

January 27, 2026

UNITED STATES GOVERNMENT
MEMORANDUM

To: Public Information

From: Plan Coordinator, OLP, Plans Section (GM 235D)

Subject: Public Information copy of plan

Control # - Control S-08210

Type - Supplemental Development Operations Coordinations Document

Lease(s) - OCS-G08823 Block - 552 Mississippi Canyon Area

Operator - BP Exploration & Production Inc.

Description - Tie-in of a single subsea production well to Mississippi Canyon Block 522 (OCS-G-08823) Well F007 (or F007 Alt.)

Rig Type - Not Found

Attached is a copy of the subject plan.

It has been deemed submitted and is under review for approval.

Henry Emembolu
Plan Coordinator



Mississippi Canyon Block 522 (OCS-G 08823)

“MC522-F007 Project”

PUBLIC COPY

Supplemental Development Operations Coordination Document (SDOCD)

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1.0 Plan Contents

1.1 Description of Activities

The drilling of MC522 007 (F007) was included under Revised Exploration Plan (R-7376) approved on July 15, 2025 and Revised Exploration Plan (R-7407) approved on December 2, 2025. The Diamond Black Lion will perform the completion operations on the MC522 007 (F-7) well.

This Supplemental Development Operations Coordination Document (SDOCD) provides for the following operations:

This plan addresses the tie-in of a single subsea production well that will be tied into the South Oil Loop at Fourier Field -- Mississippi Canyon Block 522 (OCS-G-08823) Well F007 (or F007 Alt.); installation of a subsea tree, intermediate structure that will connect the well to the existing F34 manifold via a well jumper and intermediate jumper, and associated flying leads. Chemicals, hydraulics, power and communication will be supplied by an existing in-field static umbilical.

Commence production from the Mississippi Canyon Block 522 Well 007 (F007).

BP will not be utilizing pile-driving in this plan.

Included in **Appendix A** are Forms BOEM 137 "OCS Plan Information Form" which provide for the installation of the proposed subsea facilities and commencement of production from the associated wells.

1.2 History of Leases

The Initial Development Operations Coordination Document (DOCD) for the Mississippi Canyon (MC) Area Block 522 Unit (Fourier Field) was submitted to the Minerals Management Service (MMS) in June 12, 2002 by Shell Offshore Inc (SOI). The original plan called for the completion of the OCS-G 09823, MC 522 F002, F003 and F004 Wells and the installation of the subsea tree, flowline, umbilicals and jumpers to connect the wells to the Nakika host facility in Mississippi Canyon 474, approximately 17 miles to the northwest. MC 566 F005 and MC 522 F006 with associated subsea infrastructure were approved as part of Supplemental Development Operations Coordination Document (SDOCD) S-6880 approved on May 9, 2006.

MC 522 is part of Unit Contract No. 754397006 consisting of G-09821, G-08823, and G-08831. The lease has a 1/8 royalty and is held by production. Record title is held 50% BP and 50% Shell Offshore Inc.

An Environmental Assessment was approved on July 15, 2025, as part of EP Control No. R-7376.

The current lease operator and ownership are as follows:

Area / Block Lease No.	Operator	Ownership
Mississippi Canyon 522	BP Exploration & Production Inc.	BP Exploration & Production Inc. – 50.00% Shell Offshore Inc. – 50.00%

1.3 Location Information

The Mississippi Canyon Block 522 Well 007 (F007) is located in MC Block 522 (Lease OCS-G 08823) in a water depth of approximately 6,934 ft.

Vicinity, Location and Bathymetry Plats are included in **Appendix B**.

Since BP proposes to use dynamically positioned construction vessels there will be no anchors associated with this activity.

1.4 Safety and Pollution Prevention Features

No additional drilling operations will be conducted under this supplemental DOCD.

Appropriate fire drills and abandon ship drills will be conducted, and navigational aids, lifesaving equipment, and all other shipboard safety equipment will be installed and maintained as mandated by the U.S. Coast Guard regulations contained in 33 CFR Part 144.

1.5 Storage Tanks and Production Vessels

Information regarding the storage tanks that will be used to conduct the operations proposed in this plan that will store oil, as defined in 30 CFR § 254.6, is provided in the table below. Only those tanks with a capacity of 25 barrels or more are included.

Storage Tanks Construction Vessel

Type of Storage Tank	Type of Facility	Tank Capacity (bbls)	Number of Tanks	Total Capacity (bbls)	Fluid Gravity (API)
Fuel Oil	DP Flexible Lay Vessel	13,107	1	13,107	35
Fuel Oil	DP Construction/Flex-Lay Vessel	15,599	1	15,599	35

1.6 Pollution Prevention Measures

These operations do not propose activities for which the State of Florida is an affected state.

1.7 Additional Measures

Not conducting proposed activities that require reporting additional measures as per NTL 2008-G04.

2 General Information

2.1 Applications and Permits

The table below provides information on the filing or approval status of the individual and/or site-specific Federal, State and local application approvals or permits that must be obtained to conduct the proposed activities.

Application/Permit	Issuing Agency	Status
Supplemental Deepwater Operations Plan (SDWOP)	BSEE	Pending Submission
Revised Exploration Plan (REP) (R-7376)	BOEM	Approved 7/15/2025
Revised Exploration Plan (REP) (R-7407)	BOEM	Approved 12/2/2025
Supplemental Exploration Plan (S-7936)	BOEM	Approved 5/3/2019
Revised Conservation Information Document (CID)	BOEM	Accepted 12/3/2025
Lease Term Pipeline Application	BSEE	Pending Submission
Surface Commingling and Production Measurement (SCPM) Revision	BSEE	Pending Submission
Applications for Permit to Drill (APD)	BSEE	In District Review
Applications for Permit to Modify (APM) for Completions	BSEE	Pending Submission
NPDES Permit GMG290110	EPA	Existing

2.2 Drilling Fluids

There are no drilling operations proposed in this supplemental DOCD.

2.3 Anticipated Production

Anticipated Production Table (MC522 007)(F-7)

Type	Average Production Rate	Peak Production Rate	Life of Reservoir
Oil	Proprietary	Proprietary	Proprietary
Gas	Proprietary	Proprietary	Proprietary

2.4 Fluid Production Data

Fluid Properties

The fluid composition for MC522 – F007 (from Well F-3 F7.5 sand) is presented below.

PVT Data: Differential Vaporization Test

Parameter	MC522 – F007 (Oil)
Well	F7
Sample depth, ft MD	15,377
Reservoir Pressure, psia	8,752
Reservoir Temperature, °F	164.4
API Gravity	27.1
GOR (scf/bbl)	1,312
FVF (bbl/STB)	1.524
CO ₂ in mixture @ Reservoir Conditions (mol%)	0.09
CO ₂ in Gas Phase @ 14.7 psia & 130°F (mol%)	0.19
H ₂ S fraction in gas phase at standard conditions ³	0
Saturation Pressure @ Reservoir Temperature (psia)	7,361
Saturation Pressure @ 130°F (psia)	7,766
Gas SG at 14.696 psi and 130°F	1.136
Viscosity at Pb and Tr (cP)	0.91
Viscosity at Patm and Tr (cP)	6.31

Fluid Composition

The fluid properties for MC522 – F007 reservoir are presented below.

Fluid Composition

Components	Flashed Liquid		Flashed Gas		Monophasic Fluid	
	Mole %	Mass %	Mole %	Mass %	Mole %	Mass %

Nitrogen	0.00	0.00	0.05	0.07	0.04	0.01
Carbon						
Dioxide	0.00	0.00	0.12	0.27	0.09	0.05
Hydrogen						
Sulfide	0.00	0.00	0.00	0.00	0.00	0.00
Methane	0.13	0.01	91.26	74.86	68.44	12.93
Ethane	0.03	0.00	1.45	2.23	1.09	0.39
Propane	0.18	0.03	2.25	5.07	1.73	0.90
I - Butane	0.12	0.02	0.78	2.32	0.61	0.42
N - Butane	0.59	0.12	1.59	4.73	1.34	0.92
I - Pentane	0.59	0.15	0.57	2.10	0.58	0.49
N - Pentane	1.15	0.30	0.74	2.73	0.84	0.72
pseudo C6H14	2.65	0.79	0.61	2.62	1.12	1.11
pseudo C7H16	4.42	1.51	0.38	1.87	1.39	1.57
pseudo C8H18	6.72	2.56	0.16	0.88	1.80	2.27
pseudo C9H20	6.94	2.99	0.03	0.19	1.76	2.51
pseudo C10H22	6.52	3.11	0.01	0.07	1.64	2.59
pseudo C11H24	5.62	2.95	0.00	0.00	1.41	2.44
pseudo C12H26	4.60	2.64	0.00	0.00	1.15	2.18
pseudo C13H28	4.55	2.84	0.00	0.00	1.14	2.35
pseudo C14H30	4.12	2.79	0.00	0.00	1.03	2.31
pseudo C15H32	3.84	2.82	0.00	0.00	0.96	2.33
pseudo C16H34	3.61	2.86			0.90	2.36
pseudo C17H36	3.29	2.78			0.82	2.30
pseudo C18H38	2.88	2.58			0.72	2.13
pseudo C19H40	2.31	2.17			0.58	1.79
pseudo C20H42	2.51	2.46			0.63	2.04
pseudo C21H44	1.92	1.99			0.48	1.65
pseudo C22H46	1.92	2.05			0.48	1.70
pseudo C23H48	1.51	1.68			0.38	1.39
pseudo C24H50	1.66	1.92			0.42	1.59
pseudo C25H52	1.59	1.91			0.40	1.58

pseudo C26H54	1.38	1.72	0.35	1.42
pseudo C27H56	1.33	1.71	0.33	1.41
pseudo C28H58	1.26	1.67	0.32	1.38
pseudo C29H60	1.22	1.66	0.31	1.37
C30+	18.84	45.21	4.72	37.40
Total	100.00	100.00	100.00	100.00
MW	280.5	19.6	84.9	
MW of C30+	673.1		673.1	
MOLE RATIO	0.2504	0.7496		

Water Chemistry

No formation water samples are available from the F7 reservoir. Two downhole water samples from shallower F5 reservoir and deeper F8 reservoir in offset Fourier wells are available as analogues.

	MC522-2 F5 reservoir (Sample 1103)	MC522_2ST1 F8 reservoir (Sample 1097)
Cations (mg/L)		
Sodium (Na)	18,300	16,000
Potassium (K)	156	126
Calcium (Ca)	1203	281
Magnesium (Mg)	316	559
Barium (Ba)	50	40
Iron (Fe)	0	0
Anions (mg/L)		
Chloride (Cl)	30,270	26,999
Bicarbonate (HCO ₃)	494	671
Carbonate (CO ₃)	0	0
Sulfate (SO ₄)	10	10
Bromide (Br)	316	376
Iodide (I)	304	286
Sulfide (S)	0	0

Other Properties		
PH	7.49	7.76
Specific Gravity	1.0361	1.0327
Total Dissolved Solids (ppm)	50,835	42,002

2.5 New or Unusual Technology

No new or unusual technology is proposed in this supplemental DOCD as defined by 30 CFR 550.200.

2.6 Bonding Information

The bonding requirements for the activities proposed in this supplemental DOCD are satisfied by an area-wide bond, furnished and maintained according to 30 CFR 556, Subpart I; NTL No. 2000-G16, "Guidelines for General Lease Surety Bonds"; and additional security under 30 CFR 556.53(d) and NTL 2008-N07, "Supplemental Bond Procedures".

2.7 Oil Spill Financial Responsibility (OSFR)

BP (Operator No. 02481) has demonstrated oil spill financial responsibility for the facilities proposed in this supplemental DOCD according to 30 CFR Part 556, Subpart I, and NTL No. 2015-N04, and to the extent required under 30 CFR 556.901 and NTL No. 2016-N01.

2.8 Deepwater Well Control

BP (Operator No. 02481) has the financial capability to drill a relief well and conduct other emergency well control operations. According to NTL 2008-G04, this Section of the Plan is not applicable to the proposed operations.

2.9 Suspensions of Production

There are no approved suspensions of production in existence, or that BP currently intends to seek, to hold the leases or unit involved with the proposed DOCD activities.

2.10 Blowout Scenario

The uncontrolled blowout scenario is for a potential blowout of the F-7 MC522 007 well (location 'A') which BP calculates does not have the highest liquid hydrocarbons rate potential in the MC522 area. The blowout scenario assumes that the pipe has been tripped out of the hole when a problem with the wellhead connector develops resulting in the removal of the BOP stack. Due to the loss of riser margin, the well flows unrestricted. Day 1, with a worst-case discharge of approximately 36,000 bopd, For context, the highest liquid hydrocarbon rate potential in the MC522 area is 310,000 bopd, as detailed in the calculation support package submitted with the EP. The maximum duration of the blowout is

estimated at 70-days (see relief well timing below). The rate profile associated with the well blowout over this 70-day period results in a potential worst case spill volume estimated at 2.14 mmstbo.

All proposed activities and facilities in this SDOCD will be covered by the GoA Regional OSRP filed by BP America Inc. (Operator No. 21372) on behalf of several companies listed in the plan including BP Exploration & Production Inc. (Operator No. 02481) confirmed in compliance and approved by BSEE on January 10, 2025.

3 Geological and Geophysical Information

3.1 Geological Description

The geological description was submitted with the Exploration Plan Control No. R-7376 approved on July 17, 2025.

3.2 Structure Contour Maps

Structure Contour Maps were submitted with the Exploration Plan Control No. R-7376 approved on July 17, 2025.

3.3 Interpreted 2-D and / or 3D Seismic Lines

Interpreted Seismic lines were submitted with the Exploration Plan Control No. R-7376 approved on July 17, 2025.

3.4 Geological Structure Cross-Section Maps

Geological structure cross sections were submitted with the Exploration Plan Control No. R-7376 approved on July 17, 2025.

3.5 Shallow Hazards Report

Two Shallow Hazards Reports were completed, one based on Autonomous Unmanned Vehicle (AUV) site survey and the other on regional 3D seismic, were conducted, respectively in August, 2017 and March, 2005. The survey areas overlap in coverage in Blocks 522, Mississippi Canyon. The August, 2017 survey related report is the primary report used for the seafloor and near surface assessments within Mississippi Canyon Block 522 area and is entitled Fugro Marine GeoServices, Inc. (FMGI), 2017, "AUV Shallow Geohazards and Archaeological Assessment, Fourier Deep Prospect Area, Block 522, Mississippi Canyon, Gulf of Mexico ." FGSI Report No. 1166-Fourier Deep. Houston, Texas, USA. Submitted to BP August, 2017.

A regional shallow hazards report used for the deeper shallow hazards assessment dated March, 2005 entitled "3D Geohazard Assessment, Gulf of Mexico – Mississippi Canyon Blocks 338-342, 382-386, 426-431, 470-479, 517-523, 561-567, & 605-608, Na Kika Prospect 3D Geohazard Study" was prepared by Gardline Surveys, Inc., Project No. 6364.

3.6 Shallow Hazards Assessment

The Fugro Shallow Hazards and Archaeological assessment evaluated the seafloor and near-seafloor geologic condition, and identified potential hazards, constraints, and cultural resources within 2,000-feet of the well locations. The report concluded that there are no archaeologically significant artifacts identified in the vicinity of the proposed well locations.

A Site Clearance Letter was prepared for the well location by BP (BP 2025) and approved as part of Revised Exploration Plan R-7376 on July 15, 2025, based on the AUV data, 3D seismic data and existing contractor reports. The Site Clearance Letter determined that the well locations appear generally favorable for drilling operations.

3.7 High Resolution Seismic Lines

High resolution seismic lines were submitted with the shallow hazards report referenced above and submitted with the Exploration Plan Control No. R-7376 approved on July 15, 2025.

4 Hydrogen Sulfide (H2S) Information

4.1 Concentration

BP does not anticipate encountering H2S while conducting the proposed operations under this plan.

4.2 Classification

Based on previous drilling, no H2S is known to occur in the project area. Correlative wells information was included in Appendix C of Exploration Plan S-7936 as approved on May 3, 2019. BOEM confirmed the "H2S absent" classification.

4.3 H2S Contingency Plan

According to NTL 2008-G04, this Section of the Plan is not applicable to the proposed operations due to "H2S absent" classification by approval letter dated May 3, 2019, for the Exploration Plan (Control No. S-7936).

4.4 Modeling Report

According to NTL 2008-G04, this Section of the Plan is not applicable to the proposed operations due to "H2S absent" classification by approval letter dated May 3, 2019, for the Exploration Plan (Control No. S-7936).

5 Mineral Resource Conservation Information

5.1 Technology and Reservoir Engineering Practices and Procedures

The MC522 007 well is a single zone frac pack completion and to be completed in the M70L sand.

5.2 Technology and Recovery Practices and Procedures

The main recovery mechanism of the M70L is expected to be pressure depletion.

5.3 Reservoir Development

The STOOIP estimated for the Fourier M70L reservoirs is around 20.7 mmstb. Gross recoverable from M70L is estimated to be around 6.6 mmstb total, which is calculated to around 32% RF.

6 Biological, Physical, and Socioeconomic Information

6. 1 Benthic Communities Report

The BOEM requires site-specific surveys and reviews for proposed bottom-disturbing actions in water depths greater than 300-m in order to judge the potential of the region for supporting high density deepwater benthic communities, including chemosynthetic organisms. NTL No. 2009-G40 formalized the process. BP has conformed to this requirement and has located wells to avoid potential sites for benthic communities during the activities described by this plan.

Mississippi Canyon Block 522 is located in water depths greater than 300-m; At these depths, the potential exists for deepwater benthic communities to be present. Site Clearance Surveys conducted for the proposed project confirm that high density benthic communities are not found in the area. The Site Clearance Letters and Shallow Hazard Reports outlining this finding are contained in Appendix C of Revised Exploration Plan R-7376 approved on July 15, 2025.

6.2 Biologically Sensitive Underwater Features and Areas

The proposed activities will be conducted in a water depth of approximately 6,934 ft. Therefore, requirements of NTL 2009-G39 for biologically sensitive underwater features and areas such as Topographic Features, Live Bottom (low-relief), Live Bottom (Pinnacle Trend) features, and other potentially sensitive biological features when conducting OCS operations in water depths less than 300-m (984-ft) in the Gulf of America do not apply to this plan.

All proposed bottom-disturbing activities in this EP will occur outside of the nearest Topographic Features, “No Activity Zones”, Live Bottom (low Relief), and Live Bottom (Pinnacle Trend) Stipulation Blocks described in NTL 2009-G39 and shown on BOEM December 2012 Map: “Biologically Sensitive Areas (< 300-m)”.

6.3 Remotely Operated Vehicle (ROV) Monitoring Survey Plan

No longer applicable. NTL 2008-G06 “Remotely Operated Vehicle Surveys in Deepwater” has expired.

6.4 Threatened or Endangered Species, Critical Habitat and Marine Mammal Information

This section discusses species listed as Endangered or Threatened under the Endangered Species Act (ESA). In addition, it includes all marine mammal species in the region, all of which are protected under the Marine Mammal Protection Act (MMPA).

Endangered or Threatened species that may occur in the project area and/or along the northern Gulf Coast are listed in Table 6. The table also indicates the location of critical habitat (if designated in the Gulf of America). Critical habitat is defined as (1) specific areas within the geographical area occupied by the species at the time of listing, if they contain physical or biological features essential to conservation, and those features may require special management considerations or protection; and (2) specific areas outside the geographical area occupied by the species if the agency determines that the area itself is essential for conservation. The NMFS (of NOAA) has jurisdiction for ESA-listed marine

mammals (cetaceans), sea turtles, marine invertebrates, and fishes in the Gulf of America. The USFWS has jurisdiction for ESA-listed birds, terrestrial and freshwater species (e.g., beach mice, Florida salt marsh vole [*Microtus pennsylvanicus dukecampbelli*], Panama City crayfish [*Procambarus econfinae*])); the West Indian manatee (*Trichechus manatus*), and sea turtles while on their nesting beaches.

Table 6. Federally listed Endangered and Threatened species potentially occurring in the project area and along the northern Gulf Coast. Adapted from: U.S. Fish and Wildlife Service (2025) and National Marine Fisheries Service (2025a).

Species	Scientific Name	Status	Potential Presence		Critical Habitat Designated in Gulf of America
			Project Area	Coastal	
Marine Mammals					
Rice's whale ¹	<i>Balaenoptera ricei</i>	E	X	--	None
Sperm whale	<i>Physeter macrocephalus</i>	E	X	--	None
West Indian manatee	<i>Trichechus manatus</i> ²	T	--	X	Florida (Peninsular)
Sea Turtles					
Loggerhead turtle	<i>Caretta caretta</i>	T,E ³	X	X	Nesting beaches and nearshore reproductive habitat in Mississippi, Alabama, and Florida (Panhandle); <i>Sargassum</i> habitat including most of the central & western Gulf of America
Green turtle	<i>Chelonia mydas</i>	T	X	X	None
Leatherback turtle	<i>Dermochelys coriacea</i>	E	X	X	None
Hawksbill turtle	<i>Eretmochelys imbricata</i>	E	X	X	None
Kemp's ridley turtle	<i>Lepidochelys kempii</i>	E	X	X	None
Birds					
Piping Plover	<i>Charadrius melanotos</i>	T	--	X	Coastal Texas, Louisiana, Mississippi, Alabama, and Florida (Panhandle)
Whooping Crane	<i>Grus americana</i>	E	--	X	Coastal Texas (Aransas National Wildlife Refuge)
Black-capped Petrel	<i>Pterodroma hasitata</i>	E	X	--	None
Rufa Red Knot	<i>Calidris canutus rufa</i>	T	--	X	None
Fishes					
Oceanic whitetip shark	<i>Carcharhinus longimanus</i>	T	X	--	None
Giant manta ray	<i>Mobula birostris</i>	T	X	X	None
Gulf sturgeon	<i>Acipenser oxyrinchus desotoi</i>	T	--	X	Coastal Louisiana, Mississippi, Alabama, and Florida (Panhandle)
Nassau grouper	<i>Epinephelus striatus</i>	T	--	X	None
Smalltooth sawfish	<i>Pristis pectinata</i>	E	--	X	Southwest Florida
Invertebrates					
Elkhorn coral	<i>Acropora palmata</i>	T	--	X	Florida Keys and the Dry Tortugas
Staghorn coral	<i>Acropora cervicornis</i>	T	--	X	Florida Keys and the Dry Tortugas
Pillar coral	<i>Dendrogyra cylindrus</i>	E	--	X	Southeast Florida and Florida Keys, Puerto Rico, St. Thomas, St. John, St. Croix, and Navassa Island
Rough cactus coral	<i>Mycetophyllia ferox</i>	T	--	X	Southeast Florida and Florida Keys, Puerto Rico, St. Thomas, St. John, St. Croix, and Navassa Island
Lobed star coral	<i>Orbicella annularis</i>	T	--	X	Southeast Florida and Florida Keys, Puerto Rico, St. Thomas, St. John, St. Croix, Navassa Island, East and West Flower Garden Banks, Rankin Bright Bank, Geyer Bank, and McGrail Bank

Species	Scientific Name	Status	Potential Presence		Critical Habitat Designated in Gulf of America
			Project Area	Coastal	
Mountainous star coral	<i>Orbicella faveolata</i>	T	--	X	Southeast Florida and Florida Keys, Puerto Rico, St. Thomas, St. John, St. Croix, Navassa Island, East and West Flower Garden Banks, Rankin Bright Bank, Geyer Bank, and McGrail Bank
Boulder star coral	<i>Orbicella franksi</i>	T	--	X	Southeast Florida and Florida Keys, Puerto Rico, St. Thomas, St. John, St. Croix, Navassa Island, East and West Flower Garden Banks, Rankin Bright Bank, Geyer Bank, and McGrail Bank
Panama City crayfish	<i>Procambarus econfiniae</i>	T	--	X	South-central Bay County, Florida
Queen conch	<i>Aliger gigas</i>	T	--	X	None
Terrestrial Mammals					
Beach mice (Alabama, Choctawhatchee, Perdido Key, St. Andrew)	<i>Peromyscus polionotus</i> subsp. <i>Ammobates</i> , <i>allophrys</i> , <i>trissyllepsis</i> , and <i>peninsularis</i> , respectively	E	--	X	Alabama and Florida (Panhandle) beaches
Florida salt marsh vole	<i>Microtus pennsylvanicus</i> <i>dukecampbelli</i>	E	--	X	None

E = Endangered; T = Threatened; X = potentially present; -- = not present.

1 In 2021, the National Marine Fisheries Service recognized that what had previously been accepted as a subspecies of the Bryde's whale is actually a separate species. The reclassification is formerly recognized under 86 Federal Register (FR) 47022 effective date 22 October 2021 as the Rice's whale (*Balaenoptera ricei*).

2 There are two subspecies of West Indian manatee: the Florida manatee (*T. m. latirostris*), which ranges from the northern Gulf of America to Virginia, and the Antillean manatee (*T. m. manatus*), which ranges from northern Mexico to eastern Brazil. Only the Florida manatee subspecies is likely to be found in the northern Gulf of America.

3 The Northwest Atlantic Ocean Distinct Population Segment (DPS) of loggerhead turtles is designated as Threatened (76 FR 58868). The National Marine Fisheries Service and the U.S. Fish and Wildlife Service designated critical habitat for this DPS, including beaches and nearshore reproductive habitat in Mississippi, Alabama, and the Florida Panhandle as well as Sargassum spp. habitat throughout most of the central and western Gulf of America (79 FR 39756 and 79 FR 39856).

Coastal Endangered or Threatened species that may occur along the U.S. Gulf Coast include the West Indian manatee, Piping Plover (*Charadrius melanotos*), Rufa Red Knot (*Calidris canutus rufa*) Florida salt marsh vole, Panama City crayfish, Whooping Crane (*Grus americana*), Gulf sturgeon (*Acipenser oxyrinchus desotoi*), smalltooth sawfish (*Pristis pectinata*), queen conch (*Aliger gigas*) and four subspecies of beach mouse. Critical habitat has been designated for all of these species (except the Florida salt marsh vole, Rufa Red Knot, and queen conch) as indicated in Table 6 and discussed in individual sections. Two other coastal bird species (Bald Eagle [*Haliaeetus leucocephalus*] and Brown Pelican [*Pelecanus occidentalis*]) are no longer federally listed as Endangered or Threatened; these are discussed in Section C.4.2.

Five sea turtle species, the Rice's whale (*Balaenoptera ricei*), sperm whale (*Physeter macrocephalus*), oceanic whitetip shark (*Carcharhinus longimanus*), and giant manta ray (*Mobula birostris*), and the Black-capped Petrel (*Pterodroma hasitata*) are the only Endangered or Threatened species that could potentially occur within the project area. The listed sea turtles include the leatherback turtle (*Dermochelys coriacea*), Kemp's ridley turtle (*Lepidochelys kempii*), hawksbill turtle (*Eretmochelys imbricata*), loggerhead turtle (*Caretta caretta*), and green turtle (*Chelonia mydas*) (Pritchard, 1997). Effective 11 August 2014, NMFS has designated certain marine areas as critical habitat for the Northwest Atlantic Distinct Population Segment (DPS) of the loggerhead sea turtle (see Section C.3.5). No critical habitat has been designated in the Gulf of America for the leatherback turtle, Kemp's ridley turtle, hawksbill turtle, green turtle, or sperm whale.

Four Endangered mysticetes (blue whale [*Balaenoptera musculus*], fin whale [*Balaenoptera physalus*], North Atlantic right whale [*Eubalaena glacialis*], and sei whale [*Balaenoptera borealis*]) have been reported in the Gulf of America, and are considered rare or extralimital (Würsig, 2017). These species are not included in the most recent NMFS stock assessment report (Hayes et al., 2023) nor in the most recent BOEM multisale EIS (BOEM, 2017); therefore, they are not considered further in the EIA.

The Rice's whale exists in the Gulf of America as a small, resident population. This species was formally known as a subspecies to the Bryde's whale (*Balaenoptera edeni brydei*) until a DNA study identified it as a separate species (Rosel et al., 2021). It is the only baleen whale known to be resident in the Gulf of America. The species is restricted in range, being primarily found in the northeastern Gulf in the waters of the DeSoto Canyon (Waring et al., 2016, Rosel et al., 2021) with some detections also occurring along the OCS between the 100-m (328-ft) to 400-m (1,312-ft) isobaths (see Section C.3.2).

In several recent acoustic studies in the Gulf of America (Soldevilla et al., 2022a,b; 2024), all Bryde's whale complex individuals are assumed to be Rice's whales. However, Bryde's whales have a global tropical and subtropical range that can include the Gulf of America. Moreover, in the latest NMFS Rice's whale Marine Mammal Stock Assessment Report (Hayes et al., 2023), all previous data of Gulf of America Bryde's whales from studies that pre-dated the Rosel et al. (2021) study that determined that Rice's whales are a distinct species were now assumed to all be Rice's whales. However, it is unclear on what percentage of Bryde's whale complex individuals that live or previously lived in Gulf of America are Rice's whales vs Bryde's whales due to having no DNA studies that analyzed a representative population of Gulf of America Bryde's whale complex individuals.

The Marine Mammal Protected Areas Task Force has designated three Important Marine Mammal Areas (IMMAs) which overlap with the project area: the Gulf of Mexico Outer Continental Shelf and Continental Slope IMMA, the Northern Gulf of Mexico Bays, Sounds and Estuaries IMMA, and the Texas Coastal Bend IMMA (Marine Mammal Protected Areas Task Force, 2025a,b,c). The Gulf of Mexico Outer Continental Shelf and Continental Slope IMMA extends over the whole basin (both within and outside the Gulf of America encompassed in the U.S. EEZ) and covers the portion of the outer continental shelf and slope between 100 and 2,000 m depth and the portion of the abyssal plain between 2,000 and 2,500 m depth. This IMMA was identified as important habitat for Rice's whales and sperm whales residing in the Gulf of Mexico, as well as an area of high diversity of other cetacean species (e.g., beaked whales [*Ziphius cavirostris*, *Mesoplodon* spp.], short-finned pilot whales [*Globicephala macrorhynchus*], Risso's dolphins [*Grampus griseus*]) (Marine Mammal Protected Areas Task Force, 2025a). The other two IMMAs cover coastal bays and estuaries which host smaller resident populations of bottlenose dolphins (*Tursiops truncatus*) (Marine Mammal Protected Areas Task Force, 2025b,c).

The giant manta ray could occur in the project area but is most commonly observed in the Gulf of America at the Flower Garden Banks. The Nassau grouper (*Epinephelus striatus*) has been observed in the Gulf of America at the Flower Garden Banks but is most commonly observed in shallow tropical reefs of the Caribbean and is not expected to occur in the project area. The smalltooth sawfish is a coastal species limited to shallow areas off the west coast of Florida and is not expected to occur in the project area. The Panama City crayfish is a coastal species in south-central Bay County, Florida and is not expected to occur in the project area.

Six Threatened coral species are known from the northern Gulf of America: elkhorn coral (*Acropora palmata*), staghorn coral (*Acropora cervicornis*), lobed star coral (*Orbicella annularis*), mountainous star coral (*Orbicella faveolata*), boulder star coral (*Orbicella franksi*) and rough cactus coral (*Mycetophyllia ferox*). Pillar coral (*Dendrogyra cylindrus*) is a known Endangered coral species from

the northern Gulf of America. These seven coral species are shallow water, zooxanthellate species (containing symbiotic photosynthetic zooxanthellae which contribute to their nutritional needs) and are not present in the deepwater project area (see Section C.3.18).

There are no other Threatened or Endangered species in the Gulf of America that are likely to be adversely affected by either routine or accidental events.

6.5 Archaeological Report

The proposed surface hole location lies in Mississippi Canyon Area Block 522. An AUV survey and Archaeological Assessment were conducted and the following Archaeological Report has been included in Exploration Plan S-7936, as approved on May 3, 2019. The report concluded that there are no archaeologically significant artifacts identified in the vicinity of the proposed well locations.

Fugro Marine GeoServices, Inc. (FMGI), 2017, "AUV Shallow Geohazards and Archaeological Assessment, Fourier Deep Prospect Area, Block 522, Mississippi Canyon, Gulf of Mexico." FGSI Report No. 1166-FourierDeep. Houston, Texas, USA. Submitted to BP August, 2017.

7 Waste and Discharge Information

7.1 Projected Generated Wastes

A table providing information on the projected solid and liquid wastes likely to be generated by the proposed activities is included in Appendix C.

7.2 Projected Ocean Discharges

A table providing information on the projected ocean discharges likely to be generated during the proposed activities is included in Appendix C.

8 Air Emissions Information

8.1 Emissions Screening Questions

Yes	No	Screening Questions for DOCD's
	X	Is any calculated Complex Total (CT) Emission amount (tons) associated with your proposed development and production activities more than 90% of the amounts calculated using the following formulas: $CT = 3400D^2/3$ for CO, and $CT = 33.3D$ for the other air pollutants (where D = distance to shore in miles)?
	X	Do your emission calculations include any emission reduction measures or modified emission factors?
X		Does or will the facility complex associated with your proposed development and production activities process production from eight or more wells?

