographic area than Alternative B(a). Alternative B(a) included only the areas identified in the Proposed Program and thus potentially would have had fewer environmental impacts than Alternative B.

Other Comments on Alternatives and Alternatives Analysis: BOEM revised the cost-benefit discussion in the Final Programmatic EIS to articulate more clearly its relationship to the alternatives and to the decision on the size, timing, and location of leasing. Regarding significant impacts under the No Action Alternative, both the Draft and the Final Programmatic EIS acknowledge that there are ongoing activities and processes that may have consequential effects on the resources that may also be impacted by new oil and gas leasing activities. However, in analyzing these impacts for significance under NEPA, the analysis focuses on the incremental contribution of program activities to the baseline.

Section 28.1.5 – Mitigations

Summary of Comments

Two commenters provided a list of recommendations regarding mitigations, including the following:

- BOEM should “review the comments provided by NOAA Fisheries in 2021 on the Draft EIS for proposed Cook Inlet Lease Sale 258 and update the mitigation measures” in this section

accordingly, as well as incorporate any more recent discussions between BOEM Alaska Region and NOAA Fisheries regarding "LS 258 (which will soon be undergoing Section 7 consultation)."

- In Appendix F.3.3, *Modifying Operations to Protect Unique Biological Populations (Cook Inlet Planning Area)*, Cook Inlet Planning Area bullet: BOEM should update Lease Sale 244 stipulations and mitigation measures with those of LS 258, as they would be a more appropriate reference, because they are more current and consider new scientific information that was not available when LS 244 underwent NEPA.
- In Appendix F.3.4, *Protection of Beluga Whales (Cook Inlet Planning Area)*: the commenter recommended that, based on new aerial survey data (from a study funded by BOEM), this seasonal prohibition should be extended through April 30 to prevent impacts to spring feeding and migrating belugas in the Tuxedni Bay area and around Kalgin Island. The commenter also made this recommendation during a meeting with BOEM Alaska Region on 8/11/2022 and BOEM documented this recommendation in meeting notes.
    - Regarding the phrase "[t]o protect nearshore feeding, the lessee, its operators, and subcontractors are prohibited from conducting any on-lease marine seismic surveys between July 1 and September 30 of each year," the commenter requested that BOEM "see the LS 258 DEIS" because this "measure is specific to certain blocks within the lease sale area."
    - Regarding the Cook Inlet Planning Area bullet referencing Lease Sale 244, as recommended above, the commenter suggested that BOEM update this in the Final Programmatic EIS for LS 258 if it is issued before the final Draft Programmatic EIS.[46]

A commenter concluded that the Draft Programmatic EIS failed to adequately consider mitigation measures as defined by the CEQ. Citing court cases, the commenter remarked that agencies must discuss mitigation "in sufficient detail to ensure that environmental consequences have been fairly evaluated," and that a "mere listing of mitigation measures" does not suffice for the reasoned discussion required by NEPA. The commenter added that BOEM's discussion of mitigation measures is inadequate because there are many other mitigation strategies beyond lease stipulations that [they say] BOEM has not adequately considered, such as "activity management, spatial management, and temporal management."[47] The commenter provided examples of each of these types of recommended mitigation strategies:

Activity Management

- Phasing out the use of drilling muds that have toxic chemical compositions
- Implementing protocols to reduce adverse acoustic impacts to marine mammals, such as "soft-start" or "ramp-up" rules that require airgun power to be slowly increased to allow marine mammals to vacate the area before full power is reached

[46] NOAA NMFS
[47] Natural Resources Defense Council

- Prohibiting disused infrastructure from being dumped or left in place and instead requiring onshore disposal of equipment

Spatial Management

- Excluding oil and gas development in particularly vulnerable areas
- Using available technology, such as "mapping through remote sensing, habitat suitability models, and ground-truthing by seafloor observations and collections," to map sensitive and biologically abundant areas and for avoidance when deploying oil and gas assets in these environments
- Establishing and monitoring regional reference sites to identify "'normal' benthic conditions" to compare the effects to sites with drilling operations

Temporal Management

- Restricting seismic operations "along marine mammal migration routes or within known feeding or breeding grounds …. during aggregation or migration periods in order to reduce the probability of marine mammals being present in the area during the survey"
- Using soft-start procedures during daylight hours to ensure observers can monitor the area for species
- Delaying drilling near reefs during spawning periods
- Responding to oil spill emergencies more quickly during spawning seasons

The commenter also suggested including specific mitigation measures to minimize harm to Rice's whale.

In addition to the mitigation measures listed above, the commenter recommended that BOEM add lease stipulations to minimize adverse impacts to the marine environment and climate change. Examples of these lease stipulations included requiring lessees to report on the project's emissions during all phases of development and mandating a decommissioning agreement.[48]

The commenter also expressed concern regarding mitigations measures as they relate to vulnerable coastal communities and low-income communities. Citing CEQ environmental justice guidance, the commenter recommended that BOEM update the proposed mitigation measures to highlight the interests and concerns of vulnerable coastal communities. The commenter separately recommended that BOEM publish an environmental justice technical report identifying impacts to the minority and low-income populations that will be affected by the Program. The commenter also encouraged BOEM to confer with these communities to "co-develop" mitigations measures, develop an "adaptive management plan," and conduct effectiveness monitoring to track whether the measures are producing their intended outcome. The commenter listed environmental justice-focused mitigation techniques

[48] Natural Resources Defense Council

identified by a Federal Interagency Working Group "Promising Practices" report and suggested BOEM employ these techniques to reduce adverse impacts to coastal communities.[49]

Source of Comments

- *Federal Agencies*
- *Public Interest Groups*

Response to Comments

BOEM has addressed comments by NOAA on Cook Inlet Lease Sale 258 through selection of alternatives and implementation of mitigations in the Record of Decision for Lease Sale 258. NOAA comments are also being addressed through ongoing Endangered Species Act (ESA) Consultation with that agency. The Record of Decision for Lease Sale 258 combined multiple alternatives described in the Final EIS and included two alternatives not considered in Lease Sale 244, the Beluga Whale Critical Habitat Exclusion Alternative and the Northern Sea Otter Critical Habitat Exclusion Alternative. All beluga whale critical habitat was excluded from Lease Sale 258, and the extension of the prohibition on seismic surveys through April 30 is no longer necessary. **Appendix F.3** has been updated with these new mitigations.

Mitigations are implemented through legally binding, contractual provisions known as lease stipulations, which are developed during each individual lease sale's process. The lease becomes effective after both the lessee and BOEM signs the lease. Because the lease stipulations are contractual, the stipulations from the later Lease Sale 258 are not able to be transferred to Lease Sale 244. When Plans of Exploration or Development and Production Plans are submitted for the leases associated with Lease Sale 244, BOEM, through its environmental review and approval processes, will consider all impacts and could require appropriate mitigation measures to reduce those impacts through conditions of individual plan approvals. The mitigations could implement measures resulting from new information discovered since completion of the Lease Sale 244 Final EIS.

As explained in **Appendix F**, mitigations are not being adopted as part of the decision for the National OCS Program. **Appendix F** provides a representative sample of lease stipulations and other protective environmental measures typically applied at subsequent National OCS Program stages.

The analysis included in the Final Programmatic EIS is being used to decide the size, timing, and location of leasing in a specified five-year period for the National OCS Program. The analysis in the Final Programmatic EIS discloses the potential impacts of activities that could occur as a result of leasing. However, at this stage of decision-making, BOEM only considers mitigation measures that affect the size, timing, and location of leasing (i.e., exclusions). Consideration of other mitigation measures is appropriate at the lease sale stage, when the specific location and levels of proposed activities are clearly defined.

BOEM appreciates the recommendations regarding development of mitigation measures related to impacts on vulnerable coastal communities, including the recommendation to engage with communities

[49] Natural Resources Defense Council

on potential mitigations. BOEM will consider the recommendations in subsequent leasing and development stages. Coordination with communities on impacts and mitigations can provide meaningful input at later stages. For example, BOEM adopted seasonal timing restrictions on construction and vessel activities as a condition of approval of the Liberty Development and Production Plan to reduce impacts to subsistence-harvest activities for an Alaska Native community. The mitigation measure was developed based on input by the community during BOEM's review process. Regarding the recommendation for an environmental justice technical report, at this programmatic stage, BOEM does not identify specific communities that may be impacted by oil and gas activities, but rather the types of impacts that could occur. Subsequent NEPA reviews would include environmental justice analyses to describe the affected environment and impacts at a regional or local scale. BOEM also studies environmental justice issues through the ESP, e.g., *Environmental Justice: A Comparative Perspective in Louisiana* (Hemmerling and Colten 2017) and an ongoing study, *Environmental Justice Technical Workshops for the Gulf of Mexico Region*.

Section 28.1.6 – BOEM's Proposed Exclusions

Summary of Comments

A commenter expressed support for BOEM's proposed exclusion of the Mid- and South Atlantic Planning Areas from the 2023–2028 Program due to the "uniqueness, sensitivity, and importance of the geographical, geological, and ecological characteristics of the Mid- and South Atlantic OCS and adjacent coast." The commenter added that, because the benefits that offshore development might confer on local economies—and regional or national energy markets—would be minimal and injury to the Atlantic OCS and adjacent areas could be significant, these areas should be excluded from the Proposed Program. The commenter listed other reasons for removal of these planning areas, including the economic significance of tourism in the adjacent states. Citing a report, a commenter also explained that oil and gas development in the Atlantic Planning Areas would interfere with national security activities, "including Department of Defense ("DOD") operations at Norfolk Naval base in Virginia, the Virginia Capes Operations Area stretching from Delaware to North Carolina, the U.S. Navy's undersea warfare training range, and King's Bay Naval Submarine Base in Georgia. The Norfolk Naval Station is the world's largest Navy base, and the U.S. Navy and other branches of the U.S. military area regard the Atlantic as critical for training and testing."[50]

Source of Comments

- *Public Interest Groups*

Response to Comments

BOEM has noted the commenter's support for the proposed exclusion of the Mid- and South Atlantic Planning Areas from the 2023–2028 Program.

[50] Southern Environmental Law Center

Section 28.1.7 – Recommendations for Additional Exclusions

No substantive comments are associated with this issue.

Section 28.1.7.1 – Recommendations Exclusions for Planning/Program Area or Larger

No substantive comments are associated with this issue.

Section 28.1.7.2 – Recommended Exclusions Smaller than a Planning (or Program) Area

Summary of Comments

A commenter remarked that if any new leases must be agreed upon contractually, low-income communities, communities of color, Tribal lands, and marine protected areas must be completely off limits for such leases. The commenter recommended that any new leases "must include a significant buffer zone of 125 miles from the coast of the program area in which the leases are proposed." The commenter also urged BOEM to include the strongest worker protection standards.[51]

Source of Comments

- *Public Interest Groups*

Response to Comments

BOEM considered numerous exclusion areas in the Final Programmatic EIS. The suggestion for a 125-mi coastal buffer in any program area in which leases are proposed (including an Atlantic buffer and buffers within the Eastern GOM) is addressed in part by analyses captured in the Final Programmatic EIS. However, BOEM will continue to assess potential impacts at subsequent stages of leasing and can better identify appropriate measures to mitigate impacts to coastal communities based on the specific locations of leasing activities, should they occur. Safety of operations on the OCS falls under the jurisdiction of the Bureau of Safety and Environmental Enforcement (BSEE).

Section 28.1.8 – Withdrawals

No substantive comments are associated with this issue.

Section 28.1.9 – Stressors

Summary of Comments

Two submissions provided comments regarding stressors.

One commenter said that BOEM did not fully consider industrial noise as a potential stressor on coastal and estuarine, marine benthic, or marine pelagic habitats. The commenter stated that this analysis

[51] Azul

suggests that BOEM would exclude impacts on acoustic habitat as an environmental factor in its leasing decisions, and that such an omission would be inconsistent with the best available science.[52]

The same commenter stated that the sound produced by airgun shots, while distinctly impulsive within kilometers or tens of kilometers of the source, can sound virtually continuous at greater distances due to the effects of reverberation and multi-path propagation, with little diminution of the acoustic signal within the inter-pulse interval. The commenter stated that the potentially enormous scale of this acoustic footprint can raise ambient noise levels and mask whale calls from distances of thousands of kilometers.[53]

Furthermore, the commenter remarked that the Draft Programmatic EIS should have analyzed the Program's contributing stressors that would aggravate existing health conditions in minority and low-income communities. The commenter said that the Draft Programmatic EIS did not analyze the existing baseline health conditions and vulnerabilities for distinct coastal communities.[54]

A commenter offered the following suggestions for Section 2.4.2 of the Draft Programmatic EIS regarding stressors:[55]

- Vessel Traffic (A.3): Another example relevant to the Proposed Program could be the risk of vessel collisions to Rice's whales in the GOM: https://www.fisheries.noaa.gov/species/rices-whale
- Other Federal Activities (A.10): BOEM could provide a link to the Aquaculture Opportunity Area website: https://www.fisheries.noaa.gov/national/aquaculture/aquaculture-opportunity-areas

Source of Comments

- *Public Interest Groups*
- *Federal Agencies*

Response to Comments

Noise was considered by BOEM as a component of the following stressors—vessel traffic, recreation and tourism, marine mineral extraction, renewable energy, and other Federal activities. Noise also is analyzed as an IPF in the document and discussed for coastal, estuarine, marine benthic, and pelagic resources. The stressors that include noise as a consideration are identified for each resource category in the affected environment under the future baseline conditions.

The purpose of the impact analysis in the Final Programmatic EIS is to provide a high-level perspective on the pathways of impact that could occur from the IPFs associated with oil and gas activities. The type of acoustic analysis that the commenter references is not possible without specific activity levels and locations. That assessment is done at later stages in the oil and gas leasing process.

[52] Natural Resources Defense Council
[53] Natural Resources Defense Council
[54] Natural Resources Defense Council
[55] NOAA NMFS

BOEM has added information on tools and indices of interrelated health factors published by Federal agencies responsible for collecting and publishing data on human health to the affected environment section of the Final Programmatic EIS. Some additional information about existing pollution-related health burdens has been added to the applicable sections of the impact analysis of the Final Programmatic EIS. BOEM will further consider stressors that could aggravate existing health conditions in minority and low-income communities at a later stage in the process.

The suggestions for Section 2.4.2 of the Draft Programmatic EIS regarding stressors were incorporated into the Final Programmatic EIS.

Section 28.1.10 – Climate Change

Summary of Comments

Approximately 2,930 submissions provided comments regarding climate change.

Leasing Would Increase Climate Change and General Concerns Regarding Climate Change: Many commenters, including a form letter campaign, expressed concern that BOEM's plan to approve 11 new sales of offshore leases for fossil fuels would increase carbon emissions in the atmosphere and worsen climate change and climate change impacts including increased sea levels, ocean acidification, decreased marine biodiversity, increased and exacerbated droughts, increased global temperature, agricultural losses, intensified storms and hurricanes, and increased climate migration.[56] Commenters, including a form letter campaign, said that to stay within the 1.5° C goal of the Paris Agreement, no new fossil fuel facilities can be developed, and existing fossil fuel production must be phased out.[57] Some commenters stated that, according to the Intergovernmental Panel on Climate Change, carbon emissions must drop to zero by 2050 to limit the worst impacts of global climate change.[58]

One commenter urged BOEM to study the impacts of more carbon release on climate change.[59] A commenter remarked that if Secretary Haaland signals no reduction in the rate of leasing, industry would receive no signal that the U.S. is planning actively to meet CO_2 reduction targets. However, if the Secretary were to signal a reduced or zero offering of leases, industry would be forced to begin to adapt.[60] Multiple commenters expressed disappointment that President Biden promised to end new leasing for oil and gas drilling in U.S. waters, yet the Administration is proposing the next National OCS Program.[61]

One commenter asserted that, in the last 23 years, the impacts of climate change have gone from only global in nature to "demonstrably local" and added that, because of these more localized effects, BOEM

[56] Jewish Youth Climate Movement; CT General Assembly 146th District; Seattle Aquarium; Texas Caucus on Climate, Environment & Energy; Surfrider Foundation FL Chapter Network; Louisiana Just Recovery Network; Multiple Scientists (Form Letter Master); Taproot Earth; C. Lish; T. Maurer (Form Letter Master); C. Campbell
[57] The Center for Biological Diversity, et al. (Form Letter Master); Natural Resources Defense Council; Clean Water Action; Evergreen Action
[58] Aquarium Conservation Partnership; Taproot Earth
[59] North Gulfport Community Land Conservancy
[60] J. Smith
[61] C. Campbell; CT General Assembly's 146th House district; Oceana; Ocean Conservancy; Evergreen Action

must consider the emissions-related impacts of oil and gas leasing at the national program development phase.[62]

Leasing Would Not Increase Climate Change: Some commenters requested that BOEM finalize the National OCS Program and include the maximum number of offshore lease sales. Regarding climate change, the commenters said that GOM production is among the least carbon intensive in the world, and ending Federal oil and gas leasing in the GOM could increase global upstream emissions as U.S. energy demand would be partially satisfied by imports from foreign producers with a greater carbon footprint.[63] Similarly, one commenter remarked that obtaining oil and natural gas from the OCS has a lower carbon footprint than many alternative forms of energy production and thus has a net positive impact on climate change. The commenters stated that BOEM has projected that most of the energy that would replace OCS oil and natural gas production under a no-lease scenario would come from foreign oil and natural gas production with higher GHG production intensity, and, thus, a robust leasing program would have meaningful climate benefits.[64]

One commenter stated that companies in the offshore oil and gas supply chain play a key role in investing in, scaling, and deploying low-carbon solutions. The commenter stated that these companies are making investments and directly participating in decarbonization efforts such as CCS, geothermal, hydrogen, and deployment of technologies in operations that reduce emissions, and that the industry is a key funder of zero- and low-carbon energy development and deployment. The commenter concluded by stating that the future success of decarbonization efforts depends upon continued revenue generation from companies in the oil and gas sector.[65]

Revisions of, Criticisms of, or Recommendations for the Programmatic EIS: One commenter stated that BOEM improperly omitted consideration and discussion of the myriad ways in which climate change effects flowing directly from the Proposed Program would impact wildlife, fisheries, and habitats both within the respective ecoregions and across all ecoregions. The commenter stated that, in the Proposed Program, BOEM instead limited the potential impacts it considered to sound, noise, traffic, accidental spills, habitat disturbance, air quality, artificial light, and oil spills. In the Draft Programmatic EIS, the commenter stated that BOEM limited its discussion of oil and gas impacts to noise, traffic, routine discharges, bottom/land disturbance, emissions, lighting, visible infrastructure, and space-use conflicts. The commenter said that omitting consideration of climate change allowed the agency to paint an incomplete picture of substantial harms implementation of the Proposed Program would inflict on marine environments. For example, the commenter stated that climate change-induced sea level rise would lead to irreparable harm for many coastal habitats, yet BOEM stated that "[o]nly oil spills were assumed to potentially impact coastal habitats."[66]

[62] J. White & C. Fouts & H. Hyde
[63] Michigan Manufacturer's Association; The Gas and Oil Association of WV, Inc.
[64] Global Energy Institute - U.S. Chamber of Commerce
[65] National Ocean Industries Association
[66] Center for Biological Diversity

The same commenter said that what is also arbitrary is BOEM's temporal limitation of future conditions in its consideration of the affected environment. Specifically, BOEM stated that "[i]mpacts of leasing under the 2023–2028 Program may occur for 40 to 70 years, depending on the region, into the future." Contrary to BOEM's assertion, the commenter stated that the impacts of leasing under the 2023–2028 Program would occur well beyond 40 to 70 years. A large fraction of the CO_2 emitted to date would remain in the atmosphere for tens to hundreds of thousands of years. Thus, the commenter stated, climate change resulting from GHGs emitted from the Proposed Program, and the impacts those changes would have on wildlife, fisheries, ecosystems, and humans, would last for thousands of years. Furthermore, the commenter remarked that BOEM's analysis failed to properly account for the costs of marine species extinction from climate change and other stressors.[67]

A commenter offered the following comments on Section 2.2 of the Draft Programmatic EIS regarding climate change:[68]

- The impact of GHGs and climate change on the marine ecosystem in Alaska is measurable and irrefutable and should be better represented in the Final Programmatic EIS. NMFS has publicly available scientific information that more accurately represent that discussion.
- GOM Region example: no mention of offshore megafauna. It is not clear whether they were considered under this climate change section.

The same commenter provided the following recommendations for Section 2.4 of the Draft Programmatic EIS regarding resources, stressors, and IPFs:[69]

- Descriptions of baseline and impacts of stressors (non-project related, such as climate change and ocean acidification) and IPFs on resources (including marine mammals) are very general and could benefit from more current detail and discussion.
- The objective of the EIS is to identify whether IPFs are likely to be potentially significant in all planning areas, likely to be potentially significant in some planning areas, not expected to be significant, or likely to have no interaction with marine mammals.
- Possibilities of mitigation are raised, but specific impacts and mitigation recommendations would be made when project-specific details become available.
- There are no analytical models provided for estimated disturbances or population-level effects.

One commenter expressed concern with BOEM's substitution analysis, stating that the agency's current analysis understated the potential climate impacts of OCS leasing by disregarding the likelihood that the U.S. and foreign nations would take additional actions to mitigate climate change. The commenter said that, according to BOEM's net benefits analysis, the vast majority of the climate pollution that result from OCS leasing still would occur under a no-lease scenario because substitute sources of oil and gas would take the place of the forgone OCS production. Yet the commenter said, as BOEM acknowledged,

[67] Center for Biological Diversity
[68] NOAA NMFS
[69] NOAA NMFS

this finding is predicated on the assumption that the U.S. and other nations would remain heavily reliant on fossil fuels in the coming decades and would fail to meet their international climate commitments, resulting in an abundance of substitute fossil fuel sources. The commenter stated that BOEM could quantitatively model energy substitution under a range of future pathways and, in doing so, would likely find that OCS leasing has far greater climate consequences than the agency currently acknowledges.[70]

A commenter remarked that the Draft Programmatic EIS should be reviewed to ensure consistency in the assumptions related to present and future climate change policies adopted as the U.S. transitions to a net-zero energy economy. The commenter said that, for example, the Draft Programmatic EIS appeared to assume that these policies may have a greater impact under Alternative A, but there is no support for the assumption that selection of the No Action Alternative would contribute more to energy substitutions driven by climate change policies. The commenter stated that this assumption was baseless and exacerbated by conflicting assumptions employed elsewhere in the Draft Programmatic EIS when evaluating the potential impacts of the action alternatives, that energy production would occur at "the high activity level unless otherwise noted." The commenter stated that BOEM should ensure that the assumptions concerning both energy production levels, energy demand, and renewable energy production resulting from current and future climate change policies are applied equally in evaluating each alternative.[71]

One commenter stated that the Proposed Program would violate the Administrative Procedure Act because BOEM's new position is an unexplained and unacknowledged departure from its prior treatment of environmental issues in similar circumstances. Furthermore, the commenter said that the SC-GHG estimates do not provide a useful tool for assessing "significant" environmental impacts of a proposed project, as the SC-GHG estimates reflect a monetary value in an attempt to represent a suite of global socioeconomic impacts that are far removed in time and space from the proposed project or program; the commenter stated that these estimates cannot be used to assess a particular environmental impact.[72]

A commenter said that BOEM failed to quantify the climate impacts of offshore oil and gas leasing. The commenter remarked that the Draft Programmatic EIS used the word "temperature" 71 times, but BOEM failed to estimate the temperature impact of the 2023–2028 National OCS Oil and Gas Leasing Program itself. The commenter asserted that not estimating the temperature impact of the leasing program itself or the 2023–2028 Program, in particular, is contrary to the requirements of NEPA because NEPA requires a detailed statement on "the environmental impact of the proposed action."[73]

Source of Comments

- *Public Interest Groups*
- *Federal Agencies*
- *Non-energy Exploration & Production Industry and Associations*

[70] Institute for Policy Integrity at New York University School of Law
[71] American Petroleum Institute
[72] Global Energy Institute - U.S. Chamber of Commerce
[73] Institute for Energy Research

- *State-level Elected Officials*
- *Other (Multiple Scientists)*
- *General Public*
- *Energy Exploration & Production Industry and Associations*
- *Tribes and Tribal Organizations*
- *Anonymous*
- *Local Governments*

Response to Comments

Climate Change Impacts: BOEM acknowledges the potential impacts of climate change in **Sections 2.2 and 2.4.2** in the regions being considered for leasing, as well as the contribution of GHGs in **Section 2.2**. BOEM's examples are not intended to cover all the effects of climate change on the OCS and nearby onshore areas. This discussion is only intended to give the reader an idea as to the spatial range and resource range that are being impacted by climate change. As it relates to the analysis of resources, climate change is discussed throughout the document. BOEM estimates GHG emissions from all offshore activity, processing and consumption of the extracted fuels, and their substitutes if new leasing does not take place. BOEM then applies the Interagency Working Group on the Social Cost of Greenhouse Gases' (IWG's) estimates of the SC-GHGs to those emissions. To the extent climate change related costs are captured in the IWG's SC-GHGs, they are captured in BOEM's social cost of greenhouse gas analysis.

Substitution Analysis and Incorporation of Policy Within the Baseline Assumed by Models: For those areas of the Final Programmatic EIS that rely on EIA data for the No Action Alternative, BOEM updated the analysis in this Final Programmatic EIS to be based on the 2023 AEO (EIA 2023a). The projections of the 2023 AEO account for certain provisions within the IRA. Previously available AEOs were produced prior to the IRA being passed. BOEM has also performed analysis of potential net-zero pathways in Chapter 4 of the Final EAM, which are incorporated by reference within this Final Programmatic EIS where appropriate.

Appropriateness of Including SC-GHGs: BOEM notes that its analysis meets the CEQ interim guidance (issued January 9, 2023) on the consideration of GHG emissions and climate change. The guidance recommends that:

> "…agencies provide additional context for GHG emissions, including through the use of the best available social cost of GHG (SC-GHG) estimates, to translate climate impacts into the more accessible metric of dollars, allow decision makers and the public to make comparisons, help evaluate the significance of an action's climate change effects, and better understand the tradeoffs associated with an action and its alternatives."

Climate change is a global phenomenon to which GHGs, such as those produced by oil and gas development and consumption, contribute substantially. The Final Programmatic EIS discusses at a high level how resources are affected by climate change and acknowledges the connection between GHG emissions and global climate change. However, the incremental contribution to climate change and associated incremental impacts of climate change of one program to a given resource cannot be

determined with any specificity, so BOEM relies upon disclosure of the overall effects of climate change on environmental resources.

Section 28.1.11 – GHG Emissions and Social Cost of Greenhouse Gas Emissions (SC-GHG) Analysis

Summary of Comments

Approximately 46,550 submissions provided comments concerning GHG or SC-GHG emissions analysis.

Support

Many commenters, including form letter campaigns, generally commented that GOM oil production is less carbon or GHG intensive than other forms of energy production.[74] Several of these commenters cited Wood Mackenzie emissions research to support this position.[75] Commenters also stated that overall emissions may increase in a no-lease scenario if the U.S. instead imports foreign fossil fuels.[76] One of the commenters added that the GOM OCS is ideally situated for carbon storage and sequestration.[77] A commenter provided additional substantiation in support of GOM oil production being relatively less carbon intensive than other sources, including a 2016 BOEM report. The commenter stated that GOM production releases less methane (because of OCS regulations) and has a relatively small physical footprint.[78]

Emissions and Climate Targets

Other commenters, including form letter campaigns, generally stated that increased OCS oil and gas leasing would increase GHG emissions and attendant climate change impacts,[79] including sea-level rise,[80] ecological disasters,[81] heat waves,[82] floods,[83] biodiversity losses,[84] increases in ocean temperature and acidity,[85] and monetized measurements of these impacts.[86] Another commenter opposed increasing oil and gas production because the U.S. is already on track to overshoot climate pledges in IRA and the Paris Agreement.[87] A few commenters added that many communities, including their own, are making

[74] K. Soter (Form Letter Master); E. Inman (Form Letter Master); Beacon Offshore Energy; Chevron, Ridgewood Energy Corporation; Offshore Operators Committee; Equinor Gulf of Mexico LLC; Hornbeck Offshore; Consumer Energy Alliance; bp America Inc.
[75] Talos Energy Inc.; Hornbeck Offshore; bp America Inc; QuarterNorth Energy LLC; National Ocean Industries Association; Red Willow Offshore, LLC / Southern Ute Indian Tribe
[76] Louisiana Mid-Continent Oil & Gas Association; QuarterNorth Energy LLC; National Ocean Industries Association; Gulf Energy Alliance
[77] Beacon Offshore Energy; Gulf Economic Survival Team
[78] Energy Exploration & Production Industry and Associations
[79] C. Campbell; G. Bixby
[80] Surfrider Foundation FL Chapter Network
[81] The Rachel Carson Council (Form Letter Master); Clean Water Action
[82] Clean Water Action; C. Campbell
[83] Clean Water Action
[84] The Rachel Carson Council (Form Letter Master)
[85] Friends of Casco Bay
[86] Alliance for Affordable Energy; Voces Unidas Rio Grande Valley; Joint sign-on comment from coastal business alliances across the country; Texas NAACP State Conference; Healthy Gulf (Form Letter Master)
[87] C. Campbell

efforts to meet emissions goals and that BOEM should do its part as well.[88] A commenter stated that its Federal regulatory actions and initiatives are directed to meeting U.S. net-zero goals and cautioned that the Proposed Program may undermine science-based net-zero targets, providing citations. The commenter recommended that the Proposed Program discuss carbon lock-in and stranded assets concerns and the challenges the Proposed Program poses for achieving climate policy goals, as well as any opportunities to better address these goals. Additionally, the commenter recommended that BOEM consider state and local GHG reduction plans. The commenter stated that BOEM should provide a programmatic framework for considering GHG mitigation and climate resilience and that BOEM should clarify what impacts will be discussed in more detail in later, tiered analyses.[89]

A commenter provided a citation and stated that drilling on public lands is responsible for almost a quarter of U.S. GHG emissions, adding that industry groups already have 9,000 unused leases that could exacerbate the climate crisis.[90] Similarly, another comment provided citations indicating that U.S. Federal leasing for fossil fuel production could significantly threaten global emissions goals.[91] A commenter added that BOEM's NEPA analysis should frame Proposed Program emissions impacts within a carbon budget for 1.5° or 2° C scenarios.

Another commenter agreed, providing several citations as well as a projection indicating that business-as-usual OCS leasing would result in 410 million metric tons of CO_2 equivalent emissions. The commenter also compared these prospective emissions against activity consistent with a 1.5° C warming scenario. The commenter provided additional citations in arguing that fossil fuel reservations must remain unextracted to prevent emissions from exceeding targets, and that U.S. oil and gas development would account for the majority of global increases in fossil fuel production and budget allowances if U.S. production is not curtailed. The commenter stated that, even without new production developments, emissions from extant production would exceed 2030 emission goals for a 1.5° C warming scenario by 66%. The commenter said that BOEM's position that differences in lifecycle emission between leasing and no-lease scenarios would be minimal is arbitrary and capricious. The commenter stated that NEPA requires that BOEM provide more support and explanation for this position.[92]

One commenter argued that BOEM's attention to net-zero and GHG reduction goals violates the OCS Lands Act by detracting from national energy goals. The commenter stated that the OCS Lands Act, as amended by IRA, privileges oil and gas development over renewable and other energy sources and that, absent statutory amendment, BOEM must adhere to the same priorities.[93] Another commenter agreed that the OCS Lands Act does not provide for climate considerations and that BOEM's analysis of the Proposed Program GHG impacts is too incomplete. The commenter also stated that climate change

[88] A. Hill, K. Schlemmer
[89] USEPA
[90] Turtle Island Restoration Network
[91] Defenders of Wildlife
[92] Natural Resources Defense Council
[93] Global Energy Institute - U.S. Chamber of Commerce

impacts should not be considered by BOEM because OCS leasing contributes a relatively small fraction of GHG emissions to those released globally.[94]

Draft Programmatic EIS Comments

A few commenters commented more directly on the Draft Programmatic EIS. One commenter generally stated that the Draft Programmatic EIS failed to adequately account for GHG emissions and climate change impacts.[95] A couple commenters faulted the Draft Programmatic EIS for excluding consideration of downstream emissions, reasoning that the Draft Programmatic EIS should have accounted for all emissions-related costs resulting from proposed leasing.[96] One commenter added that this information must be presented clearly so that the public can ascertain that BOEM has "holistically" considered the impacts of the Proposed Program. They described the organization of the Draft Programmatic EIS as addressing costs and benefits in separate sections and appendices and argued that BOEM should have disclosed more cost-related climate impact information in a clearer way within the Draft Programmatic EIS. The commenter further provided citations and stated that, when a cost-benefit analysis is provided, it cannot be misleading, and climate impact costs must be considered together with other economic costs.[97] Furthermore, both commenters added that courts have required that NEPA analyses also describe the environmental impacts of GHG emissions—not just merely quantify them—and that these interrelated quantifiable and qualitative impacts must be considered as a whole.

These commenters cited several cases in arguing that the Proposed Program GHG emission impacts must be considered as NEPA cumulative impacts, even if there is some degree of uncertainty in making climate impact projections.[98] One commenter asserted that BOEM violates NEPA by explicitly not considering downstream carbon emissions from oil and gas consumption.[99] Additionally, one commenter also stated that the Draft Programmatic EIS inadequately discussed downstream emissions, citing CEQ guidance and several court cases as indicating that NEPA documents should thoroughly account for downstream GHG emissions.[100]

The commenter also stated that the Proposed Program NEPA analysis requires reasonable assumptions supported by the best available information and analysis and thus the consideration of upstream and midstream GHG emissions resulting from higher foreign oil production. The commenter cited cases where courts required that BOEM disclose GHG emission impacts even where sufficiently reliable information on foreign emissions factors and consumption patterns is unavailable.[101] Referencing CEQ regulations, the commenter urged BOEM to provide an evaluation based on research methods generally accepted in the scientific community.[102] Writing further on foreign GHG emissions, the commenter stated that the Draft Programmatic EIS relied on a misleading Greenhouse Gas Life Cycle Energy

[94] The Heritage Foundation
[95] Coastal Coordination Program, The Ocean Foundation
[96] Natural Resources Defense Council; J. White & C. Fouts & H. Hyde
[97] Natural Resources Defense Council
[98] Natural Resources Defense Council; J. White & C. Fouts & H. Hyde
[99] J. White & C. Fouts & H. Hyde
[100] Natural Resources Defense Council
[101] National Resources Defense Council
[102] Natural Resources Defense Council

Emissions Model by using a single emissions factor for foreign oil consumption rather than the normal practice of applying a range of emissions factors that correspond to different end uses. The commenter stated that, to comply with NEPA regulations and caselaw, BOEM should explain this decision further.[103]

Other commenters also stated that BOEM should consider midstream and downstream emissions because of their adverse impacts on the OCS and nearby environments.[104] One of the commenters also stated that BOEM should consider existing or planned pipelines in Alaska and the GOM as upstream impacts.[105] The other commenter stated that, under relevant caselaw, the OCS Lands Act neither requires nor precludes downstream effect analyses, and there is other OCS Lands Act text, legislative and regulatory requirements history, and case law to support downstream effect analysis.[106] Another commenter also provided support for BOEM's authority to consider downstream impacts, arguing that *Center for Biological Diversity v. U.S. Department of Interior* does not preclude downstream impact analyses. The commenter also cited cases as holding that BOEM may consider environmental impacts outside the OCS. The commenter also stated that the OCS Lands Act's text permits BOEM to consider various factors in assessing energy needs, and that the law's intent, as evidenced in its legislative history, was that oil and gas leasing causes substantially less harm to the environment than other available sources. The commenter cited legislative history in arguing that Congress intended BOEM to respond to future conditions and energy alternatives when the OCS Lands Act was amended in 1978; they also cited a 2002 Proposed Program and stated that BOEM has a history of considering downstream effects and GHG impacts.[107]

Conversely, another commenter supported excluding foreign oil consumption from GHG emission estimates, stating that the OCS Lands Act does not authorize such an analysis and NEPA does not require it. Even if foreign oil consumption is considered, the commenter stated that this analysis should be treated as separate because of its differing methodological issues, and that foreign midstream and upstream issues should also be included. The commenter stated that BOEM's model overstates emissions reductions under a no-lease scenario because it is not sensitive to foreign oil supply elasticity.[108] Another commenter also supported BOEM consideration of foreign production impacts if SC-GHG is used.[109]

A commenter also stated that the Draft Programmatic EIS failed to adequately consider the indirect impacts of the Proposed Program on short-lived climate pollutants (SLCPs), including methane, black carbon soot, hydrofluorocarbons, and tropospheric ozone. The commenter provided citations in stating that OCS oil production releases more methane than onshore sources as a result of offshore equipment and transportation requirements. Citing CEQ regulations and court cases, the commenter argued that SLCP emissions should be considered indirect effects and thus must be analyzed within a NEPA

[103] Natural Resources Defense Council
[104] Evergreen Action; USEPA
[105] USEPA
[106] Evergreen Action
[107] Institute for Policy Integrity at New York University School of Law
[108] American Petroleum Institute
[109] Global Energy Institute - U.S. Chamber of Commerce

review.[110] Another commenter recommended that BOEM update its social costs of GHGs figure to reflect White House releases in the next step of the Proposed Program but supported the Proposed Program use of SC-GHG overall.[111]

Conversely, another commenter stated that the Final Programmatic EIS should either focus on a "mid-activity case" or provide evidence based on retrospective data to support utilizing a high activity case. The commenter also requested that BOEM provide links to annual GHG aggregate estimates in the Final Programmatic EIS.[112]

A commenter stated that, regardless of the NEPA review's assessment of the Proposed Program climate or GHG impacts, such a review cannot impact BOEM's decision regarding the National OCS Program because NEPA's requirements are procedural in nature.[113]

SC-GHG

A commenter argued that BOEM's SC-GHG estimate is too conservative; the commenter stated that BOEM uses a 3% discount rate from the IWG, but that IWG characterizes this cost estimate as conservative. The commenter recommended that BOEM either consider IWG's full range of valuations or, consistent with a recent Office of Management and Budget (OMB) analysis, prioritize IWG's higher valuations at lower discount rates.[114] Additionally, this and another commenter recommended that the EIS provide separate social cost figures for carbon, nitrous oxide, and methane in order to clarify individual contribution of these costs for various planning and activity levels.[115] One of the commenters concluded that a "hard look" at the Proposed Program would require a full evaluation of the climate change impacts of each available alternative;[116] another commenter supported the use of SC-GHG as useful for evaluating proposal impacts and said it was not impaired by any past or pending litigation.[117]

Other commenters stated that BOEM should not rely on IWG's SC-GHG until IWG releases guidance pertaining to the usage of its estimates. Additionally, the commenters faulted BOEM for only using the 3% discount rate from IWG, recommending that the four discount rates from IWG be used.[118] Another commenter stated that BOEM should rely on discount rates described in OMB Circular A-4.[119] Two commenters also stated that BOEM should provide more discussion about the uncertainties in social cost of carbon estimates and that using differing social costs of carbon would underline these uncertainties. Furthermore, the commenters stated that adjustment of royalty is not an appropriate use of the social cost of GHGs tool because IRA limited the royalty rates to be used in the future.[120]

[110] Natural Resources Defense Council
[111] NOAA NMFS
[112] American Petroleum Institute
[113] Global Energy Institute - U.S. Chamber of Commerce
[114] Natural Resources Defense Council
[115] Natural Resources Defense Council, USEPA
[116] Natural Resources Defense Council
[117] USEPA
[118] American Petroleum Institute; Chevron
[119] Heritage Foundation
[120] American Petroleum Institute; Chevron

Additionally, another commenter called SC-GHG modeling "sensitive" to modelers' inputs and assumptions and thus too uncertain to rely on in the Proposed Program.[121]

Another commenter incorporated by reference its criticisms of the use of IWG's SC-GHG in NEPA analyses and the public process leading to the IWG's estimates. The commenter stated that IWG's SC-GHG was not designed for cost-benefit analysis purposes, reflects differing opinions about applicable discount rates, and distorts the environmental analysis by focusing too narrowly on GHG-related costs. The commenter provided citations in stating that IWG's SC-GHG was designed for EO 12866 risk analysis purposes and therefore should not be used for NEPA analyses. Additionally, the commenter stated that IWG has delayed its guidance on the use of its SC-GHG in environmental analyses despite a charge in EO 13990 to do so and described the overall public process used in developing the SC-GHG as inadequate. The commenter stated that relying on SC-GHG estimates would also signal to the broader public that BOEM is elevating concerns regarding potential impacts from GHG emissions, which the commenter identifies as not reasonably foreseeable, over other potential impacts that are not incorporated into either the cost or benefit of the Proposed Program. The commenter stated that BOEM lacks authority to analyze impacts that are global in nature and, providing citations, that court cases indicating that social cost of carbon analyses should be considered in NEPA analyses are not relevant to the Proposed Program review.

Additionally, the commenter stated that BOEM's use of SC-GHG cannot reflect a reasonably foreseeable effect of the Proposed Action. The commenter cited CEQ regulations in saying that effects outside an agency's control are not effects for NEPA purposes and stated that SC-GHG figures cannot reliably predict incremental costs of impacts up to 300 years in the future, and thus that the impacts considered are not reasonably foreseeable. The commenter stated that CEQ regulations define the significance of effects as usually pertaining to local rather than global consequences and also that CEQ has not provided a clear significance test for evaluating GHG emissions' impacts on climate change or for evaluating what costs count as significant. Because of this, the commenter asserted, BOEM has no accurate means of assessing the significant climate change impacts that would result from Proposed Program GHG emissions.[122]

The commenter also argued that IWG's SC-GHG cannot be considered as part of a generally acceptable scientific method because of insufficient peer review, citing an OMB bulletin as requiring that influential scientific information be subjected to peer review. The commenter stated that the SC-GHG as discussed by BOEM lacks a formal uncertainty analysis called for by OMB regulations. The commenter cited a case where an agency failed to respond to a comment questioning the validity of SC-GHG; differences between the IWG's methodology and recommendations from the National Academies of Sciences, Engineering, and Medicine; and IWG not conducting a peer review on the social costs of methane and nitrous oxide. The commenter also asserted that CEQ guidance that agencies use "all available tools" in

[121] Heritage Foundation
[122] Global Energy Institute - U.S. Chamber of Commerce

NEPA analysis is outweighed by the other concerns the commenter presented regarding IWG's SC-GHG, and that USEPA recommendations to use SC-GHG are merely advisory.[123]

Source of Comments

- *General Public*
- *Energy Exploration & Production Industry and Associations*
- *Public Interest Groups*
- *Non-energy Exploration & Production Industry and Associations*
- *Federal Agencies*
- *Tribes and Tribal Organizations*

Response to Comments

Support: BOEM's GHG analysis in **Section 2.2** acknowledges the lower GHG intensity of OCS oil and gas relative to other oil and gas sources. An important factor contributing to higher GHG intensity for many foreign sources is flaring and venting during operations. The GHG intensity profile of the OCS is lower due in part to methane regulations that govern venting and flaring on the OCS. For more information on OCS GHG intensity, see Section 1.2.3.4 of the PFP.

Favorability of the OCS: Displacement of Imports, CCS, and GHG intensity: BOEM's own sources and material in the GHG analysis support the stakeholders' comments that the OCS has a lower GHG intensity than many substitute sources of oil and gas. This leads to incrementally lower upstream emissions for OCS oil and gas production under a leasing scenario relative to those from substitutes under a no leasing scenario. However, BOEM's analysis suggests that the full lifecycle domestic emissions are generally higher at the low and high activity levels (and lower at the mid activity level) under an OCS leasing scenario than under a no leasing scenario when midstream and downstream emissions are also included. However, when foreign emissions are considered, BOEM finds that no leasing results in fewer global GHG emissions at all activity levels.

CCS: The Final Programmatic EIS discusses how carbon sequestration is another potential activity reasonably foreseeable on the OCS. Although regulations related to carbon sequestration have not yet been promulgated, in the Bipartisan Infrastructure Law of 2021 (P.L. 117-58), Congress directed the USDOI to develop regulations regarding carbon sequestration on the OCS. Available information regarding processes, facilities, and supporting activities is presently insufficient to assess the potential impacts of carbon sequestration activities and how they might interact with stressors and activities and IPFs resulting from the 2024–2029 Program. BOEM will continue to monitor new information developed on potential carbon sequestration activities on the OCS and incorporate it into subsequent analyses as appropriate.

OCS Footprint and Methane: BOEM has added information to the Final Programmatic EIS addressing recent studies showing larger-than-reported methane emissions.

[123] Global Energy Institute - U.S. Chamber of Commerce

Emissions and Climate Targets: BOEM acknowledges the roughly 1 trillion tons of carbon emissions left in the carbon budget intended to keep the planet below 2°C of warming in **Section 2.2.4**. BOEM does not have the ability to direct where OCS products are consumed and therefore is limited to a national analysis of the total emissions. BOEM has added language broadly acknowledging GHG reductions plans exist at the state and local levels. An additional reference to lock-in and stranded assets has been added to the Final Programmatic EIS.

Alignment of Program with Administration Climate Policy Goals: The purpose and need behind the National OCS Program and its proposed schedule of lease sales are primarily driven by the OCS Lands Act. They are further informed by the IRA, the Administration's priorities, and various stakeholders.

The OCS Lands Act requires the Secretary to develop a schedule of oil and gas lease sales over five-year periods to best meet national energy needs for that period. Lastly, the IRA requires that, as conditions for issuing any "lease for offshore wind development," the Department hold "an offshore [oil and gas] lease sale during the 1-year period ending on the date of the issuance of the lease for offshore wind development" and "the sum total of acres offered for lease in offshore [oil and gas] lease sales during the 1-year period ending on the date of the issuance of the lease for offshore wind development is not less than 60,000,000 acres" (IRA, Section 50265(b)(2)). In general, therefore, the IRA predicates continued OCS offshore wind leasing on a particular rate of OCS oil and gas leasing. Thus, the IRA makes continued OCS oil and gas leasing over the next 10 years a prerequisite to continue implementing OCS renewable energy leasing. Therefore, the OCS Lands Act and the IRA drive the purpose and require the Secretary to continue development of the National OCS Program along the current timeline to satisfy the OCS Lands Act, and to include lease sales in the schedule as dictated by the IRA in order to meet the Administration's goal of expanding offshore wind capacity.

Inclusion of Various Stages of Domestic or Foreign Life Cycle GHG Emissions: BOEM acknowledges the broad impacts from climate change in **Sections 2.2 and 2.4.2** and the contributions of new leasing to GHG emissions, including midstream and downstream emissions, in **Section 2.2.2 and 2.2.3**. The methodology used for foreign emissions is explained in Chapter 2 of the Final EAM. Although BOEM currently is unable to quantitatively estimate foreign midstream emissions, BOEM does discuss them in Chapter 2 of the Final EAM, with the overall results included in **Sections 2.2.2 and 2.2.3**.

Methane and SLCPs: Sections 2.2.1 and 2.4.2 now include an explanation of methane and other SLCPs. Soot (a component of particulate matter emissions) and ozone precursor pollutants are estimated as part of the upstream emissions analysis in **Appendix C** as part of the air quality analysis. Since these pollutants are spatially dependent, BOEM is unable to estimate their impact in the midstream and downstream, given that the location of their release and the atmospheric conditions into which particulate matter and ozone precursors would be released would factor into the volume of those pollutants in the mid- and downstream. Other SLCPs are used in trace amounts on the OCS (**Sections 2.2.1 and 2.4.2**) and are not normally released as part of the consumption of oil and gas. A full breakdown of the economic cost-benefit analysis can be found in Chapter 5 in the PFP.

Limiting Analysis to Mid Activity Scenario: The GHG sections do not focus on any of the individual activity levels. GHG analysis is provided for the low, mid, and high activity scenarios. Language has been added to clarify this.

Annualized Estimates of GHG Emissions: BOEM moved the GHG analysis from an appendix in the Draft Programmatic EIS to Chapter 2 of the Final EAM. This chapter includes a greater level of detail than would be appropriate to include directly in the Final Programmatic EIS. See the GHG analysis in Chapter 2 of the Final EAM for additional detail on methodology and results that support the summarized results included by reference in the Final Programmatic EIS and PFP.

Estimating Foreign Emissions: Multiple court decisions have found that BOEM must analyze changes in foreign emissions in response to new OCS oil and gas leasing. BOEM keeps the foreign analysis separate from the domestic analysis due to the different methodological approaches (**Section 2.2.3**).

BOEM, to the best of its ability, does estimate foreign downstream oil consumption. However, BOEM does not have the ability to use specific emissions factors based on end uses of oil for foreign markets because that data is currently unavailable at the global scale. An explanation is available in **Section 2.2.3**. BOEM's use of emissions factors to estimate future emissions is a standard scientific practice. See more information from the USEPA at www.epa.gov/air-emissions-factors-and-quantification/basic-information-air-emissions-factors-and-quantification.

Estimating Foreign Upstream and Midstream Emissions: BOEM estimates midstream and downstream GHG emissions for domestically consumed fuels (**Section 2.2.3**) as well as foreign oil's upstream and downstream. However, BOEM currently does not have the ability to quantitatively estimate foreign oil's midstream GHG emissions, nor the full life cycle GHG emissions from foreign energy substitutes other than oil. Chapter 2 of the Final EAM provides a qualitative discussion of the relative shift in foreign oil's midstream and the full life cycle of foreign energy substitutes' GHG emissions, and a qualitative explanation of the components not currently possible to calculate.

GHG Emissions Related to Pipeline: BOEM estimates and includes GHG emissions related to the installation of pipelines. See BOEM's Offshore Economic Cost Model (OECM) documentation (Industrial Economics Inc. 2023b).

Including Downstream Emissions in Net Benefits: Although not directly included in the Final Programmatic EIS, the net benefits analysis has been updated with midstream and downstream GHG emissions' social cost estimates. These can be found in Section 5.3 of the PFP.

SC-GHG: BOEM presents SC-GHG estimates using the four sets of SC-GHG values published by the IWG in their February 2021 interim guidance. BOEM's full GHG emissions and social cost analysis is presented in Chapter 2 of the Final EAM. BOEM notes that its analysis meets the CEQ interim guidance (88 Fed. Reg. 1196) on the consideration of GHG emissions and climate change. The guidance recommends that:

> "…agencies provide additional context for GHG emissions, including through the use of the best available social cost of GHG (SC-GHG) estimates, to translate climate impacts into the more accessible metric of dollars, allow decision makers and the public to

> make comparisons, help evaluate the significance of an action's climate change effects, and better understand the tradeoffs associated with an action and its alternatives."

Section 28.1.12 – Areas of Special Concern

No substantive comments are associated with this issue.

Section 28.1.13 – IPFs

No substantive comments are associated with this issue.

Section 28.1.14 – Air Quality

Summary of Comments

Approximately 20 submissions provided comments regarding air quality.

A commenter opposed further OCS leasing and provided a citation indicating that air pollution related to fossil fuel combustion resulted in more than 8.3 million deaths globally in 2017.[124] Another commenter said burning fossil fuels contributes to 300,000 deaths annually, providing a citation.[125] A commenter said that 63,000 Americans are killed each year by air pollution and that, by 2050, air pollution will cost the country $600 billion annually, providing citations.[126] Another commenter provided citations in describing how fossil fuel combustion causes negative health impacts, especially to poor people and people of color,[127] and another commenter described how refineries' emissions can contribute to acid rain.[128] A commenter further stated that Indigenous and communities of color must no longer be treated as sacrifice zones subjected to increased air pollution and cancer risks, such as those present in Louisiana's Cancer Alley. The commenter noted that over 300 plantations were once located in Cancer Alley, providing citations describing the petrochemical industry there and its attendant health impacts.[129] A commenter also provided citations illustrating greater air quality risks faced by African Americans,[130] and another commenter provided a citation indicating the cancer risks faced by communities near refineries.[131] Another commenter described fossil fuel air pollution's impacts to Indigenous communities and the health problems posed by particular pollutants.[132]

One commenter faulted BOEM's sensitivity analysis for its treatment of air pollution. The commenter wrote that air quality impacts will harm wildlife, especially birds, and provided numerous citations.[133] Another commenter stated that BOEM did not adequately consider air pollution impacts from the

[124] Chispa TX
[125] C. Campbell
[126] Texas NAACP State Conference
[127] Taproot Earth
[128] Oceana
[129] Louisiana Just Recovery Network
[130] C. Campbell
[131] J. Beard Jr.
[132] Society of Native Nations
[133] Center for Biological Diversity

onshore processing of OCS oil and gas, stating that most processing and related health harms occur in Gulf Coast states. The commenter stated that these are indirect impacts for NEPA purposes but were inadequately discussed in the Draft Programmatic EIS. In particular, the commenter said that OCS oil impacts not only the development of new refineries but the operation of existing ones in Gulf Coast states, and that BOEM should discuss the types of pollutants and attendant health impacts that the Proposed Program might increase. The commenter added that BOEM must discuss onshore air impacts related to the operation of the Trading Bay Production Facility and the Kenai Refinery near Cook Inlet. Additionally, the commenter stated that BOEM cannot rely on state environmental agencies to mitigate these air quality impacts, arguing that available evidence indicates that these agencies often fail to protect their citizens' well-being and environment.[134]

One commenter asserted that offshore leasing platforms release into the air volatile organic compounds and nitrogen oxides, which pose severe health threats, reduce lung function, exacerbate COVID-19, and generally affect disadvantaged communities at disproportionate rates.[135]

A commenter stated that OCS oil and gas leasing contributes to climate change, which in turn worsens air pollution by increasing air particulate matter via wildfires and increased ozone levels.[136] Another commenter supported offshore leasing for wind production as a way to reduce air pollution.[137]

A commenter stated that OCS leasing will increase vessel traffic and resulting nitrogen, sulfur oxide, and particulate matter emissions.[138]

Source of Comments

- *General Public*
- *Public Interest Groups*
- *Tribes and Tribal Organizations*
- *Energy Exploration & Production Industry and Associations*
- *Other (Multiple Scientists)*

Response to Comments

Environmental Justice Communities and Communities of Color: BOEM added language in the Final Programmatic EIS to further discuss the existing burdens and vulnerabilities faced by communities with environmental justice concerns. BOEM considered the references provided in the comment letters and incorporated additional information as appropriate.

BOEM added additional language about impacts from onshore sources, as well as information about uncertainties at this stage of the OCS Lands Act and NEPA processes that make a more detailed analysis

[134] Earthjustice, et al.
[135] J. White & C. Fouts & H. Hyde
[136] Natural Resources Defense Council
[137] J. DuPree
[138] Earthjustice, et al.

unreliable. As stated in the Final Programmatic EIS, BOEM will conduct a more detailed review of air quality at subsequent stages of the National OCS Program and the leasing process.

Section 28.1.15 – Water Quality

Summary of Comments

Approximately 110 submissions provided comments regarding water quality.

A commenter wrote that GHG emissions are leading to problematic omega aragonite saturations levels in Maine waters and that the Proposed Program would exacerbate this trend.[139]

One commenter discussed the higher concentration of toxic substances in water surrounding drilling platforms, including arsenic, zinc, and other heavy metals.[140] They added that the 2010 *Deepwater Horizon* spill resulted in 40 times higher concentrations of polycyclic aromatic hydrocarbons (PAHs) off the coast, and that Black and Indigenous people face the greatest threats from these forms of water pollution because they are more likely to live on the coast and are less likely to move out of the way of catastrophic events like oil spills.

A commenter attached a study that, according to the commenter, described how fossil fuel companies evade Clean Water Act requirements to discharge wastewater into streams and obscure downstream impacts to the public.[141] A commenter also stated that increased leasing could increase refinery operations. The commenter provided a citation stating that the average refinery contributes an average 11,000 gallons of oil releases—as well as dangerous pollutants such as hydrocarbons, sulfur dioxide, carbon monoxide, and particulate solids—on a daily basis, while also contributing to acid rain. The commenter added that refineries cause thermal disruptions that harm aquatic ecosystems. Additionally, the commenter provided a citation and stated that drilling rigs discharge into water pollutants, drilling mud, and drilling cuttings with toxic pollutants such as mercury, lead, chromium, barium, arsenic, cadmium, and PAHs. The commenter provided a citation in stating that this pollution can harm ocean floor life.[142] Another commenter stated that orphaned or abandoned wells also contribute significant water quality threats, citing BOEM officials from a U.S. Government Accountability Office report and a study indicating that orphaned wells contribute 3,000–17,000 metric tons of methane emissions annually. The commenter added that CO_2 leaks from prospective OCS carbon storage and sequestration harms local biota.[143] A commenter stated that increased drilling would generally produce increased oil waste in the form of oil-like derivatives, toxins, and radioactive materials that, through ground injection or runoff, eventually degrades water quality and public health.[144] A form letter campaign provided a citation and stated that more than 18 billion barrels of waste fluids from oil and gas extraction are

[139] Friends of Casco Bay
[140] J. White & C. Fouts & H. Hyde
[141] Clean Water Action
[142] Oceana
[143] Natural Resources Defense Council
[144] Environment America

produced annually in the U.S., disproportionately impacting communities of color. The commenters stated that increased oil leasing would only exacerbate these harms.[145]

Another commenter stated that BOEM's water quality discussion fails to acknowledge regulatory programs such as the National Pollution Discharge Elimination System, vessel regulations including the International Convention for the Prevention of Pollution from Ships and the Act to Prevent Pollution from Ships, or other programs administered by the USEPA.[146] Another commenter agreed and stated that discharges are also, in places, controlled by Areas of Biological Concern and Marine Sanctuaries requirements. The commenter also quoted Draft Programmatic EIS language, recommending that "[t]he primary factors that influence water quality are point and non-point discharges and sources of pollution, anthropogenic activities and development" be added following a discussion of the causes of water pollution.[147]

Source of Comments

- *General Public*
- *Public Interest Groups*
- *Energy Exploration & Production Industry and Associations*
- *Other (Multiple Scientists)*

Response to Comments

The National Pollutant Discharge Elimination System (NPDES) system is already acknowledged in the text, and BOEM included a sentence to state that "[p]ollutants discharged by ships at sea are regulated by the International Convention for the Prevention of Pollution from Ships, and enforcement is carried out by the USCG and other law enforcement agencies." Point and non-point discharges are not the primary factors that influence water quality because discharges contribute to contamination of water and affect the actual parameters that describe and influence what is considered water quality (which are the factors listed in the sentence). Point and non-point discharges are discussed as degrading water quality; specific examples of those discharges are listed in the Final Programmatic EIS.

Section 28.1.16 – Pelagic Communities

Summary of Comments

A commenter stated that the Draft Programmatic EIS did not report more than basic and generalized facts about crustacean habitats, arguing that the Draft Programmatic EIS was deficient in this respect.[148] The commenter also warned of the effects of increased CO_2 levels in the ocean, stating that it leads to hypercapnia and acidification, which are harmful to fish and other organisms. This commenter argued that BOEM has failed to adequately analyze these effects.[149]

[145] Multiple Scientists (Form Letter Master)
[146] Chevron
[147] American Petroleum Institute
[148] Natural Resources Defense Council
[149] Natural Resources Defense Council

Source of Comments

- *Public Interest Groups*
- *Federal Agencies*

Response to Comments

Description of pelagic habitat and pelagic communities, both generally and regionally, is presented in **Sections 2.5 through 2.9**. Additionally, pelagic habitat comprises the water column, and animals such as crustaceans distribute themselves vertically within zones of preferred salinity, temperature, light, oxygen, and productivity regimes.

On January 9, 2023, CEQ issued interim guidance on *National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change* (88 Fed. Reg. 1196). The Final Programmatic EIS addresses the effects of climate change consistent with that guidance, including describing the sensitivity of resources to future impacts of changing climate, such as ocean acidification.

The level of analysis in the Final Programmatic EIS is in compliance with recent CEQ guidance on programmatic reviews (Boots 2014) and is at an appropriate level of detail for the decision at hand. The analysis is at a national level, and the affected environment and associated habitats are described broadly. If a decision is made to move forward with any of the proposed lease sales in the PFP, additional reviews would take place that are more site specific, and the affected environment would be described in greater detail. Appropriate avoidance and mitigations measures would be determined at that time.

Section 28.1.17 – Marine Benthic Communities

Summary of Comments

Five submissions provided comments regarding marine benthic communities.

A commenter stated that offshore oil and gas development has caused significant harm to corals.[150]

A commenter stated that the Draft Programmatic EIS findings that there would be impacts to benthic communities, but not to essential fish habitats (EFH), appears contradictory.[151]

Expressing opposition to new offshore oil and gas leases, a commenter argued that toxic drilling muds, legally released during drilling, smother benthic communities up to 2 km from disposal, accumulate in mollusks, travel up the food chain to have ecosystem-level impacts, and reduce oxygen content of soil.[152]

A commenter argued that the Draft Programmatic EIS downplayed the potential impacts to benthic communities, stating that the Draft Programmatic EIS understated the lethality of oil spills for benthic

[150] Aquarium Conservation Partnership
[151] NOAA NMFS
[152] Surfrider Foundation

communities and did not discuss in depth the effects of bottom or land disturbance. The commenter stated that the PAHs released in oil spills harm benthic species long after they are spilled, particularly in deep water, where the chemicals degrade slowly. The commenter stated that benthic species are exposed to oil from offshore drilling in a number of ways, including marine oil snow following a spill, direct sinking, incorporation into sinking copepod fecal pellets, onshore-offshore transport, sinking of burned oil byproducts, or settling of oil-mud complexes used during top-kill operations. The commenter added that benthic species in the GOM suffered greatly from the *Deepwater Horizon* oil spill.[153]

Another commenter similarly criticized the Draft Programmatic EIS for inadequately analyzing the potential impacts on deepwater marine environments. The commenter claimed that while BOEM acknowledged the impacts of oil and gas development on benthic communities, the agency did not analyze how these impacts could be exacerbated or avoided in the Program.[154] Specifically, the commenter stated that the Draft Programmatic EIS did not adequately address the effects of dispersants or chemical emulsifiers used to treat oil spills on benthic communities.

A commenter recommended that BOEM use mapping and habitat data collected during *Deepwater Horizon* restoration projects to identify deep-sea coral and sponge locations within the proposed planning areas to evaluate impacts of proposed OCS activities.[155]

Source of Comments

- *Public Interest Groups*
- *Federal Agencies*
- *Non-energy Exploration & Production Industry and Associations*

Response to Comments

The level of analysis in the Final Programmatic EIS complies with CEQ guidance on programmatic reviews (Boots 2014) and is at an appropriate level of detail for the decision at hand. The analysis is at a national level, and the scope of the impacts is described broadly. If a decision is made to move forward with any of the proposed lease sales in the PFP, additional reviews would take place that are more site specific and would analyze impacts on unique and sensitive ecosystems in more detail. Appropriate avoidance and mitigations measures would be determined at that time.

Impacts to Benthic Communities: Impacts on marine benthic communities around platforms are expected to be mostly localized. The geographic extent of EFH is normally very large in relation to the spatial extent of potential impacts to benthic communities. Therefore, while there may be localized impacts to areas that fall within EFH, the overall impact to the EFH is not expected to be the same. Additionally, drilling activities that would result in routine discharges (such as cuttings and muds) would not likely occur in designated EFH areas.

[153] Center for Biological Diversity
[154] Natural Resources Defense Council
[155] NOAA NMFS

Oil Spill Impacts: The Final Programmatic EIS discusses oil spill impacts (with references specific to *Deepwater Horizon*) in several places. **Chapter 4** discusses impacts to benthic communities in relation to multiple IPFs, including for routine discharges and bottom/land disturbance. Both these examples state that the impacts to benthic communities are potentially significant. **Section 4.6** discusses oil spill impacts on marine benthic communities.

Dispersants: BOEM recognizes the concerns associated with dispersants are recognized by BOEM, and **Section 4.6** includes examples of potential impacts. With the wide-ranging environments discussed in the Final Programmatic EIS, a discussion of specific response strategies would be highly speculative and not appropriate to address at the programmatic level. Site-specific potential impacts and response strategies would be addressed at the lease sale stage. Specific mitigation strategies for accidental events like oil spills are not addressed at the programmatic stage of review.

Mapping and Habitat Data: The analysis in the Final Programmatic EIS incorporates mapping and habitat data collected from a wide variety of sources, including *Deepwater Horizon*-related studies and projects, and information related to deep-sea coral and sponge habitats within the GOM. The Eastern GOM buffer zones considered under the potential exclusions (**Section 4.5.3**) are informed by that information; however, they are not discussed in detail because portions of the Central and Eastern GOM Planning Areas currently are withdrawn from leasing until June 30, 2032, by a Presidential Memorandum dated September 8, 2020. Additionally, Topographic Features and Live Bottom (Pinnacle Trend) stipulations, which are designed to avoid or minimize harm from seafloor-disturbing activities to these sensitive and unique underwater features, are required by BOEM as specific measures imposed upon a lease as a condition of sale. The Final Programmatic EIS considers the programmatic application of these stipulations to new leases issued under the 2024–2029 Program.

Section 28.1.18 – Coastal and Estuarine Habitats

Summary of Comments

Five submissions provided comments regarding coastal and estuarine habitats.

A commenter stated that the Draft Programmatic EIS findings that there would be impacts to coastal or estuarine habitats, but not to EFHs, appears contradictory.[156]

A commenter warned that pipelines needed to bring oil onshore often disrupts wetlands, which serve as a buffer against flooding.[157]

A commenter criticized the Draft Programmatic EIS for inadequately analyzing impacts on coastal and estuarine ecosystems, stating that NEPA requires BOEM to describe the direct, indirect, and cumulative impacts of the National OCS Program on unique ecosystems. The commenter further warned that the installation of CCS infrastructure would significantly impact nearshore and upland ecosystems. Finally,

[156] NOAA NMFS
[157] Environment America

the commenter stated that rising sea levels could increase the frequency of flood events, stressing wetlands and estuarine ecosystems.[158]

A commenter recommended that BOEM define the term "SAV" as "submerged aquatic vegetation."[159]

Source of Comments

- *Federal Agencies*
- *Public Interest Groups*
- *Energy Exploration & Production Industry and Associations*

Response to Comments

Impacts on coastal or estuarine habitats (e.g., such as those related to land disturbance from shore-based activities and infrastructure) are expected to be mostly localized. The geographic extent of EFH is normally very large in relation to the spatial extent of potential impacts to coastal or estuarine habitats. Therefore, while there may be localized impacts to areas that fall within EFH, the overall impact to the EFH is not expected to be the same. Additionally, activities that would result in impacts to coastal or estuarine habitats would not likely occur in designated EFH areas. The level of analysis in the Final Programmatic EIS is in compliance with recent CEQ guidance on programmatic reviews (Boots 2014) and is at an appropriate level of detail for the decision at hand. The analysis is at a national level, and the scope of the impacts is described broadly. If a decision is made to move forward with any of the proposed lease sales in the D, additional site-specific reviews will analyze impacts on unique and sensitive ecosystems in more detail. Appropriate avoidance and mitigations measures will be determined at that time.

Section 4.1.3 discusses the disruption of wetlands under Bottom/Land Disturbance (I.4). BOEM amended the text "[i]nstalling pipelines and roads in or near these habitats may cause hydrologic alteration, disturbance, fragmentation, or loss of wetlands (Ko and Day 2004)" to include "which serve as a buffer against flooding" at the end of the sentence.

CCS is not an activity authorized by the National OCS Program but is briefly discussed in **Chapter 2**. The last comment summarized above regarding rising sea levels is discussed in the climate change stressor description, "[c]limate change and associated sea level rise are predicted to contribute to the increase in the intensity of storms (Intergovernmental Panel on Climate Change 2018). High-intensity storms, coupled with higher sea levels, could increase coastal flooding and erosion, damage coastal infrastructure, and degrade coastal habitats."

SAV is defined in the **Abbreviations and Acronyms** and during its first use in the text.

[158] Natural Resources Defense Council
[159] American Petroleum Institute

Section 28.1.19 – Fish

Summary of Comments

Seven submissions provided comments regarding fish.

A commenter stated that offshore oil and gas development has caused significant harm to fish.[160] More specifically, a commenter cited a study that found that every fish tested in the GOM following the *Deepwater Horizon* oil spill had been exposed to oil and further claimed that oil can cause developmental malformations, genetic damage, death, decreased size at hatching, and impaired swimming in fish.[161]

A commenter cited a study to claim that drilling muds released during oil and gas extraction contain mercury, which is consumed by fish and travels up the food chain; climate change and sea temperature rise exacerbates this problem by making fish more active.[162]

A commenter criticized BOEM's selection and analysis of fish species, stating that BOEM chose not to analyze resources in the Beaufort and Chukchi Seas because they do not contain federally listed species and that BOEM did not explain why other factors could not be used to determine the conservation importance of fish in the region. The commenter further stated that the effects of sound on fish is understudied and, citing a study, that seismic pulses can lead to significant developmental delays and body malformations in scallops.[163]

Another commenter also criticized BOEM's analysis of impacts on fish. The commenter disputed BOEM's statement that oil spill impacts on adult fish may be indistinguishable from natural variation. Citing research, the commenter stated that high levels of hydrocarbons, PAHs, and heavy metals were found in fish species following the *Deepwater Horizon* oil spill. The commenter cited various studies and stated that the observed effects of oil exposure on fish are wide ranging, including disrupted cardiac function in embryos, developmental abnormalities, skeletal and skin disorders, DNA damage, reproductive impairment, reduced growth and feeding efficiency, hepatic neoplasms and neoplasia-related liver lesions, disrupted thyroid function, impaired immune system function, altered swimming behavior, and lethal gill coating. The commenter stated that BOEM's statement about the impacts of oil spills on fish being equivalent to background stressors was arbitrary and invalid, and that BOEM must conduct a reasoned analysis on these impacts.[164]

Citing a study, a commenter stated that offshore platforms create large new habitats for fish and other marine species, providing shelter and ideal spawning grounds for fish larvae. The commenter cited the study and stated that oil and gas platforms have some of the highest levels of secondary fish production per unit area of seafloor compared to other marine habitats.[165]

[160] Aquarium Conservation Partnership
[161] Oceana
[162] C. Campbell
[163] Natural Resources Defense Council
[164] Center for Biological Diversity
[165] National Ocean Industries Association

Source of Comments

- *Public Interest Groups*
- *General Public*
- *Energy Exploration & Production Industry and Associations*
- *State-level Elected Officials*
- *Non-energy Exploration & Production Industry and Associations*

Response to Comments

Species Analyzed in the Final Programmatic EIS: Impacts to fish and EFH are discussed in **Section 4.1.3 and 4.1.6–4.1.9**, and multiple fish species found in the Beaufort and Chukchi Seas—including Arctic cod, Pacific herring, and walleye pollock—are included in the analysis. Additionally, the analysis in this programmatic document is done at a national level. Additional reviews at the lease sale stage are more area-specific and will analyze impacts to ESA-listed and non-listed species in greater detail.

Mercury in Drilling Muds and Fish Bioaccumulation: Most research indicates that atmospheric deposition of mercury is the primary source of mercury to most offshore waters of the U.S., although point sources can also be locally important. While mercury may be found in some drilling muds in low concentrations, the discharge or disposal of drilling muds is regulated by NPDES permit requirements. Impacts from routine discharges including drilling muds are discussed in **Section 4.1**.

Sound Impacts: The Final Programmatic EIS analyzes sound and its impacts on fish at the appropriate level of detail for a programmatic review. **Section 4.1** provides multiple examples of noise impacts on fish.

Oil Spill Impacts to Fish: BOEM considers impacts to OCS resources from accidental and unauthorized oil spills in the section on potential impacts of oil spills (**Section 4.6**). CDEs like the *Deepwater Horizon* oil spill can have significant and long-lasting impacts to ecosystems and OCS resources, and the study suggesting widespread exposure of fish to oil in the GOM following the *Deepwater Horizon* spill is one example report. Although multiple studies have demonstrated there can be impacts to fish at the individual and sub-organismal level, less evidence exists to indicate significant impacts to populations. **Section 4.6.1** provides examples of impacts to fish and fisheries.

For the Final Programmatic EIS, BOEM removed text ("[i]mpacts on adult fish in an affected area may be indistinguishable from natural variation in a population"), added a more recent reference, and added the following sentence: "However, long-term exposure to contaminants may cause chronic sublethal effects (Baguley et al. 2015; Millemann et al. 2015; Murawski et al. 2014; Snyder et al. 2015) that could affect fish populations."

Platforms as Fish Habitat: Claisse et al. (2019) found that oil platforms off California are some of the most productive fish habitats globally, but those observations are not universal across the U.S. OCS. The debate is longstanding on whether offshore platforms produce more fish or attract them from surrounding waters. The debate mostly centers around whether hard bottom habitat is a limiting factor and whether an oil platform significantly increases available hard bottom habitat for fish species that

require it. Pelagic and highly migratory fishes such as those found in the GOM OCS are more likely to aggregate around platforms because of enhanced feeding opportunities but do not use the platforms as spawning and recruitment sites.

Section 28.1.20 – Essential Fish Habitat

Summary of Comments

A commenter stated that the OCS planning areas contain EFH, which the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) defines as waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. The commenter recommended that BOEM incorporate this full definition in its analysis. The commenter recommended analyzing localized impacts on a project-specific basis, adding that it appears contradictory to claim that there would be no impacts to EFH from bottom disturbance but that there are potential impacts to marine benthic communities and coastal and estuarine habitats, which include EFH. The commenter further stated that the MSFCMA requires Federal agencies to consult with the Secretary of Commerce, through NOAA, with respect to any actions that may adversely affect EFH; the actions can include direct or indirect physical, chemical, or biological alterations of the waters or substrate resulting from actions occurring within or outside of EFH and potentially resulting in site-specific or habitat-wide impacts (e.g., individual, cumulative, or synergistic consequences). The commenter added that if BOEM concludes that such adverse effects may occur, the agency would need to prepare an EFH assessment to submit to NMFS, and that NOAA Fisheries staff are available to discuss these requirements.[166]

Source of Comments

- *Federal Agencies*

Response to Comments

Impacts from National OCS Program activities on marine benthic communities and coastal and estuarine habitats are expected to be mostly localized. The geographic extent of EFH is normally very large in relation to the spatial extent of potential impacts to coastal or estuarine habitats. Therefore, while there may be localized impacts to areas that fall within EFH, the overall impact to the EFH is not expected to be the same. Additionally, oil and gas activities generally do not occur in areas containing EFH, particularly for benthic EFH areas. The level of analysis in the Final Programmatic EIS is in compliance with recent CEQ guidance on programmatic reviews (Boots 2014) and is at an appropriate level of detail for the decision at hand. The analysis is at a national level, and the scope of the impacts is described broadly. If a decision is made to move forward with any of the proposed lease sales in the PFP, additional reviews and appropriate consultations with NOAA's NMFS would take place that are more site specific and would analyze impacts on unique and sensitive ecosystems in more detail. Appropriate avoidance and mitigations measures would be determined at that time.

[166] NOAA NMFS

Section 28.1.21 – Birds

Summary of Comments

Four submissions provided comments regarding birds.

A commenter stated that offshore oil and gas development has caused significant harm to birds.[167]

A commenter expressed concern about the additional carbon emissions that would result from additional leases being granted, and the extent to which they would exacerbate climate change, which the commenter stated is an existential threat to bird species, with two thirds of North American birds facing an increasing risk of extinction.[168]

A commenter argued that seabirds' foraging habits, resting requirements, and preening behavior lead to frequent contact with surface oil and internal oil exposure following an oil spill. The commenter cited research supporting that even small amounts of oil exposure is often lethal for birds, with oil spills often leading to mass die-offs of birds by causing effects such as destroying feathers' waterproofing and insulating properties, damaging the gastrointestinal tract, causing neurological damage, and reducing reproductive success, among many others. The commenter further claimed that the *Deepwater Horizon* oil spill likely killed over one million birds, possibly up to one third of the entire GOM populations of certain species. Finally, the commenter cited studies to claim that oil spills tend to have long-term negative effects on bird populations, sometimes lasting decades.[169]

A commenter recommended that BOEM expand its statement about birds considered in the Draft Programmatic EIS on page 36 in Section 2.4 to "[b]irds that spend at least part of their lives at sea migrate over parts of the sea or utilize coastal habitats for migration, foraging, staging, overwintering or breeding."[170]

Source of Comments

- *Public Interest Groups*
- *Energy Exploration & Production Industry and Associations*
- *Non-energy Exploration & Production Industry and Associations*

Response to Comments

BOEM reworded the "Birds" resource definition text to "[b]irds that spend at least part of their lives near the ocean, including those that live entirely at sea, migrate over parts of the sea, or live or use coastal habitats for migration, foraging, staging, overwintering, or breeding."

Climate change is affecting many OCS resources, including birds. With or without new leasing stemming from the PFP, the impacts of climate change on birds likely will be very similar; although new leasing may contribute more GHGs to the atmosphere, the difference of a single decision is not enough to make

[167] Aquarium Conservation Partnership
[168] Maryland Ornithological Society
[169] Center for Biological Diversity
[170] American Petroleum Institute.

a noticeable difference in addressing climate change, unless that decision is done in concert with broader national and global GHG emissions reductions.

The extent to which oil and gas development has caused significant harm to birds is difficult to quantify (Ronconi et al. 2015). **Section 4.1** discusses impacts to birds from oil and gas development related to the PFP, and **Section 4.6.1** discusses impacts to birds from oil spills. The level of analysis in the Final Programmatic EIS is in compliance with recent CEQ guidance on programmatic reviews (Boots 2014) and is at an appropriate level of detail for the decision at hand. The analysis is at a national level, and the scope of the impacts is described broadly. If a decision is made to move forward with any of the proposed lease sales in the PFP, additional reviews would take place that are more site specific and would analyze impacts on birds in more detail. Appropriate avoidance and mitigations measures would be determined at that time.

BOEM recognizes that oil spills like the *Deepwater Horizon* spill can cause significant and severe impacts on OCS resources, surrounding waters, and coastlines. As stated in **Section 4.6**, industry practices and government regulations are designed to minimize the risk of oil spills and ensure that responsible parties and Federal and state agencies are prepared to respond to spills when they occur.

Section 28.1.22 – Sea Turtles

Summary of Comments

Approximately 120 submissions provided comments regarding sea turtles.