	X	Do you expect to encounter H2S at concentrations greater than 20 parts per million (ppm)?
	X	Do you propose to flare or vent natural gas in excess of the criteria set forth under 30 CFR 250.1105(a)(2) and (3)?
	X	Do you propose to burn produced hydrocarbon liquids?
	X	Are your proposed development and production activities located within 25 miles (40 kilometers) from shore?
	X	Are your proposed development and production activities located within 124 miles (200 kilometers) of the Breton Wilderness Area?

8.2 Air Emissions Summary

An emission workbook (BOEM Form 0139) showing Plan total emissions associated with the activities proposed in this supplemental DOCD document is included in Attachment 1 in Appendix E. The complex total emissions are the same as Exploration Plan R7407 AQR. The proposed total Plan emissions are summarized in the Table below. The proposed Total plan emissions are less than BOEM's emission exemption thresholds and as a result, no further review or controls are required. See attached **Appendix E**.

COMPANY		AREA	BLOCK	LEASE	FACILITY	WELL			
BP Exploration & Production Inc.		Green Canyon	MC 522	OCS-G 08823	Nakika	MC 522 "A" (backup location "B")			
Facility Emitted Substance									
Year	TSP	PM10	PM2.5	SOx	NOx	VOC	Pb	CO	NH3
2026	9.06	5.47	5.30	0.13	217.15	6.24	0.00	34.06	0.06
Allowable	2427.57			2427.57	2427.57	2427.57		59333.13	

8.3 Emissions Reductions Measures

BP did not utilize any emission reduction measures in calculating emissions for the project. All emissions were calculated using the default values in the BOEM Form 0139.

8.4 Verification of Non-Default Emission Factors

No non-default emissions factors were used.

8.5 Distance to Shore for Emission Exemption Thresholds (EET)

The distance to shore in statute miles is based on the same coordinate system used in the lease sale documents for the lease.

8.6 Non-Exempt Facilities

The calculated maximum projected emissions of the facility are less than the respective EET calculated at 30 CFR § 550.303(d). The facility is therefore exempt from the requirements in 30 CFR § 550.303(e) through (i).

8.7 Hydrogen Sulfide

The requirements related to hydrogen sulfide (H₂S) are not repeated here as they are addressed in section 4 of the Plan.

8.8 Environmental Impact Analysis (EIA)

The requirements related to EIA are not repeated here as they are addressed in Appendix D of this Plan.

9 Oil Spill Response Information

9.1 Oil Spill Response Planning

9.1.1 Regional OSRP Information

All proposed activities and facilities in this EP will be covered by the GoA Regional OSRP filed by BP America Inc. (Operator No. 21372) on behalf of several companies listed in the plan including BP Exploration & Production Inc. (Operator No. 02481) confirmed in compliance and approved by BSEE on January 10, 2025.

BP has adopted additional performance standards:

- a. Provisions to maintain access to a supply of dispersant and fire boom for use in the event of an uncontrolled long-term blowout for the length of time required to drill a relief well;
- b. Contingencies for maintaining an ongoing response for the length of time required to drill a relief well;
- c. Description of measures and equipment necessary to maximize the effectiveness and efficiency of the response equipment used to recover the discharge on the water's surface, including methods to increase encounter rates;
- d. Information regarding remote sensing technology and equipment to be used to track oil slicks, including oil spill detection systems and remote thickness detection systems (e.g., X-band/infrared systems);
- e. Information regarding the use of communication systems between response vessels and spotter personnel;
- f. Shoreline protection strategy that is consistent with applicable area contingency plans; and
- g. For operations using a subsea BOP or a surface BOP on a floating facility, a discussion regarding strategies and plans related to source abatement and control for blowouts from drilling.

9.1.2 Spill Response Site

Primary Response Equipment Location	Preplanned Staging Location(s)
Tampa, FL; Pascagoula, MS; Houma, LA.; Leeville, LA; Morgan City, LA; Lake Charles, LA.; Venice, LA; Galveston, TX; Ingleside, TX.	Fourchon, LA.

9.1.3 OSRO Information

BP is a member of the Marine Spill Response Corporation (MSRC) and Clean Gulf Associates (CGA) and would utilize said Oil Spill Response Organization (OSRO) personnel and equipment in the event of an oil spill at Mississippi Area Block 522.

9.1.4 Worst-Case Scenario Determination

Description	Barrels of Oil
24 hour uncontrolled blowout	36,000 bbls

Oil spill response-related activities for wells to be drilled under BP's EP are governed by the BP Regional Oil Spill Response Plan (OSRP). This plan was submitted by the Gulf of Mexico Region of BP America Inc. (Company No. 21372) and received by the Bureau of Safety and Environmental Enforcement (BSEE) on 16 April 2018. The OSRP was filed on behalf of several BP companies, including BP Exploration & Production Inc. (Operator No. 02481) and approved by BSEE on 17 May 2018. The BP OSRP should meet the requirements contained in 30 CFR Part 254. BP (Operator No. 02481) has demonstrated oil spill financial responsibility for the facilities proposed in this EP, according to 30 CFR Part 553 and NTL No. 2008-N05, "Guidelines for Oil Spill Financial Responsibility for Covered Facilities." The OSRP details BP's plan for response to manage oil spills that may result from drilling and production operations. BP has designed its response program based on a regional capability of response to spills ranging from small operations-related spills to a worst-case discharge (WCD) from a well blowout. BP's spill response program is intended to meet the response planning requirements of the relevant coastal states and applicable federal oil spill planning regulations. It also includes information regarding BP's incident management team (IMT) and dedicated response assets, potential spill risks, and local environmentally sensitive areas. The OSRP describes personnel and equipment mobilization, the incident management team organization, and an overview of strategies, actions and notifications to be taken in the event of a spill.

BP will make every effort to respond to the Worst Case Discharge as effectively as practicable. A description of the response equipment to contain and recover the Worst Case Discharge is shown in Appendix D, Figure 4, which outlines contracted equipment, personnel, materials and support vessels as well as temporary storage equipment to respond to the worst case discharge. The list estimates individual times needed for procurement, load out, travel time to the site, and deployment. Figure 4 also indicates how operations would be supported.

Using the estimated chemical and physical characteristics of crude oil, an ADIOS weathering model was run on a similar product from the ADIOS oil database. The results indicate 11% or approximately 3,960 barrels of crude oil would be evaporated/dispersed within 24 hours, with approximately 32,040 barrels remaining.

Natural Weathering Data: MC 522, F-7 Well	Barrels of Oil
---	----------------

WCD Volume	36,000
Less 11% natural evaporation/dispersion	3,960
Remaining volume	32,040

BP has conducted an analysis of the activities covered by this SDOCD and has concluded that the worst case discharge scenario associated with these activities does not exceed the worst case discharge scenario described in EP, S-7936. Because the worst case discharge scenario described in EP S-7936 does not exceed the worst case discharge scenario covered by BPXP's approved OSRP, the activities proposed in this EP also do not supersede the worst-case scenario in BPXP's GoM Regional OSRP filed by BP America Inc. (Operator No. 21372) on behalf of several companies listed in the plan including BP Exploration & Production Inc. (Operator No. 02481) confirmed in compliance and approved by BSEE on January 10, 2025. Pursuant to NTL No. 2008-G04, BP makes the following statement:

Since BP Exploration & Production Inc. has the capability to respond to the worst-case spill scenario included in its regional Oil Spill Response Plan approved on January 10, 2025, and since the worst-case scenario determined for our EP does not replace the worst-case scenario in our regional or sub-regional OSRP, BP certifies that it has the capability to respond, to the maximum extent practicable, to a worst-case discharge, or a substantial threat of such a discharge, resulting from the activities proposed in this SDOCD.

Wellbore data, geologic data, reservoir data, and fluid data used in modeling and making the WCD determination are provided in Appendix F in the Proprietary Information copies of the EP S-7936.

9.2 Oil Spill Response Discussion

Not conducting proposed activities that require reporting Oil Spill Response Discussion as per NTL 2008-04.

10 Environmental Monitoring and Mitigation Measures

10.1 Monitoring Systems

In addition to rig control engineered systems, operational personnel have been instructed to check for pollution frequently during their tour of duty and, if pollution is spotted, to identify and shut-off the source and make immediate notifications as per instructions provided in Section 8 of BP's certified OSRP. In accordance with the measures described in NMFS 2025 Biological Opinion and its attachments, a person onboard the vessel(s) will visually monitor the moonpool(s) using a remote camera system. Logs will be kept for each shift documenting the observed presence/absence of marine animals in the moonpool(s). If a protected species is observed in the moonpool(s), required reporting to the appropriate agencies will be made and BP will comply with ensuing guidance.

Also, in accordance with the provisions of Title 30 CFR § 250.713(g) and NTL 2018-G01 "Ocean Current Monitoring" dated August 7, 2018, the MODU will be equipped with an Acoustic Doppler Current Profile (ADCP) current monitoring system onboard to allow continuous monitoring and gathering of ocean current data on a real-time basis in the upper 1000 meters.

10.2 Incidental Takes

Mitigation measures described in Attachments 1-10 of the NMFS 2025 Biological Opinion will be implemented to the extent they are applicable to the activities outlined in this plan. Monitoring activities are conducted by personnel on vessels to prevent accidental loss of materials overboard, and to report sightings of injured/dead protected species. Reporting of dead/injured protected species is addressed in Annex 2 of BP's "Incident Notification and Investigation Procedure - Attachment 1". Additionally, to mitigate against incidental takes, activities will be conducted in adherence to 2020 revisions of BSEE NTL 2015-G03 "Marine Trash and Debris Awareness Training and Elimination"; BOEM NTL 2016-G01 "Vessel Strike Avoidance and Injured/Dead Protected Species Reporting" and BOEM NTL 2016-G02 "Implementation of Seismic Survey Mitigation Measures and Protected Species Observer Program", as necessary. As required by BSEE NTL 2015-G03, BP submits an annual certification letter for its Marine Debris Awareness Training Process. The marine debris awareness training is required annually by the BSEE and is identified by "BP's Gulf of Mexico (GoM) Environmental Training Matrix" and "BP's GoM Health, Safety, and Environmental (HSE) Training Needs Assessment," both of which are located on BP's GoM HSE website.

Further mitigation measures can be found throughout the supporting EIA found in **Appendix D**.

10.3 Flower Garden Banks National Marine Sanctuary

All proposed activities will occur outside of the Protective Zones of the Flower Garden Banks National Marine Sanctuary boundaries.

11 Lease Stipulations

Oil and gas exploration activities on the OCS are sometimes subject to mitigations in the form of lease stipulations.

11.1 Lease Stipulation Information

Lease Stipulation for Protected Species

Mitigation measures described in Attachments 1-10 of the NMFS 2025 Biological Opinion will be implemented to the extent they are applicable to the activities outlined in this plan. Additionally, all activities will be conducted in adherence to 2020 revisions of NTL 2015-G03 "Marine Trash and Debris Awareness Training and Elimination"; BOEM NTL 2016-G01 "Vessel Strike Avoidance and Injured/Dead Protected Species Reporting" and BOEM NTL 2016-G02 "Implementation of Seismic Survey Mitigation Measures and Protected Species Observer Program", as necessary. Mitigation to prevent takes varies based on the activity underway and it can include worker training on waste management and trash and debris containment procedures to avoid accidental loss overboard and its potential impact on protected species, and training on reporting of dead/injured protected species addressed in BP's Incident Notification and Investigation Procedure.

12 Related Facilities and Operations Information

12.1 Related OCS Facilities and Operations

The Fourier 7 project consists of a single well MC522 F007 (F-7) subsea tie-in to the existing subsea facilities at the South Oil Loop, more specifically to the spare hub on the F34 manifold at the Fourier Drill Center. The F-7 well will be drilled near Fourier F-4 (MC522-004). The primary top-hole location is about 195 ft southeast of the existing F34 Manifold. The F-7 tree will be tied into the existing F34 Manifold via an intermediate skid and two rigid jumpers. Chemicals, hydraulics, power and communication will be supplied by an existing in-field static umbilical to the F-7 tree.

Production from well MC522 007 (H-7) will be commingled with the other Fourier wells in the South Oil Loop system and will terminate at BP's existing Mississippi Canyon Area Block 474 A (Na Kika) FDPS, RUE OCS-G 23624. These incoming produced hydrocarbons will be separated and measured with the existing production processed at Na Kika.

The anticipated flow rates and shut-in times for the proposed pipeline are as follows:

Origination Point	Flow Rates	Shut-in Time
MC522 007	13.5 MMCF/D 17,500 BO/D	< 3 Minutes

12.2 Transportation System

The Na Kika production will be transported by the existing export pipeline system.

Gas production from subsea wells produced to the Na Kika facility will continue to be measured for sales and royalty purposes on the Na Kika Mississippi Canyon Block 474 A Platform, a semisubmersible FDPS, prior to delivery to shore via Operations System DTN.

Liquid hydrocarbons from subsea wells produced to the Na Kika facility will continue to be measured for sales and royalty purposes using a LACT unit located on this same facility prior to delivery to shore via Operations System No. 51.1.

12.3 Produced Liquid Hydrocarbon Transportation Vessels

According to NTL 2008-G04, this Section of the Plan is not applicable to the proposed operations.

13 Support Vessels and Aircraft Information

13.1 General

Type	Maximum Fuel Tank Storage Capacity	Maximum No. in Area at Any Time	Trip Frequency or Duration
Helicopter	760-gals	2	2 / week
Supply Boats	5,000-bbls	1	2 / week

13.2 Diesel Oil Supply Vessels

Not conducting proposed activities that require reporting Oil Spill Response Discussion as per NTL 2008-G04.

13.3 Drilling Fluids Transportation

There are no drilling operations proposed in this supplemental DOCD.

13.4 Solid and Liquid Wastes Transportation

Information about the transportation of solid and liquid wastes generated by proposed activities has been included in Appendix C.

13.5 Vicinity Map

A vicinity map depicting the location of the proposed activities relative to the shoreline, the distance of the proposed activities from the shoreline, and the primary route(s) of the support vessels and aircraft when traveling between the onshore support facilities and the project areas is included in Appendix B. In accordance with NMFS 2025 Biological Opinion and its attachments transit routes will avoid the Rice's whale core distribution area. As outlined in the table below, vessels will transit from shorebases in Louisiana to the blocks where activities will occur under this plan.

14 Onshore Support Facilities Information

14.1 General

The onshore support base for the proposed operations will be in Fourchon, Louisiana. Mississippi Canyon Block 520 is located approximately 130.1 miles from the existing onshore support base located in Fourchon, Louisiana, as indicated on the vicinity map in Appendix B.

The following table provides information of the existing onshore facility that will be used to provide supply and service support for the activities proposed in this plan.

Name	Location	Existing / New / Modified
C-Port	Fourchon, LA	Existing
Heliport	Houma, LA	Existing

BP will primarily use the existing C-Port Fourchon Shorebase located in Fourchon, Terrebonne Parish, Louisiana to support general vessel operations. No expansion of these physical facilities is expected to result from the proposed revised activities. The C-Port Fourchon facility is located approximately 130.1-miles from the general activity area, provides a vehicle parking lot, office space, radio communication equipment, outside and warehouse storage space, crane, forklifts, water and fueling facilities, and boat dock space. The base is in operation 24-hours each day. Helicopters will be based out of Houma, Louisiana.

A small amount of vessel and helicopter traffic may originate from bases other than those described above in order to address changes in weather conditions. It is expected that this vessel traffic will originate from bases and locations that are in the near vicinity of the bases previously described.

14.2 Support Base Construction or Expansion

BP will utilize existing support bases for the proposed activities and will not require the construction or expansion of additional support bases.

14.3 Waste Disposal

Information about the onshore facilities used to store and dispose of solid and liquid wastes generated by proposed activities has been included in Appendix C.

15 Coastal Zone Management Act (CZMA) Information

15.1 Consistency Certification

Coastal Zone Management Act consistency certifications, according to 15 CFR § 930.76(b) and (c), for the state of Alabama is included in **Appendix F**, as approved in S-7936.

16 Environmental Impact Analysis (EIA)

Attached as **Appendix D** is an Environmental Impact Analysis (EIA) prepared for the proposed project by CSA Ocean Sciences Inc., 8502 SW Kansas Ave, Stuart, FL 34997.

Mitigation measures described in NMFS 2025 Biological Opinion and its attachments will be implemented to the extent they are applicable to the activities outlined in this plan. Additionally, BOEM (or its predecessor, the Minerals Management Service) has conducted extensive environmental analyses examining the possible impacts produced by oil and gas exploration and production activities, which evaluated impacts from similar activities on the areas in the Gulf of Mexico covered by the present plan.

The EIA addresses potential impacts to environmental resources found in the deepwater Gulf of America (GoA), coastal habitats, protected areas, and onshore. Based on the activity set of the project, these included:

Physical disturbance to the seafloor, air emissions, effluent discharges, water intake, onshore waste disposal, marine debris, support vessel/helicopter traffic, and unintended releases to the marine environment.

The EIA outlines high level mitigation measures that will be in place to reduce associated potential impacts.

17 Administrative Information

17.1 Exempted Information Description

In accordance with 43 CFR Part 2, Appendix E, sections (4) and (9), the following information has been determined by the BOEM GoAR exempt from public disclosure:

Geologic Objectives (BHL, TVD and MD) on Form BOEM-0137

Production rates and life of reservoirs

Proprietary New or Unusual Technology

Geological and Geophysical Information (except for non-proprietary Shallow Hazard Assessment)

Hydrogen Sulfide Correlative Well Information

This information is excluded from the "Public Information" copies of the submitted plan.

17.2 Bibliography

Any previously submitted EP, DPP, DOCD, study report, survey report, or any other material referenced in this DOCD is listed below:

Plan Control No	Lease	Block	Operator Name	Operator Number	Plan Type Code	Final Action Code	Final Action Date
R-7376	G8823	MC 522	BP Exploration & Production Inc.	02481	REP	A	7/17/2025
R-7407	G8823	MC 522	BP Exploration & Production Inc.	02481	REP	A	12/2/2025
S-7936	G8823	MC 522	BP Exploration & Production Inc.	02481	EP	A	5/13/2019
R-6644	RUE 23624	MC 474	BP Exploration & Production Inc.	02481	DOCD	A	
R-4321	G08823 / 08832	MC 522/ 566	BP Exploration & Production Inc.	02481	DOCD	A	7/7/06
N-7476	G8823	MC 522	Shell Offshore Inc.	0689	DOCD	A	9/13/02

17.3 Other Reference Items

Biological Opinion on the Federally Regulated Oil and Gas Program Activities in the Gulf of Mexico. Office of Protected Resources, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, U.S. Department of Commerce (March 13, 2020, amended April 24, 2021)

Deepwater Horizon Containment and Response: Harnessing Capabilities and Lessons Learned.

BP America Inc, (BP), 2018, Site Clearance Letters, Proposed Well Location MC 522 "A" and "B" Block 522 OCS-G-08823 Mississippi Canyon Area, Gulf of Mexico, USA

Fugro Marine GeoServices, Inc. (FMGI), 2017, "AUV Shallow Geohazards and Archaeological Assessment, Fourier Deep Prospect Area, Block 522, Mississippi Canyon, Gulf of Mexico." FGSI Report No. 1166-FourierDeep. Houston, Texas, USA. Submitted to BP August, 2017.

Gardline Surveys, Inc., 2005, "3D Geohazard Assessment, Gulf of Mexico-Mississippi Canyon, Blocks MC338-342, MC382-386, MC426-431, MC470-479, MC517-523, MC561-567 & MC605-608, Na Kika Prospect." Gardline, Houston, Texas, Project Ref. 6364, issued to BP America Inc., 01 April, 2005.

Environmental Impact Analysis for a Revised Exploration Plan for Mississippi Canyon Block 522, CSA Ocean Sciences Inc. April 2025

Coastal Zone Management Consistency Certification State of Louisiana for Mississippi Canyon Block 522, CSA Ocean Sciences Inc. April 2019

17.4 Service Processing Fee

A receipt in the amount of \$ \$5,565.00 for the service processing fee as required by 30 CFR § 550.125 is included in **Appendix G**.

Appendices

Appendix A: OCS Plan Information Forms – Form BOEM-0137

Appendix B: Vicinity, Location and Bathymetry Plats

Appendix C: Waste and Discharge Information

Appendix D: Environmental Impact Assessment

Appendix E: Air Emissions Information – Form BOEM-0139

Appendix F: Coastal Zone Management Certifications (AL)

Appendix G: Service Fee

Appendix A: OCS Plan Information Forms – Form BOEM-0137

OCS PLAN INFORMATION FORM

General Information

Type of OCS Plan: <input checked="" type="checkbox"/> Exploration Plan (EP)	Development Operations Coordination Document (DOCD)			<input checked="" type="checkbox"/>
Company Name: BP Exploration & Production, Inc.		BOEM Operator Number: 02481		
Address: 501 Westlake Park Boulevard		Contact Person: Kathi Gamiotea		
		Phone Number: 346-640-6725		
Houston, Texas 77079		E-Mail Address: Kathi.Gamiotea@bp.com		
If a service fee is required under 30 CFR 550.125(a), provide the		Amount paid	\$5,565.00	Receipt No.
				27O3DQVQ

Project and Worst-Case Discharge (WCD) Information

Lease(s): G08223		Area: MC	Block(s): 522	Project Name (If Applicable): F2Z a/k/a F007	
Objective(s)	<input checked="" type="checkbox"/> Oil	<input type="checkbox"/> Gas	Sulphur	Salt	Onshore Support Base(s): Fourchon, LA
Platform/Well Name: MC 522 007		Total Volume of WCD: 2.14 MMSTB0			API Gravity: 27.1°
Distance to Closest Land (Miles): 72.9 sm		Volume from uncontrolled blowout: 36,000 STBO/day			
Have you previously provided information to verify the calculations and assumptions for your WCD?					<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
If so, provide the Control Number of the EP or DOCD with which this information was provided					
Do you propose to use new or unusual technology to conduct your activities?					
Do you propose to use a vessel with anchors to install or modify a structure?					
Do you propose any facility that will serve as a host facility for deepwater subsea development?					

Description of Proposed Activities and Tentative Schedule (Mark all that apply)

Proposed Activity	Start Date	End Date	No. of Days
Exploration drilling			
Development drilling			
Well completion			
Well test flaring (for more than 48 hours)			
Installation of well jumper and flowline jumper, and associated flying leads and commission subsea infrastructure	June 2026	July 2026	~30 days
Commence production	July 2026	July 2026	~1 day
Other (Specify and attach description)			

Description of Drilling Rig

Description of Structure

Jackup	<input checked="" type="checkbox"/>	Drillship		Caisson		Tension leg platform
Gorilla Jackup		Platform rig		Fixed platform		Compliant tower
Semisubmersible		Submersible		Spar		Guyed tower
DP Semisubmersible		Other (Attach Description)		Floating production system		Other (Attach Description)
Drilling Rig Name (If Known):						

Description of Lease Term Pipelines

From (Facility/Area/Block)	To (Facility/Area/Block)	Diameter (Inches)	Length (Feet)
Tree	Tie-in SLED	6.625	85
Tie-in SLED	F34 Manifold (ZZZ-3853)	6.625	85

OCS PLAN INFORMATION FORM (CONTINUED)
Include one copy of this page for each proposed well/structure

Proposed Well/Structure Location												
Well or Structure Name/Number (If renaming well or structure, reference previous name): "A" a/k/a F7				Previously reviewed under an approved EP or DOCD? EP R-7376 and REP R-7407			<input checked="" type="checkbox"/>	Yes		No		
Is this an existing well or structure?		Yes	<input checked="" type="checkbox"/>	No	If this is an existing well or structure, list the Complex ID or API No.							
Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities?										Yes	<input checked="" type="checkbox"/>	No
WCD info	For wells, volume of uncontrolled blowout (Bbls/day): 36,000			For structures, volume of all storage and pipelines (Bbls):			API Gravity of fluid		27.1°			
	Surface Location			Bottom-Hole Location (For Wells)			Completion (For multiple completions, enter separate lines)					
Lease No.	OCS-G 08823						OCS OCS					
Area Name	Mississippi Canyon											
Block No.	522											
Blockline Departures (in feet)	N/S Departure: F____ L 3,195 ft FSL			N/S Departure: F____ L			N/S Departure: F____ L N/S Departure: F____ L N/S Departure: F____ L		E/W Departure: F____ L E/W Departure: F____ L E/W Departure: F____ L			
Lambert X-Y coordinates	X: 1,285,743.6 ft E			X:			X: X: X:		Y: Y: Y:			
Latitude/Longitude	Y: 10,330,875.0 ft N			Y:			Y: Y: Y:		Y: Y: Y:			
	Latitude 28° 27' 48.138" N			Latitude			Latitude Latitude Latitude		Longitude Longitude Longitude			
	Longitude 88° 06' 15.085" W			Longitude			Longitude Longitude Longitude					
Water Depth (Feet): 6,934				MD (Feet):		TVD (Feet)		MD (Feet):	TVD (Feet):			
Anchor Radius (if applicable) in feet:				N/A				MD (Feet):	TVD (Feet):			
Anchor Locations for Drilling Rig or Construction Barge (If anchor radius supplied above, not necessary)												
Anchor Name or No.	Area	Block	X Coordinate		Y Coordinate		Length of Anchor Chain on Seafloor					
			X =		Y =							
			X =		Y =							
			X =		Y =							
			X =		Y =							
			X =		Y =							
			X =		Y =							
			X =		Y =							

Form BOEM-0137 (October 2024 - Supersedes all previous editions of this form which may not be used.)

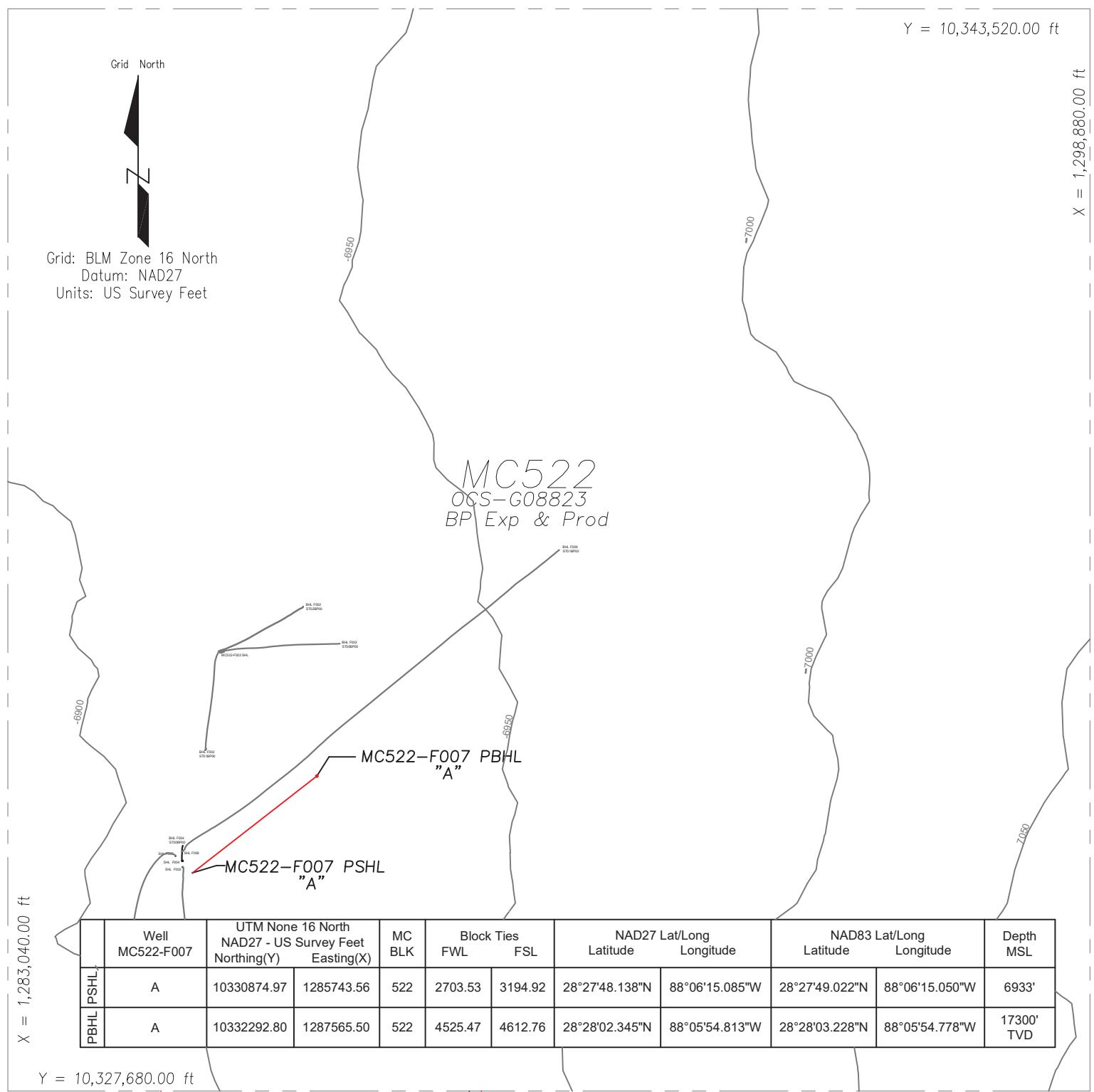
Include one copy of this page for each proposed well/structure

OCS PLAN INFORMATION FORM (CONTINUED)

Proposed Well/Structure Location

Well or Structure Name/Number (If renaming well or structure, reference previous name): "B" a/k/a F7				Previously reviewed under an approved EP or DOCD? EP R-7376 and REP R-7407			<input checked="" type="checkbox"/>	Yes		No			
Is this an existing well or structure?		<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>	No	If this is an existing well or structure, list the Complex ID or API No.							
Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities?										<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	No
WCD info	For wells, volume of uncontrolled blowout (Bbls/day): 36,000			For structures, volume of all storage and pipelines (Bbls):			API Gravity of fluid		27.1°				
	Surface Location			Bottom-Hole Location (For Wells)			Completion (For multiple completions, enter separate lines)						
Lease No.	OCS-G 08823						OCS OCS						
Area Name	Mississippi Canyon												
Block No.	522												
Blockline Departures (in feet)	N/S Departure: F_____L 3,168 ft FSL			N/S Departure: F_____L			N/S Departure: F_____L		N/S Departure: F_____L				
	E/W Departure: F_____L 2,656 ft FWL			E/W Departure: F_____L			E/W Departure: F_____L		E/W Departure: F_____L				
Lambert X-Y coordinates	X: 1,285,695.9 ft E			X:			X:		X:				
	Y: 10,330,848.0 ft N			Y:			Y:		Y:				
Latitude/Longitude	Latitude 28° 27' 47.867" N			Latitude			Latitude						
	Longitude 88° 06' 15.616" W			Longitude			Longitude						
Water Depth (Feet): 6,934				MD (Feet):		TVD (Feet)		<input type="checkbox"/>	<input type="checkbox"/>	TVD (Feet):			
Anchor Radius (if applicable) in feet:				N/A				<input type="checkbox"/>	<input type="checkbox"/>	TVD (Feet):			
Anchor Locations for Drilling Rig or Construction Barge (If anchor radius supplied above, not necessary)													
Anchor Name or No.	Area	Block	X Coordinate		Y Coordinate		Length of Anchor Chain on Seafloor						
			X =		Y =								
			X =		Y =								
			X =		Y =								
			X =		Y =								
			X =		Y =								
			X =		Y =								
			X =		Y =								

Appendix B: Vicinity, Location and Bathymetry Plots



Notes:

- 1) All data hereon based on BLM Zone 16 North, NAD27, US Survey feet, unless otherwise noted;
 - 2) All coordinate transformations by NADCON 2.0, or better equivalent software;

”Bathymetry Information”



BP EXPLORATION AND PRODUCTION
Proposed Well EP Location OCS-G08823 MC522 F007
Mississippi Canyon Area (OPD# NH16-10) Block 522 Offshore Federal
Plat prepared by Kyle Beeson, Surveyor, bp America, Inc.