A form letter campaign stated that the *Deepwater Horizon* oil spill caused lasting damage to sea turtles.[171]

A commenter stated that five species of federally listed threatened or endangered sea turtles utilize the GOM for reproduction, feeding, migration, and refuge, among other turtle species. The commenter warned that oil spills can impact sea turtles at all stages of development, further stating that the *Deepwater Horizon* oil spill killed around 6,000 juvenile and adult sea turtles and between 55,000 and 160,000 small juvenile sea turtles. The commenter recommended not approving additional oil and gas leases in the GOM to reduce risks of extinction to species like the Northwest Atlantic population of the leatherback sea turtle.[172]

Another commenter expressed similar concerns, adding specifically that loggerhead turtles can accumulate heavy metals from drilling muds and that exploration and development can disrupt foraging grounds. The commenter further claimed that in general prolonged contact with floating oil can have numerous negative effects on turtles, including significant changes in respiration, diving patterns, energy metabolism, and blood chemistry, among others.[173]

[171] The Center for Biological Diversity, et al (Form Letter Master)
[172] Sea Turtle Conservancy
[173] Oceana

Source of Comments

- *Public Interest Groups*
- *State-level Elected Officials*
- *Non-energy Exploration & Production Industry and Associations*

Response to Comments

The Draft Programmatic EIS analyzes the Draft Proposed Program (BOEM 2018a). The Secretary of the Interior uses this analysis to inform the Proposed Program. The Final Programmatic EIS analyzes the Proposed Program, and that analysis informs the Secretary's decision on the PFP. Decision makers consider the Final Programmatic EIS including the concerns of the public before making a final decision in the PFP.

The Final Programmatic EIS evaluates impacts to sea turtles from the Proposed Action. See **Section 4.1** for impacts to sea turtles, **Section 4.3** for the cumulative effects, and **Section 4.6** for potential impacts of oil spills.

Section 28.1.23 – Marine Mammals

Summary of Comments

Approximately 225 submissions provided comments regarding marine mammals.

A commenter stated that offshore oil and gas development has caused significant harm to marine mammals.[174] A form letter campaign specifically claimed that the *Deepwater Horizon* oil spill has had lasting impact on dolphins.[175] Another commenter echoed this claim, stating that cetaceans exposed to heavy oiling during the *Deepwater Horizon* oil spill experienced increased mortality, chronic disease, and reproductive impairment.[176]

A commenter generally criticized the selection of marine mammal species for analysis as skewed because it is based on outdated Stock Assessment Reports and sightings during offshore projects and further stated that it was too narrow, including only four species per OCS region. The commenter also argued that the discussion of oil spill impacts was too short and neglected to analyze specific impacts on specific marine mammal species.[177]

A commenter warned that endangered species like the Rice's whale cannot withstand the increased risk of ship strikes from expanded offshore drilling.[178] Another commenter expressed similar concerns about vessel strikes with respect to the Rice's whale.[179] Another commenter expressed general concerns about

[174] Aquarium Conservation Partnership
[175] The Center for Biological Diversity, et al (Form Letter Master)
[176] Marine Mammal Commission
[177] Natural Resources Defense Council
[178] Oceana
[179] Earthjustice, et al.

the potential effects of vessel strikes, exposure to oil spills and other pollutants, and disturbance from decommissioning activities on marine mammals.[180]

Several commenters, including a form letter campaign, expressed concern about the effects of noise pollution from oil and gas development on marine mammals.[181] One of these commenters warned that noise from seismic surveys and vessel traffic can impact foraging, navigation, and reproduction activities, as well as lead to death, and added that mitigation measures have generally proved ineffective.[182] Another of these commenters specified that such noise pollution can be caused by seismic surveys, vessel traffic, pile driving, and dredging; noise pollution also can disrupt marine mammals' behavior, including feeding, breeding, resting, migration, echolocation, and communication, as well as cause stress. This commenter recommended that the Final Programmatic EIS include such acoustic effects of development on marine mammals.[183]

A commenter criticized the Proposed Program for not stating whether impacts to the Rice's whale were considered in the environmental sensitivity analysis. The commenter stated that the Draft Programmatic EIS did not evaluate the full impacts on this species, violating NEPA's "hard look" requirement. The commenter recommended that BOEM include mitigation measures to minimize harm to the Rice's whale. The commenter recommended that BOEM rely on a NOAA-led study on the Rice's whale to analyze potential impacts and mitigation measures.[184]

A commenter criticized the Draft Programmatic EIS for acknowledging potential impacts on zooplankton but not consequent impacts on the North Pacific right whale, for which zooplankton is a primary food source.[185]

A commenter stated that the oil and gas industry routinely complies with various requirements for the protection of marine species, including requirements with respect to geophysical surveys and incidental takes of marine mammals.[186]

Source of Comments

- *Public Interest Groups*
- *Federal Agencies*
- *State-level Elected Officials*
- *Energy Exploration & Production Industry and Associations*
- *Non-energy Exploration & Production Industry and Associations*
- *Other (Multiple Scientists)*

[180] Marine Mammal Commission
[181] Multiple Scientists (Form Letter Master); Natural Resources Defense Council; Marine Mammal Commission; Oceana
[182] Oceana
[183] Natural Resources Defense Council
[184] Natural Resources Defense Council
[185] NOAA NMFS
[186] American Petroleum Institute

Response to Comments

The level of analysis in the Final Programmatic EIS is in compliance with recent CEQ guidance on programmatic reviews (Boots 2014) and is at an appropriate level of detail for the decision at hand. The analysis is at a national level, and the scope of the impacts is described broadly with specific species discussed only as examples. If a decision is made to move forward with any of the proposed lease sales in the PFP, additional reviews would take place that are more site specific and would analyze impacts on affected marine mammal species in greater detail. Appropriate avoidance and mitigations measures would be determined at that time.

Noise Impacts: Impacts of noise on marine mammals from oil and gas activity are discussed in **Section 4.1**, where many of the commenter's concerns are addressed.

Rice's Whale: Rice's whale is referred to as the Gulf of Mexico whale in the Draft Programmatic EIS but Rice's whale in the Final Programmatic EIS. Impacts to Rice's whale were not considered in the 2014 environmental sensitivity analysis used in the Proposed Program. BOEM has reevaluated the initial species and habitat selection in the original environmental sensitivity model since its adoption and application in the development of the 2017–2022 Program. All species and habitats were examined for the PFP analysis to ensure that their selections were still valid based on the criteria prescribed in the methodology. BOEM relied upon public comments, updates to Federal regulations (such as ESA listings), and best available science to inform this review and determined that some changes in selected species were warranted. Rice's whale was not selected. However, the analysis of environmental sensitivity for the Eastern GOM, which includes the range of most of the Rice's whale population, showed that ecoregion among the highest in terms of environmental sensitivity. The Draft Programmatic EIS complements the environmental sensitivity analysis in the Proposed Program and more deeply considers environmental resources and potential impacts associated with oil and gas leasing activities. The Final Programmatic EIS discusses how whales, including Rice's whale, may be affected by oil and gas leasing activities. If the Final Program includes leasing in the GOM, additional NEPA analyses will assess the potential impacts to Rice's whale.

Impacts on Zooplankton: The Proposed Program only considered lease sales in the Cook Inlet in the Alaska Region, and sightings of North Pacific right whales in the Gulf of Alaska is very rare. Additionally, any potential impacts to zooplankton from authorized activities in Cook Inlet would likely be minimal due to the high numbers and high fecundity of zooplankton, and the capability for replacement due to the strong tidal forcing in the inlet.

Section 28.1.24 – Commercial and Recreational Fishing

Summary of Comments

Six submissions provided comments regarding commercial and recreational fishing.

A commenter described ongoing harms from the 2010 *Deepwater Horizon* oil spill to fishers and oysters.[187] Another commenter cited a 2016 BOEM publication as putting the damages to the Gulf Coast fishing industry at $1 billion. Similarly, the commenter stated that oil industry groups often publicly claim commitment to safety and oil spill prevention, but that spills continue to harm communities and fishers, and catastrophic oil spills pose unacceptable risks to coastal economies. The commenter provided a citation in saying that there were over 6,000 oil spills between 2010 and 2020 in the U.S.; thus, the promises of spill prevention should not be credited.[188] Another commenter stated that uncertainty regarding catastrophic oil spills is insufficient to exclude their costs from consideration, stating that sufficient spills and damages have occurred to fisheries to produce an estimate of these costs.[189]Another commenter asserted that BOEM must more fully account for conflicting uses pertaining to OCS leasing, emphasizing that dangers associated with OCS leasing could lead to a total loss of localized sociocultural resources and lifestyles, including fishing.[190] Another commenter provided a citation in stating that climate change is harming fishing globally and in North America, especially Indigenous fishing communities. The commenter stated that, among the threats posed, climate-caused ocean acidification could cause consumer losses of $230 million across all U.S. shellfish fisheries by 2099.[191]

A commenter requested that the fishing impacts of offshore wind be studied and that workforce training and job opportunities in wind energy development be provided to its community.[192]

Source of Comments

- *Public Interest Groups*
- *Non-energy Exploration & Production Industry and Associations*
- *Federal Agencies*
- *General Public*

Response to Comments

Catastrophic discharge events (CDEs): A CDE is not considered part of the 2024–2029 Program or development scenarios because of its low probability of occurrence and the many factors that determine the severity of potential impacts. For further analysis of the impacts of a low-probability CDE, see the *Beaufort Sea: Hypothetical Very Large Oil Spill And Gas Release* (BOEM 2020), the *Gulf of Mexico Catastrophic Spill Event Analysis* (BOEM 2021), and the PFP.

Statistically, the number of catastrophic spills has been small, and they have occurred under a wide range of conditions with a broad range of impacts. The lack of robust data and the unpredictable nature of catastrophic oil spills, including the many factors that determine their severity, make efforts to quantify their costs much more uncertain than quantifying other measures considered in the net

[187] Boat People SOS Gulf Coast
[188] Joint sign-on comment from coastal business alliances across the country
[189] NOAA NMFS
[190] Earthjustice, et al.
[191] Natural Resources Defense Council
[192] Boat People SOS Gulf Coast

benefits analysis. In addition to the difficulty in calculating the cost of the potential impacts of a catastrophic spill, there are similar difficulties in calculating risk. For these reasons, risks and impacts of catastrophic oil spills are not considered in the net benefits analysis but are included in the Final EAM. Additional information is also available in the *Economic Inventory of Environmental and Social Resources Potentially Impacted by a Catastrophic Discharge Event Within OCS Regions* (Industrial Economics Inc. 2014).

Other OCS Uses: The Final Programmatic EIS discusses other uses of the OCS—including for commercial, recreational, and subsistence fishing—and acknowledges potentially significant impacts related to fishing activities if leasing occurs. Assessment of potential space-use conflicts would occur during subsequent NEPA stages at the regional and localized level for BOEM's consideration of leasing, exploration, and development activities. Regional and local level analyses would provide more detailed discussion, opportunities for engagement, and consultation with federally recognized Tribes. Such analysis and engagement could inform decisions at a lease sale stage. For example, Cook Inlet Lease Sale 244 was successfully held in 2017, and only 20% of the planning area, or 442,331 hectares, was available for leasing. The remaining 80% of the planning area contains critical marine mammal habitat and important subsistence areas, and therefore was not considered for leasing.

Offshore Wind: Although BOEM includes offshore renewable energy as a stressor, the Final Programmatic EIS focuses on identifying potentially significant impacts related to the National OCS Program. Impacts related to offshore wind, including impacts on fishing, would be assessed in reviews by BOEM and other agencies for offshore wind leasing and development. More information on planning, leasing, and development for offshore wind is available at https://www.boem.gov/renewable-energy/regulatory-framework-and-guidelines.

Section 28.1.25 – Archaeological & Cultural Resources

Summary of Comments

A commenter asserted that they "have no immediate concerns with regard to traditional cultural properties, sacred sites or Native American archaeological sites" but asked that they (the Catawba) be notified if any Native American artifacts and/or human remains are found during the ground disturbance phase of the Proposed Program.[193]

Source of Comments

- *Tribes and Tribal Organizations*

Response to Comments

BOEM's regulations, 30 CFR §550.194(c)), require that if lessees or right-of-way holders "discover any archaeological resource while conducting operations in the lease or right-of-way, [they] must immediately halt operations within the area of the discovery and report the discovery to the BOEM Regional Director." If any Native American artifacts or human remains are found during the seafloor

[193] Catawba Indian Nation

disturbance phase of a proposed oil and gas project under BOEM's jurisdiction, BOEM will notify BSEE, who is responsible for enforcing BOEM's environmental requirements. BSEE, in coordination with BOEM, will notify all federally recognized Tribes with ancestral connections to the area where the cultural material or human remains were found to formally consult on how to proceed.

Section 28.1.26 – Land Use

Summary of Comments

A commenter stated that OCS development contributes to land loss in Louisiana due to the construction of pipelines that harm land and wetland ecosystems. The commenter stated that the National OCS Program is directly responsible for land losses in Louisiana, which currently are equivalent in size to the area of Delaware; this land loss significantly exacerbates communities' vulnerability to hurricanes. The commenter concluded that, for these reasons, the GOM is ill-suited for further oil and gas development.[194]

Source of Comments

- *Public Interest Groups*

Response to Comments

BOEM appreciates that communities in coastal areas in Louisiana have experienced decades of land loss caused by a number of factors, including oil and gas development. The Final Programmatic EIS discusses the types of impacts that could occur if oil and gas activities under the 2024–2029 Program were to occur. The exact location of leasing and the potential levels of activity will be analyzed in detail at subsequent NEPA stages, and impacts of new pipelines would be analyzed for specific development and production plans. Given the existing, extensive pipeline network in the GOM and the longstanding business practice of reducing costs to maximize profits, there is a very small chance that any new pipeline landfall would occur. Companies typically choose to tie into the existing pipeline network rather than expend capital on building a new pipeline to shore. Should a development and production plan include a new pipeline to shore, other Federal and state permits, and associated mitigation measures, including requirements under the Coastal Zone Management Act, would be required. BOEM reviewed the U.S. Geological Survey report referenced in the comment letter. The report provides an overview of land area change in coastal Louisiana from 1932 to 2016. The report notes that decreases in the rate of wetland loss in recent years can be attributed to a number of factors, including the relocation of oil and gas production from coastal areas to areas either farther inland or farther offshore.

Section 28.1.27 – Subsistence

Summary of Comments

A commenter asserted that BOEM must more fully account for conflicting uses pertaining to OCS leasing, emphasizing that dangers associated with OCS leasing could lead to a total loss of localized

[194] Taproot Earth

sociocultural resources and lifestyles. The commenter cited a quotation from a Tribal government chief stating that industrialization of the Cook Inlet would end their community's subsistence lifestyle.[195]

Source of Comments

- *Public Interest Groups*

Response to Comments

The Final Programmatic EIS identifies potentially significant impacts from issuing the 2024–2029 Program. The Final Programmatic EIS acknowledges potentially significant impacts on vulnerable coastal communities, including impacts on subsistence harvest and activities, if oil and gas activities occur through lease sales identified in the PFP. Assessment of potential impacts on subsistence harvest and activities would occur during subsequent NEPA stages at the regional and localized level for BOEM's consideration of leasing, exploration, and development activities. Analysis at the lease sale stage would include an oil spill risk analysis. Regional and local level analyses would provide more detailed discussion, opportunities for engagement, and consultation with federally recognized Tribes. Such analysis and engagement can inform decisions at a lease sale stage. For example, Cook Inlet Lease Sale 244 was successfully held in 2017, and only 20% of the planning area, or 442,331 hectares, was available for leasing. The remaining 80% of the planning area contains critical marine mammal habitat and important subsistence areas, and therefore was not offered for leasing.

Section 28.1.28 – Culture

Summary of Comments

Two submissions provided comments regarding culture.

A commenter stated that the Proposed Program would be contrary to their religious beliefs by harming vulnerable communities, creating climate refugees, and contributing to the destruction of the environment.[196] Another commenter asserted that damages to Indigenous communities from climate changes that are exacerbated by oil and gas leasing include losses of Indigenous medicine, traditional ceremonies, and "other endemic ecological knowledge."[197]

Source of Comments

- *Non-energy Exploration & Production Industry and Associations*

Response to Comments

BOEM appreciates these comments and strives to respect religious and cultural values and beliefs while meeting its mandates under the OCS Lands Act and its mission to manage development of U.S. OCS energy and mineral resources in an environmentally and economically responsible way. The OCS Lands Act requires that BOEM prepare, periodically revise, and maintain a leasing program with a schedule of

[195] Earthjustice, et al.
[196] Jewish Youth Climate Movement
[197] J. White & C. Fouts & H. Hyde

sales showing size, timing, and location to best meet the Nation's energy needs for the following five-year period. The Final Programmatic EIS analyzes the potential environmental impacts from activities that could occur based on the proposed schedule of lease sales in the PFP. In addition, BOEM conducts NEPA reviews for each lease area before a lease sale is held, including site-specific analyses, so that the most current data can be incorporated. These additional NEPA reviews also will include opportunities for public involvement. NEPA reviews at the lease sale stage may be more appropriate for identifying appropriate mitigation measures for specific impacts on culture.

BOEM acknowledges the impact of climate change and provides information on it to the Secretary as she makes any decisions on the National OCS Program. Analysis of GHG emissions estimates is provided in **Appendix C**.

Section 28.1.29 – Vulnerable Coastal Communities

Summary of Comments

Approximately 2,455 submissions provided comments regarding vulnerable coastal communities.

Many commenters, including a form letter campaign, stated that the Proposed Program would be detrimental to environmental justice by

- Impairing communities' ability to transition to a renewable energy economy[198]
- Impairing public health[199]
- Subjecting GOM communities to exacerbated climate change impacts,[200] especially in the form of rising sea levels,[201] ocean acidification, and worsening storms,[202] declining food and water security, species extinctions,[203] wetland deterioration and resulting vulnerability to storm surges,[204] heat waves,[205] home flooding and property loss[206]
- Imposing pollution and general environmental, economic, and health costs on nearby communities[207]
- Promoting industrialization that generates sludge, radioactive waste, polluted water, and oil spills in communities of color[208]

[198] J. Kusyk; H. Moreno; G. Mitchell
[199] Environment America; Friends of the Earth; Clean Water Action; Friends of the Earth U.S.
[200] H. Moreno; C. Lish; Education, Economics, Environmental, Climate and Health Organization (EEECHO); Louisiana Just Recovery Network; Chispa, TX; Friends of the Earth; Environment America
[201] Natural Resources Defense Council; Friends of the Earth U.S.
[202] Oceana
[203] The Center for Biological Diversity, et al. (Form Letter Master)
[204] Environment America; Natural Resources Defense Council; C. Campbell
[205] Azul
[206] Joint sign-on comment from coastal business alliances across the country; Natural Resources Defense Council; J. White & C. Fouts & H. Hyde
[207] J. Smith; Jewish Youth Climate Movement; M. Goldstein; K. Cubina; G. Bixby
[208] Oceana; Environment America; J. White & C. Fouts & H. Hyde

- Harming Black, Indigenous, other communities of color, and low-income communities[209]

One commenter asserted that Indigenous leaders across oil affected areas have spoken out against the damages oil spills have caused to their communities and called for oil and gas activities to cease."[210]

Several commenters stated that GOM development has contributed to increased pollution, cancer, and disease among Black, Indigenous, Latino and Asian communities in Louisiana.[211] Commenters cited a USEPA report as indicating that the petroleum industry released over 11 million pounds of pollution in 25 Louisiana parishes, often in proximity to Black residents.[212] A commenter noted that the health hazards posed by these chemicals exacerbate respiratory diseases such as COVID-19.[213] Another cited the health hazards posed by the use of Corexit to mitigate the *Deepwater Horizon* oil spill.[214] Another commenter described climate change's influence on Hurricane Ida and how climate change endangers Gulf Coast communities generally.[215] A commenter also described the risks of OCS extraction development through a well's lifecycle and emphasized that a transition to clean energy is necessary to minimize the costs borne by communities.[216]

One commenter described the Proposed Program as perpetuating the "sacrifices zones," including Alaskan and GOM communities, providing citations indicating hematological, hepatic, pulmonary, and cardiac function impacts to individuals involved with oil spill cleanup, as well as health impacts to communities near refineries.[217] Another commenter described the history of sacrifice zones with several citations, pointing out especially Louisiana's "Cancer Alley."[218] Another commenter provided several citations indicating the health impacts of the fossil fuel industry generally and the disparate nature of these impacts and the damage they cause to Black communities. The commenter also provided several citations in arguing that fossil fuel development lowers home values because of health risks. The commenter urged BOEM to recognize and forestall these impacts by issuing no new lease sales in the Program.[219] Another commenter provided citations in stating that air pollution kills 63,000 Americans annually, that these deaths disproportionately affect communities of color and low-income communities, that fossil fuel development exacerbates and perpetuates these harms by taking advantage of communities with limited employment opportunities and low housing values, and that fossil fuel development further entrenches these conditions.[220]

[209] Mississippi Rising Coalition; Carrizo Comecrudo Tribe of Texas; Ocean Conservancy; Clean Water Action; Natural Resources Defense Council; Aquarium Conservation Partnership; Azul; Surfrider Foundation FL Chapter Network; J. White & C. Fouts & H. Hyde
[210] J. White & C. Fouts & H. Hyde
[211] H. Moreno
[212] H. Moreno; Ashé Cultural Arts Center and Efforts of Grace, Inc; Louisiana Just Recovery Network
[213] Ashé Cultural Arts Center and Efforts of Grace, Inc.
[214] Education, Economics, Environmental, Climate and Health Organization (EEECHO)
[215] Louisiana Just Recovery Network
[216] Southern Alliance for Clean Energy
[217] Evergreen Action
[218] Ashé Cultural Arts Center and Efforts of Grace, Inc.
[219] Taproot Earth
[220] Texas NAACP State Conference

A commenter argued that BOEM must include environmental justice within its Section 18 OCS Lands Act analysis, providing citations in arguing that OCS leasing imposes economic and environmental costs on coastal minority and low-income communities. The commenter stated that the OCS Lands Act and EO 14008 require that BOEM consider these impacts. The commenter also emphasized that BOEM's analysis should not be limited to coastal communities but needs to also consider impacts from inland infrastructure.[221] Another commenter agreed that BOEM should address impacted communities more specifically than simply referring to shoreline communities, and that inland communities should also be considered.[222]

A commenter further stated that BOEM's acknowledgement of differing environmental justice impacts is insufficient, recommending that BOEM collect relevant data and develop methodologies to quantitatively assess costs and benefits for low-income and minority communities. In particular, the commenter recommended utilizing USEPA's Environmental Benefits Mapping and Analysis Program – Community Edition. The commenter asserted that BOEM must complete and apply its "study to inform best practices for methodologies to analyze environmental justice issues in relation to the National OCS Program, including climate effects" before finalizing the Proposed Program.[223] Another commenter recommended that BOEM use the CEQ's Climate and Economic Justice Screening Tool to bolster its environmental justice analysis and align it with the directives of EO 12898 and 14008. The commenter stated that, for instance, this tool could be used to evaluate impacts to communities at a level more granular than considering all vulnerable coastal communities. The commenter also cited interagency guidance in stating that BOEM should consider—specifically, human health, socioeconomic, and cultural vulnerabilities—and that these vulnerabilities should be examined in the context of pre-existing stressors and baseline health conditions of the impacted communities. Furthermore, the commenter stated that BOEM's environmental justice analysis must include all reasonably foreseeable direct, indirect, and cumulative adverse impacts, and that BOEM's NEPA analysis should reconsider the significance of all its impacts to environmental justice communities. The commenter recommended that BOEM publish an environmental justice technical report identifying impacts to the minority and low-income populations, that this report discuss available mitigation measures for communities, and that BOEM also provide for an adaptive management plan and effectiveness monitoring. [224] The commenter also recommended the following mitigation strategies:

- Identify alternate locations or sites
- Alter the timing of activities to account for seasonal dependencies on natural and human resources
- Incorporate pollution prevention practices and policies to reduce the size or intensity of an action or its impacts
- Include additional benefits to the community incorporate other measures proposed by the community, including changing specific aspects of the project

[221] Earthjustice, et al.
[222] USEPA
[223] Earthjustice, et al.
[224] Natural Resources Defense Council

- Do not implement the Proposed Action or another action alternative[225]

The commenter stated that existing oil and gas leases can continue to provide jobs to these regions. Renewable energy commitments would allow for transition to new energy-related jobs that have greater long-term prospects. Therefore, the commenter concludes that further investment in fossil fuel development would be economically detrimental to these communities, especially as workers are leaving the OCS field because of safety risks, job security, and other job quality issues. Furthermore, the commenter stated that environmental damages from OCS leasing would negatively impact community employment. Additionally, the commenter stated that GOMESA revenue sharing caps likely will continue to be met by current lease production.[226]

A commenter stated that BOEM should solicit opposing views on the Proposed Program impacts from minority and low-income community members, as well as views on mitigation measures.[227] A commenter agreed and urged BOEM to recognize Tribal sovereignty and engage with Indigenous people and coastal communities in developing the Proposed Program.[228] The commenter also stated that, if lease sales eventually take place under the Proposed Program, lessees should be held to high standards to hold them accountable for impacts such as ocean acidification, climate impacts, and subsequent impacts on communities.[229] Another commenter recommended that BOEM adopt a programmatic EIS framework to address environmental justice concerns on a tiered basis and to conduct outreach at the appropriate community level.[230]

A commenter stated that further oil leasing could contribute to the ongoing genocide of the American Indian and deterioration of the world's environment. The commenter stated that treating regions as sacrifice zones is an extension of colonialism that has the greatest impacts communities of color.[231]

One commenter attached a map that warranted a response from NOAA of oil spills in coastal waters as a way of visualizing the impact of oil and gas development on environmental justice communities in those lease areas.[232] They urged the Biden Administration to ensure that disadvantaged populations are not sacrificed for more oil and gas development. Conversely, another commenter commended BOEM for discussing cultural resources and coastal communities in the Draft Programmatic EIS and listed a number of environmental justice principles; the commenter concluded by stating that the distances of OCS leasing from where people live minimize environmental justice conflicts and expressed their support for lease sales in the PFP.[233] One commenter asserted that the Biden Administration has made

[225] Natural Resources Defense Council
[226] Earthjustice, et al.
[227] Natural Resources Defense Council
[228] Ocean Conservancy
[229] Ocean Conservancy
[230] USEPA
[231] Carrizo Comecrudo Tribe of Texas
[232] FracTracker Alliance
[233] American Petroleum Institute

the advancement of environmental justice a priority, and, as such, BOEM should limit oil and gas leasing because of its disproportionate effects on disadvantaged communities.[234]

Source of Comments

- *General Public*
- *Non-energy Exploration & Production Industry and Associations*
- *Local Governments*
- *Public Interest Groups*
- *Tribes and Tribal Organizations*
- *Energy Exploration & Production Industry and Associations*
- *Other (Multiple Scientists)*
- *Federal Agencies*

Response to Comments

Environmental Justice: Agency obligations to consider environmental justice impacts are typically met through incorporation of environmental justice into NEPA reviews and processes. At this programmatic stage, BOEM considers environmental justice impacts in the Final Programmatic EIS through discussion of R.14 **VULNERABLE COASTAL COMMUNITIES** and, where applicable, under other resources, including R.13 **CULTURE**. Regarding the scope of consideration for "vulnerable coastal communities," BOEM is not limiting consideration to only shoreside communities, but rather considers coastal and near-coastal counties, parishes, and boroughs (see, for example, Figures 4-32 through 4-34 in BOEM (2017b)).

BOEM also recognizes that counties or parishes further inland may have high levels of natural or industrial connections to coastal areas or activities.

In response to comments received on the Draft Programmatic EIS, BOEM has expanded the description of the affected environment to include additional discussion of existing stressors and burdens on vulnerable coastal communities. In alignment with the assessment of impacts on most other resources in the Final Programmatic EIS, impacts on vulnerable coastal communities, including populations with environmental justice concerns, are described qualitatively to identify the types of impacts that could occur if oil and gas activities occur as a result of the 2024–2029 Program. The level of analysis in the Final Programmatic EIS is in compliance with CEQ guidance on programmatic reviews (Boots 2014) and is at an appropriate level of detail for the decision at hand. The analysis is at a national level, and the affected environment, including human communities, are described broadly. If a decision is made to move forward with any of the lease sales in the National OCS Program, additional reviews would take place that are more region and site specific, and the affected environment and potential impacts would be described in greater detail; BOEM would incorporate applicable information from existing data sources, including the Climate and Economic Justice Screening Tool, into subsequent reviews. Appropriate avoidance and mitigations measures would be determined at that time.

[234] J. White & C. Fouts & H. Hyde

The ongoing development of best practices for environmental justice methodologies will identify a framework for environmental justice analysis at the various scales of analysis for which BOEM conducts NEPA: from site-specific activities to national-scale programmatic planning documents. BOEM expects environmental justice methodologies will continue to be based on the scale and scope of the decision under review. Regarding the recommendation for an environmental justice technical report, at this programmatic stage, BOEM does not identify specific communities that may be impacted, but rather the types of impacts that could be experienced. Subsequent NEPA reviews would include environmental justice analyses to describe the affected environment and impacts at a regional or local scale. BOEM also studies environmental justice issues through the ESP, e.g., *Environmental Justice: A Comparative Perspective in Louisiana* (Hemmerling and Colten 2017) and an ongoing study, *Environmental Justice Technical Workshops for the Gulf of Mexico Region*.

The Final Programmatic EIS does not refer to certain planning areas as "sacrifice zones." **Section 1.1** identifies the eight factors the Secretary must consider when preparing a National OCS Program, as required in 43 U.S.C. § 1344(a)(2). At a level of detail appropriate for a national-level, programmatic assessment, the Final Programmatic EIS identifies existing pollution-related burdens in the GOM Region, and additional discussion of these considerations has been added to the document. The Final Programmatic EIS also discusses existing conditions in the Cook Inlet Planning Area, including the importance of subsistence harvest and activities to the health and community well-being of some Cook Inlet communities. BOEM acknowledges that OCS oil and gas leasing and development in the GOM Region has contributed to onshore facilities that have historically impacted communities with environmental justice concerns. BOEM has expanded the discussion of existing burdens and vulnerabilities, including health-related concerns, of coastal communities in the Alaska and GOM Regions in **Sections 2.6 and 2.8**. BOEM reviewed the provided references and incorporated the information as appropriate. As described in the Final Programmatic EIS, BOEM expects that the lease sales identified in the 2024–2029 Program would not likely result in additional onshore processing facilities; existing facilities process oil and gas from a number of sources besides the OCS, but leasing in the GOM could prolong the use of existing facilities and the associated ongoing impacts on VCCs.

Regarding oil spills, BOEM acknowledges the potential impacts of oil spills on vulnerable coastal communities (**Section 4.6**). BOEM strives to uphold environmental justice-related obligations and principles while meeting its mandates under the OCS Lands Act and its mission to manage development of U.S. OCS energy and mineral resources in an environmentally and economically responsible way. The OCS Lands Act requires that BOEM prepare, periodically revise, and maintain a leasing program with a schedule of sales showing size, timing, and location to best meet the Nation's energy needs for the following five-year period. In identifying planning areas in which to propose lease sales in the National OCS Program, the Secretary must analyze and consider eight factors identified in the OCS Lands Act (43 U.S.C. § 1344(a)(2)) (**Section 1.1**). The Final Programmatic EIS analyzes the potential environmental impacts from activities that could occur based on the proposed schedule of lease sales in the PFP. In addition, BOEM conducts regional NEPA reviews before a lease sale is held, including site-specific analyses, to incorporate the most current and relevant data. BOEM conducts oil spill risk analyses at the site-specific review stage—when we have more specific information about the location and level of

activity—to consider specific information about where an oil spill may spread and how it may affect resources. These additional NEPA reviews also will include opportunities for public involvement. NEPA reviews at the lease sale stage may be more appropriate for identifying appropriate mitigation measures for specific impacts on communities with environmental justice concerns. Multiple Federal and state agencies are responsible for ensuring appropriate oil spill prevention measures are in place and that companies are prepared to respond to a spill.

As explained in **Appendix F**, mitigations are not being adopted as part of the decision for the National OCS Program. **Appendix F** provides a representative sample of lease stipulations and other protective environmental measures typically applied at subsequent National OCS Program stages. BOEM appreciates the recommendations regarding development of mitigation measures related to impacts on vulnerable coastal communities. BOEM will consider the recommendations in subsequent leasing and development stages. Coordination with communities on impacts and mitigations can provide meaningful input at later stages. For example, BOEM adopted seasonal timing restrictions on construction and vessel activities as a condition of approval of the Liberty Development and Production Plan (BOEM 2018b) to reduce impacts to subsistence-harvest activities for an Alaska Native community. The mitigation measure was developed based on input by the community during BOEM's review process.

Public Involvement: BOEM held a 90 day public comment period for the Draft Programmatic EIS. Additionally, BOEM held public meetings on the Draft Programmatic EIS, established a public website, and provided notice on the BOEM website as well as through the USEPA and the *Federal Register*. **Section 5.3** outlines the steps BOEM took to notify interested parties of the opportunity to comment. BOEM recognizes its obligations regarding federally recognized Tribes and adheres to Bureau and Departmental policies regarding Tribal consultation. During FY 2022, BOEM invited consultation with federally recognized Tribes and Alaska Native Claims Settlement Act corporations in the GOM, Pacific, and Alaska Regions regarding development of the Proposed Program and Draft Programmatic EIS. BOEM will continue to invite consultation with Tribes at subsequent leasing, exploration, and development stages. BOEM will provide opportunities for engagement with vulnerable coastal communities in areas in which lease sales are scheduled under the 2024–2029 Program. Mitigation measures may be identified through engagement. Information on BOEM's Tribal Consultation activities can be found at www.boem.gov/about-boem/tribal-engagement.

BOEM appreciates USEPA's recommendation to include in the Final Programmatic EIS a programmatic framework for considering environmental justice concerns in NEPA reviews tiered to the 2024–2029 Program. Additional information on subsequent levels of environmental justice analysis and engagement has been added to the Final Programmatic EIS. Regional analyses for any lease sales held under the 2024–2029 Program would include more detailed discussions on exploration and development scenarios, including assumptions for analysis around types and levels of activity and potential impacts. BOEM continues to work to improve approaches to engagement with environmental justice communities and will take the recommendations into consideration when developing engagement strategies for subsequent lease sales and activities.

Section 28.1.30 – Recreation and Tourism

Summary of Comments

Approximately 2,210 submissions provided comments regarding recreation and tourism.

A commenter asserted that Florida's most important industry is its tourism industry, which amounts to billions in revenue and sales.[235] They expressed concerns about the negative impact of oil spills on the tourism industry, such as closed businesses that never re-opened. Similarly, a commenter stated that the Federal offshore drilling program negatively affects Florida's recreation and tourism industries, which together generate over $73.9 billion,[236] and another commenter opposed further OCS oil and gas production as excessively risky and harmful to South Carolina's tourism industry and that oil wells off the South Carolina coast would never produce more than 6% of the revenues generated by the state's tourism industry.[237]

A few commenters asserted that the Nation's recreation and tourism economies need a clean coastal environment to support millions in jobs and billions in revenue across the U.S. and expressed concern that offshore drilling threatens those clean environments.[238] A couple commenters added that these clean coastal environments are threatened by the risk of oil spills that come from the expansion of offshore drilling.[239]

A few commenters representing "recreation dependent businesses" expressed concern about oil and gas development, citing likely negative effects to the Nation's tourism and recreation industries.[240] Similarly, a couple commenters asserted that ending leasing for offshore drilling would protect jobs and gross domestic product reliant on tourism and recreation industries.[241]

A commenter discussed the importance of economic output and job creation from national park sites across the coast and asserted that these parks are at risk when offshore oil development happens near their shores.[242] Another commenter discussed the negative impacts of climate change on tourism in coastal areas, including flooding and shoreline erosion.[243]

Source of Comments

- *Non-energy Exploration & Production Industry and Associations*
- *General Public*
- *Public Interest Groups*

[235] Innisfree Hotels
[236] Surfrider Foundation FL Chapter Network
[237] T. Stickler
[238] Julie Dugan; Sandra Couch; Nora Coyle; Andrew Isoda
[239] Surfrider Foundation FL Chapter Network; S. Couch
[240] Sandra Couch; Nora Coyle; Andrew Isoda
[241] D. Keeton (Form Letter Master); C. Lish
[242] National Parks Conservation Association
[243] Natural Resources Defense Council

Response to Comments

The Final Programmatic EIS describes the role of recreation and tourism in the ocean economy under R.15 **RECREATION & TOURISM** in **Chapter 2**. The Final Programmatic EIS identifies potentially significant impacts to recreation and tourism in all regions (although not in all planning areas) from noise, lighting, visible infrastructure, and space-use conflicts in **Chapter 4**. Planning areas that already have higher levels of industrial development may not experience significant impacts, as leasing is expected to represent a continuation of existing conditions in those areas. **Section 4.6** identifies high-level potential impacts on recreation and tourism associated with oil spills. The Final Programmatic EIS discusses the types of impacts that could occur at a level of detail appropriate for a national programmatic assessment. Region- and area-specific analyses of potential impacts on recreation and tourism, along with more detailed information on the importance of recreation and tourism to regional and local economies, would occur at the lease sale planning stage. The lease sale stage analysis also would include area-specific analysis of oil spill risks and potential impacts of oil spills on key coastal recreation and tourism resources.

Section 28.1.31 – Employment and Income

Summary of Comments

Approximately 2,210 submissions provided comments regarding employment and income.

A commenter discussed the contributions of Delaware's coastal and marine resources to the state's economy and livelihood of its citizens and asserted that any activity that might interrupt those economic interests should be carefully balanced with other uses of the ocean and its resources.[244]

A commenter asserted that statements in the Draft Programmatic EIS regarding employment and income effects minimized the foreseeable adverse economic and social impacts of the No Action Alternative.[245] Another commenter discussed the economic effects the Draft Programmatic EIS considered if oil and gas activities do not occur and asserted that the economic benefits from the prioritization of offshore wind over oil and gas leasing should also be acknowledged, including higher returns to American taxpayers.[246]

A few commenters discussed the effects of renewable energy projects on employment and income. One commenter urged BOEM to consider the additional jobs that would be created by a transition to renewable energy,[247] while a commenter and a form letter campaign asserted that moving towards clean, renewable energy sources would result in better-paying American jobs.[248] Another commenter cited a BOEM report that asserted offshore wind has the potential to create almost 80,000 jobs by 2030 in manufacturing, operations, and maintenance sectors.[249]

[244] Delaware Department of Natural Resources and Environmental Control
[245] Chevron
[246] Sanibel Captiva Conservation Foundation
[247] J. DuPree
[248] D. Keeton; (Form Letter Master) C. Lish
[249] J. White & C. Fouts & H. Hyde

One commenter asserted that communities in the proposed lease area regions depend on offshore energy activities for job creation.[250] They stated that GOM offshore production supports about 370,000 jobs directly and about 1.4 million jobs in total both directly and indirectly, with a mean pay that is 29% higher than the national average. They added that, because the offshore energy industry is highly specialized and vertical, any delay in Federal leasing has a drastic impact on jobs and economic benefits down the line.

Conversely, one commenter asserted that coastal states rely on a clean and healthy ocean for jobs and income, and that oil and gas drilling bring coastal industrialization and pollution that stay long after the jobs are gone.[251] They added that the best way to protect coastal economies is to prevent oil spills and similar catastrophic events. Another commenter discussed the negative effects of the 2010 *Deepwater Horizon* oil spill on their coastal community, especially on jobs and the economy.[252]

A commenter discussed a July 2022 report from BOEM that claimed oil and gas extraction practices result in additional jobs at high pay but criticized the report for not mentioning the "little to no protection companies offer to their workers."[253]

A commenter faulted the equitable sharing analysis as overstating benefits and understating costs to Gulf and Cook Inlet communities, even though, the commenter states, Chapter 8 of the Proposed Program recognizes these regions as sacrifice zones. The commenter attached an economic analysis indicating that a no-lease option would avoid $528 million and $19 million, respectively, to GOM and Cook Inlet communities. The commenter also provided a citation indicating that industry-commissioned studies of employment benefits can be misleading.