Scale 1" = 2000 ft
Date: 21 March 2025

BKB

Y = 10,343,520.00 ft



Grid: BLM Zone 16 North
 Datum: NAD27
 Units: US Survey Feet

X = 1,298,880.00 ft

MC522
 OCS-G08823
 BP Exp & Prod

MC522-F007 946

PSHL PSHL
 "A" MC522-F007 PSHL

X = 1,283,040.00 ft

Y = 10,327,680.00 ft

Notes:

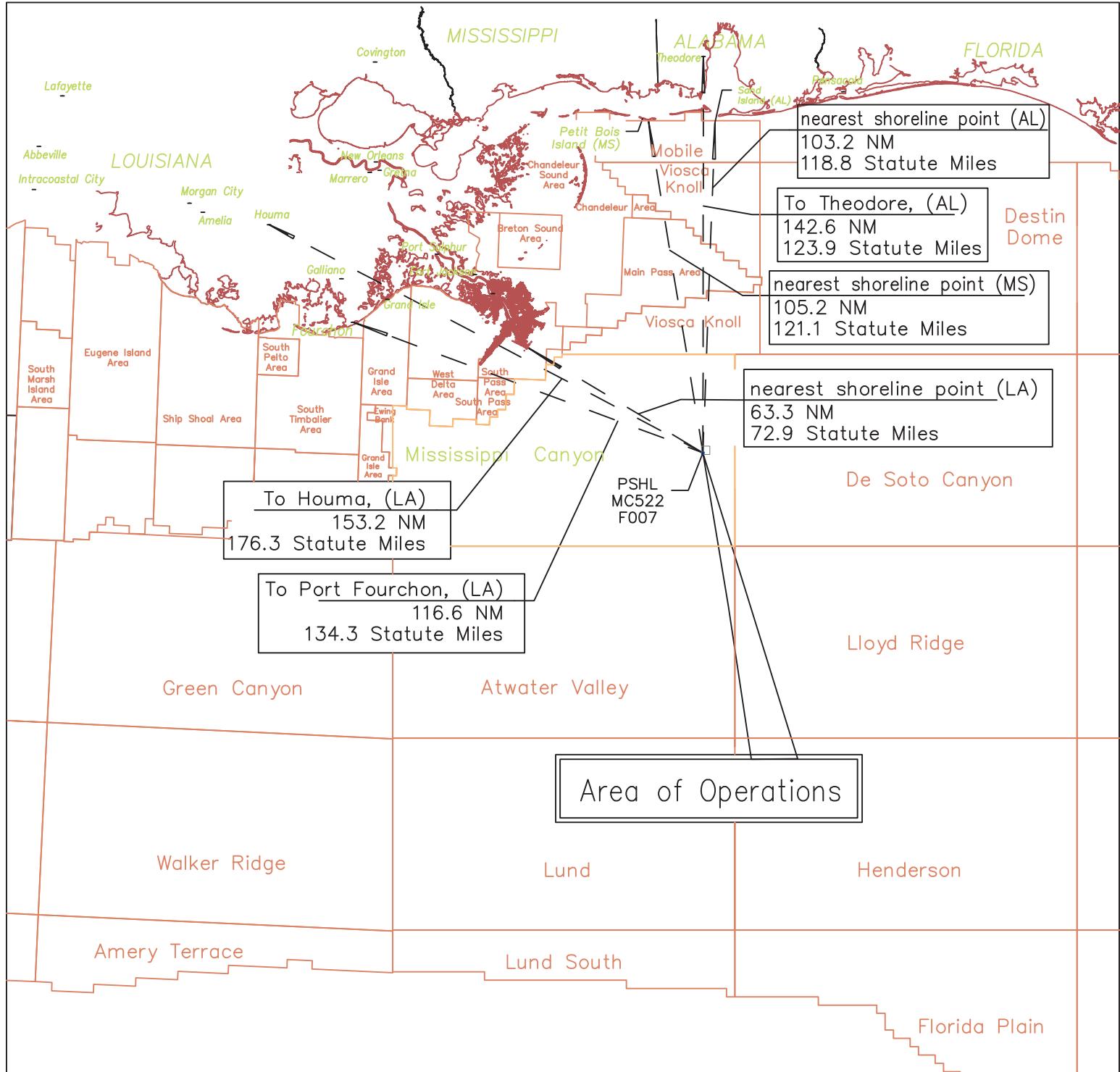
- 1) All data hereon based on BLM Zone 16 North, NAD27, US Survey feet, unless otherwise noted;
- 2) All coordinate transformations by NADCON 2.0, or better equivalent software;

”Public Information”

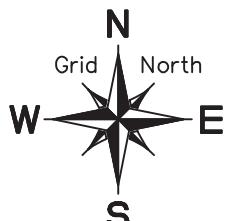


BP EXPLORATION AND PRODUCTION
 Proposed Well EP Location OCS-G08823 MC522 F007
 Mississippi Canyon Area (OPD# NH16-10) Block 522
 Offshore Federal
 Plat prepared by: Kyle Beeson, Surveyor, bp America, Inc.

Scale 1" = 2000 ft
Date: 21 March 2025
BKB



Note: Nearest Louisiana shoreline distance was computed from the Proposed Surface Location of the MC522 F007 to the nearest shoreline feature as represented in the NOAA 1:24k Continuously Updated Shoreline Product (CUSP). This vector Database is a more current, detailed, and correct representation of the actual shoreline than the NOAA 1:80k Medium-Resolution Vector Shoreline Database, which was based on medium-scale charts compiled by NOAA in the 1980's and which no longer accurately reflects the actual shoreline position in many locations, especially along the Mississippi River Delta.



Grid: BLM Zone 16 North
Datum: NAD27
Units: US Survey Feet

"VICINITY CHART"



BP EXPLORATION AND PRODUCTION
Proposed Well EP Location OCS-08823 MC522
Mississippi Canyon Area (OPD# NH16-10) Block 522
Plat prepared by: Kyle Beeson, Surveyor, BP America, Inc.

Scale 1" = 50 miles
Date: 26 March 2025
Offshore Federal
BKB

Appendix C: Waste and Discharge Information

Drilling Vessel Operator		Callsign:	MMSI:	IMO:	USCG VGP
Black Lion (DP drillship)		Diamond	V7CSS	538005314	9618903
Parameters		per day	campaign (with 10% markup)	BP Drilling Discharge	
Days on site	DRL + CPL	60	Est DRL NTE	30	Est CPL NTE
POB	210			30	this is the # of days + 10% used to calculate all MODU discharges below
DECK DRAINAGE					
Length (ft)	757.0	Ft	228.336 m		
Width - Breadth (Ft)	118	Ft	42 m		
Topside ft2	89326	area ft2			
		rainfall in/day	total ft3/day	total bbl/day	total bbl for duration
Rain	89326	0.16	1191	212	14000
			gal/day	bbl/day	
Deck Cleaning		500		12	786
Deck Drainage Total				224	14786 *
SANITARY WASTE		Total GPD		total bbl/day	total bbl for duration
Black Water treated	6 GPD/P	1260		30	1980 *
DOMESTIC WASTE					NO
	GPD/P	Total GPD		total bbl/day	total bbl for duration
Gray Water	45	9450		225.0	14850
Food Maceration	0.0365	7.665		0.2	12
Domestic Waste Total				225	14862 *
UNCONTAMINATED BALLAST WATER		6019		397,254 *	No
UNCONTAMINATED BILGE WATER		69		4,554 *	No
Fire Water - Miscellaneous Discharge		Total GPD		total bbl/day	total bbl for duration
Circulating Pump		50		1	79
Weekly Training	9.428571429 # days	3000		71	4,714
				73	4793 *
discharge firewater is based on drill ship design 2025					NO
COOLING WATER/UTILITY WATER		993287		65,556,942 *	No
DESALINATION UNIT DISCHARGE		44563		2,941,127 *	No
Evaporator SW Feed Pump Flow Rate (3 pump)			Conclusion		
m3/Hr.	m3/day	bbl/day			
			Any salt water not being turned into fresh water is pumped out as "Brine"		
King Water Produced from Evaporators (3 Ev)					
m3/Hr	m3/day	bbl/day			
4.79	115	723.3155	Total FW Produced	723	
			Total Brine Produced	44563	
BOP Fluid - Open vent to sea BOP system	So 125.88 bbls divided by 30 days = 4.196 bbls/day	4.2		277.2 *	Yes
<p><i>"BOP Vent to Sea system - Based on a seven day function test and twenty one day pressure test rotation, and regulatory requirement to function test both pods/remote panel including flushing choke/kill lines every tour, we average 28.53bbls (1,198.4gal) a week. To include also, 21 day shear ram function test fluid use of 5.88bbls (247.2 gal), and 30 day shear ram pressure test rotation of 5.88bbls (247.2gal). This would give us an approximate total of 125.88bbls (5,286.96 gal) of BOP function fluid used in a month. At this time running 4.5% Erfon 603 BOP control fluid."</i></p>					
PRODUCED WATER - from DRL Eng or CPL Eng tab		2		132	No
See below from the rig's 1 st Engineer on produced water calculation:		Total bbl/day	Total bbl for duration (above)	QaQc	
	Deck Drainage	224	14786	14786	
	Sanitary Waste	30	1980	1980	
	Domestic Waste	225	14862	14862	
	Ballast Water	6019	397,254	397254	
	*Bilge Water	69	4,554	4554	
	Fire Water* pump discharge + weekly Trn	73	4793	4793	
	Cooling Water	993287	65,556,942	65556942	
	Desalination (R.O.)	44563	2,941,127	2941127	
	BOP Fluid	4.2	277.2	277	
	Produced Water	2	132	132	
STORAGE CAPACITIES - WCD					
Liquid Mud Tank		15204			
Synthetic Mud Base Oil tank		7209			
Brine Tank		13175			
Drill Water Tank		18593			
Potable Water Tank		8834			
Bulk Storage - barite bentonite	cubic feet	16315			
Bulk Storage - cement	cubic feet	15891			
Sack Storage	cubic feet	6000			

TABLE 2. WASTES YOU WILL TRANSPORT AND /OR DISPOSE OF ONSHORE

Please specify whether the amount reported is a total or per well				Number of operational days:	30	Asset Name:	Black Hornet
Well Name: F007 Subsea Infrastructure		Projected generated waste	Solid and Liquid Wastes transportation		Waste Disposal		
Type of Waste	Composition	Transport Method		Name/Location of Facility	Quantity	Units	Disposal Method
Will drilling occur ? If yes, fill in the muds and cuttings.							
Unused Synthetic-based drilling fluid	SBM from service - has not been downhole	Liquid mud storage on workboat	Baroid / MI Swaco Fouchon LA				For Reclamation & re-use
Synthetic-based drilling mud solids and barite	SBM and barite from pit cleanout	Barged in (15 or 25 barrel cutting boxes)	Ecoserv / R360 Fouchon, LA	72	bbls/well		Landfill/ Deepwell injection on land
Contaminated Synthetic base mud	SBM interface	Barged in (15 or 25 barrel cutting boxes)	Ecoserv / R360, Fouchon, LA		bbls/well		Landfill/ Deepwell injection on land
Used Synthetic base mud - from downhole	SBM from downhole - sent in to vendor for reuse	Liquid mud storage on workboat	Baroid / MI Swaco Fouchon LA				For Reclamation & re-use
Drilling mud contaminated absorbents	Absorbent pads contaminated with drilling muds	Barged in (Omega 2 yard boxes)	Omega Waste Management, Patterson, LA		tons/well		Recycle
Excess barite	Excess barite from vessel tank cleaning	Barged in (supersacks)	River Birch Landfill, Avondale, LA		tons/well		Reuse / Landfill
Excess cement	Excess cement from vessel tank cleaning	Barged in (supersacks)	River Birch Landfill, Avondale, LA	2.4	tons/well		Reuse / Landfill
Rig Drilling washwater	Cleaning out of mud tanks	Barged in (15 or 25 barrel cutting boxes)	Ecoserv / R360, Fouchon LA	447	bbls/well		Landfill/ Deepwell injection on land
Contaminated Completion Fluids	Used Completion fluids	Barged in (15 or 25 barrel cutting boxes)	Ecoserv / R360 Fouchon LA		bbls/well		Landfill/ Deepwell injection on land
Completion Fluids	Used Completion fluids	Liquid storage tanks on workboat	Ecoserv / MI Swaco Fouchon LA		bbls/well		Landfill/ Deepwell injection on land
Will you produce hydrocarbons? If yes fill in for produced sand.							
Will you have additional wastes that are not permitted for discharge? If yes, fill in the appropriate rows.							
Well Related Hazardous Waste	Rig lab titrations containing isopropanol alcohol, silver nitrate etc.	Barged in (5 gallon DOT containers)	Chemical Waste Management, Sulphur, LA	0.018	ton/well		Incineration / Landfill
Rig Maintenance Wastes (painting, blasting)	Paint thinner, paint chips, blast media, aerosol cans	Barged in (drums or totes)	River Birch Landfill, Avondale, LA and Chemical Waste Management, Sulphur, LA	9	ton/well		Incineration / Landfill
Rig Maintenance Wastes (non hazardous)	Oily rags, pads, oil filters etc.	Barged in (totes)	Omega Waste Management, Patterson, LA	4.2	ton/well		Reuse / Landfill
Rig Used oil	Lube oil, hydraulic oil, glycol	Barged in (drums)	Omega Waste Management, Patterson, LA	1.8	bbls/well		Recycle
Domestic waste	Municipal trash	Barged in (supersacks)	River Birch Landfill, Avondale, LA	0.75	ton/well		Incineration / Landfill
Scrap Metal	scrap piping, grating and other metals	Barged in (scrap baskets)	Southern Scrap, Houma, LA	6.9	ton/well		Recycle
Universal Waste	Batteries	Barged in (DOT drums)	LEI, Hammond, LA	0.12	ton/well		Recycle
Universal Waste	Fluorescent light bulbs	Barged in (DOT drums)	LEI, Hammond, LA	0.03	ton/well		Recycle
Misc. unused chemical	Pills, spacers, additives etc.	Barged in (totes)	River Birch Landfill, Avondale, LA	102	bbls/well		Recycle

Appendix D: Environmental Impact Assessment

Environmental Impact Analysis

for a

Supplemental Development Operations Control Document
for
Mississippi Canyon Block 522 (OCS-G 08823)

Offshore Louisiana

December 2025

Prepared for:

BP Exploration & Production Inc.
501 Westlake Park Boulevard
Houston, Texas 77079-2696

Prepared by:

CSA Ocean Sciences Inc.
8502 SW Kansas Avenue
Stuart, Florida 34997
Telephone: (772) 219-3000

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Acronyms and Abbreviations

§	section	NAAQS	National Ambient Air Quality Standards
µPa	micropascal	NH ₃	ammonia
ac	acre	NMFS	National Marine Fisheries Service
bbl	barrel	NOAA	National Oceanic and Atmospheric Administration
BOEM	Bureau of Ocean Energy Management	NO _x	nitrogen oxides
BOEMRE	Bureau of Ocean Energy Management, Regulation and Enforcement	NPDES	National Pollutant Discharge Elimination System
BOP	blowout preventer	NTL	Notice to Lessees and Operators
BOPD	barrels of oil per day	NWR	National Wildlife Refuge
bp	bp Exploration & Production Inc.	OCS	Outer Continental Shelf
BSEE	Bureau of Safety and Environmental Enforcement	OSRA	Oil Spill Risk Analysis
CFR	Code of Federal Regulations	PAH	polycyclic aromatic hydrocarbons
CH ₄	methane	Pb	lead
CO	carbon monoxide	PBR	potential biological removal
CO ₂	carbon dioxide	PM	particulate matter
dB	decibel	PSO	protected species observer
DOCD	Development Operations Coordination Document	re	referenced to
DP	dynamically positioned	ROSRP	Regional Oil Spill Response Plan
DPS	distinct population segment	RWA	Rice's Whale Area
EEZ	Exclusive Economic Zone	SEL _{24h}	sound exposure level over 24 hours
EFH	Essential Fish Habitat	SO _x	sulfur oxides
EIA	Environmental Impact Analysis	SPL	root-mean-square sound pressure level
EIS	Environmental Impact Statement	SWSS	Sperm Whale Seismic Study
ESA	Endangered Species Act	TTS	temporary threshold shift
FAD	fish aggregating device	USCG	U.S. Coast Guard
FR	<i>Federal Register</i>	USEPA	U.S. Environmental Protection Agency
GPS	global positioning system	USFWS	U.S. Fish and Wildlife Service
GMFMC	Gulf of Mexico Fishery Management Council	VOC	volatile organic compound
H ₂ S	hydrogen sulfide	WCD	worst case discharge
ha	hectare		
HAPC	Habitat Area of Particular Concern		
Hz	hertz		
IMT	Incident Management Team		
IPF	impact-producing factor		
kHz	kilohertz		
MARPOL	International Convention for the Prevention of Pollution from Ships		
MC	Mississippi Canyon		
MMC	Marine Mammal Commission		
MMPA	Marine Mammal Protection Act		
MMS	Minerals Management Service		

Introduction

BP Exploration & Production Inc. (bp) is submitting a Supplemental Development Operations Coordination Document (SDOCD) for Mississippi Canyon (MC) Block 522, Gulf of America on the United States Outer Continental Shelf.

Under this SDOCD, bp proposes to install a one-well tie in to the South Oil Loop at the Fourier Drill Center. The drilling of MC522 007 (F007) was included under Revised Exploration Plan (R-7376) approved on July 15, 2025. A new SLED toe-in structure will be installed on the surface of the seafloor that will connect the F-7 well to the jumper and flowline jumper. Chemical, hydraulics, power, and communications will be supplied by the existing F-56 dynamic umbilical. A dynamically positioned (DP) installation vessel is anticipated to be on site for approximately 143 days.

The project area is located within the Central Gulf of America OCS Planning Area, approximately 69 statute miles (111 km) from the nearest shoreline (Plaquemines Parish, Louisiana), 134 statute miles (216 km) from the regional onshore support base (Port Fourchon, Louisiana), and 174 statute miles (280 km) from the helicopter base at Houma, Louisiana (**Figure 1**). The water depth at the proposed project location is approximately 2,113 m (6,934 ft).

The Environmental Impact Analysis (EIA) for this SDOCD was prepared for submittal to the Bureau of Ocean Energy Management (BOEM) in accordance with applicable regulations, including Title 30 Code of Federal Regulations (CFR) section (§) 550.242 and § 550.561. The EIA is a project- and site-specific analysis of the potential environmental impacts of bp's planned activities. The EIA complies with guidance provided in existing Notices to Lessees and Operators (NTLs) issued by BOEM and its predecessors, Minerals Management Service (MMS) and Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE), including NTLs 2008-G04 (extended by 2015-N02) and 2015-N01. Potential impacts have been analyzed at a broader level in the 2024-2029 Programmatic Environmental Impact Statement (EIS) for the OCS Oil and Gas Leasing Program (BOEM, 2023a), the 2025 NMFS Biological Opinion (NMFS, 2025a), and in multisale EISs for the Western and Central Gulf of America Planning Areas (BOEM, 2012a,b; 2013; 2014a; 2015; 2016b; 2017; 2023b). The most recent multisale EIS contains updated environmental baseline information in light of the Macondo (*Deepwater Horizon*) incident and addresses potential impacts of a catastrophic spill (BOEM, 2012a,b; 2013; 2014a; 2015; 2016b; 2017). The National Marine Fisheries Service (NMFS) Biological Opinion on the Federally Regulated Oil and Gas Program Activities in the Gulf of America assesses impacts and requires additional mitigation measures for protected species (NMFS, 2025a). The analyses and relevant information from those documents are incorporated in this EIA by reference.

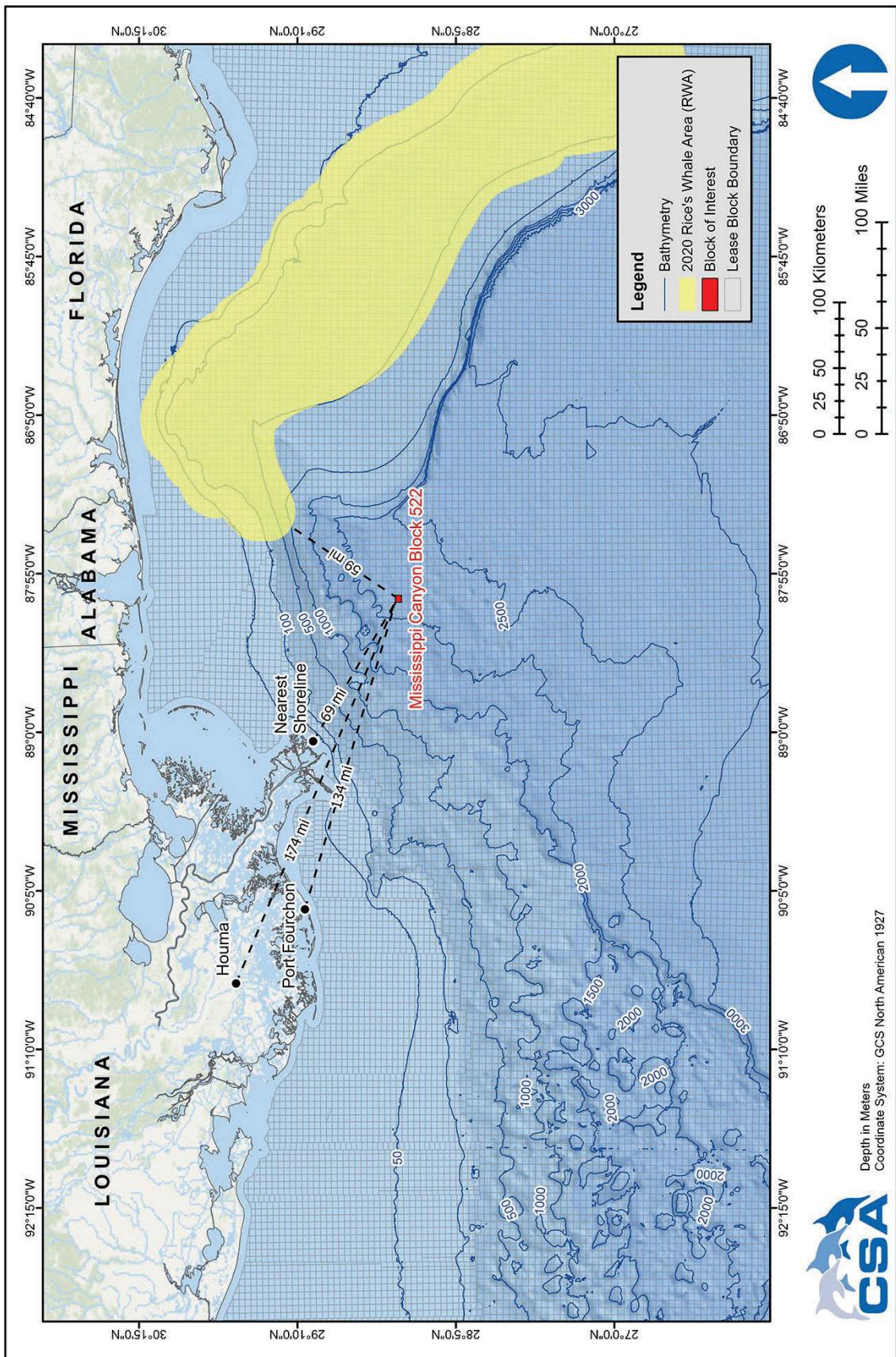


Figure 1. Location of Mississippi Canyon Block 522 relative to the northern Gulf of America shoreline and offshore bathymetric contours.

All proposed activities in this SDOCD are governed by the bp Regional Oil Spill Response Plan (ROSRP), as filed by BP America Inc. (Operator No. 21372) under cover letter dated 9 December 2024, on behalf of several affiliated companies, including BP Exploration & Production Inc. (Operator No. 02481). The RROSRP was confirmed in compliance and approved by the Bureau of Safety and Environmental Enforcement (BSEE) on 10 January 2025.

The bp RROSRP should meet the requirements contained in 30 CFR Part 254, and, as operator, bp (Operator No. 02481) has demonstrated oil spill financial responsibility for the facilities proposed in this SDOCD, according to 30 CFR Part 553 and NTL No. 2008-N05, "Guidelines for Oil Spill Financial Responsibility for Covered Facilities." The bp RROSRP details the plan for response to manage oil spills that may result from drilling and production operations with a response program based on regional capabilities to address spills ranging from small operations-related spills to a worst-case discharge (WCD) from a well blowout. The program, as detailed in bp's RROSRP, is intended to meet requirements of the relevant coastal states and applicable federal oil spill planning regulations. It also includes information regarding bp's incident management team (IMT) and dedicated response assets, potential spill risks, and local environmentally sensitive areas. The RROSRP describes personnel and equipment mobilization, the IMT organization, and an overview of strategies, actions and notifications to be taken in the event of a spill.

The EIA is organized into **Sections A** through **I** corresponding to the information required by NTLs 2008-G04 and 2015-N01. The main impact-related discussions are in **Section A** (Impact-Producing Factors) and **Section C** (Impact Analysis). **Table 1** lists and summarizes the NTLs applicable to the EIA.

Table 1. Notices to Lessees and Operators (NTLs) applicable to the Environmental Impact Analysis (EIA).

NTL	Title	Summary
BOEM-2020-G01	Air Quality Information Requirements for Exploration Plans, Development Operations Coordination Documents, and Development and Production Plans in the Gulf of Mexico Region	Cancels and supersedes the air emission information portion of NTL 2008-G04, Information Requirement for Exploration Plans and Development Operations Coordination Documents, effective date May 5, 2008.
BOEM-2016-G01 or Attachment 3 (NMFS, 2025a)	Vessel Strike Avoidance and Injured/Dead Protected Species Reporting	Recommends protected species identification training; recommends that vessel operators and crews maintain a vigilant watch for marine mammals and slow down or stop their vessel movement to avoid colliding with protected species; and requires operators to report sightings of any injured or dead protected species. This NTL may be reissued to address instances where guidance in the 2025 NMFS Biological Opinion (NMFS, 2025a) differs from the guidance provided in this NTL.

Table 1. (Continued).

NTL	Title	Summary
BOEM-2016-G02 or Attachment 1 (NMFS, 2025a)	Implementation of Seismic Survey Mitigation Measures and Protected Species Observer Program	Summarizes seismic survey mitigation measures, updates regulatory citations, and provides clarification on how the measures identified in the NTL will be used by BOEM, BSEE, and operators in order to comply with the Endangered Species Act and the Marine Mammal Protection Act. This NTL may be reissued to address instances where guidance in the 2025 NMFS Biological Opinion (NMFS, 2025a) differs from the guidance provided in this NTL.
2015-G03 or Attachment 2 (NMFS 2025a)	Marine Trash and Debris Awareness and Elimination	Instructs operators to exercise caution in the handling and disposal of small items and packaging materials; requires the posting of instructional placards at prominent locations on offshore vessels and structures; and mandates a yearly marine trash and debris awareness training and certification process.
BOEM 2015-N02	Elimination of Expiration Dates on Certain Notices to Lessees and Operators Pending Review and Reissuance	Eliminates expiration dates (past or upcoming) of all NTLs currently posted on the BOEM website.
BOEM 2015-N01	Information Requirements for Exploration Plans, Development and Production Plans, and Development Operations Coordination Documents on the OCS for Worst Case Discharge (WCD) and Blowout Scenarios	Provides guidance regarding information required in WCD descriptions and blowout scenarios.
BOEM 2014-G04	Military Warning and Water Test Areas	Provides contact links to individual command headquarters for the military warning and water test areas in the Gulf of America.
BSEE 2014-N01	Elimination of Expiration Dates on Certain Notices to Lessees and Operators Pending Review and Reissuance	Eliminates expiration dates (past or upcoming) of all NTLs currently posted on the BSEE website.
BSEE-2012-N06	Guidance to Owners and Operators of Offshore Facilities Seaward of the Coast Line Concerning Regional Oil Spill Response Plans	Provides clarification, guidance, and information for preparation of regional Oil Spill Response Plans. Recommends description of response strategy for WCD scenarios to ensure capability to respond to oil spills is both efficient and effective.

Table 1. (Continued).

NTL	Title	Summary
2010-N10	Statement of Compliance with Applicable Regulations and Evaluation of Information Demonstrating Adequate Spill Response and Well Containment Resources	Informs operators using subsea blowout preventers (BOPs) or surface BOPs on floating facilities that applications for well permits must include a statement signed by an authorized company official stating that the operator will conduct all activities in compliance with all applicable regulations, including the increased safety measures regulations (75 <i>Federal Register</i> [FR] 63346). Informs operators that BOEM will be evaluating whether each operator has submitted adequate information demonstrating that it has access to and can deploy containment resources to respond promptly to a blowout or other loss of well control.
2009-G40	Deepwater Benthic Communities	Provides guidance for avoiding and protecting high-density deepwater benthic communities (including chemosynthetic and deepwater coral communities) from damage caused by OCS oil and gas activities in water depths >300 m (984 ft). Prescribes separation distances of 610 m (2,000 ft) from each mud and cuttings discharge location and 76 m (250 ft) from all other seafloor disturbances.
2009-G39	Biologically Sensitive Underwater Features and Areas	Provides guidance for avoiding and protecting biologically sensitive features and areas (i.e., topographic features, pinnacles, low relief live bottom areas, and other potentially sensitive biological features) when conducting OCS operations in water depths <300 m (984 ft) in the Gulf of America.
2008-G04	Information Requirements for Exploration Plans and Development Operations Coordination Documents	Provides guidance on information requirements for OCS plans, including EIA requirements and information regarding compliance with the provisions of the Endangered Species Act and Marine Mammal Protection Act.
2008-N05	Guidelines for Oil Spill Financial Responsibility (OSFR) for Covered Facilities	Provides clarification and guidance to operators/lessees on policies for submitting required OSFR documents to the Gulf of America OCS Region as required under 30 CFR Part 253.

BOEM = Bureau of Ocean Energy Management; BSEE = Bureau of Safety and Environmental Enforcement;

NMFS = National Marine Fisheries Service; OCS = Outer Continental Shelf.

A. Impact-Producing Factors

Based on the description of bp's proposed activities, a series of impact-producing factors (IPFs) have been identified as presented in **Table 2**. **Table 2** provides a matrix of environmental resources that may be affected in the left column and sources of impacts (i.e., IPFs) associated with the proposed project across the top. **Table 2**, adapted from Form BOEM-0142, has been developed a priori to focus the impact analysis on those environmental resources that may be impacted as a result of one or more IPFs. The tabular matrix indicates which of the routine activities and accidental events could affect specific resources. An "X" indicates that an IPF could reasonably be expected to affect a certain resource, and a dash (--) indicates no impact or negligible impact (**Table 2**). Where there may be an effect, an impact analysis by resource is provided in **Section C**. Potential IPFs for the proposed activities are listed below and briefly discussed in the following sections:

- Installation vessel presence (including sound and lights);
- Physical disturbance to the seafloor;
- Air pollutant emissions;
- Effluent discharges;
- Water intake;
- Onshore waste disposal;
- Marine debris;
- Support vessel and helicopter traffic (includes vessel collisions with resources and marine sound); and
- Accidents.

A.1 Installation Vessel Presence, Marine Sound, and Lights

The activities proposed in this SDOCD will be completed using a DP installation vessel. DP vessels use a global positioning system (GPS), specific computer software, and sensors in conjunction with a series of thrusters to maintain position. Through satellite navigation and position reference sensors, the location of the associated project vessels is precisely monitored while thrusters, positioned at various locations about the rig pontoons, are activated to maintain position. This allows operations at sea in areas where mooring or anchoring may not be best suited or feasible. The selected installation vessel is expected to be on site for up to 143 days. All project vessels will maintain exterior lighting in accordance with applicable federal navigation and aviation safety regulations (International Regulations for Preventing Collisions at Sea, 1972 [72 COLREGS], Part C).

Potential impacts to marine resources from the installation vessel include the physical presence of the vessel in the ocean, entanglement and entrapment from moon pools and equipment in the water, working and safety lighting on the rig, and underwater sound produced during installation operations.

During the physical presence of the vessel's activities there may be occasions where equipment may be suspended in the water column. Entanglement and entrapment of protected species can occur from equipment or mooring lines with slack or looping lines and cables in the water. Marine mammals and sea turtles can become entangled in vessel lines in the water with loops or sufficient looping to trap the animals if they come into contact with them. Entanglement and entrapment can be minimized with proper maintenance of equipment or mooring lines in the water by encasing flexible lines, removing excess lines, and keeping lines taught to remove slack and line loops.

The physical presence of the installation vessel in the ocean can attract and potentially impact pelagic marine resources, as discussed in **Section C.5.1**. DP vessels maintain exterior lighting for working at night and for navigational and aviation safety in accordance with applicable federal safety regulations. This artificial lighting may also attract and directly or indirectly impact natural resources. Installation operations produce underwater sounds that may impact certain marine resources.

Sound levels produced by DP vessels for station-keeping are largely dependent on the level of thruster activity required to keep position and, therefore, vary based on local ocean currents, sea and weather conditions, and operational requirements. Representative source levels for vessels in DP activities range from 184 to 190 decibels (dB) referenced to (re) 1 micropascal (μPa) at 1 meter (m), with a primary amplitude frequency below 600 Hz (Blackwell and Greene Jr., 2003, McKenna et al., 2012; Kyhn et al., 2014). Zykov (2016) characterized a noisier drillship thruster with root-mean-square sound pressure level (SPL) source levels ranging from 190 to 195 dB re 1 μPa m. Estimated source levels from a drillship or semi-submersible using thrusters can reach approximately 188 dB re 1 μPa m (Nedwell and Howell, 2004). Nedwell and Howell (2004) reported that the majority of sound produced from a semi-submersible rig occurred below 600 Hz. BOEM (2012a) stated that source levels from oil and gas production platforms are low, with a frequency range of 50 to 500 Hz.

Table 2. Matrix of impact-producing factors (IPF) and affected environmental resources.