Source of Comments

- *Governors and State Agencies*
- *General Public*
- *Public Interest Groups*
- *Local Governments*
- *Energy Exploration & Production Industry and Associations*

Response to Comments

Renewable Energy: The Final Programmatic EIS focuses on identifying potentially significant impacts related to the 2024–2029 Program. Although renewable energy development is considered in the discussion of cumulative impacts, specific impacts related to offshore wind (including impacts on employment, income, and revenue) would be assessed in reviews by BOEM and other agencies for offshore wind leasing and development. Such an assessment is not within the scope of analysis of this Final Programmatic EIS. BOEM notes that under the IRA, for 10 years following the Act's enactment, USDOI, through BOEM, is required to hold at least one offshore oil and gas lease sale that offers at least

[250] Greater Lafourche Port Commission/Port Fourchon
[251] Oceana
[252] Ella Holmes Hines
[253] Azul

60 million acres be held, and leases executed, within the year prior to offering a new offshore wind sale. More information on planning, leasing, and development for offshore wind is available at https://www.boem.gov/renewable-energy/regulatory-framework-and-guidelines.

Protection of Offshore Oil and Gas Workers: BOEM disagrees with the statement that offshore oil and gas workers are offered "little to no protection." Working in the offshore oil and gas environment is inherently dangerous and requires multiple levels of risk reduction and continual efforts to maintain a culture of safety. A number of agencies—including BSEE, the U.S. Coast Guard, the Federal Aviation Administration, and state authorities—regulate various aspects of worker safety requirements related to the offshore oil and gas industry. BOEM welcomes additional research or information on the topic to share with applicable regulatory agencies.

No Action Alternative: The Final Programmatic EIS acknowledges, at a level of detail appropriate for a national, planning-level analysis, that effects related to employment and income may have economic, social, and cultural impacts in the Western and Central GOM Planning Areas (see Culture [R.13] and Vulnerable Coastal Communities [R.14] in **Section 4.2.1.2**). Region-specific analyses for any leases identified in the National OCS Program would include more detailed analyses of impacts of a No Action Alternative at the regional level.

Equitable Sharing Analysis: Chapter 9 (Equitable Sharing) of the PFP presents qualitative information regarding the costs and benefits of leasing in the GOM Region and Cook Inlet Planning Area. BOEM considered this comment when developing the PFP. Note that neither the PFP nor the Final Programmatic EIS refer to certain planning areas as sacrifice zones. **Section 1.1** identifies the eight factors the Secretary must consider when preparing a National OCS Program, as required in 43 U.S.C. § 1344(a)(2). At a level of detail appropriate for a national-level, programmatic assessment, the Final Programmatic EIS identifies existing pollution-related burdens in the GOM Region, and additional discussion of these considerations has been added to the document. The Final Programmatic EIS also discusses existing conditions in the Cook Inlet Planning Area, including the importance of subsistence harvest and activities to the health and community well-being of some Cook Inlet communities.

Section 28.1.32 – Oil Spills and CDEs

Summary of Comments

Approximately 180 submissions provided comments regarding oil spills and catastrophic events.

Some commenters, including a form letter campaign, discussed oil spills and their impacts in a general sense.[254] In discussing the damages that oil spills can cause, several commenters referenced the 2010 *Deepwater Horizon* oil spill as a prime example of a CDE.[255] One commenter added that they had to lay off 70% of their workforce due to the *Deepwater Horizon* spill and expressed concerns about future spill

[254] Jewish Youth Climate Movement; Multiple Scientists (Form Letter Master); NOAA NMFS; T. Spurkland; Friends of the Earth; Mississippi Rising Coalition

[255] N. McQueen; Innisfree Hotels; Taproot Earth; Surfrider Foundation FL Chapter Network; Aquarium Conservation Partnership; Ashé Cultural Arts Center and Efforts of Grace, Inc; M. Goldstein; North Gulfport Community Land Conservancy; Texas NAACP State Conference; Multiple Scientists (Form Letter Master)

impacts on jobs and employment.[256] Another commenter asserted that the oil and gas industry's ignorance of regulations increase the likelihood that something might go wrong and cause a destructive oil spill.[257]

Some commenters, including a form letter campaign, discussed an oil spill off the coast of California in 2021 that devastated the coastline and closed several coastal businesses, fisheries, and rental companies and killed birds and fish off of the coast.[258] Another commenter mentioned a 2014 oil spill that was discovered in 2018 to be leaking much more oil than initially thought and also discussed the risk of pipeline accidents. The commenter stated that these risks are heightened by offshore oil drilling, since offshore production requires the building of pipelines that move the oil and gas onshore.[259] One commenter discussed the risk of "post-abandonment leaks" from oil wells and added that lessees are in violation of lease terms and Federal law if one of their abandoned wells leaks.[260] One commenter discussed improvements in oil spill responses by the industry, citing increased training and investment in response programs and capabilities.[261]

Several commenters discussed general trends around oil spills. One commenter asserted that the cost of oil spills have been going up over time and that, as offshore drilling moves into deeper waters, the risks of oil spills will only increase.[262] Similarly, a commenter asserted that as climate change worsen and causes stronger hurricanes, the risk of oil spills continues to grow;[263] another commenter added that increased oil and gas production results in more vessel and navigation traffic, which in turn increases the risk of further oil spills.[264] Yet another commenter asserted that, even absent large, disastrous oil spills, smaller and more frequent spills can still result in a lot of oil being dumped into lease areas.[265] A few commenters asserted that there have been over 6,000 oil spills between 2010 and 2020, at an average of two a day,[266] while another commenter added that there are an average of four oil and chemical spills reported to the U.S. Coast Guard every day in the GOM.[267] A couple commenters cited a count of 389 oil spills from U.S.-based OCS platforms and barges between 2006 and 2015, which resulted in 206.5 million gallons of oil engulfing U.S. coastlines.[268]

Several commenters discussed the impact on humans, especially low-income coastal communities and communities of color, from oil spills and other CDEs.[269] Some commenters, including a form letter

[256] Innisfree Hotels
[257] Azul
[258] G. Bixby; Joint sign-on comment from coastal business alliances across the country; Multiple Scientists (Form Letter Master)
[259] Taproot Earth
[260] True Transition
[261] American Petroleum Institute
[262] Natural Resources Defense Council
[263] Texas NAACP State Conference
[264] Earthjustice, et al.
[265] Southern Environmental Law Center
[266] Oceana; Aquarium Conservation Partnership; Joint sign-on comment from coastal business alliances across the country
[267] Clean Water Action
[268] S. Couch; A. Isoda
[269] Turtle Island Restoration Network; Earth Ethics, Inc.; Azul; Seattle Aquarium; T. Spurkland; Education, Economics, Environmental, Climate and Health Organization (EEECHO); Boat People SOS Gulf Coast; Joint sign-on comment from coastal business alliances across the country; Center for Biological Diversity; Friends of the Earth U.S.

campaign, also discussed impacts of oil spills on different animals, including wildlife in general,[270] birds,[271] benthic communities,[272] sea turtles,[273] and fish.[274]

Several commenters discussed issues with the Draft Programmatic EIS and/or cost-benefit analysis BOEM provided in regard to oil spills and other CDEs. Some commenters criticized the OECM for not modeling the cost of catastrophic oil spills (those of more than 100,000 barrels) and other CDEs,[275] while one commenter asserted that oil spills should be analyzed as an IPF.[276] A few commenters asked that BOEM study the health and economic impacts of future oil spills and similar catastrophic disasters.[277] One commenter also asserted that BOEM's analysis of non-catastrophic spills underestimates the size and frequency of such spills, fails to consider the probability of such spills, and omits important economic costs from spills.[278] Another commenter asserted that the Draft Programmatic EIS did not consider the risk of catastrophic oil spills to "environmental amenities and values" as required by Federal regulations and asked that this issue be remedied in the final EIS.[279]

One commenter criticized BOEM's discussion of the impacts of oil spills for not providing species- or system-specific analysis.[280] They also stated a number of different specific impacts of oil spills, including but not limited to:

- Behavioral alteration, suppressed growth, and impaired reproduction in marine wildlife
- Exposure fishery and wildlife species to different chemical compounds such as PAHs
- Toxicity of PAHs and their capacity to suppress immune functions and interrupt hormone processes

The same commenter criticized BOEM for not discussing the impacts of dispersants used in cleaning up oil spills, asserting that dispersants can release PAHs, expose marine life to toxins, contaminate deep water, and result in oxygen depletion. Finally, they asked that BOEM discuss in detail the impacts of oil spills on birds, benthic communities, fish, and humans.

One commenter asserted that the Draft Programmatic EIS did not sufficiently analyze the impacts of oil spill responses, as well as the cumulative impacts and risks of deep-water, ultra-deepwater drilling, and oil spills in general.[281] They also discussed the dangers of corrosion to oil rig materials and asked that BOEM analyze how corrosion can increase the likelihood of an oil leak or spill, asserting that BOEM's Draft Programmatic EIS failed to discuss the impacts of corroded infrastructure components. They

[270] Environment America (Form Letter Master); Seattle Aquarium; Oceana; C. Lish
[271] Center for Biological Diversity
[272] Center for Biological Diversity
[273] Sea Turtle Conservancy; Oceana
[274] Center for Biological Diversity; Oceana
[275] Natural Resources Defense Council; M. Goldstein; Earthjustice, et al.; NOAA NMFS; Institute for Policy Integrity at New York University School of Law; Oceana; J. White & C. Fouts & H. Hyde
[276] NOAA NMFS
[277] Boat People SOS Gulf Coast; Ella Holmes Hines; North Gulfport Community Land Conservancy
[278] Earthjustice, et al.
[279] J. White & C. Fouts & H. Hyde
[280] Center for Biological Diversity
[281] Natural Resources Defense Council

further critiqued the Draft Programmatic EIS for not considering the impacts of oil spills to specific locations or clarifying which areas are impacted more than others.

One commenter criticized the Draft Programmatic EIS for not mentioning sea grass throughout Section 4.6 on oil spills, asserting that manatees need sea grass to survive but are undergoing large mortality events due to the effects of oil spills.[282]

One commenter specifically recommended that BOEM "revise the discussion in Section 4.6" on oil spill impacts to "include a summary of the modeling results" of a number of different kinds of spills.[283] They asked that BOEM incorporate the spills from Tables G-1 and G-2 into the main report in order to complete analyze of foreseeable impacts and make analysis consistent with 40 CFR 1502.21(d).

One commenter applauded BOEM for concluding that the environmental risk of offshore oil and gas drilling from catastrophic oil spills "dwarfs any purported developmental benefits" and expressed their support for BOEM's removal of the Mid- and South Atlantic Planning Areas from the Proposed Program as a result.[284]

Source of Comments

- *Public Interest Groups*
- *Non-energy Exploration & Production Industry and Associations*
- *General Public*
- *Other (Multiple Scientists)*
- *Federal Agencies*
- *Energy Exploration & Production Industry and Associations*
- *Local Governments*

Response to Comments

Post-Abandonment Leaks: BOEM recognizes the potential for post-abandonment. BOEM's oil and gas program comprises five sequential phases (**Figure 4-2**): geophysical exploration, exploratory drilling, development, production, and decommissioning. Environmental reviews are conducted at each stage to the extent required by NEPA.

The Final Programmatic EIS focuses on high-level impacts at the national and regional scale; impacts of specific proposed activities would be assessed at the project-specific level at the lease sale stage. If a lessee discovers and chooses to develop oil or gas from a specific lease, the lessee would be required submit a development and production plan to BOEM for review. The approved development and production plan would describe the number and location of wells to be drilled, type of production structure, manner of transporting recovered oil and natural gas, and related operations, and would include a description of proposed decommissioning activities for wells, platforms, pipelines, and other

[282] M. DePaolis
[283] USEPA
[284] Southern Environmental Law Center

facilities. Proposed decommissioning activities would be assessed prior to the time the lessee proposes to terminate production and commence decommissioning.

IPFs: Reasonably foreseeable accidental and unauthorized events (including spills of fuel or crude oil resulting from accidents, intentional discharges, weather events, and collisions) are identified as an IPF in **Table 2-11**.

CDEs: Potential consequences of oil spills are discussed in **Section 4.6** and **Appendix G**. BOEM assessed historical data for small and large platform spills and pipeline spills. Four large (≥ 1,000 bbl) platform spills occurred from 1974–2015, including the *Deepwater Horizon* oil spill, and 16 large pipeline spills occurred from 1974–2015.[285] Spill rates are calculated using spill data and the volume of annual oil production from 1974 to 2015 and are provided in **Tables G-1 and G-2**. BOEM estimated a median large (≥ 1,000 bbl) platform spill event of 3,283 bbl and median large pipeline spill event of 3,750 bbl based on historical data and estimated that, in any planning area, 0–1 large platform spill events could occur from the 2024–2029 Program, with the exception of 0–2 large platform spill events for the Western, Central, and Eastern GOM Planning Areas. BOEM also estimated that, in any planning area, 0–1 large pipeline spill events could occur from the 2024–2029 Program, with the exception of the Western, Central, and Eastern GOM [286] Planning Areas (at an estimated 0–7 pipeline spill events), and Beaufort Sea and Chukchi Sea Planning Areas (0–3 and 0–5 pipeline spill events, respectively). **Figure 4-9** identifies potentially affected planning areas, including planning areas that are farther away from areas of activity but could still be affected by cross-boundary impacts.

It difficult to predict possible impacts from an accidental event in further detail at the programmatic level because the specific activities that would be conducted are not fully defined at the programmatic level. More information would be known at the lease sale stage about the timing and location of proposed activities, spill risk from those activities, and specific environmental resources that could be affected. BOEM's oil spill risk analysis modeling would be conducted at the lease stage to estimate spill risk, spill trajectories, and probability of contact with an environmental resource for specific proposed activities. BOEM's risk analysis modeling would include modeling of potential catastrophic platform release events and potential pipeline release events based on the scope and scale of potential lease activities. BOEM would use the modeling results to determine potential risk to specific environmental resources and how to further mitigate risk.

As stated in **Appendix G**, a CDE references a very large (typically over 1 million bbl) but very unlikely spill that could result from OCS exploration, development, and production activities involving rigs, facilities, pipelines, tankers, or support vessels. The Final Programmatic EIS does not analyze CDEs because of the low probability of occurrence and the many factors that determine severity of potential impacts, which are not known at the programmatic stage. For further analysis of the impacts of a low-probability CDE, see the *Gulf of Mexico Catastrophic Spill Event Analysis* (BOEM 2021), *Beaufort Sea: Hypothetical Very Large Oil Spill And Gas Release* (BOEM 2020), the *Gulf of Mexico Catastrophic Spill Event Analysis: High-*

[285] The estimates in **Table G-1** do not include the ongoing Taylor Energy (Louisiana) oil spill; BOEM intends to include the Taylor oil spill in future spill rate updates.
[286] This area does not include the portions of the Central and Eastern GOM Planning Areas within the GOMESA moratorium.

Volume, Extended-Duration Oil Spill Resulting from Loss of Well Control on the Gulf of Mexico Outer Continental Shelf (BOEM 2021), and the PFP.

BOEM does consider the costs of CDEs. The cost of CDEs are analyzed in the Final EAM. The rarity and unpredictable nature of the many factors influencing the severity of a large oil spill's impact make efforts to consider expected costs less meaningful than the other measures developed by the OECM (Industrial Economics Inc. 2023b) and Market Simulation Model (MarketSim) (Industrial Economics Inc. 2017; 2023a). Catastrophic events are difficult to monetize as their rarity makes it problematic to develop statistical representations comparable to those for the other environmental effects modeled in the OECM. The possible impacts of highly unlikely catastrophic oil spills are considered separately in Chapter 6 of the Final EAM. It is important to note that these types of impacts could occur under OCS leasing or through energy substitutes from the No Action Alternative, and, while neither are monetized in the OECM, both are discussed in Chapter 6 of the Final EAM.

The Final Programmatic EIS also discusses National OCS Program-relevant aspects of CDEs (**Section 4.6** and **Appendix G**). Two separate reports discuss information on resources at risk and potential impacts from a catastrophic oil spill: *Economic Inventory of Environmental and Social Resources Potentially Impacted by a Catastrophic Discharge Event within OCS Regions* (Industrial Economics Inc. 2014) and *Forecasting Environmental and Social Externalities Associated with Outer Continental Shelf (OCS) Oil and Gas Development - Volume 2: Supplemental Information to the 2018 Revised OECM* (Industrial Economics Inc. 2017).

***Deepwater Horizon* Oil Spill:** The *Deepwater Horizon* oil spill impacts and mitigation measures are assessed in NEPA documents referenced in **Section 4.6**.

Deepwater Horizon oil spill impacts and mitigation measures were addressed in the *Deepwater Horizon Oil Spill: Final Programmatic Damage Assessment and Restoration Plan and Final Programmatic Environmental Impact Statement* issued by Federal and state natural resource trustee agencies (Trustees) in February 2016 (Deepwater Horizon Natural Resource Damage Assessment Trustees 2016). The Deepwater Horizon Natural Resource Damage Assessment addresses natural resource and economic (e.g., recreational use) impacts of the *Deepwater Horizon* oil spill and considers programmatic alternatives to restore natural resources, ecological services, and recreational use services injured or lost as a result of the spill. The natural resource assessment addressed impacts to water column, benthic resources, nearshore marine ecosystems, birds, sea turtles, and marine mammals, including toxicity impacts. The Trustees concluded that the *Deepwater Horizon* oil spill affected a wide array of linked resources over a large area, and that the effects constituted an ecosystem-level injury. The document included a comprehensive, integrated ecosystem restoration plan with a portfolio of restoration types to address the diverse suite of injuries that occurred at both regional and local scales.

Since the spill, many peer-reviewed papers and books have been published documenting spill impacts and critical data gaps. BOEM will continue to assess new information regarding potential impacts from spills, including potential CDEs, and consider this information in future impact analyses of proposed leasing activities in the planning areas.

OECM: BOEM uses the OECM to estimate environmental and social costs of activities associated with the 2024–2029 Program and those of energy substitutes under Alternative A, which are used in the net benefits analysis in the PFP. The OECM considers impacts associated with OCS production activities and potential oil spills for six cost categories: (1) recreation, (2) air quality, (3) property values, (4) subsistence harvests, (5) commercial fishing, and (6) ecological impacts. These six categories of impacts capture most environmental and social costs associated with offshore oil and gas activities; however, they only reflect costs that can be quantified for the purposes of modeling. Costs that cannot be quantified are not included in the OECM either because they do not directly relate to a monetary value or because any quantification would be speculative. The OECM does not monetize the following:

- Impacts on unique resources based on rareness or protected status impacts on these resources from general operations
- Environmental impacts related to the construction and operation of onshore infrastructure to support OCS activities
- Environmental impacts related to the construction and operation of onshore infrastructure to support OCS activities
- Costs of a CDE

Because catastrophic oil spills are extremely infrequent and only limited data are available on their impacts, the OECM was not designed to estimate the costs of a CDE. To supplement results generated by the OECM for the PFP, the Bureau includes specific analysis of catastrophic oil spills in Chapter 6 of the Final EAM. Additional discussion is found in **Section 4.6** and **Appendix G**. Additional information is also available in the *Economic Inventory of Environmental and Social Resources Potentially Impacted by a Catastrophic Discharge Event within OCS Regions* (Industrial Economics Inc. 2014).

Impacts from Oil Spills and Oil Spill Response Activities: The Final Programmatic EIS broadly describes impacts from oil spills and oil spill response activities and provides examples of specific impacts to resources, including several that the commenters were concerned about, in **Section 4.6.1**. The level of analysis in the Final Programmatic EIS is in compliance with recent CEQ guidance on programmatic reviews (Boots 2014) and is at an appropriate level of detail for the decision at hand. The analysis is at a national level, and potential impacts from proposed activities are described broadly. If a decision is made to move forward with any of the proposed lease sales in the PFP, additional reviews would take place that are more site specific, and the potential impacts to resources (including at the species and ecosystem level) would be described in greater detail.

Section 4.6.1 provides examples of impacts to resources from oil spill response activities, including in situ burning and the use of dispersants. Further analyses of potential impacts on ecosystems, as well as oil spill response plans that may involve the use of dispersants, are completed at the lease sale stage.

Florida Manatee Deaths and Oil Spills: Sea grass meadows can be affected by oil spills and is added as potentially impacted habitat in **Section 4.6**. The unusual mortality event of Florida manatees has been an ongoing concern since 2020 (Florida Fish and Wildlife Conservation Commission 2022). There is no

evidence the deaths are related to any oil spill; rather, most of the manatee deaths likely are due to starvation and malnutrition from seagrass loss and harmful algal blooms because of poor water quality in the Indian River Lagoon on the Atlantic coast of Florida.

Consideration of Impacts from Oil Spill Response Activities, Risks and Cumulative Impacts of Oil Spills from Deepwater Drilling and Corroded Offshore Infrastructure, and Location of Possible Impacts from Oil Spills: Section 4.6.1 provides examples of impacts to resources from oil spill response activities including in situ burning and the use of dispersants. The level of analysis in the Final Programmatic EIS is in compliance with recent CEQ guidance on programmatic reviews (Boots 2014) and is at an appropriate level of detail for the decision at hand. The analysis is at a national level, and potential impacts from proposed activities are described broadly. If a decision is made to move forward with any of the proposed lease sales in the PFP, additional reviews would take place that are more site specific, and the potential impacts to resources from oil spills would be described in greater detail.

The cumulative effects analysis does not include an analysis of accidental oil spills, including those from deepwater drilling. Accidental spills are non-routine events—with uncertain frequency and size—that may occur through activities under the 2024–2029 Program or otherwise (e.g., existing OCS or state submerged lands oil and gas activities). Assessing the impact of accidental spills could mask the clear description and subsequent understanding of the incremental contribution of other OCS and non-OCS routine activities this cumulative analysis seeks to provide. However, accidental oil spills are a potentially significant concern; therefore, **Section 4.6** discusses potential impacts of oil spills from 2024–2029 Program activities.

Corrosion and other safety issues relating to offshore oil development and production are the responsibility of BSEE. BSEE oversees the safety and environmental compliance of OCS oil and gas operations. BSEE's functions include development and enforcement of safety and environmental regulations; permitting OCS exploration, development, and production activities (e.g., drilling permits, OCS pipelines, structure installation, decommissioning); conducting inspections; and ensuring that industry is prepared to respond to oil spills. BSEE regulations related to OCS oil and gas operations are found primarily in 30 CFR parts 250–254.

Section 28.1.33 – Cross-Boundary Impacts

Summary of Comments

Four submissions provided comments regarding cross-boundary impacts.

One commenter discussed the NEPA standard requiring BOEM to assess all cumulative impacts of the Program, "regardless of where those impacts might occur."[287] They asserted that BOEM's Draft Programmatic EIS did not sufficiently consider environmental impacts in other planning areas, including impacts on marine mammals, birds, fish, migratory species, and invertebrates, and added that oil spills often expand beyond arbitrary boundaries, heightening the reason for cross-boundary impacts to be

[287] Natural Resources Defense Council

included in the Draft Programmatic EIS beyond simply the NEPA requirement. The commenter further urged BOEM to "evaluate the cumulative effect of inter-regional development on migratory species," support its findings with scientific evidence about migratory species, and then "re-examine the alternatives and mitigate measures to minimize impacts for specific species."

One commenter criticized BOEM's Proposed Program for calling oil spills like the 2010 *Deepwater Horizon* BP disaster "remote and…primarily regional" as a way to minimize the threat and asserted that BOEM later contradicted itself by saying that "some costs from the National OCS Program are not limited to the U.S."[288] Another commenter asked BOEM to issue a Notice of Intent to develop a multi-sale EIS about different GOM areas to be included G-2 in the Proposed Program.[289]

Source of Comments

- *Public Interest Groups*
- *Energy Exploration & Production Industry and Associations*

Response to Comments

The level of analysis in the Final Programmatic EIS is in compliance with recent CEQ guidance on programmatic reviews (Boots 2014) and is at an appropriate level of detail for the decision at hand. The analysis is at a national level, broadly describing the regions and discussing potential impacts to regions within them. If a decision is made to move forward with any of the proposed lease sales in the PFP, additional reviews would take place that are more site specific, and the potential impacts would be described in greater detail. Although it is possible for effects to go beyond regional boundaries, most effects would be local to regional in scale and unlikely to cause significant effects beyond regional boundaries. Additionally, potential mitigations considered as part of the Final Programmatic EIS—and that would be included at the lease or project-specific level—would have the potential to minimize impacts for both local and migratory species.

Potential consequences of oil spills are discussed in **Section 4.6** and **Appendix G**. Spill rates are calculated using spill data and the volume of annual oil production from 1974 to 2015 and are provided in **Tables G-1 and G-2**. BOEM estimated a median large (> 1,000 bbl) spill event of 3,283 bbl based on historical data and estimated that, in any planning area, 0–1 spill could occur from the 2024–2029 Program, with the exception of 0–2 spills for the Western, Central, and Eastern GOM Planning Areas. **Figure 4-9** identifies potentially affected planning areas, including planning areas that are farther away from areas of activity but could still be affected by cross-boundary impacts.

It difficult to predict possible impacts from an accidental event in further detail at the programmatic level because the specific activities that would be conducted are not fully defined at the programmatic level. More information would be known at the lease sale stage about the timing and location of proposed activities, spill risk from those activities, and specific environmental resources that could be affected. BOEM's oil spill risk analysis modeling would be conducted at the lease stage to estimate spill

[288] Azul
[289] Shell Offshore Inc.

risk, spill trajectories, and probability of contact with an environmental resource for specific proposed activities. BOEM would use the modeling results to determine potential risk to specific environmental resources and how to further mitigate risk.

Section 28.1.34 – Cumulative Impacts (Effects)

Summary of Comments

Approximately 15 submissions provided comments regarding cumulative impacts or effects.

One commenter discussed cumulative effects of ocean acidification caused by more oil and gas drilling, including significant economic losses and hits to consumer surplus.[290]

Some commenters asked that BOEM update the Draft Programmatic EIS to "fully analyze the cumulative impacts to the environment, coastal communities, and existing industries from drilling operations and large oil spills."[291] Similarly, one commenter asserted that BOEM's environmental sensitivity analysis is missing any consideration of cumulative effects despite cumulative effects having an important effect on both the sensitivity and vulnerability of species and habitats to a Proposed Action.[292] They also asserted that BOEM's analysis in general fails to consider the cumulative impacts of Federal oil and gas leasing, most importantly the effects of GHG emissions and general climate change impacts, and urged the agency to "take a hard and comprehensive look at the cumulative climate change impacts of authorizing new leasing under the Five-Year Program" before comprehensively evaluating the costs of the program.

One commenter recommended that BOEM include the cumulative impacts of both midstream and downstream emissions in its cost-benefit analysis and summary of the Proposed Program impacts.[293] Another commenter criticized BOEM's proposal for concluding that the cumulative impacts of 11 additional sales will be felt less in the GOM and Cook Inlet because those areas are already sacrifice zones with industrial development.[294]

Conversely, one commenter stated their support for BOEM's general efforts to "consider the potential environmental impacts of oil and gas leasing."[295]

One commenter offered a multitude of critiques and comments related to BOEM's analysis of cumulative effects in the Proposed Program and centered around the NEPA and ESA standards requiring BOEM to analyze "all cumulative effects from the Program, regardless of where these effects occur."[296] This commenter made the following statements and assertions:

- The cumulative impacts assessment in the Relative Environmental Sensitivity Analysis is inadequate, namely that cumulative impacts are not weighted correctly.

[290] Oceana
[291] Julie Dugan; N. McQueen; Surfrider Foundation; Sea Turtle Conservancy; S. Couch; Surfrider Foundation FL Chapter Network
[292] Center for Biological Diversity
[293] USEPA
[294] Friends of the Earth U.S.
[295] Chevron
[296] Natural Resources Defense Council

- The Draft Programmatic EIS should have fully discussed and assessed direct, indirect, and cumulative effects of the Proposed Action in order to comply with NEPA.
- The Draft Programmatic EIS did not adequately consider cumulative effects of GHG emissions, climate change, and SLCPs.
- The Draft Programmatic EIS should have included "an indirect impact analysis of the quantitative and qualitative impacts of the Program's emission of SLCPs."
- Cumulative impacts analysis is vital to the overall NEPA analysis.
- BOEM's cumulative impacts analysis did not meet the NEPA standard.
- Stated that the Draft Programmatic EIS failed to "consider the cumulative impacts of the expanding aquaculture industry" planned for the OCS.
- The Draft Programmatic EIS did not sufficiently consider cumulative impacts of other oil and gas assets used at various points in the oil and gas development process, such as the impacts of very large crude carriers; liquified natural gas (LNG) terminals; the transportation, storage, refining, and decommissioning processes, and abandoned infrastructure effects.
- The Draft Programmatic EIS did not adequately analyze the cumulative impacts of CCS in the OCS.
- The Draft Programmatic EIS did not adequately analyze cumulative impacts of oil spills and should include a cumulative effects analysis of accidental oil spills.
- In addition to GHG emissions, the Draft Programmatic EIS should have included in its cumulative impact analysis impacts related to environmental justice, wildlife habitat and population, water and air pollution, and recreation and other uses of public lands/waters.

Source of Comments

- *Public Interest Groups*
- *Energy Exploration & Production Industry and Associations*
- *General Public*
- *Federal Agencies*

Response to Comments

Cumulative Effects – Ocean Acidification: Ocean acidification is discussed in the Final Programmatic EIS throughout **Section 4.3**.

Environmental Sensitivity Analysis: Relative environmental sensitivity analysis is provided in the PFP.

Cumulative Effects – Climate Change: The cumulative effects analysis in the Final Programmatic EIS includes potential incremental impact of the 2024–2029 Program alternatives, ongoing stressors, expected future baseline conditions. The cumulative effects analysis does not account for climate change effects of GHG and SLCP emissions from the 2024–2029 Program and future baseline conditions. GHG and SLCP emissions and climate change effects are not included in the cumulative effects analysis

because the effects of the 2024–2029 Program are impossible to distinguish from global emissions, even though the released GHGs and SLCPs do contribute to rising concentrations of GHGs.

The level of analysis in the Final Programmatic EIS is in compliance with recent CEQ guidance on programmatic reviews (Boots 2014) and is at an appropriate level of detail for the decision at hand. The analysis is at a national level, broadly describing the regions and discussing potential impacts to regions within them. If a decision is made to move forward with any of the proposed lease sales in the PFP, additional reviews would take place, and the potential impacts would be described in greater detail. As we continue to learn more about the potential cumulative effects of climate change in OCS waters and sensitivities of species to various potentially impacting factors, the information will be incorporated into future analyses of environmental impacts.

Cumulative Impacts – Cook Inlet: The level of analysis in the Final Programmatic EIS is in compliance with recent CEQ guidance on programmatic reviews (Boots 2014) and is at an appropriate level of detail for the decision at hand. The analysis is at a national level, broadly describing the regions and discussing potential impacts to regions within them. If a decision is made to move forward with any of the proposed lease sales in the PFP, additional reviews would take place, and the potential impacts would be described in greater detail. The Final Programmatic EIS states that "[c]umulative effects in the Alaska Region would be expected to be higher than in any other OCS region due to ongoing stressors, projections of future climate change, and a greater number of potential impacts from the 2024–2029 Program" (**Summary**). Furthermore, "the incremental impact of new activities from lease sales in the Cook Inlet Planning Area may be relatively small because operators can take advantage of existing infrastructure" (**Section 4.3.3.1**). Additionally, for GOM, "The presence of a well-developed oil and gas industry means that the incremental impact of Alternative D is expected to be less significant in this ecoregion compared to anywhere else. Utilizing existing infrastructure may lessen the impacts of bottom/land disturbance, lighting, and routine discharges on various resources" (**Section 4.3.4.3**). The existence of infrastructure in both regions means there would be fewer impacts associated with developing new infrastructure, which is the source of many impacts associated with oil and gas development.

Cumulative Effects – Midstream and Downstream Emissions: The cumulative effects analysis in the Final Programmatic EIS includes potential incremental impact of the 2024–2029 Program alternatives, ongoing stressors, expected future baseline conditions. The cumulative effects analysis does not account for effects of midstream and downstream emissions from the 2024–2029 Program and future baseline conditions. Midstream and downstream emissions are addressed separately in **Section 2.2**.

Cumulative Effects – Other Oil and Gas Operations: The PFP identifies locations of existing and planned LNG terminals in the planning areas. Vessel traffic—which includes very large crude carriers, LNG carriers, and other vessels associated with oil and gas production—is identified as a stressor (A.3) and as an IPF (I.2) in the EIS.

Cumulative Effects – Aquaculture: Presently, there are limited offshore aquaculture operations on the OCS, so for the purposes of this programmatic document, their contributions to cumulative impacts to

resources is considered negligible. If a decision is made to move forward with any of the proposed lease sales in the PFP, additional reviews would take place, and the potential impacts would be described in greater detail at the appropriate stage and would include discussions on cumulative impacts of activities related to aquaculture.

Direct, Indirect, and Cumulative Effects: BOEM analyzes the GHG emissions released from the 2024–2029 Program in **Section 2.2**. BOEM's analysis shows that the emissions potentially released from activities associated with the 2024–2029 Program likely would contribute to a warming planet; however, the overall assessment of climate change on the analyzed resources is very similar to the impacts of climate change without or without new leasing. Without broader national and global action on climate change beyond the National OCS Program, the impacts on the resources analyzed in the Final Programmatic EIS would be indistinguishable.

Cumulative Effects – Offshore Carbon Sequestration: BOEM identified offshore CCS as a foreseeable potential offshore activity under Other Federal Activities (A.10). BOEM noted that Federal regulations for offshore CCS have not been promulgated, and until those regulations are adopted, available information regarding processes, facilities, and supporting activities related to potential future projects is insufficient to assess potential impacts of offshore CCS activities. At this time, BOEM is unable to assess how CCS activities might interact with the environment and new oil and gas activity resulting from the 2024–2029 Program. Any proposed CCS activities offshore would be subject to future regulations promulgated by the USDOI and would be subject to assessment under NEPA.

Cumulative Effects – Risk of Additional Oil Spills: See **Section 28.3.30** response under *Cumulative Impacts – Risk of Additional Oil Spills*.

Cumulative Effects – Environmental Justice: Section 4.3 discusses cumulative environmental justice impacts under vulnerable coastal communities, and, to an extent, culture. Impacts on recreation and other uses of public lands and waters are discussed under tourism and recreation, land use, and recreational and commercial fishing in **Section 4.3**. Cumulative impacts for this programmatic-level assessment are discussed broadly at the regional level. Subsequent NEPA at later stages would include additional environmental review, including cumulative impacts at planning area and more localized scales.

Cumulative Impacts from GHG, Climate Change, and SLCPs: Section 2.2 includes an explanation of methane emissions. Soot (a component of particulate matter emissions) and ozone precursor pollutants are estimated for upstream in **Appendix C** as part of the air quality analysis. These pollutants are spatially dependent, and BOEM is unable to estimate their impact in the midstream and downstream given that the location of their release and the atmospheric conditions factor into the volume of those pollutants in the mid- and downstream. Other SLCPs are used in trace amounts on the OCS (**Section 2.2**) and are not normally released as part of the consumption of oil and gas.

Section 28.1.35 – ESA

Summary of Comments

Five submissions provided comments regarding ESA requirements.

One commenter stated that part of the NEPA requirement to conduct an environmental review of the Proposed Program includes consideration of species or habitats under ESA.[297] Similarly, a couple commenters noted that the oil and gas industry is required to comply with a multitude of regulations and requirements related to the protection of marine species, including the ESA.[298]

One commenter asserted that BOEM must comply with Section 7 of the ESA prior to issuing the National OCS Program and, specifically, ensure or prove that the Proposed Program is "not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of [the critical] habitat of such species."[299] The commenter asserted or stated the following:

- BOEM must consult with wildlife agencies if the Proposed Action would affect any listed species.
- BOEM cannot rely on existing biological opinions to make their decision on a Proposed Action.
- Reducing GHG emissions is critical to protecting some sea ice and sea ice-dependent species.
- The process of ESA consultation is similar to many other consultation processes BOEM may have undertaken.
- The negative effects of GHG on critical habitats should be assessed.

Another commenter discussed BOEM's responsibility under NEPA and ESA to assess impacts to protected species in advance of the Proposed Program.[300] This commenter also stated the following:

- The Draft Programmatic EIS failed to adequately analyze impacts to threatened, endangered, and sensitive species, failing its responsibility under NEPA and the ESA.
- BOEM failed to identify the "amount of threatened and endangered species habitat that will be temporarily and permanently impacted by the Program."
- The Draft Programmatic EIS did not adequately consider the impacts of oil spills on a number of important ESA species.

Source of Comments

- *Public Interest Groups*
- *Energy Exploration & Production Industry and Associations*

[297] Oceana
[298] Chevron; American Petroleum Institute
[299] Center for Biological Diversity
[300] Natural Resources Defense Council

Response to Comments

BOEM acknowledges the above comments and ensures that the Final Programmatic EIS is in compliance with appropriate and applicable regulations and requirements. The D.C. Circuit has held that Section 7 of ESA is not triggered by the programmatic action here (Center for Biological Diversity v. 563 F.3d 466 [D.C. Cir. 2009]). The level of analysis in the Final Programmatic EIS is in compliance with recent CEQ guidance on programmatic reviews (Boots 2014) and is at an appropriate level of detail for the decision at hand. The analysis is at a national level, broadly describing the regions and discussing potential impacts to habitat and resources within them. If a decision is made to move forward with any of the proposed lease sales in the PFP, additional reviews and appropriate consultations would take place with all relevant agencies, and the potential impacts would be described in greater detail, including for threatened and endangered species and habitat that potentially may be affected.

Section 28.1.36 – Marine Mammal Protection Act (MMPA)

Summary of Comments

A commenter asserted that BOEM must comply with and consider the MMPA as it prepares the Final Program.[301]

Source of Comments

- *Public Interest Groups*

Response to Comments

BOEM acknowledges the above comment and ensures that the Final Programmatic EIS is in compliance with appropriate and applicable regulations and requirements. The analysis is at a national level, broadly describing the regions and discussing potential impacts to habitat and resources, including marine mammals within them. If a decision is made to move forward with any of the proposed lease sales in the PFP, additional reviews and appropriate consultations to include MMPA considerations would take place with all relevant agencies, and the potential impacts would be described in greater detail including for threatened and endangered species and habitat and marine mammals that potentially may be affected.

Section 28.1.37 – Proposed Action

No substantive comments are associated with this issue.

Section 28.1.38 – Miscellaneous

Summary of Comments

Eight submissions provided miscellaneous comments on the Draft Programmatic EIS.