Environmental Resources		Impact-Producing Factors						Accidents	
		Installation Vessel Presence (incl. sound & lights)	Physical Disturbance to Seafloor	Air Pollutant Emissions	Effluent Discharges	Water Intake	Onshore Waste Disposal	Marine Debris	Support Vessel/Helicopter Traffic
Physical/Chemical Environment									
Air quality	--	--	X	--	--	--	--	--	X(6)
Water quality	--	--	X	X	--	--	--	--	X(6)
Seafloor Habitats and Biota									
Soft bottom benthic communities	--	X	--	--	--	--	--	--	--
High-density deepwater benthic communities	--	--(4)	--	-(4)	--	--	--	--	X(6)
Designated topographic features	--	--(1)	--	-(1)	--	--	--	--	--
Pinnacle trend area live bottoms	--	--(2)	--	-(2)	--	--	--	--	--
Eastern Gulf live bottoms	--	--(3)	--	-(3)	--	--	--	--	--
Threatened, Endangered, and Protected Species and Critical Habitat									
Sperm whale (Endangered)	X(8)	--	--	--	--	--	--	--	X(8)
Rice's whale (Endangered)	X(8)	--	--	--	--	--	--	--	X(8)
West Indian manatee (Threatened)	--	--	--	--	--	--	--	--	X(8)
Non-endangered marine mammals (protected)	X	--	--	--	--	--	--	X	X(6)
Sea turtles (Endangered/Threatened)	X(8)	--	--	--	--	--	--	X(8)	X(6,8)
Piping Plover (Threatened)	--	--	--	--	--	--	--	--	--
Whooping Crane (Endangered)	--	--	--	--	--	--	--	--	--
Black-capped Petrel (Endangered)	X	--	--	--	--	--	--	X(8)	X(6,8)
Rufa Red Knot (Threatened)	--	--	--	--	--	--	--	X(8)	X(6,8)
Oceanic whitetip shark (Threatened)	X	--	--	--	--	--	--	--	--
Giant manta ray (Threatened)	X	--	--	--	--	--	--	--	--
Gulf sturgeon (Threatened)	--	--	--	--	--	--	--	--	--
Nassau grouper (Threatened)	--	--	--	--	--	--	--	--	--
Smalltooth sawfish (Endangered)	--	--	--	--	--	--	--	--	--
Beach mice (Endangered)	--	--	--	--	--	--	--	--	--
Florida salt marsh vole (Endangered)	--	--	--	--	--	--	--	--	--
Panama City crayfish (Threatened)	--	--	--	--	--	--	--	--	--
Threatened coral	--	--	--	--	--	--	--	--	X(6)

Table 2. (Continued).

		Impact-Producing Factors								
		Installation Vessel Presence (incl. sound & lights)	Physical Disturbance to Seafloor	Air Pollutant Emissions	Effluent Discharges	Water Intake	Onshore Waste Disposal	Marine Debris	Support Vessel/ Helicopter Traffic	Accidents
		--	--	--	--	--	--	--	--	Large Oil Spill
Coastal and Marine Birds		--	--	--	--	--	--	--	--	X(6)
Marine birds		X	--	--	--	--	--	X	X(6)	X(6)
Coastal birds		--	--	--	--	--	--	X	--	X(6)
Fisheries Resources		--	--	--	X	X	--	--	--	
Pelagic communities and ichthyoplankton		X	--	--	X	X	--	--	--	X(6)
Essential fish habitat		X	--	--	X	X	--	--	--	X(6)
Archaeological Resources		--	--(7)	--	--	--	--	--	--	
Shipwreck sites		--	--(7)	--	--	--	--	--	--	X(6)
Prehistoric archaeological sites		--	--(7)	--	--	--	--	--	--	X(6)
Coastal Habitats and Protected Areas		--	--	--	--	--	--	X	--	X(6)
Coastal habitats and protected areas		--	--	--	--	--	--	--	--	X(6)
Socioeconomic and Other Resources		--	--	--	--	--	--	--	--	X(6)
Recreational and commercial fishing		X	--	--	--	--	--	--	--	X(6)
Public health and safety		--	--	--	--	--	--	--	--	X(5,6)
Employment and infrastructure		--	--	--	--	--	--	--	--	X(6)
Recreation and tourism		--	--	--	--	--	--	--	--	X(6)
Land use		--	--	--	--	--	--	--	--	X(6)
Other marine uses		--	--	--	--	--	--	--	--	X(6)

(1-8) See table footnotes on the following page.

X = potential impact; dash (--) = no impact or negligible impact.

Table 2 Footnotes and Applicability to this Program:

Footnotes are numbered to correspond to entries in **Table 2**; project applicability to each case is specified in a bullet point following the respective footnote.

- (1) Activities that may affect a marine sanctuary or topographic feature. Specifically, if the well, rig site, or any anchors will be on the seafloor within the following:
 - (a) 3-mile zone of the Flower Garden Banks, or the 4-mile zone of East and West Flower Garden Bank;
 - (b) 1,000-m, 1-mile, or 3-mile zone of any topographic feature (submarine bank) protected by the Topographic Features Stipulation attached to an Outer Continental Shelf (OCS) lease;
 - (c) Essential Fish Habitat (EFH) criteria of 152 m (500 ft) from any no-activity zone; or
 - (d) Proximity of any submarine bank (152-m [500-ft] buffer zone) with relief greater than 2 m (7 ft) that is not protected by the Topographic Features Stipulation attached to an OCS lease.
 - None of these conditions (a through d) are applicable. The project area is not within or near any marine sanctuary, topographic feature, submarine bank, or no-activity zone.
- (2) Activities with any bottom disturbance within an OCS lease block protected through the Live Bottom (Pinnacle Trend) Stipulation attached to an OCS lease.
 - The Live Bottom (Pinnacle Trend) Stipulation is not applicable to the project area.
- (3) Activities within any Eastern Gulf OCS block where seafloor habitats are protected by the Live Bottom (Low-Relief) Stipulation attached to an OCS lease.
 - The Live Bottom (Low-Relief) Stipulation is not applicable to the project area.
- (4) Activities on blocks designated by the BOEM as being in water depths 400 m or greater.
 - No impacts on high-density deepwater benthic communities are anticipated. There are no features indicative of seafloor hard bottom that could support high-density chemosynthetic communities or coral communities within 610 m (2,000 ft) of the proposed seafloor project activities (bp, 2025).
- (5) Exploration or production activities where Hydrogen Sulfide (H₂S) concentrations greater than 500 ppm might be encountered.
 - MC 522 is classified as H₂S Absent. See SDOCD Section 4 for H₂S management information.
- (6) All activities that could result in an accidental spill of produced liquid hydrocarbons or diesel fuel that you determine would impact these environmental resources. If the proposed action is located a sufficient distance from a resource that no impact would occur, the EIA can note that in a sentence or two.
 - Accidental hydrocarbon spills could affect the resources marked (X) in the matrix, and impacts are analyzed in **Section C**.
- (7) All activities that involve seafloor disturbances, including anchor emplacements, in any OCS block designated by the BOEM as having high probability for the occurrence of shipwrecks or prehistoric sites, including such blocks that will be affected that are adjacent to the lease block in which your planned activity will occur. If the proposed activities are located a sufficient distance from a shipwreck or prehistoric site that no impact would occur, the EIA can note that in a sentence or two.
 - No impacts to archaeological resources are expected. Per the Final Rule outlined in 89 FR 71160, bp has previously submitted an archaeological report that determined that none of the sonar contacts in the project area were identified as being archaeologically significant.
- (8) All activities that you determine might have an adverse effect on endangered or threatened marine mammals or sea turtles or their critical habitats.
 - IPFs that may affect marine mammals, sea turtles, or their critical habitats include installation vessel presence, support vessel and helicopter traffic, and accidents. See **Section C**.
- (9) Production activities that involve transportation of produced fluids to shore using shuttle tankers or barges.
 - Not applicable.

The physical presence of the installation vessel in the ocean can attract and potentially impact pelagic marine resources, as discussed in **Section C.5.1**. Offshore vessels maintain exterior lighting for working at night and for navigational and aviation safety in accordance with applicable federal safety regulations. This artificial lighting may also attract and directly or indirectly impact natural resources.

The response of marine mammals, sea turtles, and fishes to a perceived marine sound depends on a range of factors, including 1) SPL, frequency, duration, novelty of the sound, nature of the sound (i.e., continuous vs. intermittent and impulsive vs. non-impulsive); 2) the physical and behavioral state of the animal at the time of perception; and 3) the ambient acoustic features of the environment (Hildebrand, 2009). Additionally, the sound detection capabilities of a particular species or group of species can make them more or less susceptible to potential impacts from sound sources (BOEM, 2014b).

A.2 Physical Disturbance to the Seafloor

This project will tie a single well back to the existing Na Kika South Oil Loop via the F-34 Manifold. The subsea architecture includes a subsea tree, a well jumper, tie-in sled, an intermediate jumper, and associated controls equipment. The tie-in sled will be mudmat based, laid directly on the seafloor. The total length of pipe between the manifold and tree is approximately 55 m (180 ft). BOEM (2012a) estimated an area of seafloor disturbance between 1.2 ac (0.5 ha) and 2.5 ac (1.0 ha) per kilometer of pipeline or flowline installation; however, due to the water depth in the project area, the subsea infrastructure will not be buried by trenching, but instead will be placed on the seafloor, decreasing the area of impact.

A.3 Air Pollutant Emissions

The air pollutant emissions are calculated in accordance with BOEM requirements for screening air impacts and summarized in the Air Quality Emissions Report in SDOCD Section 8 and SDOCD Appendix E. Offshore air pollutant emissions will result from installation vessel operations as well as support vessel (both supply and crew vessels) and helicopter transits. The primary air pollutants typically associated with OCS activities are suspended particulate matter (PM_{2.5} and PM₁₀), sulfur oxides (SO_x), nitrogen oxides (NO_x), volatile organic compounds (VOCs), and carbon monoxide (CO) (Reşitoğlu et al., 2015), as well as ammonia (NH₃) and lead (Pb) per NTL BOEM-2020-G01. These emissions occur mainly from combustion diesel and aviation fuel, also known as Jet-A.

The Air Quality Emissions Report estimates that the projected emissions from the proposed project will not exceed exemption levels set by the applicable regulations in 30 CFR § 550.303. The project is not expected to cause an exceedance of NAAQS at any receptor.

A.4 Effluent Discharges

Effluent discharges are summarized in SDOCD Section 7.2 and SDOCD Appendix D. All offshore discharges are expected to meet the requirements of the National Pollutant Discharge Elimination System (NPDES) General Permit or Vessel General Permit issued by the U.S. Environmental Protection Agency (USEPA) Region 6 and any applicable U.S. Coast Guard (USCG) regulations and maintenance logs/records for marine sanitation devices.

Other marine vessel effluent discharges are expected from installation activities and are expected to be discharged in accordance with the conditions in the NPDES permit or applicable USCG regulations (33 CFR 151.51-151.79 and 33 CFR 159). These effluents include miscellaneous discharges that are untreated, effluents that are treated before discharge, and substances removed during wastewater control. Miscellaneous discharges will consist of uncontaminated seawater/freshwater, such as uncontaminated ballast/bilge water, fire water, cooling water, potable water, graywater from dishwater, shower, laundry, bath, and washbasin drains, off-specification potable water and desalination unit discharge. Chemically treated effluents include seawater/freshwater to which treatment chemicals such as biocides or corrosion inhibitors have been added, sewage processed through a marine sanitation device, and deck drainage effluents passed through the drillship oil-water separator. Removed substances including solids, sewage sludges, filter backwash, and other pollutants removed from wastewater removed in the course of treatment or wastewater control shall be disposed of in a manner such as to prevent any pollutant from such materials from entering navigable waters.

Under certain circumstances, the installation vessel may relocate to a safe zone which is not located within the leased area to avoid severe weather, loop currents, or to conduct routine maintenance while idled from installation activities. During these limited times of safe zone harboring, incidental vessel discharges may occur. These discharges are expected to be within the limits represented in the waste and water discharge table estimates submitted as part of this SDOCD.

A.5 Water Intake

Seawater will be drawn from the ocean for once-through, non-contact cooling of machinery on the installation vessel. Section 316(b) of the Clean Water Act requires NPDES permits to ensure that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available to minimize adverse environmental impact from impingement and entrainment of aquatic organisms. The General NPDES Permit specifies design requirements for facilities for which construction commenced after 17 July 2006 with a cooling water intake structure having a design intake capacity of >2 million gallons of water per day, of which at least 25% is used for cooling purposes. It is expected that the project vessels ultimately selected for this project will be in compliance with all applicable cooling water intake structure design requirements, monitoring, and limitations. Where applicable, the vessel operator takes responsibility for obtaining necessary NPDES permit coverage for its cooling water intake structure and associated permit compliance.

A.6 Onshore Waste Disposal

A list of the solid and liquid wastes generated during this project to be disposed of onshore are tabulated in SDOCD Section 7.1. Waste generated during the proposed project is expected to be properly stored and segregated on the installation and support vessels. Wastes are expected to be packaged in appropriate non-hazardous or hazardous waste containers for transportation to shore for disposal in an appropriately permitted facility. All other wastes generated by bp and its contractors are managed by their respective waste management procedures. Compliance with established bp waste management practices and procedures is expected to result in either no impacts or negligible impacts.

A.7 Marine Debris

All activities of bp and its contractors relating to solid waste handling, transportation, and disposal are expected to comply with all applicable regulations, including MARPOL requirements, and USEPA, USCG, BSEE, and BOEM regulations. These regulations include prohibitions and compliance requirements regarding the deliberate discharging of containers and other similar materials (i.e., trash and debris) into the marine environment as well as the protective measures to be implemented to prevent the accidental loss of solid material into the marine environment. For example, BSEE regulations 30 CFR § 250.300(a) and (b)(6) prohibit operators from deliberately discharging containers and other similar materials (i.e., trash and debris) into the marine environment, and 30 CFR § 250.300(c) requires durable identification markings on equipment, tools, containers (especially drums), and other materials. The USEPA and USCG regulations require operators to be proactive in avoiding accidental loss of solid materials by developing waste management plans, posting informational placards, manifesting trash sent to shore, and using special precautions such as covering outside trash bins to prevent accidental loss of solid waste. Additionally, the debris awareness training, instruction, and placards required by the Protected Species Lease Stipulation should minimize the amount of debris that is accidentally lost overboard by offshore personnel (NMFS, 2025a Appendix 2). In compliance with NTL BSEE-2015-G03, bp and its contractors intend to exercise caution in the handling and disposal of small items and packaging materials, require the posting of informational placards at prominent locations on offshore vessels and structures, and mandate a yearly marine trash and debris awareness training and certification process. Compliance with these requirements is expected to result in minimal and only accidental loss of solid waste. Consequently, there will be either no impacts or negligible impacts from this factor.

A.8 Support Vessel and Helicopter Traffic

A.8.1 Physical Presence

IPFs associated with support vessel and helicopter traffic include their physical presence and operational sound. The existing shorebase facilities at Port Fourchon, Louisiana, will be used by bp for support vessel activities. Support helicopters are expected to be based at heliport facilities in Houma, Louisiana. No terminal expansion or construction is planned at either location.

NMFS (2025a) noted that support vessel traffic has the potential to disturb protected species (e.g., marine mammals, sea turtles, fishes) and creates a risk of vessel collisions. The probability of a vessel collision depends on the number, size, and speed of vessels as well as the distribution, abundance, and behavior of the species (Laist et al., 2001; Jensen and Silber, 2004; Hazel et al., 2007; Vanderlaan and Taggart, 2007; Conn and Silber, 2013; NMFS, 2025a). To reduce the potential for vessel collisions, BOEM issued NTL BOEM-2016-G01 which recommends protected species identification training, that vessel operators and crews maintain a vigilant watch for marine mammals and slow down or stop their vessel to avoid striking protected species and requires operators to report sightings of any injured or dead protected species. bp intends to comply with the mitigation measures in NTL BOEM-2016-G01, as amended or supplemented by the mitigation measures summarized in Attachment 3 of the 2025 Biological Opinion (NMFS, 2025a).

The project will be supported by onshore crew boats and supply vessels making trips two days per week. The boats typically move to the project area via the most direct route from the shorebase.

A helicopter will make approximately four round trips per week between the installation vessel and the heliport. The helicopter will be used to transport personnel and small supplies and will normally take the most direct route of travel between the shorebase and the project area when air traffic and weather conditions permit. Offshore support helicopters typically maintain a minimum altitude of 213 m (700 ft) while in transit offshore, 305 m (1,000 ft) over unpopulated areas or across coastlines, and 610 m (2,000 ft) overpopulated areas and sensitive habitats such as wildlife refuges and park properties.

Table 3 summarizes generalized and estimated fuel capacity and trip frequency of the support vessels and aircraft.

Table 3. Estimated support vessel and aircraft fuel capacity and trip frequency or duration in Mississippi Canyon Block 522 during the proposed project.

Vessel/Aircraft Type	Estimated Fuel Tank Storage Capacity	Estimated Trip Frequency or Duration
Helicopter	731 gal	4 flights per week
Crew boats	1,000 bbl	2 per week
Supply boats	5,000 bbl	2 per week

bbl = barrels; gal = gallons.

A.8.2 Operational Sound

Offshore support vessels associated with the proposed project will contribute to the overall acoustic environment by transmitting sound through both air and water. The support vessels will use conventional diesel-powered screw propulsion. Vessel sound is a combination of narrow band (tonal) and broadband sound (Richardson et al., 1995; Hildebrand, 2009; McKenna et al., 2012). Tones typically dominate frequencies up to approximately 60 Hz, whereas broadband sounds may extend to 100 kHz. The primary sources of vessel sound are propeller cavitation, propeller singing, and main population thrust bearing rhythmic pulses; other sources include engine sound, flow sound from water dragging along the hull, and bubbles breaking in the vessel's wake (Richardson et al., 1995). The intensity of sound from support vessels is roughly

related to ship size, weight, and speed. Broadband SPL source levels for smaller boats (a category that includes supply and other service vessels) are in the range of 150 to 180 dB re 1 μ Pa m (Richardson et al., 1995; Hildebrand, 2009; McKenna et al., 2012).

Penetration of aircraft sound below the sea surface is greatest directly below the aircraft. Aircraft sound produced at angles >13 degrees from vertical is mostly reflected from the sea surface and does not propagate into the water (Richardson et al., 1995). The duration of underwater sound from passing aircraft is much shorter in water than air; for example, a helicopter passing at an altitude of 152 m (500 ft) that is audible in air for 4 minutes may be detectable under water for only 38 seconds at 3 m (10 ft) depth and for 11 seconds at 18 m (59 ft) depth (Richardson et al., 1995). Dominant tones for helicopters are generally below 500 Hz with SPL source levels ranging from approximately 149 to 151 dB re 1 μ Pa m (for a Bell 212 helicopter) (Richardson et al., 1995). However, underwater sound levels received from passing aircraft depend on the aircraft's altitude, the aspect (direction and angle) of the aircraft relative to the receiver, receiver depth, water depth, and seafloor type (Richardson et al., 1995). The received level diminishes with increasing receiver depth when an aircraft is directly overhead, but may be stronger at mid-water than at shallow depths when an aircraft is not directly overhead (Richardson et al., 1995).

Because of the relatively high expected airspeeds during transits and these physical variables, aircraft-related sound (including both airborne and underwater sound) is expected to be very brief in duration.

A.9 Accidents

The accidents addressed in the EIA focus on the following two potential types:

- A small fuel spill, which is the most likely type of spill during OCS exploration activities; and
- A large oil spill, up to and including the WCD For this SDOCD, which is an oil spill resulting from an uncontrolled blowout.

The following subsections summarize assumptions about the sizes and fates of these spills as well as bp's spill response plans. Impacts from these accidents are analyzed in **Section C**.

Recent EISs (BOEM, 2012a,b; 2013; 2014a; 2015; 2016b; 2017) analyzed three types of accidents relevant to drilling operations that could lead to potential impacts to the marine environment: loss of well control, vessel collision, and chemical and drilling fluid spills. These types of accidents, along with dropped objects and an H₂S release, are discussed briefly below.

Loss of Well Control. A loss of well control is the uncontrolled flow of a reservoir fluid that may result in the release of gas, condensate, oil, drilling fluids, sand, and/or water. Loss of well control includes incidents from the very minor up to the most serious well control incidents, while blowouts are considered to be a subset of more serious incidents with greater risk of oil spill or human injury (BOEM, 2016a; 2017). Loss of well control may result in the release of drilling fluid and/or loss of oil. Not all loss of well control events result in blowouts (BOEM, 2012a). In addition to the potential release of gas, condensate, oil, sand, and/or water, the loss of well control can also resuspend and disperse bottom sediments (BOEM, 2012a; 2017). BOEM (2016a) noted that most OCS blowouts have resulted in the release of gas.

The robust system bp has in place to prevent loss of well control includes measures to prevent a blowout, reduce the likelihood of a blowout, and conduct effective and early blowout intervention as described in the NTL 2015-N01 package submitted with this SDOCD, as required by BOEM (as discussed in **Section A.9.2**). The potential for a loss of well control event will be minimized by adhering to the requirements of applicable regulations and NTL 2010-N10, which specifies additional safety measures for OCS activities.

Vessel Collisions. BSEE data show that there were 205 OCS-related collisions between 2007 and 2023 (BSEE, 2024a). Most collision mishaps are the result of service vessels colliding with platforms or vessel collisions with pipeline risers. Approximately 10% of vessel collisions with platforms in the OCS resulted in diesel spills, and during several collision incidents fires resulted from hydrocarbon releases. To date, the largest diesel spill associated with a collision occurred in 1979 when an anchor-handling boat collided with a drilling platform in the Main Pass Lease Area, spilling 1,500 barrels (bbl). Diesel fuel is the product most frequently spilled, but oil, natural gas, corrosion inhibitor, hydraulic fluid, and lube oil have also been released as the result of vessel collisions. Human error accounted for approximately half of all reported vessel collisions from 2006 to 2009. As summarized by BOEM (2017), vessel collisions occasionally occur during routine operations. Some of these collisions have caused spills of diesel fuel or chemicals. bp and its contractors intend to comply with all applicable USCG and BOEM safety requirements to minimize the potential for vessel collisions.

Dropped Objects. Objects dropped overboard could potentially pose a risk to existing live subsea pipelines or other infrastructure. If a dropped pipe or other subsea equipment landed on existing seafloor infrastructure, loss of integrity of seafloor pipelines, umbilicals, or other infrastructure, it could result in a spill. Dropped objects could also result in seafloor disturbance and potential impacts to benthic communities. bp and its contractors intend to comply with applicable BOEM and BSEE safety requirements to minimize the potential for objects dropped overboard.

Chemical Spills. Chemicals are stored and used for pipeline hydrostatic testing, leak and pressure testing of subsea equipment and during drilling and well completion operations. The relative quantities of their use is reflected in the largest volumes spilled (BOEM, 2017) with completion, workover, and treatment fluids comprising the largest releases. Any potential leak due to pressure testing failure will be limited to a single line leak and would be limited to <1 bbl. Potentially spilled fluids include Transqua HT, monoethylene glycol 50/50, or methanol. Between 2007 and 2014, an average of two chemical spills <50 bbl in volume and three chemical spills >50 bbl in volume occurred each year (BOEM, 2017).

H₂S Release. MC 522 is classified as H₂S Absent. See SDOCD Section 4 for H₂S management information.

A.9.1 Small Fuel Spill

Spill Size. According to the analysis by BOEM (2017), the most likely type of small spill (<1,000 bbl) resulting from OCS activities is a failure related to the storage of oil or diesel fuel. Historically, most diesel spills have been ≤ 1 bbl, and this is predicted to be the most common spill volume in ongoing and future OCS activities in the Western and Central Gulf of America Planning Areas (Anderson et al., 2012). As the spill volume increases, the incident rate declines dramatically (BOEM, 2017). The median size for spills ≤ 1 bbl is 0.024 bbl, and the median volume

for spills of 1 to 10 bbl is 3 bbl (Anderson et al., 2012). For the EIA, a small diesel fuel spill of 3 bbl is used. Operational experience suggests that the most likely cause of such a spill would be a rupture of the fuel transfer hose resulting in a loss of contents (3 bbl of fuel) (BOEM, 2012a).

Spill Fate. The fate of a small fuel spill in the project area would depend on meteorological and oceanographic conditions at the time of the spill as well as the effectiveness of spill response activities. However, given the open ocean location of the project area and response actions, it is expected that impacts from a small spill would be minimal (BOEM, 2016a).

The water-soluble fractions of diesel are dominated by two- and three-ringed polycyclic aromatic hydrocarbons (PAHs), which are moderately volatile (National Research Council, 2003a). The constituents of these oils are light to intermediate in molecular weight and can be readily degraded by aerobic microbial oxidation. Due to its light density, diesel will not sink to the seafloor. Diesel dispersed in the water column can adhere to suspended sediments, but this generally occurs only in coastal areas with high amounts of suspended solids (National Research Council, 2003a) and would not be expected to occur to any appreciable degree in offshore waters of the Gulf of America. Diesel fuel is readily and completely degraded by naturally occurring microbes (National Oceanic and Atmospheric Administration [NOAA], 2023).

Sheens from small fuel spills are expected to persist for relatively short periods of time, ranging from minutes (<1 bbl) to hours (<10 bbl) to a few days (10 to 1,000 bbl), and rapidly spread out, evaporate, and disperse into the water column (BOEM, 2012a).

For purposes of the EIA, the fate of a small diesel fuel spill of 3 bbl was estimated using WebGNOME, a publicly available oil spill trajectory and fate model developed by NOAA (NOAA, 2022). This model uses the physical properties of oils in its database to predict the rate of evaporation and dispersion over time as well as changes in the density, viscosity, and water content of the product spilled. It is estimated that over 90% of a small diesel spill would be evaporated or dispersed within 24 hours (NOAA, 2022). The area of the sea surface with diesel fuel on it during this 24-hour period would range from 0.5 to 5 ha (1.2 to 12 ac), depending on sea state and weather conditions.

The WebGNOME results, coupled with spill trajectory information discussed below for a large spill, indicate that a small fuel spill would not impact coastal or shoreline resources. The project area is 69 statute miles (111 km) from the nearest shoreline (Louisiana). Slicks from small fuel spills are expected to persist for relatively short periods of time ranging from minutes (<1 bbl) to hours (<10 bbl) to a few days (10 to 1,000 bbl) and rapidly spread out, evaporate, and disperse into the water column (BOEM, 2012a). Because of the distance from shore of these potential spills on the OCS and their lack of persistence, it is unlikely that a spill would make landfall prior to dissipation (BOEM, 2012a).

Spill Response. In the unlikely event the shipboard procedures fail to prevent a fuel spill, response equipment and trained personnel would be activated so that any spill effects would be localized and would result only in short-term environmental consequences. A discussion of bp's response efforts if a spill were to occur during operational activities is provided in SDOCD Appendix G.

Weathering. Following a diesel fuel spill several physical, chemical, and biological processes, collectively called weathering, interact to change the physical and chemical properties of the diesel, and thereby influence its harmful effects on marine organisms and ecosystems. The most important weathering processes include spreading, evaporation, dissolution, dispersion into the water column, formation of water-in-oil emulsions, photochemical oxidation, microbial degradation, adsorption to suspended particulate matter, and stranding on shore or sedimentation to the seafloor (National Research Council, 2003a; International Tanker Owners Pollution Federation Limited, 2018).

Weathering decreases the concentration of diesel fuel and produces changes in its chemical composition, physical properties, and toxicity. The more toxic, light aromatic and aliphatic hydrocarbons are lost rapidly by evaporation and dissolution from the slick on the water surface. Evaporated hydrocarbons are degraded rapidly by sunlight. Biodegradation of diesel fuel on the water surface and in the water column by marine bacteria removes first the n-alkanes and then the light aromatics. Other petroleum components are biodegraded more slowly (National Research Council, 2003a). Diesel fuel spill response-related activities for facilities included in this SDOCD are governed by bp's ROSRP, which meets the requirements contained in 30 CFR Part 254.

A.9.2 Large Oil Spill (Worst Case Discharge)

Under this SDOCD, bp proposes tie a single well back to the existing Na Kika South Oil Loop via the F-34 manifold. The uncontrolled blowout scenario is for a potential blowout of the well which bp calculates has the highest liquid hydrocarbons rate potential in the area.

Spill Size. Day 1 WCD is estimated to be 36,000 barrels of oil per day (BOPD). The maximum duration of the blowout is estimated at 70 days. The rate profile associated with the well blowout over this 70-day scenario results in a potential worst case spill volume estimated at 2,140,000 bbl.

Spill Probability. Holland (1997) estimated a probability of 0.0021 for a deep drilling blowout during exploration drilling based on U.S. Gulf of America data. The International Association of Oil & Gas Producers (2010) conducted an analysis and estimated a blowout frequency of 0.0017 per exploratory well for non-North Sea locations. BOEM updated OCS spill frequencies (bbl spilled per bbl produced) to include the Deepwater Horizon incident. According to ABS Consulting Inc. (2016), the spill rate for spills >1,000 bbl dropped to 0.22 spills per billion barrels produced. According to the ABSG Consulting, Inc. (2018) analysis, the baseline risk of loss of well control spill >10,000 bbl on the OCS is estimated to be once every 27.5 years.

Spill Trajectory. The fate of a large oil spill in the project area would depend on meteorological and oceanographic conditions at the time of and during the spill. The Oil Spill Risk Analysis (OSRA) model is a computer simulation of oil spill transport that uses realistic data for winds and currents to predict spill trajectory. The OSRA report by Ji et al. (2004) provides conditional contact probabilities for shoreline segments in the Gulf of America.

The results for Launch Area 57 (where MC 522 is located) are presented in **Table 4**. Shoreline contact is predicted within 3 days for shorelines in Plaquemines Parish, Louisiana. Within 10 days of a spill, predicted shoreline contact ranges from Terrebonne Parish, Louisiana to St. Bernard Parish, Louisiana. Predicted shoreline contact within 30 days of a spill ranges from Cameron Parish, Louisiana, to Bay County, Florida. The conditional probability of shoreline

contact is low (1 to 3%) for all shorelines with predicted contact within 30 days, save for Plaquemines Parish, Louisiana. There is a 21 % conditional probability for shoreline contact within Plaquemines Parish within 30 days of an oil spill.

Table 4. Conditional probabilities of a spill in the lease area contacting shoreline segments (From: Ji et al., 2004). Values are conditional probabilities that a hypothetical spill in the lease area (represented by Oil Spill Risk Analysis Launch Area 57) could contact shoreline segments within 3, 10, or 30 days.

Shoreline Segment	County or Parish, State	Conditional Probability of Contact ¹ (%)		
		3 Days	10 Days	30 Days
C13	Cameron Parish, Louisiana	--	--	1
C14	Vermilion Parish, Louisiana	--	--	1
C17	Terrebonne Parish, Louisiana	--	1	2
C18	Lafourche Parish, Louisiana	--	1	2
C20	Plaquemines Parish, Louisiana	4	14	21
C21	St. Bernard Parish, Louisiana	--	1	3
C22	Hancock and Harrison Counties, Mississippi	--	--	1
C23	Jackson County, Mississippi	--	--	1
C24	Mobile County, Alabama	--	--	1
C25	Baldwin County, Alabama	--	--	1
C26	Escambia County, Florida	--	--	1
C28	Okaloosa County, Florida	--	--	1
C29	Walton County, Florida	--	--	1
C30	Bay County, Florida	--	--	1

¹Conditional probability refers to the probability of contact within the stated time period, assuming that a spill has occurred (-- indicates <0.5%).

The original OSRA modeling runs reported by Ji et al. (2004) did not evaluate the fate of a spill over time periods exceeding 30 days, nor did they estimate the fate of a release that continues over a period of weeks or months. As noted by Ji et al. (2004), the OSRA model does not consider the chemical composition or biological weathering of oil spills, the spreading and splitting of oil spills, or spill response activities. The model does not specify a particular spill size but has been used by BOEM to evaluate contact probabilities for spills >1,000 bbl.

OSRA is a preliminary risk assessment model. In the event of an actual oil spill, real-time monitoring and trajectory modeling would be conducted using current and wind data available from the rigs and permanent production structures in the area. Satellite and aerial monitoring of the plume and real-time deterministic trajectory modeling using wind and current data would continue on a daily basis to help position equipment and human resources throughout the duration of any major spill or uncontrolled release.

Weathering. In the event of a diesel fuel spill, it is expected that weathering and evaporation will occur quickly. The constituents of diesel fuel are light to intermediate in molecular weight and can be readily degraded by aerobic microbial oxidation. NOAA has reported that diesel fuel is readily and completely degraded by naturally occurring microbes (NOAA, 2023).

Weathering decreases the concentration of oil and produces changes in its chemical composition, physical properties, and toxicity. The more toxic, light aromatic and aliphatic hydrocarbons are lost rapidly by evaporation and dissolution from a slick on the water surface. For example, the light, paraffinic crude oil spilled during the *Deepwater Horizon* incident lost approximately 55 wt. % to evaporation during the first 3 to 5 days while floating on the sea surface (Daling et al., 2014). Evaporated hydrocarbons are degraded rapidly by sunlight. Biodegradation of oil on the water surface and in the water column by marine bacteria removes first the n-alkanes and then the light aromatics from the oil. Other petroleum components are biodegraded more slowly (National Research Council, 2003a). Photo-oxidation attacks mainly the medium and high molecular weight PAHs in the oil on the water surface (Prince, 2014).

Spill Response. All proposed activities and facilities in this SDOCD will be covered by the Gulf of Mexico ROSRP filed by BP America Inc. (Operator No. 21372) under cover letter dated 9 December 2024 on behalf of several companies listed in the plan including bp Exploration & Production Inc. (Operator No. 02481) and approved by BSEE on 10 January 2025.

The bp ROSRP includes information about enhanced measures for responding to a spill in open water, near shore spill response, and shoreline spill response based on lessons learned from the *Deepwater Horizon* oil spill. In compliance with the requirements of 30 CFR Part 254 and related NTLs, bp's ROSRP includes the following:

- Provisions to maintain access to a supply of dispersant and fire boom for use in the event of an uncontrolled, long-term blowout, for the length of time required to drill a relief well;
- Contingencies for maintaining an ongoing response for the length of time required to drill a relief well;
- A description of the measures and equipment necessary to maximize the effectiveness and efficiency of the response equipment used to recover the discharge on the water's surface. The description will include methods to increase encounter rates, the use of vessel tracking, and the use of remote sensing technologies;
- Information on remote sensing technology and equipment to be used to track oil slicks, including oil spill detection systems and remote thickness detection systems (such as X-band/infrared systems);
- Information pertaining to the use of vessel tracking systems and communication systems between response vessels and spotter personnel;
- A shoreline protection strategy that is consistent with applicable area contingency plans; and
- For operations using a subsea BOP or a surface BOP on a floating facility, a discussion regarding strategies and plans related to source abatement and control for blowouts from drilling.

As a member of the Marine Spill Response Corporation, Clean Gulf Associates, and a client of the National Response Corporation, bp would utilize oil spill response organization personnel and equipment in the event of an oil spill in the Gulf of America. Primary response equipment for the activation of bp's ROSRP is located in Houma, Louisiana; Lake Charles, Louisiana; Galveston, Texas; Pensacola, Florida; Mobile, Alabama; Pascagoula, Mississippi; Ft. Jackson, Louisiana; Venice, Louisiana; and Corpus Christi, Texas. The preplanned staging area for this SDOCD is Port Fourchon, Louisiana.

See SDOCD Appendix G for a detailed description of bp's ROSRP and site-specific response for an oil spill associated with this project.

B. Affected Environment

The project area is in the Central Gulf of America, approximately 69 statute miles (111 km) from the nearest shoreline (Plaquemines Parish, Louisiana), 134 statute miles (216 km) from the onshore support base at Port Fourchon, Louisiana, and 174 statute miles (280 km) from the helicopter base at Houma, Louisiana (**Figure 1**). The water depth at the location of the proposed activities is approximately 2,113 m (6,934 ft) (**Figure 2**).

The seafloor in the vicinity of the proposed activities is expected to be comprised of soft clays and possible coarser-grained drill cuttings (bp, 2025). Additional information on autonomous underwater vehicle interpretation of the seafloor sediments is provided in bp (2025).

A detailed description of the regional affected environment, including meteorology, oceanography, geology, air and water quality, benthic communities, Threatened and Endangered species, biologically sensitive resources, archaeological resources, socioeconomic conditions, and other marine uses is provided in previously developed EISs (BOEM, 2012a; 2013; 2014a; 2015; 2016b; 2017, 2023a,b). These regional descriptions, applicable to MC 522, remain valid and are incorporated by reference. General background information is presented in the following sections, and brief descriptions of each potentially affected resource, including site-specific and new information if available, are presented in **Section C**.

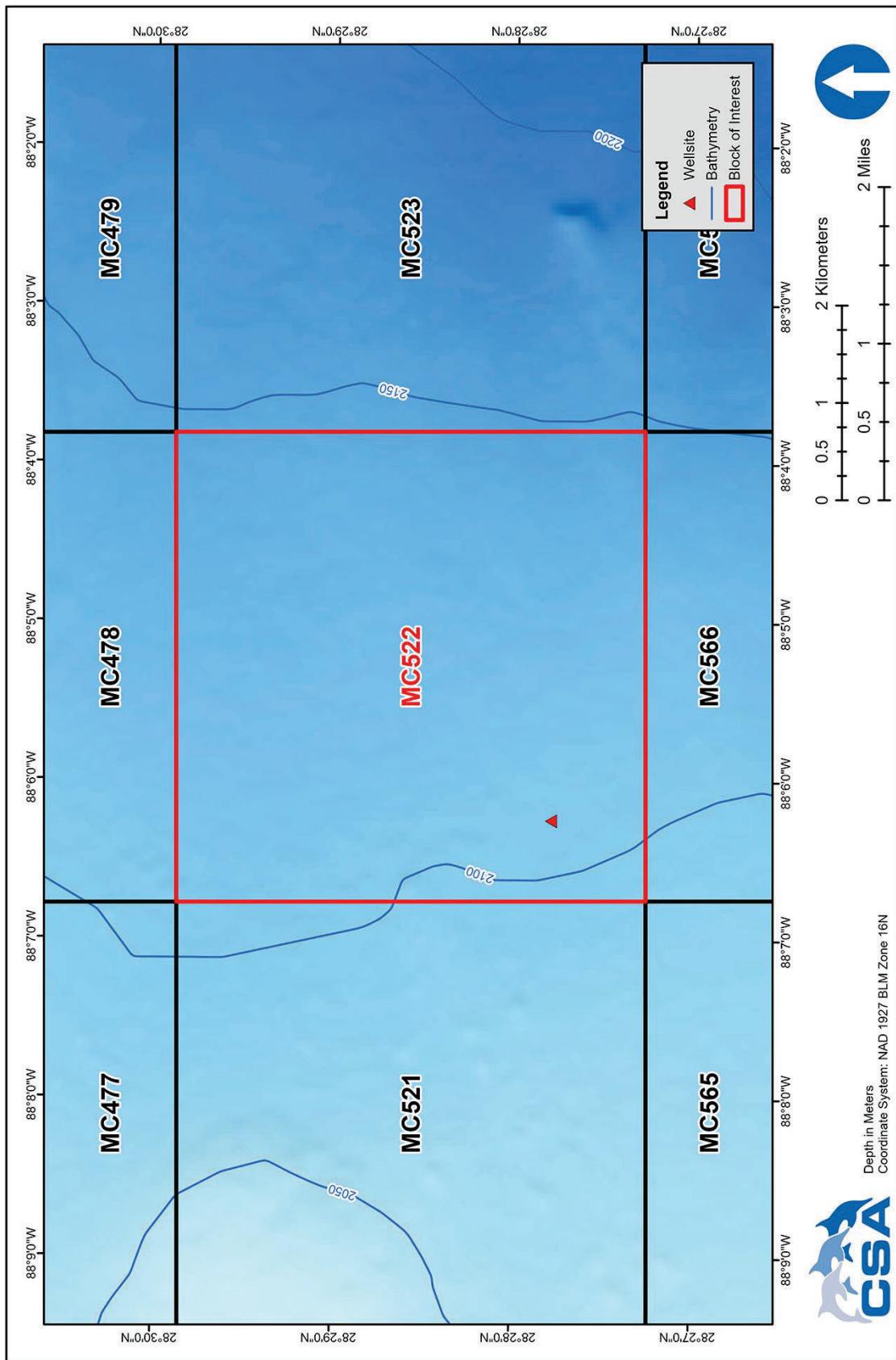


Figure 2. Bathymetric map of the project area showing the location of the F-7 well location in Mississippi Canyon Block 522.

C. Impact Analysis

This section analyzes the potential direct and indirect impacts of routine activities and accidents. Impacts have been analyzed extensively in lease sale EISs for the Central and Western Gulf of America Planning Areas (BOEM, 2013; 2014a; 2015; 2016a,b; 2017; 2023b) and this information in these documents is incorporated by reference. This section is organized by the environmental resources identified in **Table 2** and addresses each IPF potentially affecting the resource.

C.1 Physical/Chemical Environment

C.1.1 Air Quality

There are no site-specific air quality data for the project area due to the distance from shore. Because of the distance from shore-based pollution sources and the minimally dispersed sources offshore, air quality at the wellsite is expected to be good. The attainment status, (i.e., meeting air quality standards set by the USEPA) of federal OCS waters is unclassified because there is no provision in the Clean Air Act for classification of areas outside state waters (BOEM, 2012a).

In general, ambient air quality of coastal counties along the Gulf of America is relatively good (BOEM, 2012a). As of September 2025, Mississippi, Alabama, and Florida Panhandle coastal counties in proximity to the project area are in attainment of the National Ambient Air Quality Standards (NAAQS) for all criteria pollutants (USEPA, 2025). St. Bernard Parish in Louisiana is a nonattainment area for sulfur dioxide based on the 2010 standard. One coastal metropolitan area in Texas (Houston-Galveston-Brazoria) is a nonattainment area for 8-hour ozone (2015 Standard). One coastal metropolitan area in Florida (Tampa) was reclassified in October 2018 from a nonattainment area to maintenance status for lead based on the 2008 Standard (USEPA, 2025). Hillsborough County, Florida was reclassified in 2019 from a nonattainment area to maintenance status for sulfur dioxide based on the 2010 standard (USEPA, 2025).

Winds in the region are driven by the anticyclonic (clockwise) atmospheric circulation around the Bermuda High, a semi-permanent, subtropical area of high pressure in the North Atlantic Ocean off the East Coast of North America that migrates east and west with varying central pressure (BOEM, 2017). The Gulf of America is located to the southwest of this circulation center, resulting in a prevailing southeasterly to southerly flow, which is conducive to transporting emissions toward shore. However, circulation is also affected by tropical cyclones (hurricanes) during summer and fall and by extratropical cyclones (cold fronts) during winter.

As noted earlier, based on air emissions modeling undertaken by bp, the project is not expected to cause an exceedance of NAAQS at any receptor. Therefore, the only potential effects to air quality would be from air pollutant emissions associated with routine operations and accidental spills (a small fuel spill or a large oil spill). These IPFs with potential impacts listed in **Table 2** are discussed below.

Impacts of Air Pollutant Emissions

Air pollutant emissions are the only routine IPF likely to affect air quality. Offshore air pollutant emissions will result primarily from the installation vessel and service vessels. These emissions occur mainly from combustion or burning of diesel and Jet-A aircraft fuel. The combustion of fuels occurs primarily in generators, pumps, or motors and from lighter fuel motors. Primary air pollutants typically associated with OCS activities are suspended PM, SO_x, NO_x, VOCs, CO, NH₃, and Pb. As noted by BOEM (2017), emissions from routine activities are projected to have minimal impacts on onshore air quality because of the prevailing atmospheric conditions, anticipated emission rates, anticipated heights of emission sources, and the distance to shore of the proposed activities. However, support vessel and helicopter traffic entering or departing coastal facilities will release air pollutants in these areas during the project period. The incremental contribution to cumulative impacts from activities described in bp's SDOCD are minimal and are not expected to cause or contribute to a violation of NAAQS.

Greenhouse gas emissions may contribute to climate change, with important effects on temperature, rainfall, frequency of severe weather, ocean acidification, and sea level rise (Intergovernmental Panel on Climate Change, 2014). Greenhouse gas emissions from this proposed project represent a negligible contribution to the total greenhouse gas emissions from reasonably foreseeable activities in the Gulf of America and are not expected to significantly alter or exceed any of the climate change impacts evaluated in the Programmatic EIS (BOEM, 2016a). Carbon dioxide (CO₂) and methane (CH₄) emissions from the project would constitute a small incremental contribution to greenhouse gas emissions from all OCS activities. According to Programmatic and OCS lease sale EISs (BOEM, 2016a; 2017), estimated CO₂ emissions from OCS oil and gas sources are 0.4% of the U.S. total. Although estimated air emissions from the project will exceed BOEM thresholds, modeling has shown that project emissions are not expected to result in the exceedance of NAAQS for any receptor.

As noted in the lease sale EIS (BOEM, 2017), emissions of air pollutants from routine activities in the Central Gulf of America Planning Area are projected to have minimal impacts to onshore air quality because of the prevailing atmospheric conditions, emission rates, and the distance of these emissions from the coastline. The Air Quality Emissions Report indicates that the projected project emissions are below exemption levels set by the applicable regulations in 30 CFR § 550.303. Based on this and the distance from shore, it can be concluded that emissions will not significantly affect the air quality of the onshore area for any of the criteria pollutants.

The Breton Wilderness Area, which is part of the Breton National Wildlife Refuge (NWR), is designated under the Clean Air Act as a Prevention of Significant Deterioration Class I air quality area. BOEM is required to notify the National Park Service and U.S. Fish and Wildlife Service (USFWS) if emissions from proposed projects may affect the Breton Class I area. The project area is approximately 92 statute miles¹ (148 km) from the Breton Wilderness Area. bp and its contractors intend to comply with applicable BOEM requirements regarding air emissions.

There are three Class I air quality areas on the west coast of Florida: St. Marks NWR in Wakulla County, Chassahowitzka NWR in Hernando County, and Everglades National Park in Monroe, Miami-Dade, and Collier counties. The project area is approximately 240 statute miles (386 km)

¹ Distance calculated based on the nearest point of Mississippi Canyon Block 522.

from the closest Florida Class I air quality area (St. Marks NWR Class I Air Quality Area). bp expects to comply with applicable BOEM emissions requirements.

Impacts of a Small Fuel Spill

Potential impacts of a small spill on air quality are expected to be consistent with those analyzed and discussed by (BOEM, 2012a; 2015; 2016b; 2017, 2023a,b). The probability of a small spill would be minimized by bp's preventative measures during routine operations, including fuel transfer. In the unlikely event of a spill, implementation of bp's ROSRP is expected to reduce the potential impacts. SDOCD Appendix G includes a detailed discussion of the spill response measures that would be employed.

The EIA small spill scenario is proposed to occur in offshore waters at the project location. A small fuel spill would affect air quality near the spill site by introducing VOCs into the atmosphere through evaporation. The WebGNOME model (see **Section A.9.1**) indicates that over 90% of a small diesel spill would be evaporated or dispersed within 24 hours (NOAA, 2022). The area of the sea surface with diesel fuel on it would range from 0.5 to 5 ha (1.2 to 12 ac), depending on sea state and weather conditions.

Because of the offshore location of the proposed small fuel spill, coastal air quality would not be affected because the spill would be expected to be degraded by weathering processes and dissipate prior to making landfall or reaching coastal waters (see **Section A.9.1**).

Impacts of a Large Oil Spill

Potential impacts of a large oil spill on air quality are expected to be consistent with those analyzed and discussed by BOEM (2012a; 2015; 2016b; 2017; 2023a,b). A large oil spill could potentially affect air quality by introducing VOCs into the atmosphere through evaporation. The extent and persistence of impacts would depend on the meteorological and oceanographic conditions at the time of the spill and the effectiveness of spill response measures. Real-time wind and current data from the project area would be available at the time of a spill and would be used to assess the fate and effects of VOCs released. Additional air quality impacts could occur if response measures included in situ burning of floating oil. Burning would generate a plume of black smoke and result in emissions of NO_x, SO_x, CO, and PM as well as greenhouse gases. However, in situ burning would occur only after authorization from the USCG Federal On-Scene Coordinator. This approval would also be based upon consultation with the regional response team, including the USEPA.

Because of the project area's location (69 statute miles [111 km]) from the nearest shoreline, most air quality impacts would occur in offshore waters with minimal chance to affect onshore air quality. However, depending on the spill trajectory and the effectiveness of spill response measures, coastal air quality could be affected if oil on the sea surface approaches or contacts the coast.

C.1.2 Water Quality

There are no site-specific baseline water quality data for the project area. Deepwater areas in the northern Gulf of America are relatively similar with respect to patterns of water column temperature, salinity, and oxygen (BOEM, 2017), with the exception of the hypoxic zone off the coast of the Atchafalaya River and Mississippi River basin. Kennicutt (2000) noted that the deepwater region has little evidence of contaminants in the dissolved or particulate phases of

the water column. Within the northern Gulf of America, there are localized areas (termed natural seeps) that release oil, gas, and brines from subsurface deposits into near surface sediments and up through the water column. No natural seeps were noted within 610 m (2,000 ft) of the proposed project activities (bp, 2025).

The only IPFs that may affect water quality are effluent discharges associated with routine operations and two types of accidents (a small fuel spill and a large oil spill) as discussed below.

Impacts of Effluent Discharges

Treated sanitary and domestic wastes, including those from support vessels, may have a transient effect on water quality in the immediate vicinity of the discharge at the sea surface. Treated sanitary and domestic wastes may have elevated levels of nutrients, organic matter, and chlorine but should dilute rapidly to undetectable levels within tens to hundreds of meters from the source. Applicable NPDES permit limitations and requirements as well as USCG regulations (as applicable) are expected to be met during proposed activities; therefore, little or no impact on water quality from the overboard releases of treated sanitary and domestic wastes is anticipated.

Deck drainage includes all effluents resulting from rain, deck washings, and runoff from curbs, gutters, and drains (including drip pans) in work areas. Rainwater that falls on uncontaminated areas of the installation vessel and support vessels will flow overboard without treatment. However, rainwater that falls on vessel decks and other areas such as chemical storage areas and places where equipment is exposed (such as drip or containment pans) will be collected, and oil and water will be separated to meet NPDES permit requirements. Based on expected adherence to permit limits and applicable regulations, little or no impact on water quality from deck drainage is anticipated.

Other discharges in accordance with the NPDES permit, such as desalination unit brine, uncontaminated cooling water, firewater, ballast water, bilge water, and other discharges of seawater and freshwater to which treatment chemicals have been added are expected to dilute rapidly and have little or no impact on offshore water quality.

All vessels will discharge treated sanitary and domestic wastes. These are not expected to have a significant impact on water quality in the vicinity of the discharges. Support vessel discharges are expected to be in accordance with USCG and MARPOL 73/78 regulations and, as applicable, the NPDES Vessel General Permit, and therefore are not expected to cause significant impacts on water quality.

Impacts of a Small Fuel Spill

Potential impacts of a small spill on water quality are expected to be consistent with those analyzed and discussed by BOEM (2012a; 2015; 2016b; 2017, 2023a, b). The EIA small spill scenario is proposed to occur in offshore waters at or near the project location. The probability of a small spill would be minimized by bp's preventative measures during routine operations, including fuel transfer. In the unlikely event of a spill, implementation of bp's ROSRP is expected to potentially help mitigate and reduce the impacts. SDOCD Appendix G provides details on spill response measures in addition to the summary information provided in the EIA.

The water-soluble fractions of diesel are dominated by two- and three-ringed PAHs, which are moderately volatile (National Research Council, 2003a). The molecular weight of diesel fuel (i.e., ultra-low-sulfur marine diesel fuel) constituents is light to intermediate and can be readily degraded by physiochemical weathering processes (e.g., evaporation, dissolution, dispersion, photochemical oxidation) and biological processes (microbial degradation). Diesel fuel is much lighter than water (specific gravity is between 0.83 and 0.88, compared to 1.03 for seawater). When spilled on water, diesel fuel spreads very quickly to a thin film of rainbow and silver sheens, except for marine diesel, which may form a thicker film of dull or dark colors. However, because diesel fuel has a very low viscosity, it is readily dispersed into the water column when winds reach 5 to 7 knots or with breaking waves (NOAA, 2023). It is possible for the diesel fuel that is dispersed by wave action to form droplets that are small enough to be kept in suspension and moved by the currents.

Diesel dispersed in the water column can adhere to suspended sediments, but this generally occurs only in coastal areas with high levels of suspended solids (National Research Council, 2003a) and would not be expected to occur to any appreciable degree in offshore waters of the Gulf of America.

Some vessels may contain heavy fuel oil (i.e., No. 6 Fuel Oil, Bunker C) that may sink or be suspended in the water column. This fuel can stick to surfaces and does not readily disperse or breakdown from weathering. However, encounters with these vessels are considered rare and not further discussed.

The extent and persistence of water quality impacts from a small diesel fuel spill would depend on the meteorological and oceanographic conditions at the time of the spill and the effectiveness of spill response measures. It is estimated that more than 90% of a small diesel spill would evaporate or disperse within 24 hours (NOAA, 2022) (see **Section A.9.1**). The sea surface area covered with a very thin layer of diesel fuel would range from 0.5 to 5 ha (1.2 to 12 ac), depending on sea state and weather conditions. In addition to removal by evaporation, constituents of diesel fuel are readily and completely degraded by naturally occurring microbes (NOAA, 2023). Given the open ocean location of the project area, the extent and duration of water quality impacts from a small spill would not be significant.

Impacts of a Large Oil Spill

Potential impacts of a large oil spill on water quality are expected to be consistent with those analyzed and discussed by BOEM (2012a; 2015; 2016b; 2017, 2023a,b). Most of the spilled oil would be expected to form a slick at the surface, although information from the *Deepwater Horizon* incident indicates that submerged oil droplets can be produced when subsea dispersants are applied at the wellhead (Camilli et al., 2010; Hazen et al., 2010; NOAA, 2011a,b,c). Dispersants would be applied only after approval from the Federal On-Scene Coordinator with collaboration from the USEPA and Regional Response Team Region 6.

The extent and persistence of impacts would depend on the meteorological and oceanographic conditions at the time of the release and the effectiveness of spill response measures. Real-time wind and current data from the project area would be available at the time of a spill and would be used to assess the fate and effects of released hydrocarbons. Weathering processes that affect spilled oil on the sea include adsorption (sedimentation), biodegradation, dispersion, dissolution, emulsification, evaporation, and photo oxidation. Most crude oil blends will emulsify quickly when spilled, creating a stable mousse that presents a more persistent cleanup and removal challenge (NOAA, 2017).

Hazen et al. (2010) studied the impacts and fate of oil released in the deepwater environment after the 2010 *Deepwater Horizon* incident. Initial studies suggested that the potential exists for rapid intrinsic bioremediation (bacterial degradation) of subsea dispersed oil in the water column by deep-sea indigenous microbial activity without significant oxygen depletion (Hazen et al., 2010), although other studies showed that oil bioremediation caused oxygen drawdown in deep waters (Kessler et al., 2011; Dubinsky et al., 2013). Additional studies investigated the effects of deepwater dissolved hydrocarbon gases (e.g., methane, propane, ethane) and the microbial response to a deepwater oil spill suggest dissolved hydrocarbon gases may promote rapid hydrocarbon respiration by low-diversity bacterial blooms, thus priming indigenous bacterial populations for rapid hydrocarbon degradation of subsea oil (Kessler et al., 2011; Du and Kessler, 2012; Valentine et al., 2014). A 2017 study identified water temperature, taxonomic composition of initial bacterial community, and dissolved nutrient levels as factors that may regulate oil degradation rates by deep-sea indigenous microbes (Liu et al., 2017).

Due to the project area being located approximately 69 statute miles (111 km) from the nearest shoreline, it is expected that most water quality impacts would occur in offshore waters before low molecular weight alkanes and volatiles are weathered (Operational Science Advisory Team, 2011), especially in the event of a spill lasting <30 days. The 30-day OSRA modeling (**Table 4**) indicates nearshore waters and embayments from Cameron Parish, Louisiana to Bay County, Florida, could be affected within 30 days of a spill (1% to 21% conditional probability within 30 days).

C.2 Seafloor Habitats and Biota

The water depth at the location of the proposed wellsite is approximately 2,113 m (6,934 ft). According to BOEM (2016a), existing information for the deepwater Gulf of America indicates that the seafloor is composed primarily of soft sediments; exposed hard substrate habitats and associated biological communities are rare. The site clearance letter did not note the presence of hard bottom communities or potential seepage locations within 610 m (2,000 ft) of the proposed project activities (bp, 2025). The IPFs with potential impacts listed in **Table 2** are discussed below.

C.2.1 Soft Bottom Benthic Communities

There are no site-specific benthic community data from the project area. However, data from the Northern Gulf of Mexico Continental Slope Habitats and Benthic Ecology Study (Wei, 2006; Rowe and Kennicutt, 2009; Wei et al., 2010; Carvalho et al., 2013; Spies et al., 2016) can be used to describe typical baseline benthic communities in the area. **Table 5** summarizes data collected at two stations in water depths similar to that in the proposed project area.

Table 5. Baseline benthic community data from stations near the project area in similar depths sampled during the Northern Gulf of Mexico Continental Slope Habitats and Benthic Ecology Study (Adapted from: Wei, 2006; Rowe and Kennicutt, 2009).

Station	Water Depth (m)	Abundance		
		Meiofauna (>63 µm; individuals m ⁻²)	Macrofauna (>300 mm; individuals m ⁻²)	Megaфаuna (>1 cm; individuals ha ⁻¹)
HiPro	1,565	343,118	5,076	--
S37	2,387	291,179	2,192	1,451

Meiofaunal and megaфаunal abundances from Rowe and Kennicutt (2009); macrofaunal abundance from Wei (2006). ha = hectare. -- = no data available.

Densities of meiofauna (animals passing through a 0.5-mm sieve but retained on a 0.062-mm sieve) at stations in the vicinity of the project area ranged from approximately 291,000 to 343,000 individuals m⁻² (Table 5) (Rowe and Kennicutt, 2009). Nematodes, nauplii, and harpacticoid copepods were the three dominant meiofaunal groups, accounting for about 90% of total abundance.

The benthic macrofauna is characterized by small mean individual sizes and low densities, both of which reflect the meager primary production in surface waters of the Gulf of America continental slope (Wei, 2006). Densities decrease exponentially with water depth. Based on the Wei (2006) equation, the macrofauna density in the project area is expected to be approximately 1,406 individuals m⁻²; however, actual densities at the proposed project area are unknown.

Polychaetes are typically the most abundant macrofaunal group on the northern Gulf of America continental slope, followed by amphipods, tanaids, bivalves, and isopods. Carvalho et al. (2013) found polychaete abundance to be higher in the central region of the northern Gulf of America when compared to the eastern and western regions. Wei (2006) recognized four depth-dependent faunal zones (1 through 4), two of which are divided horizontally. The project area is on the border of Zones 2E and 3E. Zone 2E, which extends from the Texas-Louisiana slope to the west Florida terrace. The most abundant species in this zone were the polychaetes *Aricidea suecica*, *Litocorsa antennata*, *Paralacydonia paradoxa*, and *Tharyx marioni*; and the bivalve *Heterodonta* spp. (Wei, 2006). Zone 3E is a broad zone that encompasses the west flank of the lower Mississippi Fan, the lower Mississippi Canyon, the lower DeSoto Canyon, the lower West Florida Terrace, the deep Mississippi Fan, and the base of the Sigsbee Escarpment. The most abundant species in this zone were the polychaetes *Paraonella monilaris* and *Tharyx marioni*; the bivalve *Heterodonta* spp. and the isopod *Macrostylis* sp. (Wei, 2006).

Common benthic fauna observed during the Northern Gulf of Mexico Continental Slope Habitats and Benthic Ecology Study included motile taxa such as echinoderms, cnidarians (sessile sea anemones, pens and whips), decapod crustaceans, and demersal fish (Rowe and Kennicutt, 2009).

Bacteria also are an important component in terms of biomass and cycling of organic carbon (Cruz-Kaegi, 1998). For example, in deep-sea sediments, Main et al. (2015) observed that microbial oxygen consumption rates increased and bacterial biomass decreased with

hydrocarbon contamination. Bacterial biomass at the depth range of the project area typically is about 1 to 2 g C m⁻² in the top 15 cm of sediments (Rowe and Kennicutt, 2009).

IPFs that potentially may affect benthic communities are physical disturbance to the seafloor and potential effects from a large oil spill resulting from a well blowout at the seafloor. A small fuel spill would not affect benthic communities because the diesel fuel is expected to float and dissipate on the sea surface.

Impacts of Physical Disturbance to the Seafloor

BOEM (2012a) estimated an area of seafloor disturbance between 1.2 ac (0.5 ha) and 2.5 ac (1.0 ha) per kilometer of pipeline or flowline installation. For this project, the total length of pipe between the manifold and tree is approximately 55 m (180 ft). Due to the water depth in the project area, the subsea infrastructure will not be buried by trenching, but instead will be placed on the seafloor, decreasing the area of impact.

There will be disturbance to the seafloor and soft bottom communities due to the installation of subsea equipment such as a subsea tree, well jumper, tie-in sled, an intermediate jumper, and associated controls equipment. However, this disturbance will be limited to the immediate vicinity of the subsea equipment footprints. A shallow geohazards assessment of the proposed location indicated that there are no potential hardgrounds within 610 m (2,000 ft) of the mooring pile locations (bp, 2025).

The areal extent of these impacts from the proposed project are expected to be small compared to the lease area itself, and these types of soft bottom communities are ubiquitous along the northern Gulf of America continental slope (Gallaway, 1988; Gallaway et al., 2003; Rowe and Kennicutt, 2009). Impacts from the physical disturbance of the seafloor during this project are expected to be spatially localized and temporally short term. Therefore, these disturbances will not likely have a significant impact on soft bottom benthic communities in the region.

Impacts of a Large Oil Spill

The most likely effects of a subsea blowout on benthic communities would be within a few hundred meters of the wellsite. BOEM (2012a) estimated that a severe subsurface blowout could resuspend and disperse sediments within a 300 m (984 ft) radius. While coarse sediments (sands) would probably settle at a rapid rate within 400 m (1,312 ft) from the blowout site, fine sediments (silts and clays) could be resuspended for more than 30 days and dispersed over a wider area. Based on previous studies, surface sediments at the project area are assumed to largely be silt and clay (Rowe and Kennicutt, 2009).

While impacts from a large oil spill are anticipated to be confined to the immediate vicinity of the wellhead, depending on the specific circumstances of the incident, additional benthic community impacts could extend beyond the immediate vicinity of the wellhead (BOEM, 2017). During the *Deepwater Horizon* incident, subsurface oil plumes were reported in water depths of approximately 1,100 m (3,600 ft), extending at least 22 miles (35 km) from the wellsite and persisting for more than a month (Camilli et al., 2010).

C.2.2 High-Density Deepwater Benthic Communities

As defined by NTL 2009-G40, high-density deepwater benthic communities are features or areas that could support high-density chemosynthetic communities or high-density hard bottom communities, including deepwater coral-dominated communities. Chemosynthetic communities were discovered in the central Gulf of America in 1984 and have been studied extensively (MacDonald, 2002). Deepwater coral communities are also known from numerous locations in the Gulf of America (Brooke and Schroeder, 2007; CSA International, 2007; Brooks et al., 2012). In the Gulf of America, deepwater coral communities occur almost exclusively on exposed authigenic carbonate rock created by a biogeochemical (microbial) process.

The only IPF identified for this project that could affect high-density deepwater benthic communities is a large oil spill from a well blowout at the seafloor. A small fuel spill would not affect benthic communities because the diesel fuel would float and dissipate on the sea surface. Physical disturbance and effluent discharge are not considered IPFs for deepwater benthic communities because these communities are not expected to be present down current of the proposed wellsite.

Impacts of a Large Oil Spill

A large oil spill caused by a seafloor blowout could cause direct impacts (i.e., caused by the physical impacts of a blowout) on benthic communities within approximately 300 m (984 ft) of the wellhead (BOEM, 2012a; 2013). However, based on the wellsite clearance letter for the proposed wells (bp, 2025), there are no seafloor features that could support high-density deepwater benthic communities within 610 m (2,000 ft) of the proposed project location. The nearest chemosynthetic community is located approximately 47 statute miles (76 km) from the project area. Therefore, this type of impact is not expected.

Additional benthic community impacts could extend beyond the immediate vicinity of the wellhead, depending on the specific circumstances (BOEM, 2017). During the *Deepwater Horizon* spill, subsurface plumes were reported at a water depth of approximately 1,100 m (3,600 ft), extending at least 55 miles (89 km) from the wellsite and persisting for more than a month (Camilli et al., 2010). Oil plumes that contact sensitive benthic communities before degrading could potentially impact the resource (BOEM, 2017). Potential impacts on sensitive resources would be an integral part of the decision and approval process for the use of dispersants, and such approval would be obtained from the Federal On-Scene Coordinator upon consultation with the regional response team, including USEPA, prior to the use of dispersants.

The biological effects and fate of the oil remaining in the Gulf of America from the *Deepwater Horizon* incident are still being studied, but numerous papers have been published discussing the nature of subsea oil plumes (e.g., Ramseur, 2011; Reddy et al., 2012; Valentine et al., 2014). Hazen et al. (2010) reported changes in plume hydrocarbon composition with distance from the source. Incubation experiments with environmental isolates demonstrated faster than expected hydrocarbon biodegradation rates at 5°C (41°F). Based on these results, Hazen et al. (2010) suggested the potential exists for intrinsic bioremediation of the oil plume in the deepwater column without substantial oxygen drawdown.

Potential impacts of oil on high-density deepwater benthic communities are discussed in recent EISs (BOEM, 2012a; 2015; 2016b; 2017, 2023a,b). Oil droplets or oiled sediment particles could come into contact with chemosynthetic organisms or deepwater corals in the vicinity of the spill

site. Impacts could include loss of habitat, biodiversity, and live coral coverage; destruction of hard substrate; reduction or loss of one or more commercial and recreational fishery habitats; or changes in sediment characteristics (BOEM, 2023a).