A few commenters discussed oil and gas infrastructure and possible impacts from construction and maintenance. One commenter asserted that BOEM's analysis does not account for the impacts (such as

[301] Oceana

increased air pollution, habitat destruction and behavioral disruption from construction and operation of such infrastructure) of onshore infrastructure needed to support oil and gas development.[302] Another commenter discussed the process of decommissioning and removing oil and gas leasing infrastructure such as pipelines and platform rigs.[303] They asked that the Secretary require lessees to remove all decommissioned infrastructure through an "Idle Iron Pipeline" program within 1 year of no use, as well as eliminate the Rigs-to-Reef program due to crowding. Another commenter discussed the vulnerability of oil and gas infrastructure to hurricanes and the risk of air pollution events when hurricanes hit such infrastructure.[304]

A couple commenters discussed Draft Programmatic EIS impacts from added noise and vessel traffic caused by oil and gas development. One commenter asserted that new offshore development could increase ship traffic, in turn leading to more ship strikes and ship pollution.[305] They also expressed concern about increased underwater sound from oil and gas development and seismic surveys used to search for oil and gas, which can be damaging to many marine species. Another commenter stated that oil and gas development causes noise pollution through surveying, drilling, and vessel traffic.[306]

One commenter discussed the prevalence of pollution from oil and gas derivatives, including macro- and microplastics, per- and polyfluoroalkyl substances, chemical fertilizers, and pesticides.[307]

A few commenters offered comments or recommendations specifically on certain parts of the Draft Programmatic EIS. One commenter recommended that the Final Programmatic EIS discuss any space-use conflicts in the OCS as well as potential mitigation measures for minimizing those conflicts.[308] Another commenter asserted that the analysis of seismic impacts in the Draft Programmatic EIS is incomplete, and that BOEM "must improve on the scientific validity of its recent Environmental Impact Statements for Atlantic (2014) and Gulf of Mexico (2017) geological and geophysical activities."[309]

Another commenter stated that BOEM's Draft Programmatic EIS and cost-benefit analysis failed to analyze harmful impacts of CCS technologies. They asserted that CCS is a harmful "delay tactic" used by polluting industries to distract from clean renewable energy practices and discussed a number of environmental, public health, and safety risks from CCS. They added that disadvantaged environmental justice communities are being targeted for CCS infrastructure and criticized BOEM for disregarding the many substantial concerns about CCS.

Source of Comments

- *Governors and State Agencies*
- *Federal Agencies*

[302] Center for Biological Diversity
[303] Taproot Earth
[304] Southern Environmental Law Center
[305] Oceana
[306] Earthjustice, et al.
[307] Taproot Earth
[308] USEPA
[309] Natural Resources Defense Council

- *Public Interest Groups*
- *Energy Exploration & Production Industry and Associations*

Response to Comments

Onshore Infrastructure Impacts: The Final Programmatic EIS identifies IPFs related to onshore infrastructure that would be needed to support lessee offshore activities. Some of the impacts analyzed include Traffic (I.2), which includes onshore traffic; Noise (I.1) related to construction onshore ports and other infrastructure; and Emissions (I.5) from onshore facilities and mobile sources, including onshore oil and gas support facilities such as heliports, seaports, and other support facilities.

Hurricane Vulnerability: Historically, hurricanes pass by OCS facilities without causing the release of air pollutants. Facilities are shut down when there is a risk of a hurricane passing an oil and gas facility, which would temporarily reduce the release of air pollutants. Upon restarting the facility, air emissions from normal operations would resume. During shutdown and restart, emission release may not be typical; however, operators still are required to comply with their approved air permit (if the facility is under USEPA jurisdiction) or approved air plan (if under BOEM jurisdiction).

Decommissioning: Operators of offshore platforms are required to maintain a decommissioning plan and to decommission offshore platforms after lease termination to return the ocean and seafloor to pre-lease condition. The OCS Lands Act and implementing regulations establish decommissioning obligations to which an operator must commit when they sign an offshore lease under the OCS Lands Act, including the requirement to apply for and obtain a permit for removal of platforms. Leases typically require the operator to remove seafloor obstructions, including offshore platforms, within 1 year of lease termination or prior to termination of the lease if either the operator or the USDOI deems the structure unsafe, obsolete, or no longer useful for operations. Decommissioning plans prepared by lessees for platforms proposed within the planning areas would be subject to review by the BSEE, and BSEE would oversee implementation of decommissioning plans for platforms. The Rigs-to-Reefs program is outside of the scope of the Final Programmatic EIS because it is not part of the BOEM leasing program.

Noise and Vessel Traffic: Noise and vessel traffic are identified as IPFs in **Table 2-11** in under Noise (I.1) and Traffic (I.2), which includes support vessels, barges, oil spill response vessels, and vessels used during activities ranging from geophysical surveys to decommissioning. The Final Programmatic EIS concludes that increasing vessel traffic may lead to greater risk of vessel strikes; associated vessel traffic noise may lead to acoustic masking, increased stress, and changes in migration routes; and vessel strikes of sea turtles or marine mammals may lead to injury or death. The Final Programmatic EIS also concludes that marine mammals may experience physiological harm or behavioral disturbance from noise, particularly from deep-penetration seismic surveys.

Oil and Gas Derivatives Pollution: Oil and natural gas that would be produced by National OCS Program activities would be used for production of fuels and other products including petrochemicals, plastics, pesticides, and chemical fertilizers. Environmental impacts of production and use of these projects is outside of the scope of the Final Programmatic EIS because use of produced petroleum is not subject to BOEM's regulatory authority under the OCS Lands Act.

Space-Use Conflicts: Throughout the Final Programmatic EIS, BOEM discusses in detail how oil and gas activities may cause Space-Use Conflicts (I.8).

Seismic Impacts Analysis: BOEM's environmental analysis conducted for the Atlantic (2014) and GOM (2017) geological and geophysical activities represented state-of-the-art acoustic modeling. Since then, there have not been any major advances in acoustic modeling that would change our quantitative approach for predicting impacts.

CCS: BOEM identified offshore CCS as a foreseeable potential offshore activity under Other Federal Activities (A.10). BOEM noted that Federal regulations for offshore CCS have not been promulgated and that available information regarding processes, facilities, and supporting activities is insufficient to assess potential impacts of offshore CCS activities and how they might interact with stressors and activities and IPFs resulting from the 2024–2029 Program. Any proposed offshore CCS activities would be subject to future regulations promulgated by the USDOI and would be subject to assessment under NEPA. Existing and proposed onshore CCS activities are regulated under the USEPA regulations (including the Safe Drinking Water Act) and under corresponding state regulations. Regulation of onshore CCS activities is outside of the scope of BOEM's statutory authority and the Final Programmatic EIS.

Section 28.2 – Cook Inlet Program Area (Alaska Region)

Comments associated with this issue appear in the sub-issues below.

Section 28.2.1 - Alternatives and Impact Comparison

Summary of Comments

A commenter stated that the Proposed Program acknowledges that several IPFs could impact water quality, biological resources, and sociocultural resources significantly if leases in the Alaska OCS were developed.[310]

Source of Comments

- *Public Interest Groups*

Response to Comments

An analysis of the impacts of IPFs on water quality, biological resources, and sociocultural resources within the Alaska Region are included in the Final Programmatic EIS. **Figures 4-10, 4-11, and 4-12** provide summary tables describing potentially significant impacts of IPFs for each alternative.

Section 28.2.2 - Mitigations

No substantive comments are associated with this issue.

[310] Azul

Section 28.2.3 – Recommendations for Additional Exclusions

No substantive comments are associated with this issue.

Section 28.2.4 – Stressors

No substantive comments are associated with this issue.

Section 28.2.5 – Climate Change

Summary of Comments

Three submissions provided comments regarding the discussion in the Draft Programmatic EIS on climate change in the Cook Inlet.

A couple commenters stated that the Pacific cod fishery in Cook Inlet was closed for the 2020 season because of climate change and expressed concerns about further ocean acidification and river warming in the Cook Inlet area from climate change as exacerbated by the Proposed Program.[311]

Source of Comments

- *Public Interest Groups*
- *General Public*
- *Tribes and Tribal Organizations*

Response to Comments

The Pacific cod fishery was closed in the Gulf of Alaska in 2020 due to historically low numbers of cod. Cod numbers declined significantly after the 2014 marine heatwave in the Gulf of Alaska, and the stock has not recovered. Fish stocks and other resources continue to be at risk from warming and acidification linked to climate change. Concerns about how the PFP could exacerbate climate change is understandable, but, with or without new leasing, the impacts of climate change on Alaskan fisheries would be very similar. Although new leasing may contribute more GHGs to the atmosphere than the No Action Alternative, the difference is not enough to make a noticeable difference without broader global action to use lower carbon energy sources in place of OCS oil and gas.

Section 28.2.6 - Areas of Special Concern

Summary of Comments

Two submissions provided comments regarding areas of special concern in the Cook Inlet.

One commenter asserted that BOEM failed to discuss the extreme sensitivity of Cook Inlet to oil and gas development-related impacts given the area's strong tidal currents, significant ice concentrations, harsh

[311] T. Spurkland; Kenaitze Indian Tribe

weather, and turbid waters.[312] The commenter added that Cook Inlet is a difficult area to conduct vessel- and aircraft-based surveys because of inclement weather conditions and heavy ice cover.

Another commenter discussed the western side of Cook Inlet, known as Bear Coast, expressing their concerns about the devastating effects an oil spill would have in that location.[313]

Source of Comments

- *Public Interest Groups*

Response to Comments

The analysis in the Final Programmatic EIS is at a national level, and the impacts to the Alaska OCS and adjacent areas from issuing an oil and gas leasing program are described broadly. Prior to any leasing, exploration, and development resulting from a proposed lease sale, detailed NEPA reviews would be completed and would address all potential impacts to the physical, biological, and social environment of Cook Inlet. BOEM acknowledges the challenges relating to oceanographic and meteorological conditions, and further analysis at subsequent stages will describe potential difficulties operating under these conditions in more detail. Regarding conducting vessel and aircraft surveys during inclement weather conditions or periods of ice cover, aircraft and vessel mitigation requirements to avoid and minimize effects would be included in lease stipulations, permit conditions, and plan approvals. In addition, BOEM's ESP is developing techniques to improve detection of marine mammals during low visibility and inclement weather conditions.

Regarding the potential effects of oil spills on the western side of Cook Inlet, it is difficult to estimate possible impacts from an accidental event in further detail at this time because the specific activities that would be conducted are not fully defined at the programmatic level. BOEM's oil spill risk analysis modeling would be conducted at the lease sale stage to estimate spill occurrence, spill trajectories, and the chance of spill occurrence and contact with environmental, social, and economic resources (including coastal habitats and brown bears) for specific proposed activities. Oil spill risk analysis modeling would also include the likely paths of simulated oil spill trajectories using wind, sea ice, and current data from a coupled ice-ocean model developed specifically for Cook Inlet. The results of the oil spill risk analysis modeling will be used to evaluate potential impacts to specific environmental, social, and economic resources and determine how to further mitigate potential impacts.

With respect to the ability to prevent, mitigate, and clean up an oil spill in Cook Inlet, BSEE requires operators to provide an oil spill response plan prior to approval of an exploration plan or development and production plan. *Oil Spill Preparedness, Prevention, and Response on the Alaska OCS* (BOEM 2019b) provides information on oil spill prevention and preparedness requirements, including spill drills, and response strategies that could be employed on the Alaska OCS if needed.

[312] Center for Biological Diversity
[313] National Parks Conservation Association

Section 28.2.7 - IPFs

Summary of Comments

Approximately 100 submissions provided comments regarding IPFs in the Cook Inlet.

One commenter stated that the Proposed Program acknowledges that several IPFs could impact water quality, biological resources, and sociocultural resources significantly if leases were developed in the Alaska OCS.[314] A form letter campaign discussed small and large oil spills as possible, and in fact likely, IPFs in the Lower Cook Inlet.[315] One commenter asserted that there was a lack of detail for species impacts in Alaska discussed in the Draft Programmatic EIS and stated that a more thorough analysis should have been completed, especially for the Cook Inlet area.[316]

Source of Comments

- *Public Interest Groups*
- *Federal Agencies*

Response to Comments

The level of analysis in the Final Programmatic EIS is in compliance with recent CEQ guidance on programmatic reviews (Boots 2014) and is at an appropriate level of detail for the decision at hand. The analysis is at a national level, and the scope of the impacts is described broadly. If a decision is made to move forward with a lease sale in the Cook Inlet Planning Area, additional reviews would take place that are more site specific to Cook Inlet and would analyze these impacts in greater detail. Appropriate avoidance and mitigations measures would be determined at that time.

Section 28.2.8 – Air Quality

No substantive comments are associated with this issue.

Section 28.2.9 - Water Quality

Summary of Comments

A form letter campaign with approximately 95 submissions provided comments regarding water quality in the Cook Inlet.

The commenters discussed the effect of infrastructure construction on the quality of freshwater habitat in the Cook Inlet watershed and the effect of contaminated drilling muds on the bioaccumulation of heavy metals like mercury.[317]

[314] Azul
[315] Alaska Marine Conservation Council (Form Letter Master)
[316] NOAA NMFS
[317] Alaska Marine Conservation Council (Form Letter Master)

Source of Comments

- *Public Interest Groups*

Response to Comments

Section 4.1.6 discusses both the potential impacts from bottom/land disturbance from BOEM-authorized activities on coastal and estuarine habitats and the potential impacts of contaminated drilling muds on water quality and marine benthic communities. The level of analysis in the Final Programmatic EIS is in compliance with recent CEQ guidance on programmatic reviews (Boots 2014) and is at an appropriate level of detail for the decision at hand. The analysis is at a national level, and the scope of the impacts is described broadly. If a decision is made to move forward with any of the proposed lease sales in the PFP, additional reviews would take place that are more site specific and would analyze these impacts in greater detail. Appropriate avoidance and mitigations measures would be determined at that time.

Section 28.2.10 - Pelagic Communities

Summary of Comments

A commenter discussed the importance of sea ice and sea ice algae to the Bering Sea, referenced a number of endangered species and their critical habitat areas within the Alaska Region, and asserted that North Pacific right whales and beluga whales would be disproportionately affected by oil and gas development in Cook Inlet.[318] The commenter also asserted that the impacts of climate change on pelagic organisms in Alaskan waters are well documented and offered to provide BOEM with more information.

Source of Comments

- *Federal Agencies*

Response to Comments

Section 2.6 discusses the importance of sea ice in the northern Alaska Region.

The PFP does not include any lease sales in the Cook Inlet. Although the Cook Inlet Planning Area was included in the Proposed Program, North Pacific right whales are not known to venture into Cook Inlet waters. They do have designated critical habitat in the Gulf of Alaska on the southeastern side of Kodiak Island, where they are occasionally observed. Oil spill risk analysis models that were run for Lease Sale 258 in the Cook Inlet indicated that the maximum probability that any oil from a Cook Inlet oil spill would contact North Pacific right whale habitat is less than 2% (Ji and Smith 2021).

Section 2.6 discusses climate change impacts to Alaska Region resources. The level of analysis in the Final Programmatic EIS is in compliance with recent CEQ guidance on programmatic reviews (Boots 2014) and is at an appropriate level of detail for the decision at hand. The analysis is at a national level,

[318] NOAA NMFS

and the scope of the impacts is described broadly. However, the PFP does not include any lease sales in the Cook Inlet.

Section 28.2.11 - Marine Benthic Communities

Summary of Comments

Two submissions provided comments regarding marine benthic communities in the Cook Inlet.

One commenter discussed a shift from cold to warm water temperature in 1977 that changed the Gulf of Alaska's benthic community from a crustacean-dominated to a fish-dominated environment.[319] Another commenter asserted that the building of oil rigs and pipelines tears up the ocean floor, impacts fragile benthic ecosystems, and can destroy deep-sea habitats like corals that can take decades to recover, if at all.[320]

Source of Comments

- *Federal Agencies*
- *Public Interest Groups*

Response to Comments

Gulf of Alaska ecosystem changes have been historically driven by changes in the dynamics of the Aleutian Low, a low-pressure system in the North Pacific that influences water column mixing and heat flux contributing to the Pacific Decadal Oscillation, a recurring pattern of ocean-atmosphere climate variability that occurs every 20–30 years. These changes are amplified further by the recurring marine heatwaves occurring in the North Pacific waters of the OCS over the last decade. The siting of offshore oil and gas infrastructure on the OCS may impact benthic communities, some of which like deepwater corals are slow to recover. These impacts are described broadly and at a national level in the Final Programmatic EIS. If a decision is made to move forward with any of the proposed lease sales in the PFP, additional NEPA reviews would take place that are more site specific and that would include suggested mitigation measures to avoid or reduce impacts to sensitive benthic habitats.

Section 28.2.12 - Coastal and Estuarine Habits

Summary of Comments

Approximately 10 submissions discussed coastal and estuarine habitats in the Cook Inlet.

A form letter campaign asserted that Cook Inlet provides important habitat for near-threatened beluga whales.[321] Another commenter generally stated that leasing in Cook Inlet would threaten sensitive habitat in that area.[322]

[319] NOAA NMFS
[320] Taproot Earth
[321] The Rachel Carson Council (Form Letter Master)
[322] 61 Organizations

Source of Comments

- *Public Interest Groups*

Response to Comments

Cook Inlet does provide important habitat for the endangered resident population of beluga whales. Approximately 7,800 km^2 of Cook Inlet was designated critical habitat for beluga whale in 2011. Federal agencies consult with NOAA Fisheries when the actions they are proposing may affect ESA-listed species or their designated critical habitat. During the most recent Cook Inlet oil and gas lease sale in 2022, 10 lease blocks wholly or partially overlapping beluga whale critical habitat were excluded from consideration.

Presently, there are 16 active oil platforms in Cook Inlet, and exploration, development and production activities are commonplace. A small amount of additional oil and gas activity may not have a noticeable impact to sensitive resources unless there is an accident.

Section 28.2.13 - Fish

Summary of Comments

Approximately 100 submissions, including a form letter campaign, provided comments regarding the analysis of impacts to fish in the Cook Inlet.

A couple commenters asserted that anadromous fish populations are a key resource of the Cook Inlet, and, because they spend a significant portion of their lives in the Cook Inlet and are particularly valuable and lucrative, oil and gas leasing could be very damaging or destructive to the anadromous fish resources.[323]

One commenter stated that oil spills and chemical dispersants kill fish, using the 2010 *Deepwater Horizon* oil spill as an example for the destructive short- and long-term effects that such spills can have.[324] A form letter campaign added discussion of the ways in which oil spills can affect fish, including toxin exposure, changes in oxygen and light availability, damages to fish eggs, impacts on bacterial and planktonic communities, and general population collapse.[325] The commenters also asserted that seismic surveys used for discovering oil and gas can alter or delay salmon migration; kill fish eggs, larvae, and adult fish; and ; and cause damage to hearing and reproductive organs.

Source of Comments

- *Public Interest Groups*

[323] Susitna River Coalition; Alaska Survival
[324] Taproot Earth
[325] Alaska Marine Conservation Council (Form Letter Master)

Response to Comments

BOEM is concerned about the potential impacts of oil spills on the environment and analyzes the potential for, and environmental impacts of, spills on the spectrum of resources and alternatives considered in the Final Programmatic EIS. The analysis is at a national level, and the scope of the impacts is described broadly. If a decision is made to move forward with any of the proposed lease sales in the PFP, additional reviews would take place that are more site specific and would analyze the impacts from oil spills in more detail. Appropriate avoidance and mitigations measures would be determined at that time.

Noise is potentially significant for fish and EFH in all Alaska planning areas. **Section 4.1.6** provides examples of noise impacts to fish, but the level of analyses is not required to be comprehensive at the programmatic stage.

Section 28.2.14 – Essential Fish Habitat

Summary of Comments

Three submissions provided comments regarding EFH in the Cook Inlet.

One commenter expressed concern about the Cook Inlet lease sale area being adjacent to the Kachemak Bay Critical Habitat Area.[326] Another commenter added that Cook Inlet is surrounded by several critical habitat designations under the ESA, including areas for all five species of Pacific salmon.[327]

One commenter asserted that a lease sale would "occur in critical habitat for the endangered Cook Inlet belugas which are struggling to survive."[328]

Source of Comments

- *General Public*
- *Public Interest Groups*

Response to Comments

Cook Inlet is essential fish habitat for all five Pacific salmon species as well as other important fishes. Impacts on EFH and critical habitat are considered at the broad, programmatic level at this stage. Should leasing occur in any of the areas identified at this programmatic stage under the 2024–2029 Program, BOEM will determine whether EFH consultation is required, as per the MSFCMA.

Section 28.2.15 - Birds

Summary of Comments

Two submissions provided comments regarding birds in the Cook Inlet.

[326] D. Aderhold
[327] Oceana
[328] National Parks Conservation Association

One commenter asserted that the Cook Inlet area includes important wintering area for Steller's eiders, as well as several Important Bird Areas in or near the lease area.[329] Another commenter added that a lease sale in the Cook Inlet would result in disturbance to migratory birds.[330]

Source of Comments

- *Public Interest Groups*

Response to Comments

The use of Cook Inlet as overwintering habitat by Steller's eiders has been added to the description of the affected environment in the Alaska Region in **Chapter 2**. A BOEM-funded study describing overwintering of the Steller's eiders is also referenced. **Section 4.1.6** provides a high-level discussion of the potentially significant impacts to birds in the Alaska Region; if leasing were to occur in Cook Inlet under the 2024–2029 Program, BOEM will conduct additional site-specific reviews and describe the potential impacts greater detail.

Section 28.2.16 – Sea Turtles

No substantive comments are associated with this issue.

Section 28.2.17 - Marine Mammals

Summary of Comments

Approximately 7,850 submissions, including form letter campaigns, provided comments regarding marine mammals in the Cook Inlet.

Several commenters, including form letter campaigns, expressed concern about the effects of leasing on the endangered Cook Inlet beluga whale, whose population has declined by 80% since 1979, in part due to subsistence hunting but also from pollution, seismic surveys, and ocean noise, all cumulative impacts that could increase with further oil and gas exploration.[331]

One commenter added that ototoxins, which are often absorbed through the skin or respiratory tract, can temporarily or permanently damage hearing and add another synergistic stressor for beluga whales in Cook Inlet.[332] Another commenter, in addition to discussing the distribution of beluga whales, discussed damages to cetaceans in general, including mortality, chronic disease, and reproductive impairment caused by oil spills, especially in the wake of the *Deepwater Horizon* disaster.[333] They added that the Cook Inlet OCS also overlaps with critical habitat of the threatened northern sea otter and

[329] Maryland Ornithological Society
[330] National Parks Conservation Association
[331] K. T.; Natural Resources Defense Council; Earthjustice, et al.; NOAA NMFS; Alaska Wilderness League (Form Letter Master); T. Spurkland; K. Cubina; The Rachel Carson Council (Form Letter Master); Alaska Survival; National Parks Conservation Association
[332] Defenders of Wildlife
[333] Marine Mammal Commission

recommended that if BOEM includes a lease sale in Cook Inlet for the 2024–2029 Program, that the Bureau exclude blocks that overlap with beluga whale and sea otter critical habitat.

Another commenter discussed damages to beluga whales, specifying that their position near the top of the marine food web and their "extensive blubber stores" gives them greater exposure to bioaccumulating toxins and PAHs, which can have adverse reproductive effects and even cause gastrointestinal cancer.[334]

One commenter listed a number of marine mammal species in the Alaska Region not addressed and recommended discussion on these species, including sperm, sei, and fin whales, harbor seals, spotted seals, harbor and Dall's porpoise, Pacific white-sided dolphins, and killer, minke, and beaked whales; the commenter referenced a few reports on harbor seal research that were provided to BOEM in 2011.[335] The commenter also asked that section for Noise (I.1) and R.9 **MARINE MAMMALS** (p. 207) include a discussion of impacts to marine mammal prey, such as noise disturbance to salmon, and that the section for Traffic (I.2) and R.9 **MARINE MAMMALS** (p. 209) discuss how vessels can impact marine mammal prey presence and habitat, specifically in Alaska.

Source of Comments

- *General Public*
- *Public Interest Groups*
- *Federal Agencies*

Response to Comments

Proposed leases would be in the northern portion of the Cook Inlet Planning Area and exclude critical habitat for the Cook Inlet beluga whale. Incremental impacts of new activities from lease sales in the Cook Inlet may be relatively small because oil development and production activities already occur in the planning area. Additionally, operators can utilize existing infrastructure, and new construction most likely would occur within existing industrial areas, reducing new impacts.

There is no indication that ototoxins occur in concentrations that can affect hearing in marine mammals in Cook Inlet waters. The vulnerability of Cook Inlet beluga whales to future change, such as climate stressors (e.g., food scarcity) and increased human activities (e.g., commercial shipping) is discussed in **Section 2.6**.

BOEM is concerned about the potential impacts of oil spills on the environment and analyzes the potential for, and environmental impacts of, spills on the spectrum of resources and alternatives considered in the Final Programmatic EIS. The analysis is at a national level, and the scope of impacts is described broadly. If a decision is made to move forward with any of the proposed lease sales in the PFP, additional reviews would take place that are more site specific and would analyze the impacts from oil spills in more detail.

[334] Center for Biological Diversity
[335] NOAA NMFS

The Preferred Alternative in the 2022 Lease Sale 258 Final EIS in the Cook Inlet excludes 17 OCS blocks wholly or partially overlapping beluga whale and norther sea otter critical habitat. Similar site-specific exclusions or mitigations can be considered for lease sales under the PFP.

Impacts to specific species such as beluga whales are not described in detail at the programmatic stage of analysis. The level of analysis in the Final Programmatic EIS is in compliance with recent CEQ guidance on programmatic reviews (Boots 2014) and is at an appropriate level of detail for the decision at hand. The analysis is at a national level, and the scope of the impacts and the affected environments and resources are described broadly. If a decision is made to move forward with any of the proposed lease sales in the PFP, additional reviews would take place that are more site specific and would analyze the impacts and describe affected environments and resources such as beluga whales in greater detail. Appropriate avoidance and mitigations measures would be determined at that time.

Section 28.2.18 - Commercial and Recreational Fishing

Summary of Comments

Nine submissions provided comments regarding commercial and recreational fishing in the Cook Inlet.

A couple commenters expressed concern about the potential for harm to commercial and subsistence fishing, especially mariculture in Alaska, from oil and gas development in the Cook Inlet.[336] One commenter similarly asserted that Cook Inlet is an important part of Alaska's commercial fishing industry, as Cook Inlet's contribution in 2014 to Alaska's salmon fishery was $35.1 million.[337] Another commenter valued Alaska's 2019 fishery landings at $1.8 billion and asserted that Cook Inlet is one of the most productive fisheries in Alaska with commercial fishing for "all five species of Pacific salmon, Pacific herring, smelt, Pacific cod, sablefish, lingcod, and pelagic shelf rockfish."[338] One commenter estimated that the 2017 economic contribution of sportfishing in the Matanuska-Susitna Borough in Cook Inlet was about $57.4 million and asserted that the anadromous fish resource in the Susitna River basin is incredibly valuable.[339]

One commenter expressed concern about the damages oil and gas infrastructure can cause to fishing equipment and asserted that damaged or torn equipment can contribute to ocean pollution, with an estimated 10% of ocean plastic pollution consisting of fishing gear.[340]

Source of Comments

- *General Public*
- *Public Interest Groups*

[336] D. Aderhold; National Parks Conservation Association; Center for Biological Diversity
[337] Earthjustice, et al.
[338] Oceana
[339] Alaska Survival
[340] Taproot Earth

Response to Comments

BOEM appreciates the importance of commercial fishing in Cook Inlet. In alignment with the assessment of impacts on most other resources in the Final Programmatic EIS, impacts on commercial fishing are described qualitatively to identify the types of impacts that could occur if oil and gas activities were to occur as a result of the 2024–2029 Program. The level of analysis in the Final Programmatic EIS is in compliance with CEQ guidance on programmatic reviews (Boots 2014) and is at an appropriate level of detail for the decision at hand. The analysis is at a national level, and the affected environment, including commercial fishing activities, are described broadly. Additional regional and local level analysis would occur at subsequent stages and would provide more detailed discussion and opportunities for engagement with commercial fishers. Such analysis and engagement can inform decisions at a lease sale stage. For example, Cook Inlet Lease Sale 258 was held in 2022 and included adoption of mitigation measures on 117 whole or partial OCS lease blocks to reduce potential for conflicts with the Cook Inlet drift gillnet fishery. Opportunities for more localized consideration of impacts on commercial fisheries, including opportunities to engage on the topic, may be more impactful at the lease sale stage than at a national-level planning stage.

Section 28.2.19 - Archaeological & Cultural Resources

Summary of Comments

Two submissions provided comments regarding archaeological and cultural resources in the Cook Inlet.

One commenter noted that the Cook Inlet lease sale area is adjacent to two Alaska Native villages (Port Graham and Nanwalek) and other communities with a mix of Native and non-Native residents (Ninilchik and Seldovia).[341]

Source of Comments

- *General Public*

Response to Comments

BOEM appreciates and strives to respect the ties of Alaska Native peoples to the Cook Inlet Planning Area. BOEM will engage further with and incorporate input from Alaska Native communities prior to any lease sale in Cook Inlet under the 2024–2029 Program. BOEM recognizes its obligations regarding federally recognized Tribes and adheres to Bureau and Departmental policies regarding Tribal consultation. Information on BOEM's Tribal Consultation activities can be found at www.boem.gov/about-boem/tribal-engagement.

BOEM will continue to invite consultation with Tribes at subsequent leasing, exploration, and development stages. BOEM will provide opportunities for engagement with Tribes in areas where lease sales are scheduled under the 2024–2029 National Oil and Gas Program. Mitigation measures may be

[341] D. Aderhold

identified through engagement, and BOEM invites input from Cook Inlet communities, including Alaska Native communities, on important resource areas to consider during area-specific planning processes.

Section 28.2.20 – Land Use

No substantive comments are associated with this issue.

Section 28.2.21 - Subsistence

Summary of Comments

Approximately 7,830 submissions, including a form letter campaign, provided comments regarding subsistence in the Cook Inlet.

One commenter discussed Cook Inlet's importance in supporting subsistence fishing and hunting for Indigenous people and other residents, a practice that is culturally important, vital for a sense of identity, an important economic pursuit, and important both socially and religiously.[342] A form letter campaign added that many Alaskan families rely heavily on Cook Inlet for their livelihood, and that new drilling puts that subsistence economy to risk.[343] Similarly, another commenter asserted that the waters of Lower Cook Inlet have supported their people through "traditional harvest practices" vital to physical and cultural survival, support valuable subsistence fisheries, and would be negatively impacted and polluted by oil and gas development in the area.[344]

A couple commenters asserted that new oil leases in Cook Inlet will put subsistence communities at risk due to their reliance on Cook Inlet fisheries for their livelihoods, as up to 90% of villagers' diet relying on this subsistence lifestyle.[345] Another commenter asserted that summer is a particularly difficult season for fishers in the Alaska Native community in Cook Inlet; they rely heavily on the bounty of summer fish but are having to fish further from home as fisheries in Cook Inlet continue to struggle.[346]

One commenter added that oil and gas pollution could decrease anadromous resource availability and negatively impact subsistence in many lingering ways.[347]

A couple commenters discussed particular failings by BOEM in considering subsistence in the Cook Inlet in the Draft Programmatic EIS. One commenter asserted that BOEM's sensitivity analysis failed to account for the reality that subsistence fishing and hunting are critically important uses of the Cook Inlet Program Area, despite acknowledging it.[348] They added that BOEM failed to comply with the OCS Lands Act in its environmental justice impact analysis of Cook Inlet leasing, asserting that BOEM did not sufficiently consider the effects of oil leases on subsistence communities in Cook Inlet. Another commenter criticized the OECM's "narrow treatment of cost in the subsistence harvest category,"

[342] Earthjustice, et al.
[343] Alaska Wilderness League (Form Letter Master)
[344] Kenaitze Indian Tribe
[345] Center for Biological Diversity; Oceana
[346] Earthjustice
[347] Susitna River Coalition
[348] Center for Biological Diversity

asserting that BOEM should have also considered the costs of lost access to subsistence fishing and hunting areas from a spill and not limited cost consideration to non-catastrophic oil spills in Alaska.[349]

Source of Comments

- *Tribes and Tribal Organizations*
- *Public Interest Groups*
- *General Public*

Response to Comments

Environmental Justice: Agency obligations to consider environmental justice impacts are typically met through incorporation of environmental justice into NEPA reviews and processes. At this programmatic stage, BOEM considers environmental justice impacts in the Final Programmatic EIS through discussion of R.14 **VULNERABLE COASTAL COMMUNITIES** and, where applicable, under other resources including R.13 **CULTURE**.

BOEM appreciates the comments highlighting the importance of subsistence harvest and activities to Cook Inlet communities and has expanded the discussion of subsistence under the "Culture" and "Vulnerable Coastal Communities" resources in the Final Programmatic EIS. In alignment with the assessment of impacts on most other resources in the Final Programmatic EIS, impacts on vulnerable coastal communities, including populations with environmental justice concerns, are described qualitatively to identify the types of impacts that could occur if oil and gas activities were to occur as a result of the 2024–2029 Program.

The level of analysis in the Final Programmatic EIS is in compliance with CEQ guidance on programmatic reviews (Boots 2014) and is at an appropriate level of detail for the decision at hand. The analysis is at a national level, and the affected environment, including human communities, are described broadly. At this programmatic stage, the discussion of impacts on subsistence activities for Alaska Native peoples remains a high-level discussion of the types of impacts that could occur if oil and gas activities occur in Cook Inlet under the 2024–2029 Program. Additional regional and local level analysis would occur at subsequent stages and would provide more detailed discussion, opportunities for engagement, and consultation with federally recognized Tribes. Such analysis and engagement can inform decisions at a lease sale stage. For example, Cook Inlet Lease Sale 244 was held in 2017, and only 20% of the planning area, or 442,331 hectares, was made available for leasing. The remaining 80% of the planning area was not offered for leasing to protect important subsistence areas and critical marine mammal habitat.

Economic Impacts of Lost Access to Subsistence Fishing: Regarding the economic impacts of lost access to subsistence fishing and hunting areas from a spill, BOEM provided additional discussion of economic impacts to subsistence harvesters from changes in access to subsistence resources in the discussion of impacts on vulnerable coastal communities in the Final Programmatic EIS. In the Final Programmatic EIS, BOEM describes economic impacts on subsistence harvesters generally but does not quantify the pounds of subsistence foods potentially lost due to the Proposed Action nor the monetary value of

[349] Earthjustice, et al.

replacing those foods, consistent with BOEM's approach to analyses of impacts on subsistence in Alaska regional NEPA documents (BOEM 2015a; 2016a; 2018b). BOEM recognizes that subsistence activities and harvest hold cultural, social, and economic value for Alaska Native peoples beyond the monetary value of the cost of replacement of subsistence foods. While not included in the Final Programmatic EIS, the OECM, which was updated and published in September just prior to the publication of the PFP and Final Programmatic EIS, does monetize replacement costs of subsistence harvests as part of the net benefits calculation included in Section 5.3.2 of the PFP. As the commenter points out, the model's monetization of these impacts is limited to the impact of OCS oil and natural gas activities on subsistence harvests in Alaska planning areas. Although subsistence harvests do occur in other regions of the coastal U.S., data on the scope and value of harvests are not available to the extent they would be required for the OECM. The methodology is further described in Chapter 7 of Volume 1 of the OECM (Industrial Economics Inc. 2023b).

Potential Oil and Gas Pollution in Cook Inlet: Regarding potential impacts of pollution from oil and gas leasing in Cook Inlet, the analysis in the Final Programmatic EIS to identify potentially significant impacts of the 2024–2029 Program assumes oil and gas operators would adhere to all applicable state and Federal permitting requirements for discharges to water. Regarding pollution from oil spills, the document discusses the types of impacts that could occur to environmental resources as a result of an oil spill, but specific analysis on where oil may spread and how it may affect resources, including anadromous resources, would occur at subsequent NEPA stages when more specific information is available on the location and level of activity.

Oil Spill Analysis: The Final Programmatic EIS does not analyze CDEs because of the low probability of occurrence and the many factors that determine severity of potential impacts, which are not known at the programmatic stage. For further analysis of the impacts of a low-probability CDE, see the *Gulf of Mexico Catastrophic Spill Event Analysis* (BOEM 2021), *Beaufort Sea: Hypothetical Very Large Oil Spill And Gas Release* (BOEM 2020), and the PFP.

The OECM is also not designed to represent impacts from catastrophic oil spill events. The OECM only considers a range of oil spills up to 100,000 barrels. Statistically, the number of catastrophic spills has been small, and these spills have occurred under a wide range of conditions with a broad range of impacts. The lack of robust data and the unpredictable nature of catastrophic oil spills, including the many factors that determine their severity, make efforts to quantify their costs much more uncertain than those to quantify other measures considered in the net benefits analysis. In addition to the difficulty in calculating the cost of the potential impacts of a catastrophic spill, there are similar difficulties in calculating the risk. For these reasons, the risks and impacts of catastrophic oil spills are not considered in the net benefits analysis but are included in the Final EAM. Additional information is also available in the *Economic Inventory of Environmental and Social Resources Potentially Impacted by a Catastrophic Discharge Event within OCS Regions* (Industrial Economics Inc. 2014).

Sensitivity Analysis: The methodology for the sensitivity analysis conducted under Section 18(a)(2)(G) of the OCS Lands Act, which requires BOEM to consider the relative environmental sensitivity and marine productivity of the OCS, are described in Sections 8.2 and 8.3 of the PFP. The methodology applied to

analyze the relative environmental sensitivity for the 2024–2029 Program is identical to that used in the 2017–2022 Program.

Section 28.2.22 - Culture

Summary of Comments

Two submissions provided comments regarding culture in the Cook Inlet.

One commenter asserted that Indigenous communities with "deeply ingrained spiritual and cultural ties to the land" would be forced to bear the brunt of oil and gas development in Cook Inlet.[350] Another commenter added that the waters of Lower Cook Inlet support harvest practices vital to the survival of their culture and traditions.[351]

Source of Comments

- *Public Interest Groups*
- *Tribes and Tribal Organizations*

Response to Comments

BOEM appreciates and strives to respect the ties of Alaska Native peoples to the Cook Inlet Planning Area. BOEM will engage further with and incorporate input from Alaska Native communities prior to any lease sale in Cook Inlet under the 2024–2029 Program. BOEM recognizes its obligations regarding federally recognized Tribes and adheres to Bureau and Departmental policies regarding Tribal consultation. During FY 2022, BOEM invited consultation with federally recognized Tribes and Alaska Native Claims Settlement Act corporations in the GOM, Pacific, and Alaska Regions on the development of the Proposed Program and Draft Programmatic EIS. Information on BOEM's Tribal Consultation activities can be found at www.boem.gov/about-boem/tribal-engagement. BOEM will continue to invite consultation with Tribes at subsequent leasing, exploration, and development stages. BOEM will provide opportunities for engagement with vulnerable coastal communities in areas in which lease sales are scheduled under the 2024–2029 Program. Mitigation measures may be identified through engagement, and BOEM invites input on important resources to consider during area-specific planning processes.

Section 28.2.23 - Vulnerable Coastal Communities

Summary of Comments

A couple of submissions provided comments regarding vulnerable coastal communities in the Cook Inlet.

One commenter asserted that, because there might not be enough of an Alaska-based workforce to develop infrastructure in Cook Inlet, local communities may not benefit from the jobs even as they experience harmful effects from oil and gas extraction.[352] Another commenter added that the potential

[350] Earthjustice, et al.
[351] Kenaitze Indian Tribe
[352] Azul

lease sale in Cook Inlet would jeopardize coastal communities who would have to bear the brunt of oil and gas development.[353]

One commenter asserted that the Draft Programmatic EIS analysis of impacts from offshore oil and gas leasing on the Indigenous People of Alaska in Cook Inlet was deficient and that BOEM should have evaluated more comprehensively the impacts of more leasing on environmental justice communities in Cook Inlet.[354]

Source of Comments

- *Public Interest Groups*

Response to Comments

Additional discussion of sociocultural considerations for the Cook Inlet Planning Area has been added to the Final Programmatic EIS. At this programmatic stage, the impacts on subsistence activities for Alaska Native peoples remains a high-level discussion of the types of impacts that could occur if oil and gas activities occur in Cook Inlet under the 2024–2029 Program. Additional regional and local level analysis would occur at subsequent stages and would provide more detailed discussion, opportunities for engagement, and consultation with federally recognized Tribes. Such analysis and engagement can inform decisions at a lease sale stage. For example, Cook Inlet Lease Sale 244 was successfully held in 2017, and only 20% of the planning area, or 442,331 hectares, was available for leasing. The remaining 80% of the planning area contains critical marine mammal habitat and important subsistence areas, and therefore was not considered for leasing.