C.2.3 Designated Topographic Features

MC 522 is not within or near a designated topographic feature or a no-activity zone as identified in NTL 2009-G39. The nearest designated Topographic Feature Stipulation Block is located approximately 84 statute miles (135 km) from the project area. There are no IPFs associated with routine operations that could cause impacts to designated topographic features.

Due to the distance from the project area, it is unlikely that designated topographic features could be affected by an accidental spill. A small fuel spill would float and dissipate on the surface and would not reach these seafloor features. In the event of an oil spill from a well blowout, a surface slick would not contact these seafloor features. If a subsurface plume were to occur, impacts on these features would be unlikely due to the distance and the difference in water depth from the source. Near-bottom currents in the region are predicted to flow along the isobaths (Nowlin et al., 2001) and typically would not carry a plume upward onto the continental shelf edge.

C.2.4 Pinnacle Trend Area Live Bottoms

The project area is not covered by the Live Bottom (Pinnacle Trend) Stipulation. As defined by NTL 2009-G39, the nearest Pinnacle Stipulation Block is located approximately 48 statute miles (77 km) from the project area. There are no IPFs associated with routine operations that could cause impacts to pinnacle trend area live bottoms due to the distance from the project area.

Due to the distance from the project area, it is unlikely that pinnacle trend live bottom areas would be affected by an accidental spill. A small fuel spill would float on the surface and would not reach these seafloor features. In the event of an oil spill from a well blowout, a surface slick would not contact these seafloor features. If a subsurface plume were to occur, impacts on these features would be unlikely due to the distance and the difference in water depth from the source. Near-bottom currents in the region are predicted to flow along the isobaths (Nowlin et al., 2001) and typically would not carry a plume upward onto the continental shelf edge.

C.2.5 Eastern Gulf Live Bottoms

The project area is not covered by the Live Bottom (Low-Relief) Stipulation, which applies to seagrass communities and low-relief hard bottom reef within the Eastern Gulf of America Planning Area leases in water depths of 100 m (328 ft) or less and portions of Pensacola and Destin Dome Area blocks in the Central Gulf of America Planning Area. The nearest block covered by the Live Bottom Stipulation, as defined by NTL 2009-G39, is located approximately 63 statute miles (101 km) from the project area. There are no IPFs associated with routine operations that could cause impacts to eastern Gulf live bottom areas due to the distance from the project area.

Because of the distance from the project area, it is unlikely that eastern Gulf live bottom areas would be affected by an accidental spill. A small fuel spill would float and dissipate on the surface and would not reach these seafloor features. In the event of an oil spill from a well

blowout, a surface slick would not contact these seafloor features. If a subsurface plume were to occur, impacts on these features would be unlikely due to the distance and the difference in water depth from the source. Near-bottom currents in the region are predicted to flow along the isobaths (Nowlin et al., 2001) and typically would not carry a plume upward onto the continental shelf.

C.3 Threatened, Endangered, and Protected Species and Critical Habitat

This section discusses species listed as Endangered or Threatened under the Endangered Species Act (ESA). In addition, it includes all marine mammal species in the region, all of which are protected under the Marine Mammal Protection Act (MMPA).

Endangered or Threatened species that may occur in the project area and/or along the northern Gulf Coast are listed in **Table 6**. The table also indicates the location of critical habitat (if designated in the Gulf of America). Critical habitat is defined as (1) specific areas within the geographical area occupied by the species at the time of listing, if they contain physical or biological features essential to conservation, and those features may require special management considerations or protection; and (2) specific areas outside the geographical area occupied by the species if the agency determines that the area itself is essential for conservation. The NMFS (of NOAA) has jurisdiction for ESA-listed marine mammals (cetaceans), sea turtles, marine invertebrates, and fishes in the Gulf of America. The USFWS has jurisdiction for ESA-listed birds, terrestrial and freshwater species (e.g., beach mice, Florida salt marsh vole [*Microtus pennsylvanicus dukemcampbelli*], Panama City crayfish [*Procambarus econfinae*]}; the West Indian manatee (*Trichechus manatus*), and sea turtles while on their nesting beaches.

Table 6. Federally listed Endangered and Threatened species potentially occurring in the project area and along the northern Gulf Coast. Adapted from: U.S. Fish and Wildlife Service (2025) and National Marine Fisheries Service (2025a).

Species	Scientific Name	Status	Potential Presence		Critical Habitat Designated in Gulf of America
			Project Area	Coastal	
Marine Mammals					
Rice's whale ¹	<i>Balaenoptera ricei</i>	E	X	--	None
Sperm whale	<i>Physeter macrocephalus</i>	E	X	--	None
West Indian manatee	<i>Trichechus manatus</i> ²	T	--	X	Florida (Peninsular)
Sea Turtles					
Loggerhead turtle	<i>Caretta caretta</i>	T,E ³	X	X	Nesting beaches and nearshore reproductive habitat in Mississippi, Alabama, and Florida (Panhandle); <i>Sargassum</i> habitat including most of the central & western Gulf of America
Green turtle	<i>Chelonia mydas</i>	T	X	X	None
Leatherback turtle	<i>Dermochelys coriacea</i>	E	X	X	None
Hawksbill turtle	<i>Eretmochelys imbricata</i>	E	X	X	None

Table 6. (Continued).

Species	Scientific Name	Status	Potential Presence		Critical Habitat Designated in Gulf of America
			Project Area	Coastal	
Kemp's ridley turtle	<i>Lepidochelys kempii</i>	E	X	X	None
Birds					
Piping Plover	<i>Charadrius melanotos</i>	T	--	X	Coastal Texas, Louisiana, Mississippi, Alabama, and Florida (Panhandle)
Whooping Crane	<i>Grus americana</i>	E	--	X	Coastal Texas (Aransas National Wildlife Refuge)
Black-capped Petrel	<i>Pterodroma hasitata</i>	E	X	--	None
Rufa Red Knot	<i>Calidris canutus rufa</i>	T	--	X	None
Fishes					
Oceanic whitetip shark	<i>Carcharhinus longimanus</i>	T	X	--	None
Giant manta ray	<i>Mobula birostris</i>	T	X	X	None
Gulf sturgeon	<i>Acipenser oxyrinchus desotoi</i>	T	--	X	Coastal Louisiana, Mississippi, Alabama, and Florida (Panhandle)
Nassau grouper	<i>Epinephelus striatus</i>	T	--	X	None
Smalltooth sawfish	<i>Pristis pectinata</i>	E	--	X	Southwest Florida
Invertebrates					
Elkhorn coral	<i>Acropora palmata</i>	T	--	X	Florida Keys and the Dry Tortugas
Staghorn coral	<i>Acropora cervicornis</i>	T	--	X	Florida Keys and the Dry Tortugas
Pillar coral	<i>Dendrogyra cylindrus</i>	E	--	X	Southeast Florida and Florida Keys, Puerto Rico, St. Thomas, St. John, St. Croix, and Navassa Island
Rough cactus coral	<i>Mycetophyllia ferox</i>	T	--	X	Southeast Florida and Florida Keys, Puerto Rico, St. Thomas, St. John, St. Croix, and Navassa Island
Lobed star coral	<i>Orbicella annularis</i>	T	--	X	Southeast Florida and Florida Keys, Puerto Rico, St. Thomas, St. John, St. Croix, Navassa Island, East and West Flower Garden Banks, Rankin Bright Bank, Geyer Bank, and McGrail Bank
Mountainous star coral	<i>Orbicella faveolata</i>	T	--	X	Southeast Florida and Florida Keys, Puerto Rico, St. Thomas, St. John, St. Croix, Navassa Island, East and West Flower Garden Banks, Rankin Bright Bank, Geyer Bank, and McGrail Bank

Table 6. (Continued).

Species	Scientific Name	Status	Potential Presence		Critical Habitat Designated in Gulf of America
			Project Area	Coastal	
Boulder star coral	<i>Orbicella franksi</i>	T	--	X	Southeast Florida and Florida Keys, Puerto Rico, St. Thomas, St. John, St. Croix, Navassa Island, East and West Flower Garden Banks, Rankin Bright Bank, Geyer Bank, and McGrail Bank
Panama City crayfish	<i>Procambarus econfiniae</i>	T	--	X	South-central Bay County, Florida
Queen conch	<i>Aliger gigas</i>	T	--	X	None
Terrestrial Mammals					
Beach mice (Alabama, Choctawhatchee, Perdido Key, St. Andrew)	<i>Peromyscus polionotus</i> subsp. <i>Ammobates</i> , <i>allophrys</i> , <i>trissyllepsis</i> , and <i>peninsularis</i> , respectively	E	--	X	Alabama and Florida (Panhandle) beaches
Florida salt marsh vole	<i>Microtus pennsylvanicus</i> <i>dukecampbelli</i>	E	--	X	None

E = Endangered; T = Threatened; X = potentially present; -- = not present.

¹ In 2021, the National Marine Fisheries Service recognized that what had previously been accepted as a subspecies of the Bryde's whale is actually a separate species. The reclassification is formerly recognized under 86 *Federal Register* (FR) 47022 effective date 22 October 2021 as the Rice's whale (*Balaenoptera ricei*).

² There are two subspecies of West Indian manatee: the Florida manatee (*T. m. latirostris*), which ranges from the northern Gulf of America to Virginia, and the Antillean manatee (*T. m. manatus*), which ranges from northern Mexico to eastern Brazil. Only the Florida manatee subspecies is likely to be found in the northern Gulf of America.

³ The Northwest Atlantic Ocean Distinct Population Segment (DPS) of loggerhead turtles is designated as Threatened (76 FR 58868). The National Marine Fisheries Service and the U.S. Fish and Wildlife Service designated critical habitat for this DPS, including beaches and nearshore reproductive habitat in Mississippi, Alabama, and the Florida Panhandle as well as *Sargassum* spp. habitat throughout most of the central and western Gulf of America (79 FR 39756 and 79 FR 39856).

Coastal Endangered or Threatened species that may occur along the U.S. Gulf Coast include the West Indian manatee, Piping Plover (*Charadrius melanotos*), Rufa Red Knot (*Calidris canutus rufa*), Florida salt marsh vole, Panama City crayfish, Whooping Crane (*Grus americana*), Gulf sturgeon (*Acipenser oxyrinchus desotoi*), smalltooth sawfish (*Pristis pectinata*), queen conch (*Aliger gigas*) and four subspecies of beach mouse. Critical habitat has been designated for all of these species (except the Florida salt marsh vole, Rufa Red Knot, and queen conch) as indicated in **Table 6** and discussed in individual sections. Two other coastal bird species (Bald Eagle [*Haliaeetus leucocephalus*] and Brown Pelican [*Pelecanus occidentalis*]) are no longer federally listed as Endangered or Threatened; these are discussed in **Section C.4.2**.

Five sea turtle species, the Rice's whale (*Balaenoptera ricei*), sperm whale (*Physeter macrocephalus*), oceanic whitetip shark (*Carcharhinus longimanus*), and giant manta ray (*Mobula birostris*), and the Black-capped Petrel (*Pterodroma hasitata*) are the only Endangered

or Threatened species that could potentially occur within the project area. The listed sea turtles include the leatherback turtle (*Dermochelys coriacea*), Kemp's ridley turtle (*Lepidochelys kempii*), hawksbill turtle (*Eretmochelys imbricata*), loggerhead turtle (*Caretta caretta*), and green turtle (*Chelonia mydas*) (Pritchard, 1997). Effective 11 August 2014, NMFS has designated certain marine areas as critical habitat for the Northwest Atlantic Distinct Population Segment (DPS) of the loggerhead sea turtle (see **Section C.3.5**). No critical habitat has been designated in the Gulf of America for the leatherback turtle, Kemp's ridley turtle, hawksbill turtle, green turtle, or sperm whale.

Four Endangered mysticetes (blue whale [*Balaenoptera musculus*], fin whale [*Balaenoptera physalus*], North Atlantic right whale [*Eubalaena glacialis*], and sei whale [*Balaenoptera borealis*]) have been reported in the Gulf of America, and are considered rare or extralimital (Würsig, 2017). These species are not included in the most recent NMFS stock assessment report (Hayes et al., 2023) nor in the most recent BOEM multisale EIS (BOEM, 2017); therefore, they are not considered further in the EIA.

The Rice's whale exists in the Gulf of America as a small, resident population. This species was formally known as a subspecies to the Bryde's whale (*Balaenoptera edeni brydei*) until a DNA study identified it as a separate species (Rosel et al., 2021). It is the only baleen whale known to be resident in the Gulf of America. The species is restricted in range, being primarily found in the northeastern Gulf in the waters of the DeSoto Canyon (Waring et al., 2016, Rosel et al., 2021) with some detections also occurring along the OCS between the 100-m (328-ft) to 400-m (1,312-ft) isobaths (see **Section C.3.2**).

In several recent acoustic studies in the Gulf of America (Soldevilla et al., 2022a,b; 2024), all Bryde's whale complex individuals are assumed to be Rice's whales. However, Bryde's whales have a global tropical and subtropical range that can include the Gulf of America. Moreover, in the latest NMFS Rice's whale Marine Mammal Stock Assessment Report (Hayes et al., 2023), all previous data of Gulf of America Bryde's whales from studies that pre-dated the Rosel et al. (2021) study that determined that Rice's whales are a distinct species were now assumed to all be Rice's whales. However, it is unclear on what percentage of Bryde's whale complex individuals that live or previously lived in Gulf of America are Rice's whales vs Bryde's whales due to having no DNA studies that analyzed a representative population of Gulf of America Bryde's whale complex individuals.

The Marine Mammal Protected Areas Task Force has designated three Important Marine Mammal Areas (IMMAs) which overlap with the project area: the Gulf of Mexico Outer Continental Shelf and Continental Slope IMMA, the Northern Gulf of Mexico Bays, Sounds and Estuaries IMMA, and the Texas Coastal Bend IMMA (Marine Mammal Protected Areas Task Force, 2025a,b,c). The Gulf of Mexico Outer Continental Shelf and Continental Slope IMMA extends over the whole basin (both within and outside the Gulf of America encompassed in the U.S. EEZ) and covers the portion of the outer continental shelf and slope between 100 and 2,000 m depth and the portion of the abyssal plain between 2,000 and 2,500 m depth. This IMMA was identified as important habitat for Rice's whales and sperm whales residing in the Gulf of Mexico, as well as an area of high diversity of other cetacean species (e.g., beaked whales [*Ziphius cavirostris*, *Mesoplodon* spp.], short-finned pilot whales [*Globicephala macrorhynchus*], Risso's dolphins [*Grampus griseus*]) (Marine Mammal Protected Areas Task Force, 2025a). The other two IMMAs cover coastal bays and estuaries which host smaller

resident populations of bottlenose dolphins (*Tursiops truncatus*) (Marine Mammal Protected Areas Task Force, 2025b,c).

The giant manta ray could occur in the project area but is most commonly observed in the Gulf of America at the Flower Garden Banks. The Nassau grouper (*Epinephelus striatus*) has been observed in the Gulf of America at the Flower Garden Banks but is most commonly observed in shallow tropical reefs of the Caribbean and is not expected to occur in the project area. The smalltooth sawfish is a coastal species limited to shallow areas off the west coast of Florida and is not expected to occur in the project area. The Panama City crayfish is a coastal species in south-central Bay County, Florida and is not expected to occur in the project area.

Six Threatened coral species are known from the northern Gulf of America: elkhorn coral (*Acropora palmata*), staghorn coral (*Acropora cervicornis*), lobed star coral (*Orbicella annularis*), mountainous star coral (*Orbicella faveolata*), boulder star coral (*Orbicella franksi*) and rough cactus coral (*Mycetophyllia ferox*). Pillar coral (*Dendrogyra cylindrus*) is a known Endangered coral species from the northern Gulf of America. These seven coral species are shallow water, zooxanthellate species (containing symbiotic photosynthetic zooxanthellae which contribute to their nutritional needs) and are not present in the deepwater project area (see **Section C.3.18**).

There are no other Threatened or Endangered species in the Gulf of America that are likely to be adversely affected by either routine or accidental events. The IPFs with potential impacts listed in **Table 2** are discussed below.

C.3.1 Sperm Whale (Endangered)

The only Endangered marine mammal likely to be present at or near the project area is the sperm whale. Resident populations of sperm whales occur within the Gulf of America; a species description is presented in the recovery plan for this species (NMFS, 2010). Gulf of America sperm whales are classified as an Endangered species and a “strategic stock” (defined as a stock that may have unsustainable human-caused impacts) by NOAA Fisheries (Waring et al., 2016). A “strategic stock” is defined by the MMPA as a marine mammal stock that meets the following criteria:

- The level of direct human-caused mortality exceeds the potential biological removal (PBR) level;
- Based on the best available scientific information, is in decline and is likely to be listed as a Threatened species under the ESA within the foreseeable future; or
- Is listed as a Threatened or Endangered species under the ESA or is designated as depleted under the MMPA.

Current threats to sperm whale populations are defined as “any factor that could represent an impediment to recovery.” Current threats to sperm whale populations worldwide include fisheries interactions, anthropogenic marine sound, vessel interactions, contaminants and pollutants, disease, injury from marine debris, research, predation and natural mortality, direct harvest, competition for resources, loss of prey base due to climate change and ecosystem change, and cable laying. In the Gulf of America, the impacts from many of these threats are identified as either low or unknown (BOEM, 2012a).

The distribution of sperm whales in the Gulf of America is correlated with mesoscale physical features such as eddies associated with the Loop Current (Jochens et al., 2008). Sperm whale populations in the north-central Gulf of America are present throughout the year (Davis et al., 2000). Results of a multi-year tracking study show female sperm whales are typically concentrated along the upper continental slope between the 200- and 1,000-m (656 and 3,280 ft) depth contours (Jochens et al., 2008). Male sperm whales were more variable in their movements and were documented in water depths >3,000 m (9,843 ft). Generally, groups of sperm whales observed in the Gulf of America during the MMS-funded Sperm Whale Seismic Study (SWSS) consisted of mixed-sex groups comprising adult females with juveniles, and groups of bachelor males. Typical group size for mixed groups was 10 individuals (Jochens et al., 2008).

A review of protected species observer (PSO) sighting reports from seismic mitigation surveys in the Gulf of America conducted over a 6-year period found a mean group size for sperm whales of 2.5 individuals (Barkaszi et al., 2012). In these mitigation surveys, sperm whales were the most common large cetacean encountered. Tagging and observation data from the SWSS also showed that sperm whales' transit through the vicinity of the project area. Movements of satellite-tracked individuals suggest that this area of the continental slope is within the home range of the Gulf of America population (within the 95% utilization distribution) (Jochens et al., 2008).

IPFs that may potentially affect sperm whales include installation vessel presence, underwater sound, and lights; support vessel and helicopter marine sound; support vessel collisions; and two types of accidents (a small fuel spill and a large oil spill). Effluent discharges are likely to have negligible impacts on sperm whales due to rapid dilution, the small area of ocean affected, the intermittent nature of the discharges, and the mobility of these marine mammals. Compliance with NTL BSEE-2015-G03 is intended to minimize the potential for marine debris-related impacts on sperm whales.

Though NMFS (2025a) stated marine debris as an IPF, compliance with BSEE-NTL 2015-G03 and NMFS (2025a) Appendix 2 will minimize the potential for marine debris-related impacts on sperm whales. NMFS (2025a) estimates that no more than three sperm whales will be non-lethally taken, with one sperm whale lethally taken through the ingestion of marine debris over 45 years of proposed action. Therefore, marine debris is likely to have no more than negligible impacts on sperm whales and is not discussed further (See **Table 2**).

Impacts of Installation Vessel Presence, Marine Sound, and Lights

Sound from routine installation activities (see **Section A.1**) has the potential to disturb individuals or groups of sperm whales or mask the sounds they would normally produce or hear. Behavioral responses to sound by marine mammals vary widely and overall, are short-term and include, temporary displacement or cessation of feeding, resting, or social interactions (NMFS, 2009a; Gomez et al., 2016; Southall et al., 2021). Additionally, behavioral changes resulting from auditory masking may induce an animal to produce more calls, longer calls, or shift the frequency of the calls. For example, masking caused by vessel sound was found to result in a reduced number of sperm whale calls in the Gulf of America (Azzara et al., 2013).

NMFS (2024) lists sperm whales in the same functional hearing group (i.e., high-frequency cetaceans) as most dolphins and other toothed whales (i.e., odontocetes), with an estimated hearing sensitivity from 150 Hz to 160 kHz. Therefore, the frequencies of installation and

DP vessel-related sound overlap with the hearing sensitivity range of sperm whales. Frequencies <150 Hz produced by the installation operations may be audible but are not likely to be perceived with any significance by high-frequency cetaceans. The sperm whale may possess better low-frequency hearing than some of the other odontocetes, although not as low as many baleen whale species whose vocalizations between 12 Hz and 28 kHz (Wartzok and Ketten, 1999; Southall et al., 2019). Generally, most of the vocalizations produced by sperm whales vocalizations occur at frequencies below 10 kHz, although diffuse energy up to and past 20 kHz is common, with SPL source levels up to 236 dB re1 μ Pa m (Møhl et al., 2003).

Observations of sperm whales near offshore oil and gas operations suggest an inconsistent response to anthropogenic marine sound (Jochens et al., 2008). Most observations of behavioral responses of marine mammals to non-impulsive sources such as drilling sound, in general, involve short-term behavioral responses, which included onset of avoidance behavior and the cessation of feeding, resting, or social interactions (NMFS, 2010; Southall et al., 2021). Animals can determine the direction from which underwater sound arrives based on cues, such as differences in arrival times, sound levels, and phases at the two ears. Thus, an animal's directional hearing capabilities have a bearing on its ability to avoid sound sources (National Research Council, 2003b).

NMFS (2024) presents criteria that may be used to determine auditory injury and temporary threshold shifts (TTS) thresholds for marine mammals. Behavioral disturbance thresholds have not been updated in the most recent acoustic guidance (NMFS, 2024) and therefore, this assessment refers to thresholds published by NMFS in FR 70(7): 1871-1875 (NMFS and NOAA, 2005) and summarized in NMFS (2025c). For high-frequency cetaceans exposed to non-impulsive sources (which include the proposed installation operations), acoustic injury is estimated to occur when the animal has received a sound exposure level over 24 hours (SEL_{24h}) of 201 dB re 1 μ Pa² s. Similarly, TTS is estimated to occur when the animal has received an SEL_{24h} of 181 dB re 1 μ Pa² s. Given the non-impulsive nature of DP vessels used during installation operations and the estimated source levels (**Section A.1**), sperm whales are unlikely to be exposed to sound above the auditory injury threshold. While sound during installation operations may exceed the TTS threshold, it is expected that, due to the relatively stationary nature of these vessels, sperm whales would move away from the proposed operations area, reducing the duration that individuals are exposed to sound, further reducing the likelihood of TTS being realized. Therefore, due to transient nature of sperm whales and the stationary nature of installation activities, it is not expected that any sperm whales will remain in proximity to the source for a full 24-hour period to receive an SEL_{24h} necessary for the onset of auditory threshold shifts.

Noise associated with proposed installation operations may cause behavioral disturbance effects to sperm whales. Behavioral disturbance thresholds for marine mammals are applied equally across all functional hearing groups. Received SPL of 120 dB re 1 μ Pa from a non-impulsive source is considered high enough to elicit the onset of a behavioral reaction in some marine mammal species. Based on the estimated source levels provided in **Section A.1**, the maximum estimated source level of 195 dB re 1 μ Pa m for sound produced by project operations may exceed the behavioral disturbance threshold out to 3.5 mi (5.6 km). However, in the case of behavioral responses, exposure to above-threshold sound levels alone does not indicate a behavioral response and, more importantly, does not equate to biologically important responses (Southall et al., 2016; Ellison et al., 2012).

There are other OCS facilities and activities near the project area, and the region as a whole has a large number of similar marine sound sources (HDR [Athens, AL], 2022). Installation-related marine sound associated with this project may contribute to increases in the marine sound environment within the region, but it is not expected to be at amplitudes above ambient sound conditions sufficient enough to result in long-term behavioral effects to sperm whales. The proposed activity may cause behavioral effects, primarily avoidance or temporary displacement from the project area, but are not expected to be biologically significant for the population. Vessel lighting and presence are not expected to impact sperm whales (NMFS, 2007; BOEM, 2016a; 2017) and therefore, are not identified as IPFs.

Impacts of Support Vessel and Helicopter Traffic

Support vessel traffic has the potential to disturb sperm whales, and there is also a risk of vessel collisions, which are identified as a threat in the recovery plan for this species (NMFS, 2010). To reduce the potential for vessel collisions, BOEM issued BOEM-2016-G01. This NTL recommends that vessel operators and crews receive protected species identification training. This NTL was reissued in June 2020 to address instances where guidance in the 2020 NMFS Biological Opinion (NMFS, 2020a) replaces compliance with the NTL as well as the amendment in April 2021 (NMFS, 2021a); a new NTL in response to the 2025 Biological Opinion has not yet been issued. However, bp intends to follow the mitigation measures summarized in Attachment 3 of the 2025 Biological Opinion (NMFS, 2025a).

Vessel operators are required to reduce vessel speed to 10 knots or less, as safety permits, when mother/calf pairs, pods, or large assemblages of cetaceans are observed near an underway vessel (NTL BOEM-2016-G01). When sperm whales are sighted while a vessel is underway, the vessel should take action (e.g., attempt to remain parallel to the whale's course, avoid excessive speed or abrupt changes in direction until the whale has left the area) as necessary to avoid violating the relevant separation distance. However, if the sperm whale is sighted within this distance, the vessel should reduce speed and shift the engine to neutral and not re-engage until the whale is outside of the separation area. This does not apply to any vessel towing gear (NMFS [2025a] Attachment 1). Compliance with these mitigation measures will minimize the likelihood of vessel collisions as well as reduce the chance for disturbing sperm whales. However, this mitigation is effective only during daylight hours and during periods of adequate visibility.

NMFS (2025a) analyzed the potential for vessel collisions and harassment of sperm whales in its Biological Opinion on the Federally Regulated Oil and Gas Program Activities in the Gulf of Mexico. NMFS concluded that the observed avoidance of passing vessels by sperm whales is an advantageous response to avoid a potential threat and is not expected to result in any significant effect on migration, breathing, nursing, breeding, feeding, or sheltering to individuals, or have any consequences at the level of the population. With the implementation of the NMFS vessel collision protocols listed in Attachment 3 of NMFS (2025a) in addition to the NTL BOEM-2016-G01, NMFS (2025a) concluded that the likelihood of collisions between vessels and sperm whales would be reduced during daylight hours. During nighttime and during periods of poor visibility, it is assumed that vessel sound and sperm whale avoidance of moving vessels would reduce the chance of vessel collisions with this species. It is, however, likely that a collision between a sperm whale and a moving support vessel would result in severe injury or mortality of the stricken animal. The current PBR level for the Gulf of America stock of sperm whales is 2.0 (Hayes et al., 2022). The PBR level is defined by the MMPA as the maximum

number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population. NMFS (2025a) estimated that there would be 4 nonlethal takes and 12 lethal vessel strikes over the course of 45 years. Mortality of a single sperm whale would constitute a significant impact to the local (Gulf of America) stock of sperm whales but would not likely be significant at the species level.

Helicopter traffic also has the potential to disturb sperm whales. Smultea et al. (2008) documented responses of sperm whales offshore Hawaii to fixed wing aircraft flying at an altitude of 245 m (800 ft). A reaction to the initial pass of the aircraft was observed during 3 (12%) of 24 sightings. All three responses consisted of a hasty dive and occurred at <360 m (1,180 ft) lateral distance from the aircraft. Additional reactions were seen when aircraft circled certain whales to make further observations. Based on other studies of cetacean responses to sound, the authors concluded that the observed reactions to brief overflights by the aircraft were short-term and limited to behavioral disturbances.

While flying offshore in the Gulf of America, support helicopters maintain altitudes above 213 m (700 ft) during transit to and from the working area. In the event that a whale is observed during transit, the helicopter will not approach or circle the animals. Although whales may respond to helicopters (Smultea et al., 2008), NMFS (2025a) concluded that this altitude would minimize the potential for disturbing sperm whales. Therefore, no significant impacts are expected.

Impacts of a Small Fuel Spill

Potential spill impacts on marine mammals, including sperm whales, are discussed by NMFS (2025a) and BOEM (2017). Oil impacts on marine mammals are discussed by Geraci and St. Aubin (1990) and by the Marine Mammal Commission (MMC) (2011) with discussions germane to the Gulf of America populations concerning composition and fate of petroleum and spill-treating agents in the marine environment, aspects of cetacean ecology, and physiological and toxic effects of oil on cetaceans. For this SDOCD, there are no unique site-specific issues with respect to spill impacts on these animals that were not analyzed in the previous documents.

A small fuel spill in offshore waters would produce a thin sheen on the water surface and introduce concentrations of petroleum hydrocarbons and their degradation products. The extent and persistence of impacts would depend on the meteorological and oceanographic conditions at the time of the spill and the effectiveness of spill response measures. **Section A.9.1** discusses the likely fate of a small fuel spill and indicates that over 90% would be evaporated or dispersed naturally within 24 hours (NOAA, 2022). The area of the sea surface with diesel fuel on it would range from 0.5 to 5 ha (1.2 to 12 ac), depending on sea state and weather conditions.

Direct physical and physiological effects of exposure to diesel fuel could include skin irritation, inflammation, or necrosis; chemical burns of skin, eyes, and mucous membranes; inhalation of toxic fumes; ingestion of oil directly or via contaminated prey; and stress from the activities and marine sound of response vessels and aircraft (MMC, 2011). However, due to the limited areal extent and short duration of water quality impacts from a small fuel spill as well as the mobility of sperm whales, no significant impacts would be expected.

The probability of a fuel spill will be minimized by bp's preventative measures during routine operations, including fuel transfer. In the unlikely event of a spill, implementation of bp's ROSRP will mitigate and lessen the potential for impacts on sperm whales. Given the open ocean location of the project area, the duration of a small spill is expected to be brief and therefore potential for impacts to be minimal.

Impacts of a Large Oil Spill

Potential spill impacts on marine mammals, including sperm whales, are discussed by NMFS (2025a) and BOEM (2017, 2023a,b). Oil impacts on marine mammals are discussed by Geraci and St. Aubin (1990) and by the MMC (2011). For this SDOCD, there are no unique site-specific issues with respect to spill impacts on sperm whales.

Impacts of oil spills on sperm whales can include direct impacts from oil exposure as well as indirect impacts due to response activities and materials (e.g., vessel traffic, marine sound, and dispersants) (MMC, 2011). Direct physical and physiological effects can include skin irritation, inflammation, or necrosis; chemical burns of skin, eyes, and mucous membranes; inhalation of toxic fumes; ingestion of oil (and dispersants) directly or via contaminated prey; and stress from the activities and marine sound of response vessels and aircraft. The level of impact of oil exposure depends on the amount, frequency, and duration of exposure; route of exposure; and type or condition of petroleum compounds or chemical dispersants (Hayes et al., 2020). Complications of the above may lead to dysfunction of immune and reproductive systems, physiological stress, declining physical condition, and death. Behavioral responses can include displacement of animals, including displacement from prime habitat, disruption of social structure, changing prey availability and foraging distribution and/or patterns, changing reproductive behavior/productivity, and changing movement patterns or migration (MMC, 2011).

In the event of a large spill, the level of vessel and aircraft activity associated with spill response could disturb sperm whales and potentially result in vessel collisions, entanglement, or other injury or stress. Response vessels are expected to operate in accordance with NTL BOEM-2016-G01 to reduce the potential for colliding with or disturbing these animals. This NTL was reissued in June 2020 to address instances where guidance in the 2020 NMFS Biological Opinion (NMFS, 2020a) and the amendment in April 2021 (NMFS, 2021a) replaces compliance with the NTL; a new NTL in response to the 2025 Biological Opinion has not yet been issued. Operators should follow the mitigation measures summarized in Attachment 3 of the 2025 Biological Opinion (NMFS, 2025a). Based on the current PBR level for the Gulf of America stock of sperm whales (2.0), mortality of a single sperm whale would constitute a significant impact to the local (Gulf of America) stock of sperm whales but would not likely be significant at the species level.

C.3.2 Rice's Whale (Endangered)

A study by Rosel et al. (2021), identified the genetically distinct northern Gulf of America Bryde's whale stock as a new species of baleen whale named the Rice's whale through DNA analysis. The reclassification was approved by NMFS under 86 FR 47022 and was effective 22 October 2021. The Rice's whale is the only year-round resident baleen whale in the northern Gulf of America. The Rice's whale is sighted most frequently in the waters over DeSoto Canyon between the 100 m (328 ft) and 1,000 m (3,280 ft) isobaths (**Figure 3** ; Rosel et al., 2016; Hayes et al., 2021).