Section 28.2.24 - Recreation and Tourism

Summary of Comments

Two submissions provided comments regarding recreation and tourism in the Cook Inlet.

One commenter asserted that many coastal states are dependent on a healthy ocean for their tourism and recreation industries, including Cook Inlet, which has a significant tourism economy, with almost 1 million traveling there every year.[355] Another commenter asserted that the waters of Cook Inlet support more than $1 billion annually in economic value, including local tourism businesses, and added that oil and gas development would pollute the waters this tourism industry depends on.[356]

Source of Comments

- *Public Interest Groups*
- *Tribes and Tribal Organizations*

[353] 61 Organizations
[354] Center for Biological Diversity
[355] Oceana
[356] Center for Biological Diversity

Response to Comments

The Final Programmatic EIS describes the role of recreation and tourism in the ocean economy under R.15 **RECREATION & TOURISM** in **Chapter 2**. The Final Programmatic EIS identifies potentially significant impacts to recreation and tourism in all Alaska planning areas from noise, lighting, visible infrastructure, and space-use conflicts in **Chapter 4**. **Section 4.6** identifies high-level potential impacts on recreation and tourism associated with oil spills. The Final Programmatic EIS discusses the types of impacts that could occur at a level of detail appropriate for a national programmatic assessment. Region- and area-specific analyses of potential impacts on recreation and tourism, along with more detailed information on the importance of recreation and tourism to regional and local economies, would occur at the lease sale planning stage. The lease sale stage analysis would also include area-specific analysis of oil spill risks and potential impacts of oil spills on key coastal recreation and tourism resources.

Section 28.2.25 - Employment and Income

Summary of Comments

Three submissions provided comments regarding employment and income in the Cook Inlet.

One commenter noted BOEM's acknowledgement that Alaska may not have enough of a workforce to develop the Cook Inlet oil and gas infrastructure, and that workers might have to travel for temporary jobs. They added that local communities might not benefit from the jobs added by the Proposed Program in Alaska.[357] Another commenter asserted that nearly 64,000 jobs and $4 billion in gross domestic product rely on healthy oceans in Alaska.[358]

One commenter expressed support for oil and gas leasing in Cook Inlet, asserting that development would support jobs, labor income, and revenue, as well as support the growing renewable energy industry in Alaska; the commenter added that state, Federal, and local governments would benefit from oil and gas development in Alaska from property and income taxes.[359] The commenter—referencing a study stating that, in 2019, the oil and gas development industry supported over 47,000 Alaska jobs and provided $4.6 billion in wages—asserted that OCS development in the Cook Inlet could generate 1,750 annual jobs and $101.7 million in annual labor income. The commenter further indicated willingness to collaborate with the next National OCS Program in order to "encourage long-term economic growth and investment in Alaskan and American production and jobs."

Source of Comments

- *Governors and State Agencies*
- *Public Interest Groups*

[357] Azul
[358] Oceana
[359] State of Alaska

Response to Comments

BOEM appreciates the importance of potential impacts on employment and income from OCS oil and gas leasing on Alaskan communities. At the National OCS Program stage, impacts are discussed at a high level in **Section 4.1.4** and in Section 9.2.1 in the PFP. Further analysis of impacts on employment and income would occur prior to any lease sale scheduled for Alaska planning area(s) under the National OCS Program. Analysis at the lease sale stage also would consider impacts on other economically important sectors in Alaska, including commercial fishing and recreation and tourism. Section 9.2.1 of the PFP also recognizes that impacts would likely extend beyond direct jobs from OCS oil and gas production to indirect employment and to state and local revenues, which provide critical support for jobs in some Alaskan communities.

Section 28.2.26 - Oil Spills and CDEs

Summary of Comments

Approximately 1,115 submissions provided comments regarding oil spills and CDEs in the Cook Inlet.

A commenter expressed opposition to additional oil and gas development in Cook Inlet, arguing that past oil spills, like the Exxon Valdez spill, have had immeasurable financial, ecological, and social costs.[360]

A commenter cited a study to claim that marine species in Alaska are still recovering from the Exxon Valdez oil spill.[361] Another commenter similarly stated that the Cook Inlet has a history of small and large oil spills from platforms and pipelines, which threaten marine mammals.[362]

A form letter campaign expressed opposition to oil and gas development in the Cook Inlet based on the prediction in the Draft EIS for cancelled Lease Sale 258 of a one-in-five chance of one or more large oil spills from development there. The commenters added that Cook Inlet has a long history of oil spills and leaks and that large spills, like the Exxon Valdez oil spill, have impacted water, fish, food, and tourism in the region.[363]

A commenter expressed concern about the potential impact of oil spills on beluga whales in Cook Inlet, stating that oil exposure to whales in that area has already caused adverse reproductive effects. The commenter argued that BOEM's analysis failed to account for this impact.[364]

A commenter warned that new oil and gas leases in Cook Inlet would jeopardize the area's ecology with pipelines and platforms, which will periodically flare and spill.[365]

A commenter further criticized BOEM's analysis of oil spill likelihood and severity, arguing that BOEM inappropriately only considered median spill volume rather than catastrophic events, that consequences

[360] Alaska Marine Conservation Council
[361] D. Aderhold
[362] Marine Mammal Commission
[363] Cook Inletkeeper (Form Letter Master)
[364] Center for Biological Diversity
[365] Earthjustice, et al.

of small spills are difficult to predict, and that BOEM relied on models with assumptions that are inconsistent with local knowledge of the area or that are based on historical weather patterns, which are likely to change because of climate change.[366]

A commenter argued that based on ocean currents, an oil spill occurring in the Lower Cook Inlet would lead to oil spread across the Gulf of Alaska, where cleanup would be hindered by freezing temperatures and large waves.[367] Another commenter similarly argued that oil spilled in the Lower Cook Inlet would likely be impossible to clean up and would thus spread across the Gulf of Alaska.[368] Another commenter echoed these concerns about the difficulty of cleanup following an oil spill in the Cook Inlet, adding that any oil spill would likely spread to other economically sensitive tourist areas.[369] A commenter agreed, stating that oil spills would be especially harmful to the tourist and fishing economies of Seldovia.[370]

A commenter argued that BOEM's analysis did not fully consider the effects of dispersants on fish eggs and bacterial and plankton communities.[371]

A commenter argued that BOEM has failed to conduct due diligence and open consultive public processes as required by law, adding that a favored lessee in the Cook Inlet has a documented history of undersea pipeline leaks.[372] Another commenter claimed that Hilcorp is likely the only company interested in additional leases in Cook Inlet, and that the company has a history of environmental violations and disregard for regulatory compliance with respect to oil spills.[373]

Source of Comments

- *General Public*
- *Public Interest Groups*
- *Federal Agencies*

Response to Comments

Public Involvement: BOEM held a 90-day public comment period for the Draft Programmatic EIS. Additionally, BOEM held public meetings on the Draft Programmatic EIS, established a public website, and provided notice on the BOEM website as well as through the USEPA and the *Federal Register*. **Section 5.3** outlines the steps BOEM took to notify interested parties of the opportunity to comment. BOEM does not speculate on potential bidders when making decisions about scheduling lease sales within a five-year period. Any lessees that gain OCS leases through sales identified in the 2024–2029 Program would be required to submit exploration plans prior to any exploratory drilling and development and production plans prior to development activities; these plans would undergo review by both BOEM and BSEE to ensure alignment with safety requirements. Failure by an OCS operator to

[366] Alaska Marine Conservation Council
[367] T. Spurkland
[368] Alaska Marine Conservation Council
[369] National Parks Conservation Association
[370] C. Mom
[371] Alaska Marine Conservation Council
[372] Coastal Coordination Program, The Ocean Foundation
[373] Alaska Marine Conservation Council

comply with spill prevention, preparedness, and response requirements would result in enforcement actions and potential disqualification. Information on oil spill prevention, preparedness, and response on the Alaska OCS is available at www.boem.gov/sites/default/files/boem-newsroom/Library/Publications/2019/2019_0404_OSPRR_Final.pdf.

Potential Impacts of Oil Spills on Beluga Whales: It is difficult to predict possible impacts from an accidental event at the programmatic level. More information is known at the lease sale stage about the timing and location of proposed activities, spill risk from those activities, and specific environmental resources that could be affected. BOEM's oil spill risk analysis modeling is conducted at that stage to estimate spill risk, spill trajectories, and probability of contact with an environmental resource. BOEM uses the modeling results to determine potential risk to specific environmental resources and how to further mitigate risk.

The level of analysis in the Final Programmatic EIS is in compliance with recent CEQ guidance on programmatic reviews (Boots 2014) and is at an appropriate level of detail for the decision at hand. The analysis is at a national level, and the scope of the impacts is described broadly. If a decision is made to move forward with any of the proposed lease sales in the PFP, additional reviews would take place that are more site specific and would analyze oil spill impacts on unique and sensitive habitats and species in more detail. Appropriate avoidance and mitigations measures would be determined at that time.

Oil Spill Likelihood and Severity: Oil spill likelihood and severity is addressed in **Appendix G**. A CDE references a very large (typically over 1 million bbl) but very unlikely spill that could result OCS exploration, development, and production activities involving rigs, facilities, pipelines, tankers, or support vessels. The Final Programmatic EIS does not analyze CDEs because of the low probability of occurrence and the many factors that determine severity of potential impacts, which are not known at the programmatic stage. For further analysis of the impacts of a low-probability CDE, see the *Gulf of Mexico Catastrophic Spill Event Analysis* (BOEM 2021), *Beaufort Sea: Hypothetical Very Large Oil Spill And Gas Release* (BOEM 2020), and the PFP.

Effects of Dispersants on Fish Eggs and Bacterial and Plankton Communities: Concerns associated with dispersants are recognized by BOEM, and examples of potential impacts to resources are included in **Section 4.6**. With the wide-ranging environments discussed in the Final Programmatic EIS, a discussion of specific response strategies would be highly speculative and not appropriate to address in any detail. Site-specific response strategies and associated potential impacts would be addressed at the lease sale stage. Specific mitigation strategies for accidental events like oil spills are not appropriately addressed at the programmatic stage of review.

Section 28.2.27 - Cross-Boundary Impacts

Summary of Comments

A commenter argued that given the inadequacy of spill response technology and tidal currents and storms in the Lower Cook Inlet, any oil spill occurring there would likely spread through the Gulf of

Alaska, harming the region as a whole and impacting food security.[374] Other commenters, including a form letter campaign, expressed similar concerns about an oil spill in the Cook Inlet spreading across the Gulf of Alaska and harming economically sensitive tourist areas.[375]

Source of Comments

- *Public Interest Groups*
- *General Public*
- *Tribes and Tribal Organizations*

Response to Comments

At this programmatic stage, the Final Programmatic EIS discusses the types of potentially significant impacts of oil spills. Sociocultural impacts, including impacts on subsistence harvest and activities, and commercial and recreational fishing, are identified as potentially significant. Potential consequences of oil spills are discussed in **Section 4.6** and **Appendix G**. Spill rates are calculated using spill data and the volume of annual oil production from 1974 to 2015 and are provided in **Tables G-1 and G-2**. BOEM estimated a median large (≥ 1,000 bbl) platform spill event of 3,283 bbl and median large pipeline spill event of 3,750 bbl based on historical data and estimated that, in any Alaska or Pacific planning area, 0–1 large platform spill events could occur from the 2024–2029 Program. BOEM also estimated that, in any Alaska or Pacific planning area, 0–1 large pipeline spill events could occur from the 2024–2029 Program, with the exception of the Beaufort Sea and Chukchi Sea Planning Areas (0–3 and 0–5 pipeline spill events, respectively). **Figure 4-9** identifies potentially affected planning areas—including Shumagin, Kodiak, and the Gulf of Alaska—that are farther away from areas of activity but could still be affected by cross-boundary impacts.

It difficult to predict possible impacts from an accidental event in further detail at the programmatic level because the specific activities that would be conducted are not fully defined at the programmatic level. Analysis at the lease sale stage would include an oil spill risk analysis, which would provide estimates of the probability of various size ranges of oil spills, along with the probability of contact to environmental resources. To ensure impacts of a spill are not underestimated, the oil spill impact analysis at the lease sale stage does not incorporate a potential volume reduction from cleanup and response; the entire spill or release volume(s) is analyzed. BOEM would use the modeling results to determine potential risk to specific environmental resources and how to further mitigate risk. BOEM welcomes input and references on environmentally important areas, including subsistence, recreation, and tourism areas, to include in future oil spill risk assessments for Cook Inlet.

[374] Kenaitze Indian Tribe
[375] T. Spurkland; Alaska Marine Conservation Council (Form Letter Master); National Parks Conservation Association

Section 28.2.28 - Cumulative Impacts (Effects)

Summary of Comments

Two submissions provided comments regarding cumulative impacts (effects) in the Cook Inlet Program Area (Alaska Region).

A commenter requested that BOEM update the Draft Programmatic EIS to fully analyze cumulative impacts to the environment, coastal communities, and existing industries from drilling operations and large oil spills.[376]

A commenter stated that BOEM's cumulative effects analysis failed to discuss impacts of oil and gas development on the critically endangered Cook Inlet beluga whale. The commenter disputed BOEM's argument that the incremental impact of additional development would be small because of existing development adjacent to Cook Inlet, arguing that the species has already been heavily depleted and additional development would hinder its recovery. The commenter cited studies which found that cumulative effects (from noise and other stressors) are severely impacting beluga whales by reducing reproductive success and survival.[377]

Source of Comments

- *Public Interest Groups*

Response to Comments

Cumulative Impacts – Risk of Additional Oil Spills: See **Section 28.3.30** response under *Cumulative Impacts – Risk of Additional Oil Spills*

Cook Inlet Beluga Whale: Cook Inlet does provide important habitat for the endangered resident population of beluga whales. Federal agencies consult with NOAA when the actions they are proposing may affect ESA-listed species or their designated critical habitat. During the most recent Cook Inlet oil and gas lease sale in 2022, 10 lease blocks comprising beluga whale critical habitat were excluded from consideration. The Preferred Alternative in the 2022 Lease Sale 258 Final EIS in the Cook Inlet excludes 17 OCS blocks wholly or partially overlapping beluga whale and norther sea otter critical habitat. Similar site-specific exclusions or mitigations can be considered for lease sales under the PFP.

Impacts to specific species such as beluga whales are not described in detail at the programmatic stage of analysis. The level of analysis in the Final Programmatic EIS is in compliance with recent CEQ guidance on programmatic reviews (Boots 2014) and is at an appropriate level of detail for the decision at hand. The analysis is at a national level, and the scope of the impacts and the affected environments and resources are described broadly. If a decision is made to move forward with any of the proposed lease sales in the PFP, additional reviews would take place that are more site specific and would analyze the

[376] Surfrider Foundation
[377] Center for Biological Diversity

impacts and describe affected environments and resources such as beluga whales in greater detail. Appropriate avoidance and mitigations measures would be determined at that time.

Section 28.2.29 – ESA

Summary of Comments

A commenter stated that Cook Inlet is surrounded by several critical habitat designation under the ESA, including habitat for the critically endangered Cook Inlet beluga whale.[378]

Source of Comments

- *Public Interest Groups*

Response to Comments

BOEM acknowledges that Cook Inlet and its neighboring areas provide critical habitat designations under the ESA, including for the endangered Cook Inlet beluga whale. Impacts to critical habitat and specific species such as beluga whales are not described in detail at the programmatic stage of analysis. The level of analysis in the Final Programmatic EIS is in compliance with recent CEQ guidance on programmatic reviews (Boots 2014) and is at an appropriate level of detail for the decision at hand. The analysis is at a national level, and the scope of the impacts and the affected environments and resources are described broadly. If a decision is made to move forward with any of the proposed lease sales in the PFP, additional reviews and consultations with appropriate Federal agencies would take place that are more site specific and would analyze the impacts and describe affected environments and resources such as beluga whales in greater detail. Appropriate avoidance and mitigations measures would be determined at that time.

Section 28.2.30 – MMPA

No substantive comments are associated with this issue.

Section 28.2.31 – Proposed Action

No substantive comments are associated with this issue.

Section 28.2.32 – Miscellaneous

No substantive comments are associated with this issue.

Section 28.3 – GOM Program Area 1

Comments associated with this issue are summarized in the sub-issues below.

[378] Oceana

Section 28.3.1 – Alternatives and Impact Comparison

Summary of Comments

Approximately 35 submissions discussed alternatives and impact comparison.

A form letter campaign requested that BOEM update the Draft Programmatic EIS to fully analyze the cumulative impacts to the environment, coastal communities, and existing industries from drilling operations and large oil spills associated with new lease sales and potential alternatives of the Proposed Program. The form letter campaign urged BOEM to adopt the No Action Alternative, in which no leasing occurs in 2023–2028.[379]

Source of Comments

- *Public Interest Groups*

Response to Comments

BOEM appreciates this comment and notes the form letter campaign's support of the No Action Alternative. The analyses in this Final Programmatic EIS and public comment period were conducted in accordance with current NEPA regulations and the CEQ guidance (Boots 2014). As such, cumulative impacts consider the contribution of the potential impacts of the Proposed Action to those from the past, present, and reasonably foreseeable future activities in the action area. Cumulative impacts are described in **Section 4.3**.

Section 28.3.2 – Mitigations

No substantive comments are associated with this issue.

Section 28.3.3 – BOEM's Proposed Exclusions

No substantive comments are associated with this issue.

Section 28.3.4 – Recommendations for Additional Exclusions

Summary of Comments

While expressing general opposition to new oil and gas leases in the GOM, a commenter expressed specific concern about potential impacts on coastal areas and ecosystems, like Mobile Bay and the greater Mobile-Tensaw River area. The commenter stated that these areas are home to many species of fish, crayfish, mussels, and snails, many of which are not found elsewhere. The commenter recommended that such areas be recognized as particularly sensitive and inappropriate for further leasing.[380]

[379] Florida Offshore Drilling Coalition et al. (Form Letter Master)
[380] Southern Environmental Law Center

Source of Comments

- *Public Interest Groups*

Response to Comments

Mobile Bay and the greater Mobile-Tensaw River area are not on the OCS and therefore are not considered for leasing as part of the National OCS Program.

Section 28.3.5 – Withdrawals

No substantive comments are associated with this issue.

Section 28.3.6 – Stressors

No substantive comments are associated with this issue.

Section 28.3.7 – Climate Change

Summary of Comments

Approximately 50 submissions provided comments regarding climate change in the GOM.

Some commenters argued that oil and gas production in the GOM is less carbon intensive than anywhere else in the world.[381] Several other commenters, including form letter campaigns, specifically agreed with BOEM's conclusion that, since oil and gas production in the GOM is less carbon intensive than in other regions, ending leasing in the GOM could increase global upstream emissions if U.S. energy demand is satisfied by more carbon intensive energy imports.[382]

Some commenters stated that new oil and gas leases in the GOM will contribute to climate change.[383] Several commenters argued that oil and gas production contributes to climate change, which results in more severe hurricanes. These commenters further argued that this impact is particularly severe in the GOM, where hurricanes regularly displace large numbers of residents and are a leading cause of oil spills by damaging oil and gas infrastructure.[384] Another commenter and a form letter campaign added that sea-level rise caused by climate change has led to saltwater intrusion (which threatens drinking water and coastal ecosystem) and coastal erosion (which reduces natural buffers against hurricanes in the GOM).[385] Other commenters similarly argued that the GOM Region is particularly burdened by climate risks.[386]

A commenter argued that BOEM's analysis failed to account for methane emissions from drilling in the GOM. The commenter cited a study to claim that offshore oil and gas in the GOM have a methane loss

[381] Chambers County Commissioner Precinct 4; Greater Lafourche Port Commission/Port Fourchon
[382] West Virginia Manufacturers Association (Form Letter Master); Terrebonne Port Commission (Form Letter Master); Terrebonne Parish Government; Island Operating; John Locke Foundation
[383] Coastal Coordination Program, The Ocean Foundation; Oceana
[384] Alliance for Affordable Energy; M. Martin; Cherokee Concerned Citizens
[385] Taproot Earth, The Center for Biological Diversity, et al. (Form Letter Master)
[386] K. Schlemmer; Voces Unidas Rio Grande Valley

rate of 23 to 66%, far greater than land-based production. The commenter stated that, by comparison, the Permian Basin has a loss rate of around 4%. The commenter argued that, because of the substantial climate warming effect of methane and because its effects in the atmosphere are relatively short lived, methane emissions reductions are a particularly important climate goal.[387]

Source of Comments

- *Non-energy Exploration & Production Industry and Associations*
- *Local Governments*
- *Public Interest Groups*
- *General Public*
- *Local Governments*
- *Tribes and Tribal Organizations*

Response to Comments

GOM Methane Emissions: In the Final Programmatic EIS, BOEM has expanded its discussion of methane emissions in the GOM, including adding recent studies showing higher-than-expected methane emissions.

GHG Intensity on the OCS: BOEM's GHG analysis in **Section 2.2** acknowledges the lower GHG intensity of OCS oil and gas relative to alternate sources. A recognized factor of higher GHG intensity for many foreign sources is flaring and venting during operations. The OCS GHG intensity benefits from methane regulations, which govern venting and flaring on the OCS. For more information on OCS GHG intensity, see Section 1.2.3.4 of the PFP. Although carbon intensity is generally lower for the GOM compared to other typical sources of oil and natural gas for the U.S. market, overall emissions from new OCS activity show higher GHG emissions from the foreign and domestic life cycle (**Section 2.2**).

Climate Impacts in the GOM: BOEM provides a broad discussion of climate impacts in **Sections 2.2 and 2.4.2** and touches on climate change as relevant for each resource.

Section 28.3.8 – Areas of Special Concern

Summary of Comments

A form letter campaign stated that the GOM is host to many valuable natural resource economies, biodiversity hotspots, and disaster resiliency zones; the campaign also stated that effects from oil spills, including solid waste and oil from spills, disproportionately impact communities of color.[388] A commenter provided examples of how offshore oil and gas activities provide financial support for conservation efforts, including the LWCF and Louisiana's Coastal Protection and Restoration Authority.[389]

[387] Center for Biological Diversity
[388] The Rachel Carson Council
[389] Greater Lafourche Port Commission/Port Fourchon

Source of Comments

- *Public Interest Groups*
- *Local Governments*

Response to Comments

At this programmatic stage, BOEM does not identify specific communities that may be impacted by oil and gas activities, but rather the types of impacts that could occur. Subsequent NEPA reviews would include environmental justice analyses to describe the affected environment and impacts at a regional or local scale. BOEM also studies environmental justice issues through the ESP, e.g., *Environmental Justice: A Comparative Perspective in Louisiana* (Hemmerling and Colten 2017) and an ongoing study, *Environmental Justice Technical Workshops for the Gulf of Mexico Region*.

Section 28.3.9 – IPFs

Summary of Comments

A commenter expressed particular concern about noise as an IPF in the GOM. This commenter argued that "Gulf of Mexico whales" are particularly vulnerable to acoustic disturbances from seismic testing, which elevate background noise across wide areas. Specifically, the commenter cited a study to claim that the airgun arrays used in high-energy seismic exploration disrupt whale vocalizations over large areas of the ocean and across a wide range of important behavioral contexts, including foraging, breeding, and migrating.[390]

Source of Comments

- *Public Interest Groups*

Response to Comments

As discussed in **Section 4.1.8**, noise is potentially significant for marine mammals in all GOM planning areas. Disturbance from noise in the Eastern GOM Planning Area has the potential for greater impacts than in other GOM planning areas because of the lack of existing oil and gas activity there. The impacts from seismic surveys to whales are mentioned in this section.

The level of analysis in the Final Programmatic EIS is in compliance with recent CEQ guidance on programmatic reviews (Boots 2014) and is at an appropriate level of detail for the decision at hand. The analysis is at a national level, and the scope of the impacts is described broadly. If a decision is made to move forward with any of the proposed lease sales in the PFP, additional reviews would take place that are more site specific and would analyze noise impacts on species in more detail. Appropriate avoidance and mitigations measures would be determined at that time.

[390] Natural Resources Defense Council

Section 28.3.10 – Air Quality

Summary of Comments

Four submissions provided comments regarding air quality in the GOM.

A commenter stated that the GOM Region has been unfairly burdened by air pollution and the resultant health risks caused by oil and gas development, specifically claiming that, in Houston alone, oil and gas pollution causes 22,000 asthma attacks per year.[391] Another commenter echoed this concern about oil and gas development causing asthma, adding that it has been linked to cancer as well.[392]

A commenter cited studies to claim that benzene is emitted into the air from petroleum refineries, that it is a known human carcinogen, and that a recent assessment found that air near nine refineries in the GOM Region exceed USEPA limits on benzene. The commenter also claimed that a single petroleum coke plant in Jefferson County, Texas, releases 92% of the county's sulfur dioxide emissions, exposure to which can cause shortness of breath, chest tightness, and increased susceptibility to respiratory infections; the commenter further claimed that nearby residents are predominantly people of color and low income, and face a higher-than-average asthma rate. The commenter also stated that the country's petrochemical facilities are particularly concentrated in Houston and that children living nearby face a higher-than-average risk of leukemia. The commenter claimed that such facilities emit fine particulate matter, coarse particulate matter, and volatile organic compounds, exposure to which has been linked to cardiovascular disease, premature death, and damage to bodily systems and organs; the commenter stated that, in Houston, such pollutants are far more concentrated in poor neighborhoods and communities of color.[393]

Similarly, another commenter recommended that BOEM revise its environmental justice analysis to include the deleterious impacts of air pollution on communities of color in the GOM Region. The commenter stated that BOEM arbitrarily relied on USEPA's regulation of air pollution, but that BOEM cannot substitute another agency's permit for the analyses required by the OCS Lands Act and NEPA. The commenter further claimed that BOEM improperly narrowed the scope of its air quality impact analysis to uninhabited, isolated coastal Louisiana. The commenter cited studies to claim that offshore oil and gas contribute to air pollution and that proximity to oil refineries increases the risk of cancer. The commenter further specified that new oil and gas development in the GOM, and refining and processing facilities that would accompany such development, would emit pollutants such as nitrogen oxides, particulate matter, sulfur dioxide, carbon monoxide, benzene, toluene, and xylene, which can cause various health issues, including cancer; damage to the brain, nervous system, liver, and kidneys; fatigue; drowsiness; headaches; dizziness; confusion; eye and respiratory tract irritation; and loss of muscle coordination.[394]

[391] K. Schlemmer
[392] Voces Unidas Rio Grande Valley
[393] Natural Resources Defense Council
[394] Center for Biological Diversity

Source of Comments

- *Public Interest Groups*
- *General Public*

Response to Comments

BOEM added language to the Final Programmatic EIS about impacts from onshore sources, as well as additional information about uncertainties at this stage of the OCS Lands Act and NEPA processes that make a more detailed analysis unreliable. At later stages of the National OCS Program, more information becomes available about the location and timing of development, and equipment expected to be utilized, allowing for a more specific analysis of new offshore operations. Those future analyses are not limited by conclusions drawn in this analysis.

At a level of detail appropriate for this programmatic-level analysis, BOEM added language in the Final Programmatic EIS to discuss further the existing burdens and vulnerabilities faced by communities with environmental justice concerns.

Section 4.1.8 discusses a study that looked at future impacts from offshore oil and gas operations and found that impacts might occur along the Louisiana Coast (Wilson et al. 2019). The same study did not find such impacts in Texas from future OCS oil and gas operations. Currently, BOEM has no information to suggest new offshore oil and gas development is likely to impact the remainder of the GOM Region.

It should also be noted that, in most of the GOM, air quality jurisdiction for OCS sources is with BOEM, not USEPA. BOEM discusses the existing regulatory authority offshore to note at which stages more information should become available on the potential impacts to air quality. Additionally, courts have determined that the reliance on the enforcement of laws in determining which impacts are foreseeable in NEPA.

BOEM does not have the authority to regulate refineries and other downstream activities. BOEM is unable to evaluate the air quality impacts, because air quality impacts are localized and the Bureau does not have knowledge of which refineries or other onshore facilities would be used to process OCS oil. However, these impacts are required to be evaluated by the states prior to issuing an air quality permit, and BOEM-authorized activities do not allow state-permitted sources to exceed state-approved air quality permits.

Section 28.3.11 – Water Quality

Summary of Comments

Three submissions provided comments regarding water quality in the GOM.

A commenter stated that the GOM Region has been unfairly burdened by water pollution and the resultant health risks caused by oil and gas development.[395]

[395] K. Schlemmer

A commenter claimed that waste produced during offshore drilling that cannot be disposed of in the ocean is brought onshore for disposal, and, when this disposal is done improperly, leachate and contaminated water can reach the water table, contaminating drinking water and harming nearby residents in some instances.[396]

A commenter cited studies to claim specifically that dispersants used to clean up after the *Deepwater Horizon* oil spill increased the toxicity of oil to marine organisms, and that traces of the chemicals were still found in the area up to 3 years after their use.[397] Another commenter expressed similar concerns about dispersants, arguing that effects of exposure to it are unclear.[398]

Source of Comments

- *Public Interest Groups*
- *General Public*

Response to Comments

BOEM added text to **Section 2.8.5** to discuss further the impacts of the oil and gas industry on coastal communities in the GOM. Vulnerable coastal communities may experience past, ongoing, and potential future impacts, such as exposure to air and water pollutants that may impact health; these pollutants and potential impacts are discussed at the appropriate level in the Final Programmatic EIS. It should also be noted that, when waste produced during offshore drilling is brought onshore for disposal, the disposal is reasonably expected by BOEM to be done in accordance with local, state, and Federal regulations and requirements.

Oil spill impacts are covered in **Section 4.6** at a programmatic level, in compliance with CEQ guidance on programmatic reviews (Boots 2014), and at an appropriate level of detail for the decision at hand. BOEM added additional text to the section to capture the potential impacts from dispersants.

Section 28.3.12 – Pelagic Communities

Summary of Comments

Two submissions provided comments regarding pelagic communities in the GOM.

A commenter said that the GOM has been identified as one of the most diverse mesopelagic ecosystems in the world and that it was profoundly affected by the *Deepwater Horizon* oil spill. The commenter said that coral colonies are extremely slow growing, so recovery may take decades or longer.[399]

A commenter provided text for an additional paragraph on the Rice's whale for the section on pelagic communities.[400]

[396] Natural Resources Defense Council
[397] Natural Resources Defense Council
[398] J. Nixon
[399] Natural Resources Defense Council
[400] USEPA

Source of Comments

- *Federal Agencies*
- *Public Interest Groups*

Response to Comments

Oil spill impacts are discussed at a high-level in **Section 4.6**, and **Section 2.8.2** discusses impacts specifically from *Deepwater Horizon* on pelagic habitats, including mesopelagic fish. The level of analysis in the Final Programmatic EIS is in compliance with recent CEQ guidance on programmatic reviews (Boots 2014) and is at an appropriate level of detail for the decision at hand. The analysis is at a national level, and the scope of the impacts is described broadly. If a decision is made to move forward with any of the proposed lease sales in the PFP, additional reviews would take place that are more site specific and would analyze impacts from accidental events like oil spills in more detail.

BOEM has required mitigation measures to avoid sensitive habitats, such as coral colonies, in the past (**Appendix F**) and is considering continuing this programmatic requirement for all leases issued under the National OCS Program.

BOEM appreciates the suggestion of additional text describing the Rice's whale in the GOM. BOEM has added language to better characterize Rice's whale habitat in the northern GOM and to clarify that more detailed information and analysis will occur at the lease sale stage.

Section 28.3.13 – Marine Benthic Communities

Summary of Comments

Three submissions provided comments regarding marine benthic communities in the GOM.

A commenter said that, although many leases in the GOM are in the deep sea, there is virtually no consideration of these habitats in the leasing program plan or EIS.[401]

A commenter said that, given the harm suffered by benthic communities and organisms in the wake of prior oil spills, BOEM should "present a more searching, thorough, and reasoned analysis of the potential impacts of oil spill-induced harms—including harms from cleanup activities (e.g., the use of dispersants and/or burns)—on benthic communities and not summarily and inaccurately conclude that such effects will largely be sublethal."[402]

Another commenter said that oil continued to sink to the ocean floor more than a year after the *Deepwater Horizon* spill, changing the area's sediment chemistry and reducing oxygen. The commenter also said that oysters have suffered from the spill, and recovery is slow despite significant resources put to use in oyster restoration efforts.[403]

[401] R. Grubbs
[402] Center for Biological Diversity
[403] Natural Resources Defense Council

Source of Comments

- *Public Interest Groups*
- *General Public*

Response to Comments

The language used in the Final Programmatic EIS does not always specifically use the words "deep sea" but rather focuses on language referring to specific resources within it (including, for example, marine benthic and pelagic communities). The "deep sea" is considered as part of the analyses related to relevant deep-sea resources, which specifically considers sensitive habitats and fauna such as deep-sea corals and chemosynthetic communities. Additionally, BOEM's analyses predominantly consider the deep-sea resources that fall within its regulatory jurisdiction, which may not include all deep-sea areas of the oceans adjacent to the U.S.

BOEM recognizes the concerns associated with dispersants, burns, and other oil spill response strategies, and **Section 4.6** includes examples of potential impacts to resources. With the wide-ranging environments discussed in the Final Programmatic EIS, a discussion of specific response strategies would be highly speculative and not appropriate to address in detail. Site-specific response strategies and associated potential impacts would be addressed at the lease sale stage. Specific mitigation strategies for accidental events like oil spills would not be appropriately addressed at the programmatic stage of review.

The level of analysis in the Final Programmatic EIS is in compliance with recent CEQ guidance on programmatic reviews (Boots 2014) and is at an appropriate level of detail for the decision at hand. The analysis is at a national level, and the scope of the impacts is described broadly. If a decision is made to move forward with any of the proposed lease sales in the PFP, additional reviews would take place that are more site specific and would analyze impacts on unique and sensitive habitats and species in more detail. Appropriate avoidance and mitigations measures would be determined at that time.

Section 28.3.14 – Coastal and Estuarine Habitats

Summary of Comments

Seven submissions provided comments regarding coastal and estuarine habitats in the GOM.

Some commenters said that the oil and gas industry has dug thousands of miles of canals and navigation channels through wetlands along the GOM, severely damaging the wetlands and leading to the loss of hundreds of thousands of acres of land in Louisiana.[404] Another commenter also said that the construction of the Mississippi River Gulf Outlet damaged or destroyed wetlands and coastal ecosystems in Louisiana, and oil company profits should be used to restore these areas.[405]

[404] Natural Resources Defense Council; Glass Half Full; Earthjustice, et al.
[405] M. Martin

A commenter stated that oil spills from future lease sales could impact many natural resources—including plants in salt marshes that could be killed by oil, resulting in soil destabilization and erosion—and habitat for dozens of federally listed endangered species.[406]

A commenter said that Florida's coastal and offshore areas have high environmental and economic value and expressed concern about the effects of OCS oil and gas activities on the state's coastal environment. The commenter said that protection of the state's sensitive coastal and marine resources should be given primary consideration.[407]

A commenter said that the Flower Garden Banks National Marine Sanctuary contains the northernmost coral reefs in the U.S., and offshore drilling is a threat to this sensitive marine ecosystem.[408]

A commenter expressed concern about the effects of oil spills on the shores of the Gulf Coast, commenting that the tons of oil that washed up after the *Deepwater Horizon* spill will take at least 30 years to degrade.[409]

Source of Comments

- *Governors and State Agencies*
- *Public Interest Groups*
- *General Public*

Response to Comments

BOEM acknowledges the potentially significant impacts of past, ongoing, and future oil and gas activities on GOM coastal and estuarine habitats (**Sections 2.8.4** and **4.1.8**, **Figure 4-7**), including impacts from the *Deepwater Horizon* oil spill. Potential impacts analyzed include accidental events, such as oil spills (**Section 4.6**). However, it is difficult to predict potential impacts at the programmatic level without knowledge of the scale, location, and timing of the activities and which potential resources may be affected. Oil spill risk analysis modeling is conducted at the lease stage, when more specific strategies can be adopted to further address or reduce risk to specific resources.

Unleased portions of the Central and Eastern GOM Planning Areas that were subject to the restrictions under GOMESA were further withdrawn from disposition until June 30, 2032, by Presidential Memorandum, dated September 8, 2020. This withdrawal includes the areas around Florida. Additionally, the National OCS Program excludes oil and gas activity within the 2008 boundary of the Flower Garden Banks National Marine Sanctuary. Any activities in the expanded sanctuary would be subject to sanctuary regulations and may warrant additional mitigation measures at the project-specific level.

The level of analysis in the Final Programmatic EIS is in compliance with recent CEQ guidance on programmatic reviews (Boots 2014) and is at an appropriate level of detail for the decision at hand. The

[406] National Parks Conservation Association
[407] Florida Department of Environmental Protection
[408] Turtle Island Restoration Network.
[409] Natural Resources Defense Council

analysis is at a national level, and the scope of the impacts is described broadly. If a decision is made to move forward with any of the proposed lease sales in the PFP, additional reviews would take place that are more site specific and would analyze impacts on coastal and estuarine habitats. Appropriate avoidance and mitigations measures would be determined at that time.

Section 28.3.15 – Fish

Summary of Comments

A commenter said that many fish species were highly impacted by the *Deepwater Horizon* oil spill, including through consumption of contaminated food and harm to their habitats and spawning areas. The commenter said that trillions of larval fish died from the spill, leading to millions or billions fewer fish reaching one year of age. The commenter went on to say that this disruption to several native fish species populations led to the arrival of the invasive lionfish.[410]

Source of Comments

- *Public Interest Groups*

Response to Comments

Large oil spills are considered an unlikely occurrence, and impacts are discussed at a high level in **Section 4.6**. **Sections 2.8.2 and 2.8.3** discuss impacts specifically from *Deepwater Horizon* on fish. Lionfish are estimated to have been introduced into U.S. waters in the 1980s, long before the *Deepwater Horizon* oil spill. Many factors have contributed to the proliferation of lionfish since then.

The level of analysis in the Final Programmatic EIS is in compliance with recent CEQ guidance on programmatic reviews (Boots 2014) and is at an appropriate level of detail for the decision at hand. The analysis is at a national level, and the scope of the impacts is described broadly. If a decision is made to move forward with any of the proposed lease sales in the PFP, additional reviews would take place that are more site specific and would analyze impacts of accidental events like oil spills in more detail. Appropriate avoidance and mitigations measures would be determined at that time.

Section 28.3.16 – EFH

Summary of Comments

Three submissions provided comments regarding EFH in the GOM.

A commenter said that “it seems contradictory to note that there would be bottom/land disturbance impacts of oil and gas activity on marine benthic communities and coastal/estuarine habitats, but not on fish and EFH, since a lot of these habitats are EFH” and recommended that “steps be taken at the “targeted leasing approach” sub-option stage, if selected, to mitigate an individual project’s potential impacts to benthic communities, coastal and estuarine habitats, and fish [and] EFH.”[411]

[410] Natural Resources Defense Council
[411] NOAA NMFS

A commenter said that the marine environment remained toxic to fish larvae for years after the *Deepwater Horizon* spill.[412]

Another commenter commented that the GOM provides crucial habitat for endangered and threatened species.[413]

Source of Comments

- *Public Interest Groups*
- *Federal Agencies*

Response to Comments

Mostly localized impacts resulting from oil and gas activities are expected for marine benthic communities and coastal and estuarine habitats, while EFH is generally more spread out and therefore unlikely to be as susceptible. Additionally, oil and gas activities generally are avoided in many areas containing EFH, particularly for benthic EFH areas. The level of analysis in the Final Programmatic EIS is in compliance with recent CEQ guidance on programmatic reviews (Boots 2014) and is at an appropriate level of detail for the decision at hand. The analysis is at a national level, and the scope of the impacts is described broadly. If a decision is made to move forward with any of the proposed lease sales in the PFP, additional reviews would take place that are more site specific and would analyze impacts on unique and sensitive ecosystems in more detail. Appropriate avoidance and mitigations measures would be determined at that time.

Section 28.3.17 – Birds

Summary of Comments

Three submissions provided comments regarding birds in the GOM.

A commenter said that Texas, Louisiana, and Mississippi have Important Bird Areas all along their coasts, and birds in these areas were harmed by the *Deepwater Horizon* spill.[414] A commenter stated that Dauphin Island in particular is a stopover point for many migratory birds, particularly during the spring migration.[415]

Another commenter said that microplastics like nurdles are mistaken by sea birds and other animals as food and noted that areas with high recorded numbers of nurdles correspond to petrochemical hubs in Texas and Louisiana, which are already impacted by other pollution from the oil and gas industry.[416]

Source of Comments

- *Public Interest Groups*

[412] Natural Resources Defense Council
[413] Oceana
[414] Maryland Ornithological Society
[415] Southern Environmental Law Center
[416] Natural Resources Defense Council

Response to Comments

BOEM added text to **Section 2.8.4** on Important Bird Areas, though site-specific discussions are not appropriate at this stage. Similarly, marine plastic debris is broadly discussed in **Section 2.4.2** at a national level under Pollution (A.7). The level of analysis in this Final Programmatic EIS is in compliance with recent CEQ guidance on programmatic reviews (Boots 2014) and is at an appropriate level of detail for the decision at hand. The analysis is at a national level, and the scope of the impacts is described broadly. If a decision is made to move forward with any of the proposed lease sales in the PFP, additional reviews would take place that are more site specific and would describe the affected environment and analyze impacts on birds in more detail. Appropriate avoidance and mitigations measures would be determined at that time.

Section 28.3.18 – Sea Turtles

Summary of Comments

Nine submissions provided comments regarding sea turtles in the GOM.

Two commenters said that the Draft Programmatic EIS Section 2.8.4 sentence, "[t]he coastline of the Eastern GOM Planning Area represents 90% of the nesting habitat for the Northwest Atlantic subpopulation of loggerhead turtles," is not correct. The commenters said that this overstates the percentage of loggerhead turtles nesting in the Eastern GOM Planning Area, saying that the 87% figure cited in the document actually represents an area on the east coast of Florida that is not within the Eastern GOM Planning Area. The commenters asked BOEM to correct these figures in the Final Programmatic EIS.[417]

Several commenters said that the GOM provides critical habitat for multiple species of threatened and endangered sea turtles.[418] A few commenters said that leatherneck turtles rely on habitat off the coasts of Alabama, Mississippi, and Louisiana, which are areas that overlap with the highest density for oil and gas platforms in the GOM.[419] One commenter added that critical habitat for loggerhead sea turtles spans large portions of the GOM Program Area and expressed concern that oil and gas leases would adversely affect this critical habitat.[420] A couple commenters said that the *Deepwater Horizon* oil spill led to the deaths of up to 200,000 sea turtles.[421]

A commenter described the many ways that sea turtles are affected by exposure to oil spills, including organ failure, birth defects, and effects on locomotion. The commenter also said that sea turtle behavior can increase their exposure to oil contamination, particularly swimming into oil-contaminated areas instead of avoiding them. Finally, the commenter said that, given all of the risks to sea turtles posed by oil spills, BOEM should not omit an in-depth analysis of the likely impacts of spills on these species.[422] A

[417] American Petroleum Institute; Chevron
[418] Turtle Island Restoration Network; Sea Turtle Conservancy; Oceana; J. White & C. Fouts & H. Hyde
[419] Sea Turtle Conservancy; Oceana
[420] J. White & C. Fouts & H. Hyde
[421] Sea Turtle Conservancy; Natural Resources Defense Council
[422] Center for Biological Diversity

Federal agency also said that impacts to sea turtles from oil spills should be included in the analysis of GOM leases.[423]

A commenter said that sea turtles are important to Florida's economy due to the tourism generated by people traveling to view the sea turtles.[424]

Source of Comments

- *Public Interest Groups*
- *Energy Exploration & Production Industry and Associations*
- *Federal Agencies*

Response to Comments

The level of analysis in this Final Programmatic EIS is in compliance with recent CEQ guidance on programmatic reviews (Boots 2014) and is at an appropriate level of detail for the decision at hand. The analysis is at a national level, and the scope of the impacts is described broadly. If a decision is made to move forward with any proposed lease sales in the PFP, additional reviews would take place that are more site specific and would describe the affected environment and analyze impacts on sea turtles in more detail. Appropriate avoidance and mitigations measures would be determined at that time.

BOEM appreciates the correction on the loggerhead turtle nesting habitat described in Section 2.8.4 of the Draft Programmatic EIS. Ceriani et al. (2019) found the majority of loggerhead turtle nesting occurred along the east coast of Florida (approximately 82% of nests between 2014–2018), while approximately 13.5% occurred along the west coast of Florida. The Final Programmatic EIS was updated to reflect this correction.

Section 28.3.19 – Marine Mammals

Summary of Comments

Approximately 10 submissions provided comments regarding marine mammals in the GOM.

A commenter said that marine mammals are known to be affected by oil and gas development and spills in the GOM. The commenter said that more information is needed about how new production might compound or worsen the impacts from existing development and climate change.[425]

Several commenters commented on the impacts of oil and gas development on "Gulf of Mexico whales," also known as Rice's whales. They noted that Rice's whales are already an endangered species with an estimated population of only around 51 individuals.[426] One commenter listed drilling, chronic noise exposure, and ship strikes as some of the biggest threats to Rice's whales and stated that any new oil and gas leases should be designated with these whales in mind.[427] Commenters also said that these

[423] NOAA NMFS
[424] Sea Turtle Conservancy
[425] Marine Mammals Commission
[426] NRDC; Oceana; Natural Resources Defense Council; J. White & C. Fouts & H. Hyde
[427] J. White & C. Fouts & H. Hyde

baleen whales are affected by noise from seismic oil and gas exploration, with airguns having significant effects on their feeding and reproductive practices and vessel noise affecting Rice's whales and other marine mammal species.[428] They also stated that Rice's whales are susceptible to vessel strikes.[429] Commenters said that the *Deepwater Horizon* oil spill impacted nearly half of the whale's habitat and decreased their population by around 22%.[430] The commenters said that oil and gas activities should be prohibited from occurring in the whale's habitat in the Eastern, Central, and Western GOM.[431] Another commenter agreed with excluding from proposed lease sales areas of 100 to 400 meter depths, as these are confirmed to be Rice's whale habitat.[432]

A commenter provided text for an additional paragraph on Rice's whale in the section on pelagic communities:[433]

> **Rice's Whale Extent, Section 2.8.2 Pelagic Environment:**
>
> "Twenty-one species of R.9 MARINE MAMMALS regularly occur in the GOM pelagic environment: a unique evolutionary lineage of baleen whale (Rice's whale, previously known as the GOM subpopulation of Bryde's whale) and 20 species of toothed whales and dolphins. Both the Rice's and sperm whale are ESA-listed and have presumed year-round resident populations in the GOM (NMFS 2020; Van Parijs 2015). Sighting records and acoustic detections of Rice's whales in the northern GOM occur almost exclusively in the northeastern Gulf in the DeSoto Canyon area (Hayes et al. 2018)." [Underline: For the past 25 years, the Rice's whale has been consistently located in the northeastern GOM, along the continental shelf break between 100 and about 400 meters depth. They are the only resident baleen whale in the GOM. A single Rice's whale was observed in the western Gulf of Mexico off the coast of Texas, suggesting that their distribution may occasionally include waters elsewhere in the GOM. NOAA Fisheries scientists are conducting research to better understand the whales' distribution, for example, if they utilize the western GOM and Mexican waters of the southern GOM, and how frequently they may occur in these other areas. The Rice's whale is one of the few types of baleen whales to prefer warmer, tropical waters and that does not make long-distance migrations. They remain in the GOM year-round."] The best abundance estimate available for northern GOM Rice's whales is 33 individuals (Hayes et al. 2018); therefore, any mortality events could affect the population's survival."

A commenter said that more data is needed on the abundance and distribution of the 22 marine mammal species that occur in the GOM and encouraged BOEM to conduct these surveys.[434]

[428] NRDC; Center for Biological Diversity; Natural Resources Defense Council
[429] NRDC; Center for Biological Diversity; Natural Resources Defense Council
[430] Southern Environmental Law Center; Oceana
[431] NRDC; Natural Resources Defense Council
[432] Marine Mammals Commission
[433] USEPA
[434] Marine Mammals Commission

A few commenters argued that BOEM failed to sufficiently analyze the potential impacts of oil spills from the Proposed Program on marine mammal species.[435] A commenter described in detail the myriad ways that marine mammals have been affected by inhalation, dermal contact, and ingestion of oil and oil dispersants from the *Deepwater Horizon* and other spills.[436] A few commenters said that sperm whales and bottlenose dolphins continue to be affected by exposure to oil from the *Deepwater Horizon* oil spill.[437]

A commenter disputed the need for the Draft Programmatic EIS Section 4.1.8 box on page 193, saying that "physical disturbance is too vague a descriptor and there is no empirical evidence showing injury from airgun surveys on mysticetes."[438]

Source of Comments

- *Public Interest Groups*
- *Federal Agencies*
- *Energy Exploration & Production Industry and Associations*

Response to Comments

The level of analysis in the Final Programmatic EIS is in compliance with recent CEQ guidance on programmatic reviews (Boots 2014) and is at an appropriate level of detail for the decision at hand. The analysis is at a national level, and the scope of the impacts is described broadly. If a decision is made to move forward with any of the proposed lease sales in the PFP, additional reviews would take place that are more site specific and would analyze impacts, including oil spill impacts, on unique and sensitive habitats and species, such as the Rice's whale, in more detail. Potential avoidance and mitigation measures may be implemented at that more localized, lease and/or project-specific level.

Additionally, it should be noted that unleased portions of the Central and Eastern GOM Planning Areas are currently withdrawn from disposition until June 30, 2032, by a Presidential Memorandum dated September 8, 2020. It is difficult to predict possible impacts from an accidental event at the programmatic level. More information is known at the lease sale stage about the timing and location of proposed activities, spill risk from those activities, and specific environmental resources that could be affected. BOEM's oil spill risk analysis modeling is conducted at that stage to estimate spill risk, spill trajectories, and probability of contact with an environmental resource. BOEM uses the modeling results to determine potential risk to specific environmental resources and how to further mitigate risk.

GOM bottlenose dolphins and sperm whales were impacted by the *Deepwater Horizon* oil spill, and the effects of the spill may still be impacting those populations. As discussed in **Appendix G**, CDEs like the *Deepwater Horizon* oil spill are extremely rare. Furthermore, since that spill, BOEM and BSEE have

[435] Center for Biological Diversity; NOAA NMFS; Natural Resources Defense Council
[436] Center for Biological Diversity
[437] Southern Environmental Law Center; Natural Resources Defense Council
[438] American Petroleum Institute

worked to implement controls to prevent these events from occurring in the future (BOEM 2021) and mitigate impacts should they occur.

Section 4.6.1 describes potential examples of the oil spill impacts oil spills on marine mammals, including the various pathways in which marine mammals can be exposed to oil or dispersed oil. The effects of dispersants are also described in this section, and additional text has been added regarding the effects of dispersant application.

BOEM continues to seek more data on the abundance and distribution of the 22 marine mammal species that occur in the GOM. BOEM considers the best available scientific data (at an appropriate scale) in its analyses and regularly works with other agencies, organizations, and researchers to collect additional information to improve information and data available for analyses.

BOEM appreciates the concern about the level of detail regarding the Rice's whale in the GOM. BOEM and its partners continue to fund and carry out research aimed at improving understanding of the biology, abundances, and distributions of marine mammals in all regions.

BOEM revised the text in the Final Programmatic EIS to read: "Several species of baleen and toothed whales in all GOM planning areas may experience behavioral disturbance from noise, particularly noise generated by seismic airguns or vessels. When in very close proximity to airguns, it is possible that auditory injury could also occur" (**Section 4.1.8**).

Section 28.3.20 – Commercial and Recreational Fishing

Summary of Comments

Nine submissions provided comments regarding commercial and recreational fishing in the GOM.

Several commenters stated that the *Deepwater Horizon* oil spill had a significant impact on GOM fisheries and the people who depend on those fisheries for their livelihood; the spill caused billions of dollars of damage to the commercial fisheries.[439] A commenter said that the GOM currently supports commercially valuable fisheries, with dockside values in the hundreds of millions of dollars.[440]

Source of Comments

- *Public Interest Groups*
- *Governors and State Agencies*
- *General Public*

Response to Comments

Information on commercial and recreational fishing at a level of detail appropriate for a national-level, programmatic assessment is provided throughout the Final Programmatic EIS and found under **R.10 COMMERCIAL & RECREATIONAL FISHERIES**. Additional region-specific baseline information and

[439] Rethink Energy Florida; Florida Department of Environmental Protection; Southern Environmental Law Center; M. Martin; Center for Biological Diversity; Oceana; Surfrider Foundation; Natural Resources Defense Council
[440] Oceana; Southern Environmental Law Center; Surfrider Foundation

assessment of potential impacts would be conducted for any lease sales scheduled under the National OCS Program.

The Final Programmatic EIS does not analyze CDEs, such as the *Deepwater Horizon* oil spill, because of the low probability of occurrence and the many factors that determine severity of potential impacts, which are not known at the programmatic stage. However, BOEM recognizes the impacts that disaster had on commercial and recreational fishing throughout the GOM Region and has supported studies on the topic through the ESP. More information on social science and fisheries studies is available on the BOEM Environmental Studies Hub, Social Sciences Theme. For further analysis of the impacts of a low-probability CDE, see the *Gulf of Mexico Catastrophic Spill Event Analysis* (BOEM 2021), *Beaufort Sea: Hypothetical Very Large Oil Spill And Gas Release* (BOEM 2020), and the PFP.

Section 28.3.21 – Archaeological & Cultural Resources

Summary of Comments

A commenter said that "[u]nique cultural and historic treasures such as shipwrecks, archaeological sites, Civil War defenses, and other resources that tell the stories of our nation and inhabitants before us" are threatened by the impacts from oil spills and cleanup activities.[441]

Source of Comments

- *Public Interest Group*

Response to Comments

BOEM agrees that oil spills and cleanup activities have potential to impact archaeological and cultural resources. Oil spill response is discussed in **Appendix G**, which also describes the responsibilities of BSEE in addressing offshore oil spill prevention, planning, preparedness, and response. An in-depth, region-specific discussion of potential impacts of small and large oil spills and associated spill response activities, including discussion of regulatory measures to protect archaeological and cultural resources, would be provided prior to any lease sales scheduled under the National OCS Program. For further analyses of the impacts of a low-probability catastrophic discharge, see the *Gulf of Mexico Catastrophic Spill Event Analysis* (BOEM 2021), *Beaufort Sea: Hypothetical Very Large Oil Spill And Gas Release* (BOEM 2020), and the PFP.

BOEM also supports research to help further understanding and protection of archaeological and cultural resources, with information available at BOEM's ESP Hub, Social Science Themes page.[442] Additional resources documenting BOEM-supported research on impacts of the *Deepwater Horizon* oil spill and dispersants through the Gulf of Mexico Shipwreck Corrosion, Hydrocarbon Exposure, Microbiology, and Archaeology Project (GOM-SCHEMA) project are summarized at

[441] National Parks Conservation Association
[442] https://esp-boem.hub.arcgis.com/pages/dc1b7ef3dccd4e25a75de9bad7a9247a

www.boem.gov/sites/default/files/environmental-stewardship/Environmental-Studies/Gulf-of-Mexico-Region/Hamdan.pdf and documented in Hamdan et al. (2018).

Section 28.3.22 – Land Use

Summary of Comments

Three submissions provided comments regarding land use in the GOM.

A couple commenters said that oil and gas development in the Eastern GOM Planning Area would likely be supported by existing infrastructure, and new infrastructure will not be required to be built in Florida.[443]

A commenter said that further oil and gas leasing likely will lead to further erosion, saltwater intrusion, and other effects as more pipelines, canals, and infrastructure are built to support additional leases.[444]

Source of Comments

- *Energy Exploration & Production Industry and Associations*
- *Public Interest Groups*

Response to Comments

The Final Programmatic EIS identifies the types of impacts and potentially significant impacts that may occur if oil and gas activities occur under the 2024–2029 Program, including impacts in the Eastern GOM Planning Area. BOEM understands the likelihood of new infrastructure being installed in Florida is low.

BOEM appreciates that communities in coastal areas in Louisiana have experienced decades of land loss caused by a number of factors, including oil and gas development. The exact location of leasing and the potential levels of activity would be analyzed in detail at subsequent NEPA stages, and impacts of new pipelines would be analyzed for specific development and production plans. Given the existing, extensive pipeline network in the GOM and the longstanding business practice of reducing costs to maximize profits, the possibility of new pipeline landfall is very small. Companies typically choose to tie into the existing pipeline network rather than expend capital on building a new pipeline to shore. Should a development and production plan include new pipeline to shore, other Federal and state permits and associated mitigation measures, including requirements under the Coastal Zone Management Act, would be required.

BOEM reviewed the U.S. Geological Survey report referenced in the comment letter. The report provides an overview of land area change in coastal Louisiana from 1932 to 2016. The report notes that decreases in the rate of wetland loss in recent years can be attributed to a number of factors, including the relocation of oil and gas production from coastal areas to areas farther inland or farther offshore.

[443] American Petroleum Institute; Chevron
[444] Earthjustice, et al.

Section 28.3.23 – Subsistence

Summary of Comments

Two submissions provided comments regarding subsistence in the GOM.

A commenter commented that "there are entire populations that rely on the Gulf to feed their families healthy protein" in Alabama, and communities in Louisiana also support themselves by harvesting crawfish from the Atchafalaya Basin.[445] Another commenter said that the *Deepwater Horizon* spill destroyed coastal Tribes' fishing and shrimping livelihoods.[446]

Source of Comments

- *Public Interest Groups*

Response to Comments

BOEM appreciates information regarding subsistence uses of GOM resources. BOEM will consider human uses of coastal and offshore resources in regional-specific analyses for any lease sales identified in the GOM Region under the National OCS Program. BOEM welcomes input on important harvest resources and areas to inform further analyses.

The Final Programmatic EIS does not analyze CDEs, such as the *Deepwater Horizon* oil spill, because of the low probability of occurrence and the many factors that determine severity of potential impacts, which are not known at the programmatic stage. However, BOEM recognizes the impacts that disaster had on communities throughout the GOM Region. For further analysis of the impacts of a low-probability CDE, see the *Gulf of Mexico Catastrophic Spill Event Analysis* (BOEM 2021), *Beaufort Sea: Hypothetical Very Large Oil Spill And Gas Release* (BOEM 2020), and the PFP.

Section 28.3.24 – Culture

Summary of Comments

Two submissions provided comments regarding impacts to culture in the GOM.

A commenter said that Indigenous groups along the GOM have suffered culture loss due to the impacts of subsidence and coastal erosion from oil and gas industry activities. The commenter said that in Louisiana, historic waterways are now nonexistent or impassible, while others are turning into open water. In Texas, the commenter said that the cultural heritage of Indigenous communities is threatened by the expansion of a crude export terminal in the Corpus Christi area.[447] Another commenter said that "fisheries in the Gulf are as integral to the culture as they are to the economy."[448]

[445] Southern Environmental Law Center
[446] Natural Resources Defense Council
[447] Natural Resources Defense Council
[448] Southern Environmental Law Center

Source of Comments

- *Public Interest Groups*

Response to Comments

BOEM appreciates the comment regarding sociocultural impacts to Indigenous communities in the GOM Region related to subsidence and coastal erosion. BOEM expanded the discussion of the ongoing impacts related to this issue in the Final Programmatic EIS. Given the localized nature of the concerns referenced in the comment, BOEM notes that the exact location of leasing and the potential levels of activity would be analyzed in detail at subsequent NEPA stages. Should a development and production plan include a new pipeline to shore or similar actions that could result in increased subsidence or coastal erosion, other Federal and state permits, and associated mitigation measures, including requirements understate coastal management plans, would be required. Regarding expansion of existing infrastructure including the referenced oil export terminal, BOEM recognizes that a portion of the oil processed at such facilities originates from the OCS; however, regulating expansion of such facilities is outside of BOEM's jurisdiction and would be reviewed by other local, state, and Federal agencies.

Section 28.3.25 – Vulnerable Coastal Communities

Summary of Comments

Approximately 1,710 submissions provided comments regarding vulnerable coastal communities in the GOM.

Many commenters, including a form letter campaign, commented that people living in communities near oil industry facilities face dangers and threats from spills or leaks from the facilities, and any additional oil and gas leases will increase those risks.[449]

A few commenters commented on the severe health risks associated with offshore oil and gas development and onshore refining and processing. Many of these commenters described what has been dubbed "Cancer Alley" in an area of Louisiana home to multiple petrochemical facilities and with cancer risks as much as 50 times the national average among the population that lives nearby.[450] One commenter said that exposure to oil spills has been associated with mental health effects, and children are more likely to have mental and physical health issues than children not exposed to spills.[451]

Several commenters said that environmental justice communities along the GOM bear some of the worst health impacts of the petrochemical industry, and BOEM has failed to meet the requirements of NEPA and the OCS Lands Act to adequately address environmental justice in its Draft Programmatic

[449] Cherokee Concerned Citizens; Mid-Atlantic Regional Council on the Ocean; W. Strader (Form Letter Master); Natural Resources Defense Council; 61 Organizations
[450] Natural Resources Defense Council; Southern Environmental Law Center; Center for Biological Diversity; Earthjustice et al.
[451] Natural Resources Defense Council

EIS.[452] Other commenters said that environmental justice communities are also disproportionately affected by climate change, which is caused by GHG emissions from the oil and gas industry.[453]

Source of Comments

- *Public Interest Groups*
- *State-level Elected Officials*
- *General Public*
- *Local Governments*

Response to Comments

Agency obligations to consider environmental justice impacts are typically met by incorporating environmental justice considerations into NEPA reviews and processes. At this programmatic stage, BOEM considers environmental justice impacts in the Final Programmatic EIS through discussion of **R.14 VULNERABLE COASTAL COMMUNITIES** and, where applicable, under other resources, including **R.13 CULTURE**.

Many of the existing impacts identified by commenters, especially those related to onshore oil and gas processing facilities, are tied to other sources of oil and gas (state waters, onshore sources, imported product) in addition to the OCS.

In response to the comments, BOEM expanded the description of the affected environment to include discussion of existing stressors and burdens on vulnerable coastal communities. BOEM understands that vulnerable communities, including environmental justice populations, in the GOM Region have long experienced environmental and health impacts of oil and gas and petrochemical facilities; BOEM added language to the Final Programmatic EIS to describe these existing conditions more fully.

In alignment with the assessment of impacts on most other resources in the Final Programmatic EIS, impacts on vulnerable coastal communities, including populations with environmental justice concerns, are described qualitatively to identify the types of impacts that could occur if oil and gas activities occur as a result of the 2024–2029 Program. The level of analysis in the Final Programmatic EIS is in compliance with CEQ guidance on programmatic reviews (Boots 2014) and is at an appropriate level of detail for the decision at hand. The analysis is at a national level, and the affected environment, including human communities, are described broadly. If a decision is made to move forward with any of the lease sales in the PFP, additional regional and local level analysis would occur at subsequent NEPA stages when specific information becomes available on the location and level of activity to provide more detailed discussion, opportunities for engagement, and consultation with federally recognized Tribes.

[452] Natural Resources Defense Council; Southern Environmental Law Center; Center for Biological Diversity; Earthjustice et al.; The Rachel Carson Council (Form Letter Master); Center for Biological Diversity; Ocean Conservancy; Florida Offshore Drilling Coalition et al. (Form Letter Master); Surfrider Foundation

[453] Glass Half Full; Southern Environmental Law Center; Coastal Coordination Program, The Ocean Foundation

Section 28.3.26 – Recreation and Tourism

Summary of Comments

Approximately 45 submissions provided comments regarding recreation and tourism in the GOM.

Several commenters, including a form letter campaign, described the importance of recreation and tourism to the economies of Gulf Coast states, including locations such as Dauphin Island, and said that these industries are at risk of impacts from additional leasing in the GOM.[454] A commenter said that the LWCF allocates funds from domestic oil and gas production to the outdoor recreation economy.[455]

Several commenters said that the *Deepwater Horizon* oil spill greatly affected recreation and tourism across the Gulf Coast.[456]

Source of Comments

- *Non-energy Exploration & Production Industry and Associations*
- *Governors and State Agencies*
- *Public Interest Groups*
- *Local Governments*
- *Energy Exploration & Production Industry and Associations*

Response to Comments

Impacts on recreation and tourism are discussed throughout the Final Programmatic EIS under **R.15 RECREATION & TOURISM** at a level of detail appropriate for a national-level, programmatic assessment. Section 7.2.1 of the PFP also provides information on the role of recreation and tourism in the economies of Gulf Coast states. The PFP also provides information on how revenues from OCS oil and gas activities support the LWCF. Additional region-specific assessment of the affected environment and potential impacts on recreation and tourism would be conducted prior to any lease sales scheduled in the National OCS Program. BOEM welcomes input on areas and activities important for recreation and tourism in the GOM Region.

Impacts of small and large oil spills also would be assessed at a regional level and would include information on key coastal recreation and tourism resources. The Final Programmatic EIS does not analyze CDEs, such as the *Deepwater Horizon* oil spill, because of the low probability of occurrence and the many factors that determine severity of potential impacts, which are not known at the programmatic stage. For further analysis of the impacts of a low-probability CDE, see the *Gulf of Mexico Catastrophic Spill Event Analysis* (BOEM 2021), *Beaufort Sea: Hypothetical Very Large Oil Spill And Gas Release* (BOEM 2020), and the PFP.

[454] Southern Environmental Law Center; Turtle Island Restoration Network; Sea Turtle Conservancy; Florida Offshore Drilling Coalition et al. (Form Letter Master); Surfrider Foundation; Oceana; National Parks Conservation Association
[455] Village of Cimarron
[456] Ship Island Excursions; Florida Department of Environmental Protection; Oceana; Southern Environmental Law Center

Section 28.3.27 – Employment and Income

Summary of Comments

Three submissions provided comments regarding employment and income in the GOM.

A commenter said that as many as 9,000 jobs were lost in the first 8 months following the *Deepwater Horizon* oil spill.[457] Another commenter said that the *Deepwater Horizon* spill has caused long-term damage to local farmers' and fishermen's income.[458]

A commenter said they were lucky to have started their ecotourism business after the *Deepwater Horizon* oil spill, because many other businesses suffered greatly and took many years to rebuild their businesses after the spill.[459]

Source of Comments

- *General Public*
- *Local Governments*

Response to Comments

BOEM recognizes the *Deepwater Horizon* spill had significant impacts on the economy of Gulf Coast states, including impacts on employment and income. The Final Programmatic EIS does not analyze CDEs, such as the *Deepwater Horizon* oil spill, because of the low probability of occurrence and the many factors that determine severity of potential impacts, which are not known at the programmatic stage. For further analysis of the impacts of a low-probability CDE, see the *Gulf of Mexico Catastrophic Spill Event Analysis* (BOEM 2021), *Beaufort Sea: Hypothetical Very Large Oil Spill And Gas Release* (BOEM 2020), and the PFP.

Section 28.3.28 – Oil Spills and CDEs

Summary of Comments

Approximately 2,520 submissions provided comments regarding oil spills and CDEs in the GOM.

A commenter said that this section is very general and needs to be revised as follows:

- More information on oil spill response in Appendix G.
- More information on how many oil spills have occurred in the areas where lease sales may be held, and of the challenges of working in remote areas such as Alaska.
- Appendix H citation lists several regulations and EOs, but none relate to oil spills.
- Add "toxicity" to the list of "density, viscosity, and volatility" to line 4 in the text box.

[457] M. Martin
[458] J. Brahier
[459] D. Holcomb

- Add "For satellite-based reports of oil in the marine environment, see NOAA's Office of Satellite Product and Operations web page (www.ospo.noaa.gov/Products/ocean/marinepollution/)" to line 6 after the text box.[460]

Several commenters, including a form letter campaign, commented generally that new oil and gas leases contribute to risks to human health and the environment due to the risks from oil spills and other discharge events, including from spills caused by hurricanes and other severe weather events.[461]

Multiple commenters said that oil spills and routine discharges impact water quality and can impact the fishing and tourism industries in the Gulf.[462]

Several commenters said that, while the *Deepwater Horizon* oil spill was large, it was not a unique occurrence, as there are smaller oil spills and discharges all the time.[463] Another commenter said that oil spills continue to occur despite the safeguards and improvements that have been made since the *Deepwater Horizon* oil spill.[464]

A commenter argued that BOEM's analysis fails to consider the impacts from routine discharges from offshore oil and gas drilling. The commenter further expressed concern that many of the chemicals used in offshore activities are undisclosed and often considered proprietary, so their true effects are unknown to the public. The commenter also said that BOEM fails to consider the costs of a catastrophic spill or leak and stated that uncertainty around the cost is not a justification for failing to include the analysis.[465] A form letter campaign said that oil spills cost American taxpayers millions of dollars.[466]

Many commenters described the various human health and environmental impacts that occurred as a result of the *Deepwater Horizon* oil spill. A few commenters said that the spill covered tens of thousands of square miles of the ocean surface and reached over a thousand miles of shoreline.[467] Some commenters, including a form letter campaign, described the various effects of oil spills on birds,[468] sea turtles,[469] marine mammals,[470] and other marine species,[471] in addition to humans working on spill cleanups or living near spill and discharge locations.[472]

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[460] NOAA NMFS
[461] Turtle Island Restoration Network; Steps Coalition, Gulfport MS; Stone County MS NAACP; Biloxi MS NAACP; Mississippi State Conference NAACP Environmental and Climate Justice Committee; Center for Biological Diversity; The Rachel Carson Council (Form Letter Master)
[462] Rethink Energy Florida; Ship Island Excursions; Florida Department of Environmental Protection; Boat People SOS Biloxi, MS; San Antonio Bay Estuarine Waterkeeper; Oceana
[463] L. Metzger; Natural Resources Defense Council; Southern Environmental Law Center; Earthjustice, et al.
[464] D. Holcomb
[465] Center for Biological Diversity
[466] Healthy Gulf (Form Letter Master)
[467] Southern Environmental Law Center; Oceana; Natural Resources Defense Council
[468] Southern Environmental Law Center; Oceana; Natural Resources Defense Council
[469] Oceana; Center for Biological Diversity; Sea Turtle Conservancy; Florida Offshore Drilling Coalition et al. (Form Letter Master); Natural Resources Defense Council
[470] Southern Environmental Law Center; Oceana; Center for Biological Diversity; Florida Offshore Drilling Coalition et al. (Form Letter Master)
[471] Oceana; Center for Biological Diversity; Florida Offshore Drilling Coalition et al. (Form Letter Master)
[472] Southern Environmental Law Center; Rethink Energy Florida; Boat People SOS Biloxi, MS; North Gulfport Community Land

Source of Comments

- *Public Interest Groups*
- *General Public*
- *Non-energy Exploration & Production Industry and Associations*
- *Governors and State Agencies*
- *Federal Agencies*

Response to Comments

Oil Spill Response/Appendix G: Appendix G provides an assessment of historical data for large (> 1,000 bbl) and small oil spills (< 1,000 bbl) and BOEM's estimates for the occurrence of offshore oil spills (small and large) using estimated oil production for each planning area. **Appendix G** discusses oil spill response and describes the responsibilities of BSEE in addressing offshore oil spill prevention, planning, preparedness, and response. **Section 4.6** provides examples of impacts from oil spills and oil spill response activities.

Oil Spill Data for Planning Areas (Alaska, Pacific, GOM, Atlantic): Discussion of accidental spills in the Final Programmatic EIS focuses on event frequency and associated impacts, all within a programmatic context. BOEM uses historical oil spill data and the volume of annual oil production from 1974 to 2015 to estimate the number of future oil spills (ABS Consulting Inc 2016). Spill rates at the planning area level for pipelines and platforms are presented in **Table G-1**.

Alaska Operating Conditions: The level of analysis in the Final Programmatic EIS is in compliance with recent CEQ guidance on programmatic reviews (Boots 2014) and is at an appropriate level of detail for the decision at hand. It is not within the scope of the Final Programmatic EIS to analyze oil spill response in detail, including specific oil spill response measures and location specific response challenges. If a decision is made to move forward with any of the proposed lease sales in the PFP, additional reviews would take place that are more site specific, and oil spill response measures and challenges would be described in greater detail. More information regarding challenges to responding to oil spills in Alaska and Arctic environments can be found in *Responding to Oil Spills in the US Arctic Marine Environment* - (National Research Council 2014).

Appendix H: Appendix H identifies Federal laws, EOs, and Secretary's Orders that are applicable to BOEM, including laws and orders relevant to implementation of the National OCS Program and preparation of NEPA documentation. Laws and regulations applicable to lessees operating in planning areas are not identified in **Appendix H**. **Appendix H** refences the *OCS Regulatory Framework* (Cameron Jr. and Matthews 2016), which includes laws and EOs informing and guiding the development of the Final Programmatic EIS and regulating BOEM-authorized activities on the OCS. Example regulations include the Comprehensive Environmental Response, Compensation and Liability Act of 1980, which gave the USDOI the authority to develop regulations and procedures for the assessment of damages for natural resource injuries resulting from oil spills, and the Oil Pollution Act of 1990, which includes provisions to improve oil spill prevention, preparedness, and response; establish limitations on liability

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for damages resulting from oil pollution; and implement a fund for the payment of compensation for such damages. Lessees are subject to laws and regulations regarding safe operation of platforms and pipelines and regarding spill prevention, control, response, and mitigation. Lessees proposing to operate platforms or pipelines in OCS planning areas are required to prepare an Oil Spill Response Plan (OSRP) under 30 CFR 254 Subpart B: *Oil-Spill Response Plans for Outer Continental Shelf Facilities.* The OSRP would be submitted by the lessee to BSEE for review as part of the lessee's plan for proposed offshore activities, and approval is required before the operator is permitted to commence operations. Under 30 CFR 254, the lessee's OSRP must demonstrate that the operator can respond quickly and effectively whenever oil is discharged from the operator's facility. Operators are required to maintain a current OSRP for an abandoned offshore facility until the operator physically removes or dismantles the facility or until the Chief, Oil Spill Preparedness Division, notifies the operator in writing that an OSRP is no longer required.

Text Box/Section 4.6: The text box has been edited as follows:

> Oil spills can occur at the surface, in the water column, or at the seafloor, and can comprise both liquid oil and natural gas. Crude oil is a complex mixture of thousands of chemical compounds that result in different oil types having different properties, including density, viscosity, toxicity, and volatility. This variability could lead to differences in how spilled oil would react in the environment and differences in impacts.

For satellite-based reports of oil in the marine environment, see NOAA's Office of Satellite Product and Operations webpage at www.ospo.noaa.gov/Products/ocean/marinepollution/.

Routine Discharges: BOEM considers routine discharges from offshore oil and gas drilling as an IPF in the Final Programmatic EIS. Types of routine discharges from offshore operations are identified as an IPF in **Table 2-11** in **Section 2.4.3**. Routine discharges identified under Routine Discharges (I.3) include produced water; sanitary waste and gray water; well completion and enhanced recovery fluids; drilling muds and cuttings; and miscellaneous discharges from facilities and vessels. Impacts from routine discharges are discussed throughout **Chapter 4**. All discharges of pollutants, including proprietary chemicals by an offshore operator, are regulated by NPDES and must be disposed of according to NPDES requirements.

The level of analysis in this Final Programmatic EIS is in compliance with recent CEQ guidance on programmatic reviews (Boots 2014) and is at an appropriate level of detail for the decision at hand. The analysis is at a national level, and potential impacts from routine discharges are described broadly. If a decision is made to move forward with any of the proposed lease sales in the PFP, additional reviews would take place that are more site specific, and the potential impacts would be described in greater detail.

Consideration of Cost of Oil Spills: See **Section 28.1.32** comment response under *OECM.*

***Deepwater Horizon* Oil Spill:** See **Section 28.1.32** comment response under *Deepwater Horizon Oil Spill.*

Section 28.3.29 – Cross-Boundary Impacts

Summary of Comments

Four submissions provided comments regarding cross-boundary impacts in the GOM.

A commenter said that oil and gas activities impact America's neighbors in the GOM—including Mexico, Central America, and Cuba—through ocean currents.[473]

A few commenters commented that the effects of oil spills are wide ranging and difficult to quantify.[474]

A commenter said that grants funded by offshore oil and gas revenue support communities all over the country in building and repairing parks, among other projects.[475]

Source of Comments

- *Public Interest Groups*
- *General Public*
- *Energy Exploration & Production Industry and Associations*

Response to Comments

Section 4.6 discussions the potential consequences of oil spills. Spill rates are calculated using spill data and the volume of annual oil production from 1974 to 2015 and are provided in **Tables G-1 and G-2**. BOEM estimated a median large (≥ 1,000 bbl) platform spill event of 3,283 bbl and median large pipeline spill event of 3,750 bbl based on historical data and estimated that, in the Western, Central, and Eastern GOM Planning Areas, 0–2 large platform spill events and 0–7 large pipeline spill events could occur from the 2024–2029 Program. **Figure 4-9** identifies potentially affected planning areas, including planning areas that are farther away from areas of activity but could still be affected by cross-boundary impacts.

It is difficult to predict possible impacts from an accidental event in further detail at the programmatic level because the specific activities that would be conducted are not yet fully defined. More information would be known at the lease sale stage about the timing and location of proposed activities, spill risk from those activities, and specific environmental resources that could be affected. BOEM's oil spill risk analysis modeling would be conducted at the lease stage to estimate spill risk, spill trajectories, and probability of contact with an environmental resource for specific proposed activities. The analysis also would identify impacts (if any) to planning areas further away from the specific proposed GOM activities. BOEM would use the modeling results to determine potential risk to specific environmental resources and how to further mitigate risk.

BOEM acknowledges that grants funded by offshore oil and gas revenue support building and repairing parks, among other projects in local communities, and that these funds represent a beneficial cross border impact.

[473] B. Albrecht
[474] Environment America; Natural Resources Defense Council
[475] Hess Corporation

Section 28.3.30 – Cumulative Impacts (Effects)

Summary of Comments

Four submissions provided comments regarding cumulative impacts in the GOM.