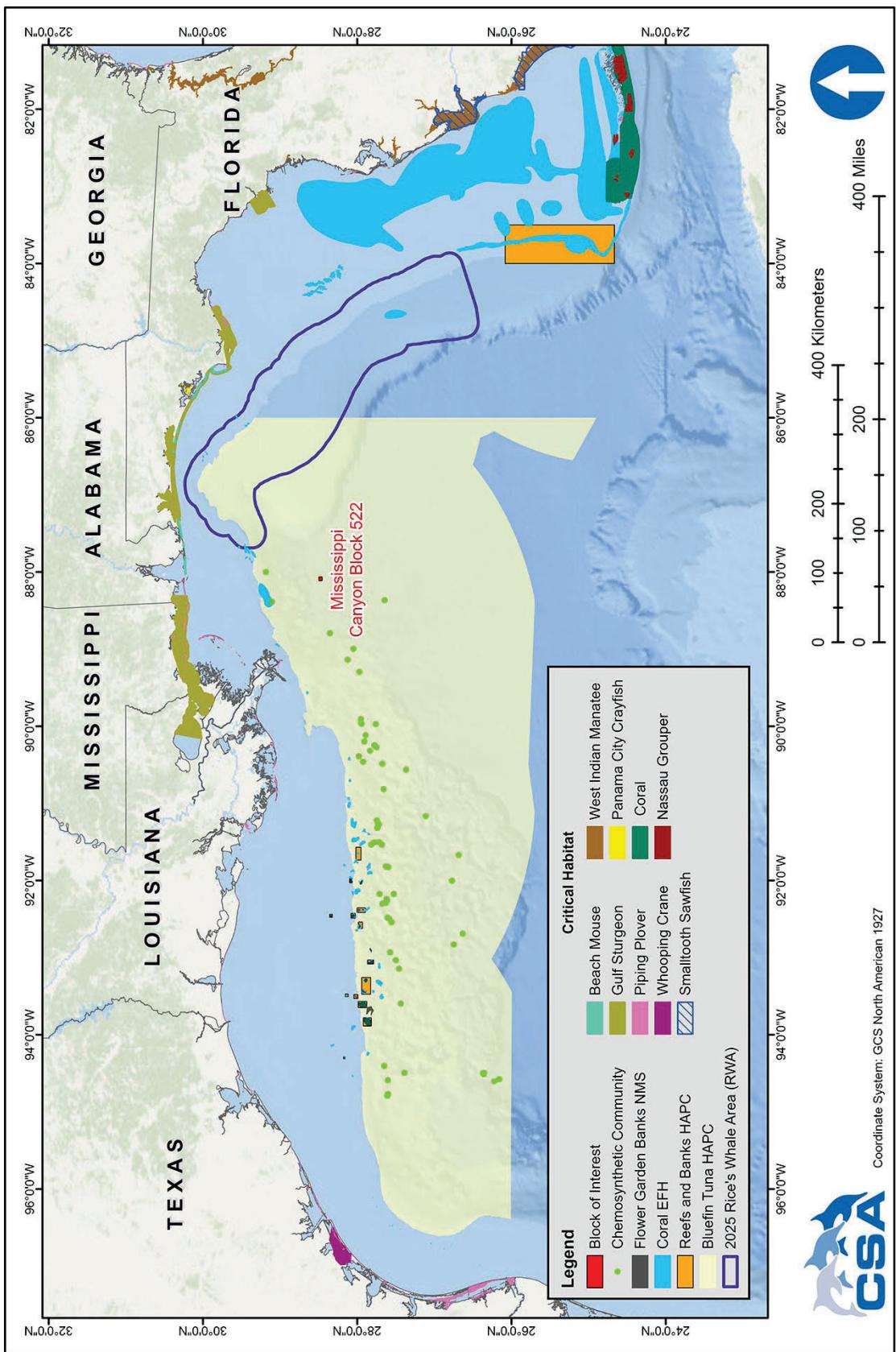


Figure 3. Location of selected environmental features in relation to the project area. EFH = Essential Fish Habitat; HAPC = Habitat Area of Particular Concern; NMS = National Marine Sanctuary.

Most sightings have been made in the DeSoto Canyon region and off western Florida, although there have been some in the west-central portion of the northeastern Gulf of America. Soldevilla et al. (2022a) identified new variants of long-moan calls along the northwestern Gulf of America shelf break that were determined to share distinctive features with typical eastern Gulf of America long-moan calls. In 2017, a large whale was sighted off the coast of Corpus Christi, Texas during a research cruise (Rappucci et al., 2019). A tissue biopsy was conducted, and analysis confirmed this sighting was of a Rice's whale (Rosel et al., 2021). This genetically confirmed sighting along with the newly identified long-moan calls in the northwestern Gulf of America indicate that Rice's whales may occur in a broader range in the Gulf of America than previously known and this broader range should be considered when designating critical habitat. It is not currently possible to differentiate between Rice's whales and Bryde's whales without performing DNA sampling or by examining the skull from a deceased specimen. For the purposes of mitigation, any Bryde's whale complex individual detected would be treated as a possible Rice's whale.

Kiszka et al. (2023) studied the drivers of resource selection by Rice's whale in relation to prey availability and energy density. The study indicated that Rice's whales are selective predators consuming schooling prey with the highest energy content (i.e., silver rag [*Ariomma bondi*]). The silver rag is found at a depth range of 25 to 640 m (82 to 2,100 ft) primarily over muddy bottoms on the OCS though juveniles can be within the surficial waters (Smithsonian Tropical Research Institute, 2015). Therefore, it is unlikely that Rice's whales would occur in the project area. However, support vessels transiting through the 25 to 640 m (82 to 2,100 ft) water depths could encounter a Rice's whale, although unlikely given the rate of sightings of the whales.

In 2014, a petition was submitted to designate the northern Gulf of America population as a DPS and list it as Endangered under the ESA (Natural Resources Defense Council, 2014). This petition received a 90-day positive finding by NMFS in 2015 and a proposed rule to list was published in 2016 (Hayes et al., 2019). On 15 April 2019, NMFS issued a Final Rule to list the Gulf of America DPS of Bryde's whale as Endangered under the ESA. NMFS Final Rule on the reclassification (86 FR 47022) does not affect the ESA standing; thus, the Rice's whale is listed as an Endangered species. In 2023, the NMFS proposed designated critical habitat for the Rice's whale (NMFS, 2023b). This habitat included both the northwestern and northeastern Gulf of America, extending from the 100 m to 400 m isobaths (NMFS, 2023b); a formal decision on this designation has not yet been made (NMFS, 2025a).

Although it is unlikely that the Rice's whales would occur in the project area, IPFs that could affect the Rice's whales, if present, include installation vessel presence, marine sound, and lights; support vessel and helicopter traffic; and both types of spill accidents: a small fuel spill and a large oil spill. Effluent discharges are likely to have negligible impacts on Rice's whales due to rapid dispersion, the small area of ocean affected, the intermittent nature of the discharges, and the mobility and low abundance of Rice's whales in the Gulf of America.

Though NMFS (2025a) stated marine debris as an IPF, compliance with BSEE-NTL 2015-G03 and NMFS (2025a) Attachment 2 will minimize the potential for marine debris-related impacts on Rice's whales. NMFS (2025a) estimated no lethal takes of Rice's whale (previously referred to as Bryde's whales) from marine debris over 45 years of proposed action. Therefore, marine debris is likely to have no more than negligible impacts on Rice's whales and is not further discussed (See **Table 2**).

Impacts of Installation Vessel Presence, Marine Sound, and Lights

NMFS (2024) lists Rice's whales in the functional hearing group of low-frequency cetaceans (baleen whales), with an estimated hearing sensitivity from 7 Hz to 36 kHz. Noise produced by the installation vessel may be emitted at levels that could potentially disturb individual whales or mask the sounds animals would normally produce or hear. Sound associated with installation activities are relatively weak in intensity relative to impulsive sources such as airgun sound, and an individual animal's sound exposure would be temporary.

NMFS (2024) presents criteria that are used to determine auditory injury and TTS thresholds for marine mammals. For low-frequency cetaceans, specifically the Rice's whale, auditory injury and TTS onset from non-impulsive sources is estimated to occur at SEL_{24h} of 197 dB re 1 μPa^2 s and 177 re 1 μPa^2 s, respectively. Given the non-impulsive nature of installation operations and DP vessel sound and the estimate source levels, Rice's whales are unlikely to be exposed to noise above the auditory injury threshold. While sound during installation operations may exceed the TTS threshold, it is expected that, due to the relatively stationary nature of the installation vessel and support vessels, Rice's whales would move away from the proposed operations area, reducing the duration that individuals are exposed to project-related underwater sound, further reducing the likelihood of auditory injuries being realized.

Additionally, the project area is in the Central Gulf of America OCS Planning Area, approximately 69 statute miles (111 km) from the nearest shoreline in Louisiana and outside the main distribution range identified for this species (88 FR 47453; NOAA Fisheries, 2023a) so it is unlikely this species will be exposed to sound associated with the project. Therefore, due to the short propagation distance of above-threshold SEL_{24h}, the stationary nature of the proposed activities, and the low likelihood of encountering this species in the project area, it is not expected that any Rice's whales will receive exposure levels necessary for the onset of auditory threshold shifts.

Received SPL of 120 dB re 1 μPa from non-impulsive, continuous sources are considered high enough to elicit the onset of a behavioral reaction in some marine mammal species. Based on the estimated source levels provided in **Section A.1**, the maximum estimated source level of 195 dB re 1 μPa m for sound produced by project operations may exceed the behavioral disturbance threshold out to 3.5 mi (5.6 km). However, exposure to SPL of 120 dB re 1 μPa does not alone equate to a behavioral response or a biological consequence; rather it represents the level at which onset of a behavioral response may occur that, more importantly, may not result in biologically significant responses (Southall et al., 2016; Ellison et al., 2012).

Marine sound associated with this project may contribute to increases in the ambient sound environment of the region but are not expected to cause sound-related impacts to Rice's whales. Vessel lighting and presence are not expected to impact Rice's whales (BOEM, 2017).

Impacts of Support Vessel and Helicopter Traffic

Support vessel traffic has the potential to disturb Rice's whales and create the potential for vessel collisions. Kiszka et al. (2023) indicated through Bayesian stable isotope mixing models that Rice's whales primarily feed on silver rag found between 25 and 640 m (82 and 2,100 ft) water depths. Although it is unlikely support vessels will encounter Rice's whale given that they are primarily found over DeSoto Canyon between the 100 m (328 ft) and 1,000 m (3,280 ft) isobaths (**Figure 3**; Rosel et al., 2016; Hayes et al., 2021).

To reduce the potential for vessel collisions, BOEM has issued NTL BOEM-2016-G01, which recommends protected species identification training, and that vessel operators and crews maintain a vigilant watch for marine mammals and slow down or stop their vessel to avoid colliding with protected species and requires operators to report sightings of any injured or dead protected species. bp intends to follow the mitigation measures summarized in Attachment 3 of the 2025 Biological Opinion (NMFS, 2025a).

Per the 2025 Biological Opinion, any transit through the Rice's Whale Area (RWA), as identified in the 2020 Biological Opinion, requires a visual observer, either third-party or crew with sufficient training, maintaining vigilant watch for Rice's whales and other marine mammals when within the RWA (NMFS, 2025a). Other requirements when transiting through the RWA include a 10-knot year-round speed restriction, no transit at night or during low visibility, and an operating AIS system onboard for vessel associated with oil and gas activity and 65 feet or greater (NMFS, 2025a). After the completion of transit, a post-transit report for any Rice's whales or other marine mammals must be submitted (NMFS, 2025a). Any deviation from these requirements (such as for an emergency regarding safety of the vessel or crew) requires reporting to BSEE and BOEM within 24 hours (NMFS, 2025a).

When whales are sighted, vessel operators and crews are required to maintain a distance of 500 m (1,640 ft) or greater whenever possible (NTL BOEM-2016-G01; NMFS, 2020a, 2021a; 2025a). Vessel operators are required to reduce vessel speed to 10 knots or less, as safety permits, when mother/calf pairs, pods, or large assemblages of cetaceans are observed near an underway vessel (NTL BOEM-2016-G01). When a Rice's whale or potential Rice's whale (NMFS, 2025a) is sighted while a vessel is underway, the vessel should take action (e.g., attempt to remain parallel to the whale's course, avoid excessive speed or abrupt changes in direction until the whale has left the area) as necessary to avoid violating the relevant separation distance. However, if the whale is sighted within this distance, the vessel should reduce speed and shift the engine to neutral and not re-engage until the whale is outside of the separation area. This does not apply to any vessel towing gear (NMFS, 2025a, Appendix 1).

The current PBR level for the Gulf of America stock of Rice's whale is 0.1 (Hayes et al., 2022). NMFS (2025a) estimated three nonlethal takes and nine lethal vessel strikes over 45 years of proposed action. Mortality of a single Rice's whale would constitute a significant impact to the local (Gulf of America) stock of Rice's whales. However, it is very unlikely that Rice's whale occurs within the project area, including the transit corridor for support vessels; consequently, the probability of a vessel collision with this species is extremely low.

Helicopter traffic also has the potential to disturb Rice's whales and based on studies of cetacean responses to sound, the observed responses to brief overflights by aircraft were short-term and limited to behavioral disturbances (Smulter et al., 2008). Helicopters maintain altitudes above 213 m (700 ft) during transit to and from the offshore working area. In the event that a whale is observed during transit, the helicopter will not approach or circle the animal(s). Due to the brief potential for disturbance and the low density of Rice's whales in the Gulf of America, no significant impacts are expected.

Impacts of a Small Fuel Spill

Potential spill impacts on marine mammals are discussed by NMFS (2025a) and BOEM (2012a; 2015; 2016b; 2017; 2023a,b). Oil impacts on marine mammals are discussed by Geraci and St. Aubin (1990) and by the MMC (2011). In the unlikely event of a spill, implementation of bp's ROSRP will mitigate and reduce the potential for impacts on Rice's whales. Given the open ocean location of the project area and the brief duration of a small spill, any impacts are expected to be minimal.

A small fuel spill in offshore waters would produce a thin slick on the water surface and introduce concentrations of petroleum hydrocarbons and their degradation products. The extent and persistence of impacts would depend on the meteorological and oceanographic conditions at the time of the spill as well as the effectiveness of spill response measures.

Section A.9.1 discusses the likely fate of a small fuel spill and indicates that more than 90% would evaporate or disperse naturally within 24 hours (NOAA, 2022). The area of diesel fuel on the sea surface would range from 1.2 to 12 ac (0.5 to 5 ha), depending on sea state and weather conditions at the time of a spill.

Direct physical and physiological effects of exposure to diesel fuel could include skin irritation, inflammation, or necrosis; chemical burns of skin, eyes, and mucous membranes; inhalation of toxic fumes; ingestion of oil directly or via contaminated prey; and stress from the activities and sound of response vessels and aircraft (MMC, 2011). However, due to the limited areal extent and short duration of water quality impacts from a small fuel spill, as well as the mobility of Rice's whales and the unlikelihood of occurrence in the project area, no significant impacts are expected.

Impacts of a Large Oil Spill

Potential spill impacts on marine mammals are discussed by BOEM (2012a; 2015; 2016b; 2017; 2023a,b), NMFS (2025a), Geraci and St. Aubin (1990), and the MMC (2011). Potential impacts of a large oil spill on Rice's whales could include direct impacts from oil exposure as well as indirect impacts due to response activities and materials (e.g., vessel traffic, sound, and dispersants) (MMC, 2011). Direct physical and physiological effects could include skin irritation, inflammation, or necrosis; chemical burns of skin, eyes, and mucous membranes; inhalation of toxic fumes; ingestion of oil (and dispersants) directly or via contaminated prey; and stress from the activities and sound of response vessels and aircraft. The level of impact of oil exposure depends on the amount, frequency, and duration of exposure; route of exposure; and type or condition of petroleum compounds or chemical dispersants (Hayes et al., 2019). Complications of the above may lead to dysfunction of immune and reproductive systems, physiological stress, declining physical condition, and death. Behavioral responses can include displacement of animals from prime habitat, disruption of social structure, changing prey availability and foraging distribution and/or patterns, changing reproductive behavior/productivity, and changing movement patterns or migration (MMC, 2011).

In the event of a large spill, the level of vessel and aircraft activity associated with spill response could disturb Rice's whales and potentially result in vessel collisions, entanglement, or other injury or stress. The rescinded NTL BOEM 2023-G01 provided additional guidance on Rice's whale protection efforts within the expanded Rice's whale area, inclusive of all areas between the 100 and 400 m isobaths in the northern Gulf of America. These include retaining vessel transit details if transiting within the expanded Rice's whale area, maintaining separation

distances, and utilizing Automatic Identification System on vessels 65 ft or greater, among others. Response vessels are expected to operate in accordance with NTL BOEM-2016-G01 and NMFS (2020a, 2021a, 2025a Attachment 3) (see **Table 1**) to reduce the potential for colliding with or disturbing these animals. In the event of oil from a large spill contacting Rice's whales, it is expected that impacts resulting in the injury or death of individual Rice's whales would be significant based on the current PBR level for the Gulf of America subspecies and stock (0.1). Mortality of a single Rice's whale would constitute a significant impact to the local (Gulf of America) stock of Rice's whales. The core distribution area for Rice's whales is within the eastern Gulf of America OCS Planning Area; therefore, it is unlikely that Rice's whales would occur within the project area. Consequently, the probability of spilled oil from a project-related well blowout reaching Rice's whales is extremely low.

C.3.3 West Indian Manatee (Threatened)

Most of the Gulf of America manatee population is located in peninsular Florida, but manatees have been seen as far west as Texas during the summer (USFWS, 2001a). A species description is presented in the West Indian manatee recovery plan (USFWS, 2001a). Critical habitat of the West Indian manatee has been designated in southwest Florida.

Manatee sightings in Louisiana have increased as the species extends its presence farther west of Florida in the warmer months (Wilson, 2003). Manatees are typically found in coastal and riverine habitats, but have been seen on rare occasions in deepwater areas, during colder months when they seek refuge from colder coastal waters (USFWS, 2001a; Fertl et al., 2005; Pabody et al., 2009). There have been three verified reports of Florida manatee sightings by PSOs on the OCS during seismic mitigation surveys in mean water depths of over 600 m (1,969 ft) (Barkaszi and Kelly, 2019).

IPFs that potentially may affect manatees include support vessel and helicopter traffic and a large oil spill. A small fuel spill in the project area would be unlikely to affect manatees, as the project area is approximately 69 statute miles (111 km) from the nearest shoreline (Louisiana).

As explained in **Section A.9.1**, a small fuel spill would not be expected to make landfall or reach coastal waters prior to dissipating. Compliance with BSEE-NTL 2015-G03 is intended to minimize the potential for marine debris-related impacts on manatees.

Impacts of Support Vessel and Helicopter Traffic

Support vessel traffic has the potential to disturb manatees, and there is also a risk of vessel collisions, which are identified as a threat in the recovery plan for this species (USFWS, 2001a). Manatees are expected to be limited to shelf and coastal waters, and impacts are expected to be limited to transits of these vessels and helicopters through these waters. To reduce the potential for vessel collisions, BOEM issued NTL 2016-G01, which recommends protected species identification training for vessel operators and that vessels slow down or stop their vessel to avoid colliding with protected species (NMFS, 2025a, Attachment 1). NTL 2016-G01 was reissued in June 2020 to address instances where guidance in the 2020 NMFS Biological Opinion (NMFS, 2020a) replaces compliance with the NTL. A new NTL in response to the 2025 Biological Opinion has not yet been issued. However, bp intends to follow the mitigation measures summarized in Attachment 3 of the 2025 Biological Opinion (NMFS, 2025a). If a manatee is sighted, vessels associated with the operation should operate at no wake/idle speed within that area, follow routes in deep water whenever possible, and attempt to maintain a

distance of 50 m (164 ft) if practical. This does not apply to any vessel towing gear (e.g., source towed array and site clearance trawling).

Compliance with these mitigation measures will minimize the likelihood of vessel collisions as well as reduce the chance of disturbing manatees during daylight hours. The current PBR level for the Florida subspecies of West Indian manatee is 14 (USFWS, 2014). In the event of a vessel collision during support vessel transits, the mortality of a single manatee would constitute an adverse but insignificant impact on the subspecies.

Helicopter traffic has the potential to disturb manatees and Rathbun (1988) reported that manatees were disturbed more by low-flying 20 to 160 m (66 to 525 ft) helicopters than by fixed-wing aircraft. Helicopters used in support operations maintain a minimum altitude of 213 m (700 ft) while in transit offshore, 305 m (1,000 ft) over unpopulated areas or across coastlines, and 610 m (2,000 ft) overpopulated areas and sensitive habitats such as wildlife refuges and park properties. This helicopter traffic mitigation measure will minimize the potential for disturbing manatees and results in no expected impacts.

Impacts of a Large Oil Spill

The potential for significant impacts to manatees from a large oil spill would be most likely associated with coastal oiling in areas of manatee habitats. The 30-day OSRA modeling (**Table 4**) indicates nearshore waters and embayments from Cameron Parish, Louisiana to Bay County, Florida could be affected within 30 days of spill (1 to 21% conditional probability).

In the event that manatees were exposed to oil, effects could include direct impacts from oil exposure as well as indirect impacts due to response activities and materials (e.g., vessel traffic, marine sound, dispersants) (MMC, 2011). Direct physical and physiological effects can include asphyxiation, acute poisoning, lowering of tolerance to other stress, nutritional stress, and inflammation from infection (BOEM, 2017). Indirect impacts include stress from the activities and sound of response vessels and aircraft. Complications of the above may lead to dysfunction of immune and reproductive systems, physiological stress, declining physical condition, and death. Behavioral responses can include displacement of animals from prime habitat, disruption of social structure, changing foraging distribution and/or patterns, changing reproductive behavior/productivity, and changing movement patterns or migration (MMC, 2011).

In the event that a large spill reached coastal waters where manatees were present, the level of vessel and aircraft activity associated with spill response could disturb manatees and potentially result in vessel collisions, entanglement, or other injury or stress. Response vessels would be expected to operate in accordance with NTL BOEM-2016-G01 and NMFS (2020a, 2021a, 2025a Attachment 3) (see **Table 1**) to reduce the potential for colliding with or disturbing these animals. The current PBR level for the Florida subspecies of West Indian manatee is 14 (USFWS, 2014). It is not anticipated that groups of manatees would occur in coastal waters of the north-central Gulf of America; therefore, in the event of mortality of individual manatees from a large oil spill would constitute an adverse but insignificant impact to the subspecies.

C.3.4 Non-Endangered Marine Mammals (Protected)

Excluding the three Endangered or Threatened species that have been discussed previously, there are 20 additional species of whales and dolphins (cetaceans) that may be found in the Gulf of America, including dwarf and pygmy sperm whales (*Kogia sima* and *K. breviceps*), four

species of beaked whales, and 14 species of delphinid whales (dolphins). All marine mammals are protected species under the MMPA. The most common non-endangered cetaceans in the deepwater environment are small odontocetes such as the pantropical spotted dolphin (*Stenella attenuata*), spinner dolphin (*S. longirostris*), and bottlenose dolphin. A brief summary is presented below, and additional information on these groups is presented by BOEM (2017).

Dwarf and pygmy sperm whales. At sea, it is difficult to differentiate dwarf sperm whales from pygmy sperm whales, and sightings are often grouped together as *Kogia* spp. Both species have a worldwide distribution in temperate to tropical waters. In the Gulf of America, both species occur primarily along the continental shelf edge and in deeper waters off the continental shelf (Mullin et al., 1991; Mullin, 2007; Waring et al., 2016; Hayes et al., 2023). Either species could occur in the project area.

Beaked whales. Four species of beaked whales are known to occur in the Gulf of America: Blainville's beaked whale (*Mesoplodon densirostris*), Sowerby's beaked whale (*M. bidens*), Gervais' beaked whale (*M. europaeus*), and Cuvier's beaked whale (*Ziphius cavirostris*). Stranding records as well as passive acoustic monitoring in the Gulf of America (Hildebrand et al., 2015) suggest that Gervais' beaked whale and Cuvier's beaked whale are the most common species in the region. The Sowerby's beaked whale is considered extralimital, with one documented stranding reported in the Gulf of America by Bonde and O'Shea (1989). There are a number of extralimital strandings and sightings reported beyond the recognized range of Sowerby's beaked whale (e.g., Canary Islands, Mediterranean Sea), including from the eastern Gulf of America (Pitman and Brownell, 2020). Blainville's beaked whales are rare, with only four documented strandings in the northern Gulf of America (Würsig et al., 2000) and three sightings in the Gulf of America (Hayes et al., 2021).

Due to the difficulties of at-sea identification, beaked whales in the Gulf of America are identified either as Cuvier's beaked whales or are grouped into an undifferentiated species complex (*Mesoplodon* spp.). In the northern Gulf of America, they are broadly distributed in water depths >1,000 m (3,281 ft) over lower slope and abyssal landscapes (Davis et al., 2000; Hildebrand et al., 2015). Any of these species could occur in the project area (Hayes et al., 2023).

Delphinids. Fourteen species of delphinids are known from the Gulf of America, including Atlantic spotted dolphin (*Stenella frontalis*), bottlenose dolphin, Clymene dolphin (*Stenella clymene*), false killer whale (*Pseudorca crassidens*), Fraser's dolphin (*Lagenodelphis hosei*), killer whale (*Orcinus orca*), melon-headed whale (*Peponocephala electra*), pantropical spotted dolphin, pygmy killer whale (*Feresa attenuata*), short-finned pilot whale (*Globicephala macrorhynchus*), Risso's dolphin (*Grampus griseus*), rough-toothed dolphin (*Steno bredanensis*), spinner dolphin, and striped dolphin (*Stenella coeruleoalba*). Any of these species could occur in the project area (Hayes et al., 2023).

The bottlenose dolphin is a common inhabitant of the northern Gulf of America, particularly within continental shelf waters. There are two ecotypes of bottlenose dolphins, a coastal form and an offshore form, which are genetically isolated from each other (Waring et al., 2016). The offshore form of the bottlenose dolphin may occur within the project area. Inshore populations of coastal bottlenose dolphins in the northern Gulf of America are separated into 31 geographically distinct population units, or stocks, for management purposes by NMFS (Hayes et al., 2023).

IPFs that potentially may affect non-endangered marine mammals include installation vessel presence, marine sound, and lights; support vessel and helicopter traffic; and two types of accidents (a small fuel spill and a large oil spill). Effluent discharges are likely to have negligible impacts on marine mammals due to rapid dispersion, the small area of ocean affected, the intermittent nature of the discharges, and the mobility of marine mammals. Compliance with NTL BSEE-2015-G03 is expected to minimize the potential for marine debris-related impacts on marine mammals.

Impacts of Installation Vessel Presence, Marine Sound, and Lights

The presence of the installation vessel presents an attraction to pelagic food sources that may attract cetaceans. Some odontocetes have shown increased feeding activity around lighted platforms at night (Todd et al., 2009). Therefore, prey congregation could pose an attraction to protected species that exposes them to higher levels or longer durations of sound that might otherwise be avoided. Drilling and support vessel presence and lighting are not considered as IPFs for marine mammals (BOEM, 2017).

If the vessel(s) are equipped with a moon pool, a trained crew member or company representative must monitor the moon pool area for marine mammals during operations. If a marine mammal is detected in the moon pool, immediate reporting to NMFS, BOEM, and BSEE is required (NMFS, 2020a, 2025a). Recovery may be required if a protected species is observed in a moon pool before the start of operations; a report must be made to BSEE upon observation and NMFS will determine the recovery need (NMFS, 2025a).

Sound from routine installation operations has the potential to disturb marine mammals. As discussed in **Section A.1**, sound impacts would be expected at greater distances when DP thrusters are in use than with vessel and installation sound alone and are dependent on variables relating to sea state conditions, thruster type and usage. Three functional hearing groups are represented in the 20 non-endangered cetaceans found in the Gulf of America. Eighteen of the 20 odontocete species are considered to be in the high-frequency functional hearing group and two species (*Kogia* spp.) are in the very high-frequency functional hearing group (NMFS, 2024). Thruster and installation sound will affect each group differently depending on the frequency bandwidths produced by operations. Generally, sound produced by vessels on DP is dominated by frequencies below 10 kHz. Thus, installation vessel DP sound sources have less overlap with the audible range for the high-frequency and very high-frequency groups.

For high-frequency cetaceans exposed to a non-impulsive source (like installation operations), auditory injury is estimated to occur when the mammal has received a sound exposure level (SEL) of 201 dB re 1 $\mu\text{Pa}^2 \text{ s}$ over a 24-hour period (SEL₂₄). Similarly, TTS is estimated to occur when the mammal has received an SEL of 181 dB re 1 $\mu\text{Pa}^2 \text{ s}$ over a 24-hour period. Given the non-impulsive nature of installation operations and DP vessel sound and the estimate source levels, marine mammals are unlikely to be exposed to sound above the auditory injury threshold. While sound originating from installation operations may exceed the TTS threshold, it is expected that marine mammals would move away from the operations area, reducing the duration that individuals are exposed to project-related underwater sound, further reducing the likelihood of auditory injuries being realized. Therefore, due to the short propagation distance of above-threshold SEL_{24h}, the transient nature of marine mammals and the stationary nature of

the proposed activities, it is not expected that any marine mammals will receive exposure levels necessary for the onset of auditory threshold shifts.

NMFS (2024) presents criteria used to determine physiological (i.e., injury) thresholds for marine mammals but the behavioral disturbance thresholds were not updated in this most recent acoustic guidance; these behavioral disturbance thresholds are established and published by NMFS in 70 FR 1871 and summarized in NMFS (2025c). Received SPL of 120 dB re 1 μ Pa from a non-impulsive, continuous source is considered high enough to elicit a behavioral reaction in some marine mammal species. Based on the estimated source levels provided in Section A.1, the maximum estimated source level of 195 dB re 1 μ Pa m for sound produced by project operations may exceed the behavioral disturbance threshold out to 3.5 mi (5.6 km). However, in the case of behavioral responses, received levels alone do not indicate a behavioral response and, more importantly, do not equate to biologically important responses (Southall et al., 2016; Ellison et al., 2012).

BOEM (2012a) stated the source level from oil and gas production platforms are low with a frequency range of 50 to 500 Hz. It is expected that marine mammals within or near the project area would be able to detect the presence of the installation and support vessels and avoid exposure to higher energy sounds, particularly within an open ocean environment.

There are other OCS facilities and activities near the project area, and the region as a whole has a large number of similar sources (HDR [Athens, AL], 2021). Marine mammal species in the northern Gulf of America have been exposed to sound from anthropogenic sources for a long period of time and over large geographic areas and likely do not represent a naïve population with regard to sound (National Research Council, 2003b). Due to the limited scope, timing, and geographic extent of drilling activities, this project would represent a small, temporary contribution to the overall soundscape, and any short-term behavioral impacts are not expected to be biologically significant to marine mammal populations. Vessel lighting and presence are not identified as IPFs for marine mammals by BOEM (2017).

Impacts of Support Vessel and Helicopter Traffic

Support vessel traffic has the potential to disturb marine mammals, and there is also a risk of vessel collisions. Data concerning the frequency of vessel collisions are presented by BOEM (2012a). To reduce the potential for vessel collisions, BOEM issued NTL 2016-G01, which recommends protected species identification training for vessels operators and that vessels slow down or stop to avoid colliding with protected species. This NTL was reissued in June 2020 to address instances where guidance in the 2020 NMFS Biological Opinion (NMFS, 2020a) replaces compliance with the NTL; a new NTL in response to the 2025 Biological Opinion has not yet been issued. However, bp intends to follow the mitigation measures summarized in Attachment 3 of the 2025 Biological Opinion (NMFS, 2025a). NTL 2016-G01 also required that operators and crews maintain a vigilant watch for marine mammals and report sightings of any injured or dead protected species. Vessel operators and crews are required to attempt to maintain a distance of 100 m (328 ft) or greater when toothed whales are sighted and 50 m (164 ft) when small cetaceans are sighted (NMFS, 2020a, 2025a Attachment 3). When cetaceans are sighted while a vessel is underway, vessels must attempt to remain parallel to the animal's course and avoid excessive speed or abrupt changes in direction until the cetacean has left the area. Vessel operators are required to reduce vessel speed to 10 knots or less when mother/calf pairs, pods, or large assemblages of cetaceans are observed near an underway vessel, when safety permits.

These mitigation measures are only effective during daylight hours, or in sea and weather conditions where cetaceans are sighted. All vessels must, to the maximum extent practicable, attempt to maintain a minimum separation distance of 50 m (164 ft) from all “other aquatic protected species” including sea turtles, with an exception made for those animals that approach the vessel. Vessel speeds must also be reduced to 10 knots or less when mother/calf pairs, pods, or large assemblages (greater than three) of any marine mammal are observed near a vessel. Although vessel strike avoidance measures described in NMFS (2020a, 2025a) are only applicable to ESA-listed species, complying with them may provide additional indirect protection to non-listed species as well.

When aquatic protected species are sighted while a vessel is underway, the vessel should take action as necessary to avoid violating the relevant separation distance (e.g., attempt to remain parallel to the animal’s course, avoid excessive speed or abrupt changes in direction until the animal has left the area). If aquatic protected species are sighted within the relevant separation distance, the vessel should reduce speed and shift the engine to neutral, not engaging the engines until animals are clear of the area. This does not apply to any vessel towing gear (e.g., source towed array, site clearance trawling). Use of these measures will minimize the likelihood of vessel collisions as well as reduce the chance for disturbing marine mammals, and therefore no significant impacts are expected.