Several commenters argued that BOEM failed to consider the cumulative impacts of additional oil and gas leases, and particularly the risk of additional oil spills, in the GOM.[476] Another commenter also said that the Draft Programmatic EIS failed to consider the cumulative impacts of offshore wind development.[477]

Source of Comments

- *Tribes and Tribal Organizations*
- *Public Interest Groups*

Response to Comments

Cumulative Impacts – Risk of Additional Oil Spills: The cumulative effects analysis in **Section 4.3** does not include an analysis of accidental oil spills. Accidental oil spills are non-routine events—with uncertain frequency and size—that may occur through activities under the 2024–2029 Program or otherwise, including from existing oil and gas activities in the GOM OCS or from oil and gas activities in state submerged lands in the GOM. Assessing the impact of accidental spills could mask the clear description and subsequent understanding of the incremental contribution of other OCS and non-OCS routine activities this cumulative analysis seeks to provide. BOEM understands that accidental oil spills are of concern, and therefore has provided a discussion of potential impacts of oil spills from 2024–2029 Program activities in **Section 4.6**.

Cumulative Impacts of Offshore Wind Development: BOEM assessed cumulative impacts of offshore wind development and ongoing and planned actions in environmental assessments for offshore lease areas for the Atlantic and Pacific planning areas and is preparing an environmental assessment for proposed lease sales in the GOM that will assess cumulative impacts (see e.g., *Commercial and Research Wind Lease and Grant Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf of the New York Bight*[478] and *Commercial Wind Lease and Grant Issuance and Site Assessment Activities on the Pacific Outer Continental Shelf Humboldt Wind Energy Area, California*.)[479] Stressors associated with potential offshore oil and gas development would be similar to stressors associated with offshore wind development, including **R.2 WATER QUALITY**, **R.6 FISH**, **R.7 BIRDS**, **R.8 SEA TURTLES**, **R.9 MARINE MAMMALS**, **R.10 COMMERCIAL & RECREATIONAL FISHERIES**, **R.14 VULNERABLE COASTAL COMMUNITIES**, and **R.15 RECREATION & TOURISM**. BOEM considers the development of offshore wind as a component of the baseline from which the cumulative effects of the Program are assessed.

[476] Carrizo Comecrudo Tribe of Texas; Natural Resources Defense Council; Center for Biological Diversity; Surfrider Foundation
[477] Natural Resources Defense Council
[478] https://www.boem.gov/sites/default/files/documents//NYBightFinalEA_BOEM_2021-073.pdf
[479] https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/Humboldt-EA.pdf

Section 28.3.31 - ESA

Summary of Comments

Five submissions provided comments regarding the ESA in the GOM.

A couple commenters noted that the GOM is critical habitat for many endangered species, and the impacts to these species need to be included in the analysis.[480]

One commenter discussed the ESA in general, asserting that expanding oil and gas development in the GOM would "take" multiple endangered species and have adverse effects on critical habitat in that area.[481] The commenter provided detail about certain species protected under the ESA in the GOM that may be in particular danger in the event of oil and gas leasing, including the following:

- Rice's whale (see **Section 28.3.19 – Marine Mammals** for more specific information)
- Loggerhead sea turtle (see **Section 28.3.18 – Sea Turtles** for more specific information)
- Kemp's ridley sea turtle
- Hawksbill sea turtle
- Leatherback sea turtle
- Green sea turtle
- Bottlenose, Atlantic spotted, and Risso's dolphins

The commenter also discussed Section 7 of the ESA, which requires Federal agencies to ensure that any actions they take do not jeopardize listed species or modify critical habitat and that they engage in consultation with "the Services" when their action might affect species or their critical habitat. The commenter asserted that BOEM's Proposed Program triggers the need for this consultation and added that BOEM should have developed a Biological Assessment and solicited comments on it in conjunction with the Draft Programmatic EIS.

Source of Comments

- *Public Interest Groups*
- *Federal Agencies*

Response to Comments

The level of analysis in this Final Programmatic EIS is in compliance with recent CEQ guidance on programmatic reviews (Boots 2014) and is at an appropriate level of detail for the decision at hand. The analysis is at a national level, broadly describing the regions and discussing potential impacts to regions within them. If a decision is made to move forward with any of the proposed lease sales in the PFP, additional reviews and appropriate consultations would take place with all relevant agencies, and the potential impacts would be described in greater detail. The additional reviews and consultations would

[480] Oceana; NOAA NMFS; National Parks Conservation Association; Natural Resources Defense Council
[481] J. White & C. Fouts & H. Hyde

consider all threatened and endangered species and critical habitat within the Proposed Action area being evaluated. As previously noted in **Section 28.1.35**, the court of jurisdiction for the National OCS Program has held this action does not require ESA consultation.

Section 28.3.32 – MMPA

No substantive comments are associated with this issue.

Section 28.3.33 – Proposed Action

No substantive comments are associated with this issue.

Section 28.3.34 - Miscellaneous

Summary of Comments

Three submissions provided miscellaneous comments regarding the GOM.

A few commenters commented that several studies performed after the *Deepwater Horizon* oil spill found significant human health impacts to oil spill responders, including dermal conditions and chronic respiratory conditions.[482]

A commenter said that oil and gas activities in the GOM threatens the Nation's ability to increase electricity generation from offshore wind resources.[483]

Source of Comments

- *Public Interest Groups*
- *General Public*

Response to Comments

***Deepwater Horizon* Oil Spill:** See **Section 28.1.32**.

Offshore Wind: This Final Programmatic EIS identifies ocean-based renewable energy as a stressor under Renewable Energy (A.9) and also identifies under R.12 **LAND USE** that bottom/land disturbance from OCS oil and gas activities could impact the growing offshore wind energy. BOEM recognizes that space-use conflicts between renewable energy activities and the placement of OCS oil and gas infrastructure could occur. With an emerging renewable energy program in the GOM, complexities will arise about whether the infrastructure can coexist. There could be incompatibility between the renewable energy and OCS oil and gas infrastructure in the same area. BOEM is currently studying whether these areas are compatible and is working on guidance for the distancing of OCS oil and gas infrastructure from renewable energy projects.

[482] Natural Resources Defense Council; J. Nixon
[483] Southern Environmental Law Center

GOM OCS Oil and Gas Leasing Impacts on Developing Offshore Wind: Although it seems intuitive that oil and gas compete with offshore wind for acreage, this has been shown to be neither a practical nor regulatory constraint on offshore wind to this point. Rather, the IRA requires that, as conditions for issuing any "lease for offshore wind development," the Department hold "an offshore [oil and gas] lease sale during the 1-year period ending on the date of the issuance of the lease for offshore wind development," and "the sum total of acres offered for lease in offshore [oil and gas] lease sales during the 1-year period ending on the date of the issuance of the lease for offshore wind development is not less than 60,000,000 acres" (IRA, Section 50265(b)(2)). In general, therefore, the IRA predicates continued OCS offshore wind leasing on a particular rate of OCS oil and gas leasing. Thus, the IRA reflects Congress's view that continued OCS oil and gas leasing over the next 10 years is not an impediment to OCS renewable energy leasing over the same period.

Appendix L: Glossary

This glossary provides the following definitions to explain how these terms are used in this specific document. The definitions of some terms may differ slightly from their commonly used definitions.

acoustic masking – occurs when the perception of one sound is obscured by the presence of another sound.

affected environment – areas and resources potentially impacted by the National Outer Continental Shelf Oil and Gas Leasing Program.

air pollutants – contaminants in the ambient air; may affect human health, crops and other vegetation, animals, man-made materials (such as buildings), and visibility.

air quality – condition of the ambient air.

anadromous fish – fish born in freshwater who spend most of their lives in saltwater and return to freshwater to spawn.

anthropogenic – coming from human sources; relating to the effect of man on nature.

archaeological interest – resource with the potential to provide understanding of past human behavior, cultural adaptation, or related topics.

archaeological resource – as defined in 30 CFR § 550.105 is material remains of human life or activities that are at least 50 years of age and of archaeological interest. In the marine environment, this term often refers to shipwrecks or submerged pre-contact period sites, as well as onshore historic resources. Archaeological resources are deemed significant when they meet the criteria of significance for eligibility for listing on the *National Register of Historic Places* as defined in 36 CFR 60.4.

attainment area – area classified by the U.S. Environmental Protection Agency as meeting the primary and secondary ambient air quality standards.

baleen whales – group of filter-feeding whales that use baleen plates in their mouth to prey on their small planktonic food (e.g., krill, forage fish, copepods).

barrel – standard unit of measure in the oil industry, equal to 42 U.S. gallons (159 liters).

benthic – bottom dwelling; associated with (in or on) the seafloor.

benthic environment – interface between water column and seafloor; does not include seafloor areas within the coastal environment.

benthos – organisms that dwell near, on, or in the seafloor.

birds – refers to the birds that spend at least part of their lives near the ocean, including species that live entirely at sea, migrate over parts of the sea, or live in coastal areas.

bivalves – general term for two-shelled mollusks (e.g., clams, oysters, scallops, mussels).

canyon – steep-sided valley cut into the seabed. Most marine canyons are on the edge of the continental slope and extend into the continental shelf.

cetacean – animals of the order Cetacea; includes whales, dolphins, and porpoises.

chemosynthetic communities – deepwater benthic communities that rely upon oxidation of various inorganic compounds rather than photosynthesis for primary production. These communities establish around natural oil and gas seeps and hydrothermal vents.

coastal and estuarine ecosystems – flora and fauna of areas at the land and ocean interface adjacent to the Outer Continental Shelf; does not include fish, sea turtles, birds, or marine mammals.

coastal environment – interface between land and sea, loosely bounded by the portions of the land and sea that are influenced by their proximity to each other.

coastal wetlands – area exposed to coastal waters, including forested and nonforested habitats, mangroves, and marsh islands. Forested wetlands include hardwood hammocks, cypress, tupelo, gum swamps, and fluvial vegetation or bottomland hardwoods. Nonforested wetlands include fresh, brackish, and salt marshes.

coastal zone – state land and water area officially designated in a state coastal zone program and approved by the U.S. Department of Commerce under the Coastal Zone Management Act; includes islands, transitional and intertidal areas, salt marshes, wetlands, and beaches. Excludes areas managed by the Federal Government.

commercial and recreational fisheries – people and industries that rely on harvesting fish or shellfish for their livelihood (commercial) or enjoyment (recreational).

continental margin – shallow-water area adjacent to a land mass. The continental margin contains the continental rise, continental slope, and continental shelf.

continental shelf (or shelf) – broad, gently sloping, shallow feature extending from the shore to the continental slope, generally considered to exist to the depth of 656 ft (200 m); see *Outer Continental Shelf* for the jurisdictional definition.

continental slope (or slope) – relatively steep, narrow feature paralleling the continental shelf; region in which the steepest descent to the ocean bottom occurs.

contingency plan – plan for possible offshore emergencies prepared and submitted by an oil or gas operator as part of the plan of development and production; also, may be required for part of the plan of exploration.

criteria pollutant – any one of the six pollutants for which the U.S. Environmental Protection Agency has developed National Ambient Air Quality Standards under the Clean Air Act.

critical habitat – designated area under the Endangered Species Act as essential to the conservation of an endangered or threatened species and that may require special management considerations or protection.

crude oil – petroleum in its natural state as it emerges from a well or after it passes through a gas-oil separator, but before refining or distillation.

crustaceans – aquatic invertebrates with jointed legs, such as crabs, shrimp, lobster, barnacles, amphipods, and isopods.

culture – socialized pattern of human behavior and understanding, which can help define a "sense of place." Culture comprises population, major industries and exports, terrain, and ways of life closely tied to lands, waters, and natural resources, because these cultural aspects could be impacted by offshore oil and gas activities.

current conditions – present environmental conditions and trends resulting from past and present actions that may be affected by the Proposed Action or alternatives; includes national- and regional-level resources and trends.

deferral – action taken by the Secretary of the Interior at the time of the area identification to postpone all or certain areas from a lease sale.

development – activities conducted to produce minerals following discovery of minerals in paying quantities; includes geophysical activity, drilling, platform construction, and operation of onshore support facilities.

development and production plan – plan describing the specific work to be performed on an offshore lease, including all development and production activities that the lessee proposes to undertake during the time period covered by the plan up to and including the start of production; includes descriptions of facilities and operations to be used, well locations, current geological and geophysical information, environmental safeguards, safety standards and features, time schedules, and other relevant information. All lease operators are required to submit these plans to and obtain approval from the Bureau of Ocean Energy Management before development and production activities may begin; see requirements in 30 CFR 550.241–285. In the western Gulf of Mexico (areas on the Outer Continental Shelf in the Gulf of Mexico west of 87°30'W longitude), this plan is referred to as a Development Operations Coordination Document.

discharge – liquid, gas, or other substance that flows out from where it has been confined. Flow rate of a fluid at a given instant is expressed as volume per unit of time.

dispersion – distribution of finely divided particles in a medium.

distinct population segment (DPS) – smallest division of a taxonomic species permitted to be protected under the Endangered Species Act.

drilling mud – special mixture of clay, water or refined oil, and chemical additives pumped downhole through the drill pipe and drill bit. The mud cools the rapidly rotating bit, lubricates the drill pipe as it turns in the wellbore, carries rock cuttings to the surface, serves to keep the hole from crumbling or collapsing, and provides the weight or hydrostatic head to prevent extraneous fluids from entering the wellbore and to control downhole pressures that may be encountered; also called drilling fluid.

drillship – self-propelled, self-contained vessel equipped with a derrick amidships for drilling wells in deep water.

economically recoverable reserves – portion of the identified oil or gas resources that can be extracted under current technological constraints.

ecoregion – areas differentiated by species composition and oceanographic features, such as bathymetry, hydrography, productivity, and trophic relationships.

eddy – swirling movement of water, counter to the main current, which causes a whirlpool-like motion. In the ocean, eddies often form at the edges of currents.

effluent – liquid waste of sewage and industrial processing.

El Niño-Southern Oscillation (ENSO) – irregular large-scale meteorological event that leads to changes in atmospheric and oceanic temperature and circulation, primarily affecting the tropics and subtropics, particularly around the Pacific Ocean.

endangered or threatened species – any species that is in danger of extinction throughout all or a significant portion of its range and has been officially listed by the appropriate Federal agency. A species is determined to be endangered (or threatened) under the Endangered Species Act based on any of the following factors: (1) present or threatened destruction, modification, or curtailment of its habitat or range; (2) over-utilization for commercial, sporting, scientific, or educational purposes; (3) disease or predation; (4) inadequacy of existing regulatory mechanisms; or (5) other natural or man-made factors affecting its continued existence.

environmental assessment – concise public document required by the National Environmental Policy Act. In the document, a Federal agency proposing (or reviewing) an action provides evidence and analysis for determining whether it must prepare an environmental impact statement, which it must unless it finds there is no significant impact (i.e., Finding of No Significant Impact).

environmental impact (or **effect**) – measurable alteration or change in environmental conditions.

environmental impact statement (EIS) – statement required by the National Environmental Policy Act for a proposed major action significantly affecting the human environment.

essential fish habitat (EFH) – waters and substrate designated under the Magnuson-Stevens Fishery Conservation and Management Act as necessary to fish for spawning, breeding, feeding, or growth to maturity. Includes areas that are currently or historically used by fish, or that have substrate such as sediment, hard bottom, bottom structures, or associated biological communities required to support a sustainable fishery.

estuary – semi-enclosed coastal body of water that has a free connection with the open sea and within which seawater mixes with freshwater.

ethnographic – relating to the scientific description of cultures.

eutrophication – enrichment of water by excess nutrients, frequently due to runoff, which usually leads to excessive algae growth. This process also can lead to low oxygen levels in the water.

exclusion – action taken by the Secretary of the Interior to remove certain areas or blocks from inclusion within any lease sale scheduled in a national program.

Exclusive Economic Zone (EEZ) – maritime region adjacent to the territorial sea, extending 200 nmi (370 km) from the baseline of the territorial sea, in which the U.S. has exclusive rights and jurisdiction over living and nonliving natural resources.

exploration – process of searching for minerals. Exploration activities include (1) geophysical surveys where magnetic, gravity, seismic, or other systems are used to detect or infer the presence of such minerals; and (2) any drilling, except development drilling, whether on or off known geological structures. Exploration also includes the drilling of a well in which a discovery of oil or natural gas in paying quantities is made, and the drilling, after such a discovery, of any additional well that is needed to delineate a reservoir and enable the lessee to determine whether to proceed with development and production.

exploration plan (EP) – plan submitted by a lessee (30 CFR 550.211–235) that identifies all the potential hydrocarbon accumulations and wells that the lessee proposes to drill to evaluate the accumulations within the lease or unit area covered by the plan. All lease operators are required to obtain approval of such a plan by a BOEM Regional Supervisor before exploration activities may commence.

exploratory well – well drilled in unproven or semi-proven territory for the purpose of ascertaining the presence of a commercially producible deposit of petroleum or natural gas.

fault – fracture between two zones of rocks.

fauna – animals of a particular region, habitat, or geological period.

fish – animals that live in water (whether fresh or saltwater) and use gills to breathe.

fixed or bottom founded – permanently or temporarily attached to the seafloor.

flyway – established air route of migratory birds.

formation – a rock bed or deposit sufficiently homogeneous to be distinctive as a unit. Each different formation is given a name, frequently as a result of the study of the formation outcrop at the surface and sometimes based on fossils found in the formation.

front – boundary between two water masses that move in different directions.

frontier – areas with oil and gas resource potential that is highly uncertain or considerably lower than *mature* or *intermediate* areas, limited infrastructure in place, and highly uncertain leasing patterns.

future baseline conditions – condition of the affected environment over the next 40 to 70 years resulting from ongoing and future stressors, independent of 2024–2029 Program activities; includes consideration of how the current conditions are expected to change over time.

geologic hazard – feature or condition that, if unmitigated, may seriously jeopardize offshore oil and gas exploration and development activities. Mitigation may necessitate special engineering procedures or relocation of a well.

geologic play – group of pools that share a common history of hydrocarbon generation, migration, reservoir development, and entrapment.

geophysical – of or relating to the physics of the Earth, especially the measurement and interpretation of geophysical properties of the rocks in an area.

geophysical data – facts, statistics, or samples that have not been analyzed or processed, pertaining to gravity, magnetic, seismic, or other surveys or systems.

geophysical survey – exploration of an area during which geophysical properties and relationships unique to the area are measured by one or more geophysical methods.

gyre – large system of circulating ocean currents.

habitat – specific place that is occupied by an organism, a population, or a community based on that place's physical or biological components.

Habitat Area of Particular Concern (HAPC) – type of essential fish habitat designated in areas that are high priority for conservation because of their importance to ecosystem function.

harassment – term used in the definitions of "take" in the Endangered Species Act and Marine Mammal Protection Act; generally meaning to injure or disturb.

haul-out area or **haulout** – specific locations where pinnipeds come ashore or on ice and concentrate in numbers to rest, breed, and bear young.

herbivore – animal whose diet consists of plant material.

highly migratory species – marine fishes that travel long distances and often cross domestic and international boundaries; includes species of tunas, sharks, swordfish, and billfish.

human environment – areas in which people reside, their cultures, and the ways in which they interact with the physical and biological environment.

hydrocarbon – any of a large class of organic compounds containing primarily carbon and hydrogen; comprising paraffins, olefins, members of the acetylene series, alicyclic hydrocarbons, and aromatic hydrocarbons; and occurring, in many cases, in petroleum, natural gas, coal, and bitumens.

hypoxia – depressed levels of dissolved oxygen in water, usually resulting in decreased metabolism.

ichthyoplankton – free-floating eggs and larvae of fish.

impact-producing factor (IPF) – activity or process that could cause impacts on environmental or socioeconomic resources.

Important Bird Areas – areas identified using an internationally agreed set of criteria as being globally important for the conservation of bird populations.

incidental take – take of an Endangered Species Act-listed fish or wildlife species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted or authorized by a Federal agency or applicant (see *take*).

indirect effects – effects caused by activities that are stimulated by an action but are not directly related to the action.

information to lessees – information included in the Notice of Sale to alert lessees and operators of special concerns in or near a lease sale area or regulatory provisions enforceable by Federal or state agencies.

infrastructure – man-made structures and public works that facilitate industrial growth in the onshore, nearshore, and offshore environments (e.g., roads, ports, platforms).

intermediate – areas with oil and gas resource potential, but variations in existing infrastructure, leasing patterns, and operational barriers, such as water depth.

isobath – line on a map or imaginary line connecting all points having the same depth below the water's surface.

jack-up rig – barge-like floating platform with legs at each corner that can be lowered to the sea bottom to raise the platform above the water; a drilling platform with retractable legs that can be lowered to the sea bottom to raise the platform above the water.

land use – how communities use natural resources and infrastructure in their region.

landfall – site at which a marine pipeline comes to shore.

lithotope – area or surface of uniform sediment, sedimentation, or sedimentary environment, including associated organisms.

low frequency – acoustic waves with longer wavelengths or lower pitch; in this document, low frequency describes sounds with energy < 1 kHz (**Appendix B**).

macroalgae – multicellular algae, i.e., algae that can be seen with the naked eye (unlike phytoplankton).

macrofauna – invertebrates (at least 0.4 in [1 cm] in size) that live in or on the sediment or attached to hard surfaces; key components of marine benthic ecosystems.

macroinvertebrate – animals such as worms, clams, or crabs that are large enough to be seen without the aid of a microscope.

marine mammal – mammals that spend all or part of their lives in the ocean, including semi-aquatic mammals (such as seals, sea lions, walrus, sea otters, and polar bears) and fully aquatic mammals (such as manatees, baleen whales, and toothed whales).

marine sanctuary – area protected under the Marine Protection, Research, and Sanctuaries Act of 1972.

marshes – persistent, emergent, nonforested wetlands characterized by vegetation consisting predominantly of cordgrasses and rushes.

mature – areas with high potential for oil and gas resource development, access to existing infrastructure, and existing leases or established patterns of leasing.

minerals – mineral resources such as sand and aggregates, phosphates, manganese nodules, cobalt crusts, metal sulfides, and other marine mineral resources not including oil and gas that are found on the Outer Continental Shelf.

minority population – a readily identifiable group of people living in geographic proximity that has a population that is 50% minority or greater. The USEPA (2021b) defines "minority population," according to the U.S. Census Bureau, as a population of people who are not single-race white and not Hispanic. This definition includes populations of individuals who identify on the U.S. Census as American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. A minority population may be made up of one minority or a number of different minority groups, when together the sum is 50% or more. A minority population also may be an identifiable group that has a meaningfully greater minority population than the adjacent geographic areas, or may be a geographically dispersed or transient set of individuals, such as migrant workers or Native American and Alaska Native peoples. In the context of Executive Order 12898, the term *minority* is used to identify populations whose members have been regularly excluded from important decision-making processes in ways that create a disproportionate distribution of environmental amenities and burdens, including health impacts. BOEM uses the term in that context, while recognizing that it is becoming increasingly inaccurate from a

demographic perspective and hides significant differences within groups of people and their experiences.

mitigation – actions, practices or rules that are used to reduce or eliminate environmental impacts on resources; including, but not limited to, government laws or statutes, regulatory restrictions, or best practices.

mixed layer – layer of the ocean in which active turbulence has mixed the water sufficiently so that it has relatively homogenous properties.

mollusks – animal phylum characterized by soft body parts; includes clams, mussels, snails, squid, and octopus.

natural gas – hydrocarbons that are in a gaseous state at standard atmospheric temperature and pressure.

nearshore waters – offshore open waters that extend from the shoreline out to the limit of the territorial sea (12 nmi [22 km]).

nonattainment area – area that is shown by monitoring data or air quality modeling calculations to exceed primary or secondary ambient air quality standards established by the U.S. Environmental Protection Agency.

oil spill contingency plan – plan submitted by the lease or unit operator (along with or prior to a submission of an exploration, development, or production plan) to detail provisions for fully defined specific actions to be taken following discovery and notification of an oil spill occurrence.

operator – person or company engaged in the business of drilling for, producing, or processing oil, gas, or other minerals and recognized by the Bureau of Ocean Energy Management as the official contact for the lease owners and responsible for the lease activities or operations.

organic matter – material derived from living plant or animal organisms.

Outer Continental Shelf (OCS) – submerged lands, subsoil, and seabed, lying between the seaward extent of the states' jurisdiction and the seaward extent of Federal jurisdiction.

pelagic communities – planktonic organisms that inhabit the water column of the open ocean.

pelagic environment – the environment of the water column, from the sea surface to the waters immediately above the seafloor.

petroleum – an oily, flammable, bituminous liquid that occurs in many places in the upper strata of the Earth, either in seepages or in reservoirs; essentially a complex mixture of hydrocarbons of different types with small amounts of other substances.

physical environment – non-biological aspects of the Outer Continental Shelf and adjacent waters and lands (e.g., topography, currents, water, air).

phytoplankton – microscopic, free-floating, photosynthetic microalgae that drift passively in the water, e.g., diatoms, cyanobacteria, and dinoflagellates.

pinniped – aquatic carnivorous mammals (e.g., seals, sea lions, sea otters, walrus) with all four limbs modified into flippers.

plankton – passively floating or weakly motile aquatic plants and animals; usually refers to both phytoplankton (algae and plants) and zooplankton (animals).

planning area – administrative subdivision of the Outer Continental Shelf used for planning in the National OCS Oil and Gas Leasing Program. The OCS comprises 26 planning areas.

platform – steel, concrete, or gravel structure from which offshore oil and gas wells are drilled.

population-level effect – impacts or consequences of activities that affect an entire population of a single species or multiple populations of species (e.g., changes to reproduction and fitness).

potential impact (or **potential effect**) – range of alterations or changes to environmental conditions that could be caused by an action.

primary production (or **primary productivity**) – production of biomass using carbon dioxide and water through photosynthesis. The primary productivity of the marine community is its capacity to produce energy for its component species, which sets limits on the overall biological production in marine ecosystems.

produced water – total water produced from the oil and gas extraction process; may contain soluble and non-soluble organics, suspended and dissolved solids, and various chemicals used in the production process; can be discharged after treatment, reinjected, or treated and stored onshore.

production – activities for the removal of minerals, including removal, field operations, transfer of minerals to shore, operation monitoring, maintenance, and workover drilling.

program area – area within which one or more lease sales is proposed at any stage of National Outer Continental Shelf Oil and Gas Leasing Program development; a program area may include all or portions of a Bureau of Ocean Energy Management planning area.

refining – fractional distillation, usually followed by other processing (e.g., cracking).

reserves – portion of the identified oil or gas resource that can be economically extracted.

reservoir – subsurface, porous, permeable rock body in which hydrocarbons have accumulated.

resources – something of value in the physical, biological, or human environments (e.g., air quality, marine mammals, commercial fisheries). When referring to the oil and gas industry, this term is also used to describe concentrations of naturally occurring materials that are currently or potentially extractable to produce energy.

rig – structure used for drilling an oil or gas well.

right-of-way – legal right of passage; easement; specific area of route for which permission has been granted to place a pipeline and ancillary facilities and for use in transportation.

rookery – nesting or breeding grounds of gregarious (i.e., social) birds or mammals; also, a colony of such birds or mammals.

sale area – geographical area of the Outer Continental Shelf being offered for lease for the exploration, development, and production of mineral resources.

scoping – process prior to environmental impact statement preparation to determine the issues and alternatives to be addressed in the analysis for each proposed major Federal action.

sea turtles – turtles that spend most of their lives at sea and come to shore only to lay eggs; upon hatching, young turtles immediately move back to the sea.

seagrass beds – mostly continuous mats of submerged, rooted marine flowering vascular plants occurring in shallow tropical and temperate waters.

sediment – naturally occurring material that has been transported and deposited by water, wind, glacier, precipitation, or gravity; a mass of deposited material.

seeps (hydrocarbon) – gas or oil that reaches the surface along bedding planes, fractures, unconformities, or fault planes through connected porous rocks.

seismic – geophysical survey method that uses the principles of seismology to estimate the properties of the Earth's subsurface from reflected sound waves generated by a towed acoustic sound source.

sense of place – either the intrinsic character of a place, or the meaning and importance people give to it, or both.

shunting – method used in offshore oil and gas drilling activities where expended drill cuttings and fluids are discharged near the ocean seafloor rather than at the surface, as in the case of normal offshore drilling operations; mitigates impacts on biota at the surface.

spawn – releasing or depositing of eggs and sperm by fish or other non-mammalian species to produce offspring.

stipulations – specific measures imposed upon a lease as conditions of sale. Stipulations are attached as a provision of a lease; they may apply to some or all tracts in a lease sale. For example, a stipulation could limit drilling to a certain time period of the year or certain areas within a lease.

stratification – formation of water layers based on salinity and temperature.

stressors – ongoing and future human activities or natural phenomena that could change the condition of the affected environment over the next 40 to 70 years. These stressors result from current, already

planned, or reasonably foreseeable future actions and do not include activities associated with the National Outer Continental Shelf Oil and Gas Leasing Program.

subsidence – gradual caving in or sinking of an area of land owing to subsurface movement of Earth materials.

subsistence uses – customary and traditional uses by residents of wild resources for personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for making and selling of handcrafted articles out of nonedible byproducts of fish and wildlife resources taken for personal or family consumption; for barter or sharing for personal or family consumption; or for customary trade.

take – term defined under the Endangered Species Act and Marine Mammal Protection Act. The Endangered Species Act defines the term to mean to harass, harm, pursue, hunt, shoot, wound, kill, capture, or collect a threatened or endangered fish or wildlife species, or attempt to engage in any such conduct that disrupts normal behavior patterns. The Marine Mammal Protection Act classifies take as either Level A or Level B harassment.

thermocline – steep temperature gradient in ocean waters.

threatened species – see *endangered or threatened species*.

toothed whales – group of Odontocete whales (including dolphins, porpoises, and other whales) that have teeth and hunt live prey.

tourism – practice of traveling for recreation and engaging in activities such as wildlife viewing, hiking, hunting, camping, diving, sailing, sightseeing, and commercial cruises.

traditional knowledge – knowledge passed down through generations about the natural world, often involving subsistence resources.

trawl – large, tapered fishing net of conical shape, which typically is actively towed.

trophic – hierarchy of organisms from photosynthetic plants to carnivores in which organisms at one level are fed upon by those at the next higher level (e.g., phytoplankton eaten by zooplankton eaten by fish).

turbidity – reduced water clarity resulting from the presence of suspended matter.

upwelling – process in which deep, cold water rises to the surface.

vascular plants – plants possessing specialized food- and water-conducting structures.

viewshed – view of an area from a specific vantage point; extent of the view can vary depending on distance, height of object, elevation of viewer, and weather conditions (e.g., fog, haze, rain).

volatile organic compound (VOC) – any reactive organic compound that is emitted to the atmosphere as a vapor.

vulnerability – likelihood of being damaged by external influences; sensitivity within a system and resilience to recover from hazards and disasters.

vulnerable coastal communities – historically marginalized, low-income, or "minority" communities as defined by Executive Orders 12898 and 13175.

water quality – condition or environmental health of water, reflecting its particular biological, chemical, and physical characteristics, and the ability of a waterbody to maintain the ecosystems it supports and influences.

weathering – aging of oil due to its exposure to the atmosphere and environment, causing marked alterations in its physical and chemical makeup.

wetlands – low-lying habitats where water accumulates long enough to affect the condition of the soil or substrate and promote the growth of water-tolerant plants.

zooplankton – animal plankton, mostly dependent on phytoplankton for its food source; small, free-floating animals that may be passive drifters or motile, and include fish larvae, small jellyfish, krill, copepods, amphipods, and pteropods.

Appendix M: References

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Appendix N: List of Preparers

BUREAU OF OCEAN ENERGY MANAGEMENT (BOEM)

Name	Education and Experience	Contribution
Tamara Arzt	J.D./M.P.A., ESA, NEPA, MMPA, and CZMA, Environmental Law and Policy; 20 years of experience working on a variety of national, state, and local environmental policy and legal issues	Cooperating Agency Coordination
Mark Belter	B.S., Biology (Marine); 12 years of experience in fish habitat restoration, fisheries research, and environmental impact assessment	Project Management Team
Kimberly Bittler	M.S., Marine Science; 6 years of experience in environmental science and policy	Stressors
Jennifer Bosyk	B.S., Biology; M.E.M., Coastal Environmental Management; 13 years of experience in environmental policy, conservation biology and impact assessment	Project Management Team, Exclusions
William Brown	B.A., M.A.T., Biology; J.D., Law; Ph.D., Zoology; 45 years of experience in diverse issues of environmental and cultural science, law, and policy	Project Direction and Review
Jennifer Bucatari	B.S., M.A., Ph.D., Marine Biology; 20 years of experience in marine ecosystems and impacts associated with oil in the marine environment	Writing Team for Affected Environment and Environmental Consequences; Potential Impacts from Oil Spills
Brandi Carrier	B.A., History; B.A., Sociology (Minor Anthropology); M.A., Archaeology and Prehistory; 19 years of experience in terrestrial and marine archaeology, project and contract management, and environmental compliance	Technical Writing and Review
Paulina Chen	B.S., Product Design Engineering; Over 15 years of experience in Federal environmental policies and programs; over 15 years of experience in graphic design and editing	Project Management Team, Technical Editing, Graphic Design, Document Production
Mary Cody	B.A.; 28 years of experience in seabird and marine mammal research, NRDA and Recovery monitoring, MMPA, NEPA, OCS Lands Act, and ESA consultation	Project Management Team, Purpose and Need, Potential Exclusions, Alternatives, Scoping Meetings and Comments, Technical Writing and Review
Kim Coffman	M.P.P., Government in the Private Economy (emphasis on Economic and Inter-disciplinary Analysis of Public Policy); 28 years of experience working on OCS 5-Year Program issues; 18 years of experience with socioeconomic models	Generalized Impacts on Employment and Revenues

Name	Education and Experience	Contribution
Deborah Cranswick	B.S., Geology; 39 years of experience with the OCS Oil and Gas Program, including 16 years as an Environmental Protection Specialist doing impact assessment and technical writing and editing	NEPA Guidance, Technical Writing and Review
Megan Davidson	B.S., Marine Science; B.S., Biology; M.S., Biological Oceanography; PMP; 18 years of experience in biological oceanography working on a variety of environmental related issues and field work	Project Management Team, Potential Exclusions, Appendices, and Review
Amardeep Dhanju	M.A., Public Policy; Ph.D., Marine Policy; 14 years of experience in marine and energy policy and regulation	Writing Team for Potential Environmental Exclusions
Courtney Elliton	B.S., Marine Science; M.S., Oceanography and Coastal Science; 7 years of experience in marine and coastal science, and environmental science and compliance	Writing Team, Technical Writing and Review
Stephanie Fiori	B.S., Environmental Science; B.A., Policy and Management Studies; M.Sc., Environmental Sciences and Policy; 22 years of experience in marine, environmental, and watershed science and policy, oil spill response and restoration, and energy policy and regulation	Project Management Team, Writing Team, Review and Comment Coordination Team
Sara Guiltinan	B.A., Environmental Science; M.S., Environmental Science and Management; 10 years of experience in environmental science and compliance	Technical Writing Human Environment, Pacific Region Review
Deena Hansen	M.S., Marine Science; 9 years of experience in marine and fisheries ecology, in the field and for desktop analyses, especially in the context of NEPA, ESA, MSFCMA, and OCS Lands Act regulations	Writing Team for Affected Environment and Environmental Consequences, Scoping, Species Names, and EFH Appendices
Keely Hite	B.S., Environmental & Social Science; 12 years of experience NEPA OCS Programs, Sociocultural and Socioeconomic subject matter expert	Writing Team for Affected Environment and Environmental Consequences, Potential Environmental Exclusions
Brian Jordan	B.A., Anthropology; M.Sc., Wood Science; Ph.D., Natural Resource Science and Management; 25 years of experience in underwater archaeology and historic preservation	Supervision, Document Planning and Preparation Support
Paul Knorr	Ph.D., Geology; 18 years of experience including marine sediments, carbon flux, and environmental remediation	Scoping Meetings, GIS
J. Jacob Levenson	B.S., Zoology/Marine Science; M.S., Criminal Justice; 17 years of experience in commercial and recreational fisheries in Federal fisheries management at NMFS, as charter vessel captain, and in conducting independent science on fishes, marine mammals, sea birds, and sea turtles	Scoping Meetings, Review Coordination, Potential Environmental Exclusions
Jill Lewandowski	M.S. and Ph.D., Environmental Science and Policy; 23 years of experience in protected species assessment	Supervision, Reviewer
Jessica Mallindine	B.S., Marine Biology and Environmental Science; M.S., Marine Biology; 12 years of experience in planning and environmental impact analysis, compliance, and monitoring	Technical Reviewer, Comment Resolution

Name	Education and Experience	Contribution
Laura Mansfield	B.A., Petroleum and Socio-Economic Development; M.A.L.D. International Environment and Resource Policy; 10 years of experience with energy policy and socio-economic impacts of extractive industries	Writing Team, Technical Writing and Review
Kimberly Marshall McLean	B.A., Psychology/Sociology; M.S., Biology; Ph.D., Environmental Science & Policy; 10 years of experience conducting endangered species population monitoring (sea turtles); 17 years of experience in commercial fisheries sustainability and oil spill restoration (NMFS); 3 years of studying cultural identity of Tribal communities	Writing Team Human Environment, Technical Writing and Review
Robert Martinson	B.S., Biological Science; M.S., Zoology; 38 years of experience working on NEPA, ESA, CWA, aquatic ecology, wetlands, estuarine ecology, and coastal restoration	Project Management Team, Scoping Process, Exclusions, Potential Significant Impacts Risk Evaluation
Victoria Phaneuf	B.A., Cultural Anthropology, French, and Middle Eastern Studies; M.A., Ph.D., Sociocultural Anthropology; 13 years of experience conducting social science analyses	Technical Writing, Human Environment
Michael Rasser	B.A., Environmental Studies; M.S., Forest Resources and Conservation; Ph.D., Marine Science; 18 years of experience in marine, coastal, and terrestrial ecology	Project Management Team, Writing Team Lead, Technical Writing and Review, Scientific Illustrations Coordination
Andrew Remsen	B.S., Zoology; Ph.D., Marine Science; 25 years of experience in marine biology, oceanography, oil spill response, and emerging technology	Writing Team, Technical Writing and Review
Katherine Segarra	B.S., Environmental Science; Ph.D., Marine Sciences; 14 years of experience in marine and coastal science and policy	Project Management Team, Writing Team Lead, Technical Writing and Review
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Erica Staaterman	B.S., Biology; Ph.D., Applied Marine Physics; 13 years of experience in bioacoustics and marine biology research	Writing Team for Affected Environment and Environmental Consequences, Scoping and Acoustics Appendices
Kristen Strellec	B.S., M.S., and all Ph.D. coursework, Energy, Environmental, and Mineral Economics; 20 years of experience with socioeconomic models and economic analysis	Generalized Impacts on Employment and Revenues
Timothy White	B.S., Biology; MPhil, Biology (Ecology, Evolution, and Behavior); Ph.D., Biology (Ecology, Evolution, and Behavior); 15 years of experience in the field of avian ecology and at-sea mapping of apex marine predators	Potential Environmental Exclusions, Technical Writing and Review
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Russell Yerkes	B.F.A.; 12 years of experience in the Department of Defense (4 years military, 4 years Federal contracting, 4 years Federal Government); 12 years of experience in graphic design (publication and print graphics, infographics and charts, presentations, large- and small-scale printing)	Chart and Graph Design, Layout Design

CONTRACTORS

Company	Contribution
Crowley & Co.	Scientific Illustrations

U.S. Department of the Interior

The Department of the Interior protects and manages the Nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities.

Bureau of Ocean Energy Management

The mission of the Bureau of Ocean Energy Management is to manage development of U.S. Outer Continental Shelf energy and mineral resources in an environmentally and economically responsible way. The bureau promotes energy independence, environmental protection, and economic development through responsible management of these offshore resources based on the best available science.