The current PBR level for several non-endangered cetacean species in the Gulf of America are less than three individuals (e.g., rough-toothed dolphin = undetermined, Clymene dolphin = 2.5, Fraser’s dolphin = 1.0, killer whale = 1.5, pygmy and false killer whales = 2.8, dwarf and pygmy sperm whales = 2.5) (Hayes et al., 2022). Mortality of individuals equal to or in excess of their PBR level would constitute a significant impact at a population level on the local (Gulf of America) stocks of these species.

Helicopter traffic has the potential to disturb marine mammals (Würsig et al., 1998) but relatively high-altitude flying is conducted to minimize the potential for disturbances. While flying offshore, helicopters maintain altitudes above 213 m (700 ft) during transit to and from the working area.

Impacts of a Small Fuel Spill

Potential spill impacts on marine mammals are discussed by BOEM (2017; 2023a,b). Oil impacts on marine mammals in general are discussed by Geraci and St. Aubin (1990). For this SDOCD, there are no unique site-specific issues with respect to spill impacts on these animals.

The probability of a fuel spill is expected to be minimized by bp’s preventative measures during fuel transfer. In the unlikely event of a spill, implementation of bp’s ROSRP is expected to lessen the potential for impacts on marine mammals. SDOCD Appendix G provides details on spill response measures, and those measures are summarized in the EIA. Given the open ocean location of the project area, the limited duration of a small spill, and response efforts, it is expected that any impacts would be brief and minimal.

A small fuel spill in offshore waters would produce a thin slick on the water surface and introduce the concentrations of petroleum hydrocarbons and their degradation products. Direct physical and physiological effects of exposure to diesel fuel could include skin irritation, inflammation, or necrosis; chemical burns of skin, eyes, and mucous membranes; inhalation of toxic fumes; ingestion of oil directly or via contaminated prey; and stress from the activities and sound of

response vessels and aircraft (MMC, 2011). The extent and persistence of impacts would depend on the meteorological and oceanographic conditions at the time and the effectiveness of spill response measures. A small fuel spill would not be expected to make landfall or reach coastal waters prior to dissipating (**Section A.9.1**). Therefore, due to the limited areal extent and short duration of water quality impacts from a small fuel spill as well as the mobility of marine mammals, no significant impacts would be expected.

Impacts of a Large Oil Spill

Potential spill impacts on marine mammals are discussed by BOEM (2017; 2023a,b). For this SDOCD, there are no unique site-specific issues. Impacts of oil spills on marine mammals can include direct impacts from oil exposure as well as indirect impacts due to response activities and materials (e.g., vessel traffic, marine sound, dispersants) (MMC, 2011). Direct physical and physiological effects can include skin irritation, inflammation, or necrosis; chemical burns of skin, eyes, and mucous membranes; inhalation of toxic fumes; ingestion of oil (and dispersants) directly or via contaminated prey. Complications of the above may lead to dysfunction of immune and reproductive systems (De Guise et al., 2017), physiological stress, declining physical condition, and death. Indirect impacts could include stress from the activities and sound of response vessels and aircraft. Behavioral responses can include displacement of animals from prime habitat (McDonald et al., 2017), disruption of social structure, change in prey availability and foraging distribution or patterns, change in reproductive behavior/productivity, and change in movement patterns or migration (MMC, 2011).

In the event of a large spill, response activities that may impact marine mammals include increased vessel traffic and remediation activities (e.g., use of dispersants, controlled burns, skimmers, boom) (BOEM, 2017). The increased level of vessel and aircraft activity associated with spill response could disturb marine mammals, potentially resulting in behavioral changes. The large number of response vessels could result in vessel collisions, entanglement or other injury, or stress. Response vessels are expected to operate in accordance with NTL BOEM-2016-G01 to reduce the potential for colliding with or disturbing these animals, and therefore no significant impacts are expected.

This NTL was reissued in June 2020 to address instances where guidance in the 2020 NMFS Biological Opinion (NMFS, 2020a) and amendment in April 2021 (NMFS, 2021a) replaces compliance with the NTL; a new NTL has not yet been issued in response to the 2025 Biological Opinion. However, bp intends to follow the mitigation measures summarized in Attachment 3 of the 2025 Biological Opinion (NMFS, 2025a). The application of dispersants greatly reduces exposure risks to marine mammals as the dispersants would remove oil from the surface thereby reducing the risk of contact and rendering it less likely to adhere to skin, baleen plates, or other body surfaces (BOEM, 2017). Based on the current PBR level for several non-endangered cetacean species in the Gulf of America that are less than three individuals (e.g., rough-toothed dolphin = undetermined, Clymene dolphin = 2.5, Fraser's dolphin = 1.0, killer whale = 1.5, pygmy and false killer whales = 2.8, dwarf and pygmy sperm whales = 2.5) (Hayes et al., 2022), mortality of individuals equal to or in excess of their PBR level would constitute a significant impact at the population level to the local (Gulf of America) stocks of these species.

C.3.5 Sea Turtles (Endangered/Threatened)

Five species of Endangered or Threatened sea turtles may be found near the project area. Endangered species include the leatherback, Kemp's ridley, and hawksbill turtles. As of 6 May 2016, the entire North Atlantic DPS of the green turtle is listed as Threatened (81 FR 20057). The DPS of loggerhead turtles that occurs in the Gulf of America is listed as Threatened.

Critical habitat has been designated for the loggerhead turtle in the Gulf of America as shown in **Figure 4**. Loggerhead turtles in the Gulf of America are part of the Northwest Atlantic Ocean DPS (76 FR 58868). In July 2014, NMFS and the USFWS designated critical habitat for this DPS (NMFS, 2021b). The USFWS designation (79 FR 39756) includes nesting beaches in Jackson County, Mississippi; Baldwin County, Alabama; and Bay, Gulf, and Franklin Counties in the Florida Panhandle as well as several counties in southwest Florida and the Florida Keys (and other areas along the Atlantic coast). The NMFS designation (79 FR 39856) includes nearshore reproductive habitat within 0.99 miles (1.6 km) seaward of the mean high-water line along these same nesting beaches. NMFS also designated a large area of shelf and oceanic waters, termed *Sargassum* habitat, in the Gulf of America (and Atlantic Ocean) as critical habitat. *Sargassum* is a brown algae (Class Phaeophyceae) that takes on a planktonic, often epipelagic existence after being removed from reefs during rough weather. Rafts of *Sargassum* serve as important foraging and developmental habitat for numerous fishes, and young sea turtles, including loggerhead, green, hawksbill, and Kemp's ridley turtles (Witherington et al., 2012). NMFS designated three other categories of critical habitat; of these, two (migratory habitat and overwintering habitat) are along the Atlantic coast and the third (breeding habitat) is found in the Florida Keys and along the Florida east coast (NMFS, 2021b).

The nearest designated nearshore reproductive critical habitat for loggerhead sea turtles is approximately 118 statute miles (190 km) from the project area. The project area is located approximately 18 statute miles (29 km) from the designated *Sargassum* critical habitat for loggerhead sea turtles (**Figure 4**).

In 2023, NMFS proposed critical habitat for the Northwest Atlantic distinct population segment of green turtles (NMFS, 2025a). Like the designation for the loggerhead turtle, this includes nearshore reproductive habitat and *Sargassum* habitat (NMFS, 2025a). The nearshore reproductive habitat is from mean water to 20 m of water along the shores of parts of Texas, southeastern Alabama, and all of Florida (NMFS, 2025a). The *Sargassum* habitat covers most of the northern Gulf of America to the edge of the US EEZ (NMFS, 2025a). Neither critical habitat for the green turtle has been formally designated.

Leatherbacks are the species most likely to be present near the project area, as they are the most pelagic of the sea turtles and feed on populations of gelatinous plankton, such as jellyfish and salps in all water depths. Loggerhead, green, hawksbill, and Kemp's ridley turtles are typically inner shelf and nearshore species but may be found transiting in oceanic waters during seasonal migrations. Loggerheads and green turtles are more likely to occur or be attracted to offshore structures than the other species. Hatchlings or juveniles of any of the sea turtle species with the exception of leatherbacks may be present in deepwater areas, including the project area, where they may be associated with *Sargassum* rafts and other flotsam.

Leatherbacks, while not specifically associated with *Sargassum*, do utilize similar pelagic habitats for foraging where *Sargassum* is routinely found. All five sea turtle species in the Gulf of America

are migratory and use different marine habitats according to their life stage. These habitats include high-energy beaches for nesting females and emerging hatchlings and pelagic convergence zones for hatchling and juvenile turtles. As adults, green, hawksbill, and loggerhead turtles forage primarily in shallow, benthic habitats.

Sea turtle nesting in the northern Gulf of America can be summarized by species as follows:

- Loggerhead turtles – Loggerhead turtles nest in significant numbers along the Florida Panhandle (Florida Fish and Wildlife Conservation Commission, nd-a) and, to a lesser extent, from Texas through Alabama (NMFS and USFWS, 2008);
- Green turtles – Green turtles are known to nest along the Florida Panhandle and in southwest Florida, from Tampa Bay south to Ten Thousand Island, and in the Florida Keys and Dry Tortugas (Florida Fish and Wildlife Conservation Commission, nd-b);
- Leatherback turtles – Leatherback turtles infrequently nest on Florida Panhandle beaches (Florida Fish and Wildlife Conservation Commission, nd-c);
- Kemp's ridley turtles – The critically endangered Kemp's ridley turtle nests almost exclusively on a 16-mile (26-km) stretch of coastline near Rancho Nuevo in the Mexican state of Tamaulipas (NMFS et al., 2011). A much smaller population nests in Padre Island National Seashore, Texas, mostly as a result of reintroduction efforts (NMFS et al., 2011). To date, 449 Kemp's ridley turtle nests have been counted on Texas beaches in 2025. A total of 340 nests were counted on Texas beaches in 2024 (Turtle Island Restoration Network, 2025). These nest counts are an increase from 2023 and 2022, when a total of 256 Kemp's ridley turtle nests were counted on Texas beaches in 2023 and a total of 284 Kemp's ridley turtle nests were counted during the 2022 nesting season. Padre Island National Seashore along the coast of Willacy, Kenedy, and Kleberg Counties in southern Texas, is the most important nesting location for this species in the United States; and
- Hawksbill turtles – Hawksbill turtles typically do not nest anywhere near the project area, with most nesting in the region located in the Caribbean Sea and on the beaches of the Yucatán Peninsula (USFWS, 2016a).

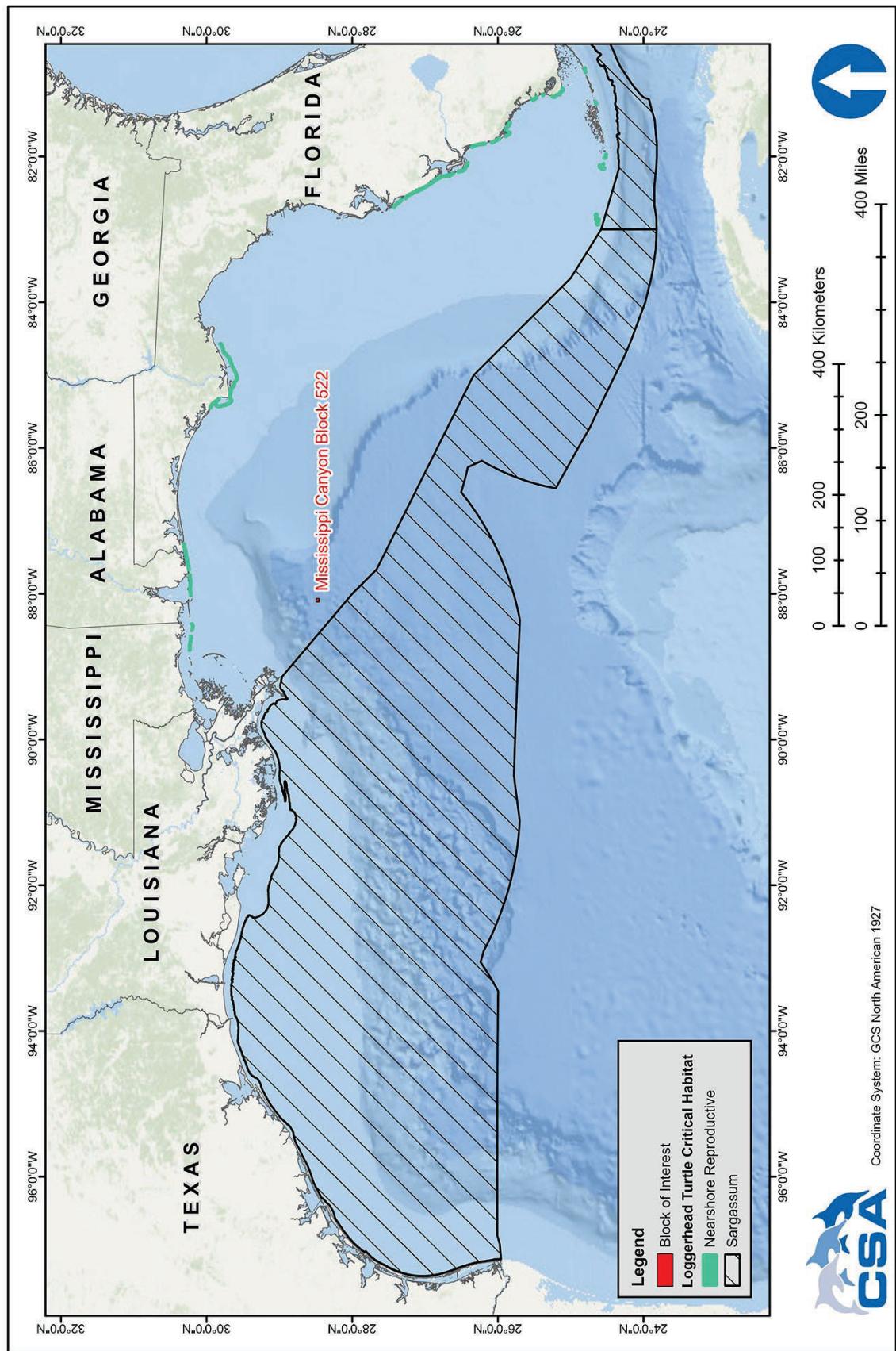


Figure 4. Location of loggerhead turtle designated *Sargassum* critical habitat and nearshore reproductive critical habitat in relation to the project area.

IPFs that could potentially affect sea turtles include installation vessel presence, marine sound, and lights; support vessel and helicopter traffic; and two types of accidents (a small fuel spill and a large oil spill). Effluent discharges are not expected to have more than negligible impacts on sea turtles due to rapid dispersion, the small area of ocean affected, and the intermittent nature of the discharges.

Though NMFS (2025a) stated marine debris as an IPF, compliance with NTL BSEE 2015-G013 (See **Table 1**) and NMFS (2025a) Attachment 2 will minimize the potential for marine debris-related impacts on sea turtles. NMFS (2025a) estimated a small proportion of individual sea turtles would be adversely affected from exposure to marine debris. Therefore, marine debris is likely to have no more than negligible impacts on sea turtles and is not further discussed in this EIA (See **Table 2**).

Impacts of Installation Vessel Presence, Marine Sound, and Lights

Installation activities produce a broad array of sounds at frequencies and intensities that may be detected by sea turtles (Samuel et al., 2005, Popper et al., 2014). Potential impacts may include behavioral disruption and temporary or permanent displacement from the area near the sound source. Sea turtles can hear low to mid-frequency sounds and they appear to hear best between 200 and 750 Hz; they do not respond well to sounds above 2,000 Hz, although primary hearing frequency ranges vary per species and life stage (Ketten and Bartol, 2005; Dow Piniak et al., 2012a,b; Martin et al., 2012; Piniak et al., 2016).

NMFS (2025d), which uses threshold estimates from Accomando et al. (2025), recommends SEL_{24h} auditory injury and TTS thresholds of 198 and 178 dB re 1 μPa^2 s, respectively, for non-impulsive sources, and an SPL behavioral threshold of 175 dB re 1 μPa for all sound sources. Based on the assessment conducted in the NMFS Biological Opinion (NMFS, 2025a), as well as the estimated source levels for installation operations relative to the acoustic thresholds for sea turtles, there is a minimal likelihood of acoustic injury such as auditory injury in sea turtles, and behavioral responses to sounds produced by activities such as vessel operations are not expected beyond 10 m (33 ft) from the source. Certain sea turtles, especially loggerheads, may be attracted to offshore structures (Lohoefer et al., 1990; Gitschlag et al., 1997; Colman et al., 2020) and thus may be more susceptible to impacts from sounds produced during routine installation activities. Any impacts would likely be short-term behavioral changes such as diving and evasive swimming, disruption of activities, or departure from the area. Because of the limited scope and short duration of installation activities, these short-term impacts are not expected to be biologically significant to sea turtle populations.

Artificial lighting can disrupt the nocturnal orientation of sea turtle hatchlings (Tuxbury and Salmon, 2005; Berry et al., 2013; Simões et al., 2017). However, hatchlings may rely less on light cues when they are offshore than when they are emerging on the beach (Salmon and Wyneken, 1990). NMFS (2007) concluded that the effects of lighting from offshore structures on sea turtles are insignificant.

NMFS (2025a) stated sea turtles have the potential to be entangled or entrapped in moon pools, and though many sea turtles could exit the moon pool under their own volition, sublethal effects could occur. If the vessel(s) are equipped with a moon pool, a trained crew member or company representative will monitor the moon pool area for sea turtles during operations. If a sea turtle is detected in the moon pool, it will be immediately reported to agencies including NMFS, BOEM, and BSEE per NMFS (2025a); compliance with ensuing agency guidance is

expected. Recovery may be required if a turtle is observed in a moon pool before the start of operations; a report must be made to BSEE upon observation and NMFS will determine recovery need (NMFS, 2025a). Based on the moon pool entrapment cases of sea turtles reported and successful rescues and releases that have occurred, NMFS (2025a) estimated approximately one sea turtle will be sub lethally entrapped in moon pools every year over 45 years of proposed action. Therefore, no significant impacts are expected.

Impacts of Support Vessel and Helicopter Traffic

Support vessel traffic has the potential to disturb sea turtles, and there is also a risk of vessel collisions. Data show that vessel traffic is one cause of sea turtle mortality in the Gulf of America (Lutcavage et al., 1997). While adult sea turtles are visible at the surface during the day and in clear weather, they can be difficult to spot from a moving vessel when resting below the water surface, during nighttime, or during periods of inclement weather. To reduce the potential for vessel collisions, BOEM issued NTL BOEM-2016-G01, which addresses 1) protected species identification training; 2) vessel operators and crews' observational vigilance and protected species collision avoidance; and 3) reporting of sightings of any injured or dead protected species. This NTL was reissued in June 2020 to address instances where guidance in the 2020 NMFS Biological Opinion (NMFS, 2020a) and amendment in April 2021 replaces compliance with the NTL; a new NTL has not been issued in response to the 2025 Biological Opinion. However, bp intends to follow the mitigation measures summarized in Attachment 3 of the 2025 Biological Opinion (NMFS, 2025a).

When sea turtles are sighted, vessel operators and crews must, to the maximum extent possible, attempt to maintain a distance of 50 m (164 ft) or greater whenever possible (NMFS, 2021a; 2025a). When sea turtles are sighted while a vessel is underway, the vessel should take action as necessary to avoid violating the relevant separation distance (e.g., attempt to remain parallel to the animal's course, avoid excessive speed or abrupt changes in direction until the animal has left the area). If aquatic protected species are sighted within the relevant separation distance, the vessel should reduce speed and shift the engine to neutral, not engaging the engines until animals are clear of the area. This does not apply to any vessel towing gear (e.g., source towed array and site clearance trawling; NMFS, 2025a, Appendix 1). Compliance with these mitigation measures will minimize the likelihood of vessel collisions as well as reduce the chance for disturbing sea turtles. Therefore, no significant impacts are expected.

Sound generated from support helicopter traffic has the potential to disturb sea turtles, but relatively high-altitude flying is conducted to minimize the potential for disturbances. While flying offshore, helicopters maintain altitudes above 213 m (700 ft) during transit to and from the working area. This altitude is intended to minimize the potential for disturbing sea turtles, and no significant impacts are expected (NMFS, 2007; BOEM, 2012a).

Impacts of a Small Fuel Spill

Potential spill impacts on sea turtles are discussed by NMFS (2020a, 2025a) and BOEM (2017; 2023a,b). For this SDOCD, there are no unique site-specific issues with respect to spill impacts on sea turtles.

The probability of a fuel spill is expected to be minimized by bp's preventative measures during fuel transfer. In the unlikely event of a spill, implementation of bp's ROSRP is expected to minimize potential impacts on sea turtles. SDOCD Appendix G provides details on spill response

measures. Given the open ocean location of the project area, the duration of a small spill would be brief and the potential for impacts to occur would be minimal.

A small fuel spill in offshore waters would produce a thin slick on the water surface and introduce concentrations of petroleum hydrocarbons and their degradation products. Direct physical and physiological effects of exposure to diesel fuel could include skin irritation, inflammation, or necrosis; chemical burns of skin, eyes, and mucous membranes; inhalation of toxic fumes; ingestion of oil directly or via contaminated prey; and stress from the activities and sound of response vessels and aircrafts (NMFS, 2020b, 2025a). The extent and persistence of impacts would depend on the meteorological and oceanographic conditions at the time of the release and the effectiveness of spill response measures. **Section A.9.1** discusses the likely fate of a small fuel spill and indicates that over 90% would be evaporated or dispersed naturally within 24 hours (NOAA, 2022). The area of the sea surface with diesel fuel on it would range from 0.5 to 5 ha (1.2 to 12 ac), depending on sea state and weather conditions. Therefore, due to the limited areal extent and short duration of water quality impacts from a small fuel spill, no significant impacts to sea turtles from direct or indirect exposure would be expected.

Loggerhead Critical Habitat – Nesting Beaches. A small fuel spill in the project area would be unlikely to affect sea turtle nesting beaches due to the distance from the nearest shoreline. Loggerhead turtle nesting beaches and nearshore reproductive habitat designated as critical habitat are located in Mississippi, Alabama, and the Florida Panhandle, at least 118 statute miles (190 km) from the project area. As explained in **Section A.9.1**, a small fuel spill would not be expected to make landfall or reach coastal waters prior to natural dispersion and degradation.

Loggerhead Critical Habitat – *Sargassum*. The project area is located approximately 18 statute miles (29 km) from the designated *Sargassum* critical habitat for the loggerhead turtles (**Figure 4**), and a small fuel spill in the project area would be unlikely to impact this critical habitat. If juvenile sea turtles come into contact with or ingest diesel fuel, impacts could include death, injury, or other sublethal effects. However, effects of a small spill on *Sargassum* critical habitat for loggerhead turtles would be limited to the small area (0.5 to 5 ha [1.2 to 12 ac]) likely to be impacted by a small spill. An impact area of 5 ha (12 ac) would represent a negligible portion of the approximately 40,662,810 ha (100,480,000 ac) designated *Sargassum* critical habitat for loggerhead turtles in the northern Gulf of America. However, if juvenile sea turtles are present in the area impacted, significant impacts on the regional population could occur.

Impacts of a Large Oil Spill

Impacts of oil spills on sea turtles can include direct impacts from oil exposure as well as indirect impacts due to response activities (e.g., vessel traffic, marine sound, dispersant use). Direct physical and physiological effects can include skin irritation, inflammation, or necrosis; chemical burns of skin, eyes, and mucous membranes; inhalation of toxic fumes and smoke (e.g., from in situ burning of oil); ingestion of oil (and dispersants) directly or via contaminated food; and stress from the activities and marine sound of response vessels and aircraft. Complications of the above may lead to dysfunction of immune and reproductive systems, physiological stress, declining physical condition, and death. Behavioral responses can include displacement of animals from prime habitat, disruption of social structure, changing food availability and foraging distribution and/or patterns, changing reproductive behavior/productivity, and changing movement patterns or migration (NOAA, 2010; NMFS, 2020b). In the unlikely event of

a spill, implementation of bp's ROSRP is expected to minimize the potential for these types of impacts on sea turtles. SDOCD Appendix G provides further details on spill response measures.

Studies of oil effects on loggerhead turtles in a controlled setting (NOAA, 2010, Lutcavage et al., 1995) suggest that sea turtles show no avoidance behavior when they encounter an oil slick, and any sea turtle in an affected area would be expected to be exposed. Sea turtles' diving behaviors also put them at risk. Sea turtles quickly inhale before diving and continually resurface over time, which may result in repeated exposure to volatile vapors and oiling (NMFS, 2025a).

Loggerhead Critical Habitat – Nesting Beaches. If spilled oil reaches or approaches sea turtle nesting beaches, nesting sea turtles, egg development, and hatchlings could be affected (NMFS, 2020a, 2025a). An oiled beach could affect nest site selection or result in no nesting at all (e.g., false crawls). Upon hatching and successfully reaching the water, hatchlings are subject to the same types of oil spill exposure hazards as adults. Hatchlings that contact oil residues while crossing a beach can exhibit a range of effects, from acute toxicity to impaired movement and normal bodily functions (NMFS, 2007). The 30-day OSRA modeling (**Table 4**) indicates nearshore waters and embayments from Cameron Parish, Louisiana to Bay County, Florida could be affected within 30 days of a spill (1 to 21% conditional probability).

Loggerhead Critical Habitat – *Sargassum*. The project area is located approximately 18 statute miles (29 km) from the designated *Sargassum* critical habitat for the loggerhead turtles which includes most of the Western and Central Planning Areas in the Gulf of America and parts of the southern portion of the Eastern Planning Area (**Figure 4**) (NMFS, 2021b). Because of the large area covered by the designated *Sargassum* critical habitat for loggerhead turtles, a large spill could result in a substantial part of the *Sargassum* critical habitat in the northern Gulf of America being oiled. The 2010 *Deepwater Horizon* spill affected approximately one-third of the *Sargassum* habitat in the northern Gulf of America (BOEM, 2014a). It is extremely unlikely that the entire *Sargassum* critical habitat would be affected by a large spill. Because *Sargassum* is a floating, pelagic species, it would only be affected by impacts that occur near the surface.

The effects of oiling on *Sargassum* vary with spill severity, but moderate to heavy oiling that could occur during a large spill could cause complete mortality to floating *Sargassum* and its associated communities (BOEM, 2017). *Sargassum* also has the potential to sink during a large spill, thus temporarily removing the habitat and possibly being an additional pathway of exposure to the benthic environment (Powers et al., 2013). Lower levels of oiling may cause sub-lethal affects, including a reduction in growth, productivity, and recruitment of organisms associated with the *Sargassum*. The *Sargassum* algae itself could be less impacted by light to moderate oiling than associated organisms because of a waxy outer layer that might help protect it from oiling (BOEM, 2016b). *Sargassum* has a yearly seasonal cycle of growth and a yearly cycle of migration from the Gulf of America to the western Atlantic. A large spill could affect a large portion of the annual crop of the algae; however, because of its ubiquitous distribution and seasonal cycle, recovery of the *Sargassum* community would be expected to occur within one to two years (BOEM, 2017).

Impacts to sea turtles from a large oil spill and associated cleanup activities would depend on spill extent, duration, and season (relative to turtle nesting season); the amount of oil reaching the shore; the importance of specific beaches to sea turtle nesting; and the level of cleanup vessel and beach crew activity required. In the event of oil from a large spill, it is expected that impacts resulting in the injury or death of individual sea turtles would be adverse but not likely

significant at the population level. In the event that spilled oil reached nesting beaches during nesting period(s), the level of mortality (and impact) would increase.

C.3.6 Piping Plover (Threatened)

The Piping Plover is a migratory shorebird that overwinters along the southeastern U.S. and Gulf of America coasts. This Threatened species experienced declines in population as a result of hunting, habitat loss and modification, predation, and disease (USFWS, 2003). However, as a result of intensive conservation and management, populations of Piping Plover appear to have been increasing since 1991 throughout its range (BirdLife International, 2020). Critical overwintering habitat has been designated, including beaches in Texas, Louisiana, Mississippi, Alabama, and Florida (**Figure 2**). Piping Plovers inhabit coastal sandy beaches and mudflats, feeding by probing for invertebrates at or just below the surface. They use beaches adjacent to foraging areas for roosting and preening.

A large oil spill is the only IPF that potentially may affect Piping Plovers. There are no IPFs associated with routine project activities that could affect these birds. A small fuel spill in the project area would be unlikely to affect Piping Plovers because a small fuel spill would not be expected to make landfall or reach coastal waters prior to dissipating (see explanation in **Section A.9.1**). Sound from helicopters would be unlikely to significantly affect Piping Plover populations, because it is assumed that helicopters will maintain an altitude of 305 m (1,000 ft) over unpopulated areas or across coastlines.

Impacts of a Large Oil Spill

The project area is approximately 69 statute miles (111 km) from the nearest shorelines designated as critical habitat for the Piping Plover (**Figure 3**). The 30-day OSRA modeling (**Table 4**) indicates nearshore waters and embayments from Cameron Parish, Louisiana to Bay County, Florida, could be affected within 30 days of a spill (1% to 21% conditional probability within 30 days).

Plovers could physically oil themselves while foraging on oiled shores or secondarily contaminate themselves through ingestion of oiled intertidal sediments and prey (BOEM, 2017). Piping Plovers congregate and feed along tidally-exposed banks and shorelines, following the tidal boundary and foraging at the water's edge. It is possible that some deaths of Piping Plovers could occur, especially if spills occur during winter months when plovers are most common along the coastal Gulf or if spills contacted critical habitat. Impacts could also occur from vehicular traffic on beaches and other activities associated with spill cleanup. Extensive bp resources would most likely be available to protect and rehabilitate wildlife in the event of a spill reaching the shoreline, as detailed in the ROSRP.

However, a large spill that contacts shorelines would not necessarily substantially impact Piping Plovers. In the aftermath of the *Deepwater Horizon* incident, Gibson et al. (2017) completed thorough surveys of coastal Piping Plover habitat in coastal Louisiana, Mississippi, and Alabama and found that only 0.89% of all observed Piping Plovers were visibly oiled, leaving the authors to conclude that the *Deepwater Horizon* incident did not substantially affect Piping Plover populations.

C.3.7 Whooping Crane (Endangered)

The Whooping Crane is a large omnivorous wading bird listed as an Endangered species. Three wild populations live in North America (National Wildlife Federation, 2016). One population overwinters along the Texas coast at Aransas NWR and summers at Wood Buffalo National Park in Canada. This population represents the majority of the world's population of free-ranging Whooping Cranes, reaching an estimated population of 536 at Aransas NWR during the 2022 to 2023 winter (USFWS, 2023a), a slight decrease from an estimated 543 individuals counted in the 2021 to 2022 winter survey. Whooping Cranes breed, migrate, winter, and forage in a variety of habitats, including coastal marshes and estuaries, inland marshes, lakes, ponds, wet meadows and rivers, and agricultural fields (USFWS, 2007). About 9,000 ha (22,240 ac) of salt flats on Aransas NWR and adjacent islands comprise the principal wintering grounds of the Whooping Crane. Aransas NWR is designated as critical habitat for the species.

A large oil spill is the only IPF that potentially may affect Whooping Cranes. A small fuel spill in the project area would also be unlikely to affect Whooping Cranes, due to the distance of the project area from Aransas NWR. As explained in **Section A.9.1**, a small fuel spill would not be expected to make landfall or reach coastal waters prior to natural dispersion and degradation.

Impacts of a Large Oil Spill

A large oil spill is unlikely to affect Whooping Cranes as the project area is approximately 508 statute miles (818 km) from the Aransas NWR, which is the nearest designated critical habitat. The 30-day OSRA modeling (**Table 4**) indicates nearshore waters and embayments from Cameron Parish, Louisiana to Bay County, Florida, could be affected within 30 days of a spill (1% to 21% conditional probability within 30 days).

In the event of oil exposure, Whooping Cranes could physically oil themselves while foraging in oiled areas or secondarily contaminate themselves through ingestion of contaminated shellfish, frogs, and fishes. It is possible that some Whooping Crane deaths could occur, especially if a spill occurred during winter months when Whooping Cranes are most common along the Texas coast and if the spill contacts their critical habitat in Aransas NWR. Impacts could also occur from vehicular traffic on beaches and other activities associated with spill cleanup. In the event of a spill, bp would work with the applicable state and federal agencies to prevent impacts on Whooping Cranes. Extensive bp resources would most likely be available to protect and rehabilitate wildlife in the event of a spill reaching the shoreline, as detailed in the ROSRP.

C.3.8 Black-capped Petrel

The Black-capped Petrel is a pelagic seabird that nests solely on Hispaniola that was listed as Endangered under the ESA in 2024. The species travels long distances to forage on fish, squid, crustaceans, and *Sargassum* (Simons et al., 2013) and have occasionally been sighted in the northern Gulf of America. While the Gulf of America is not their primary foraging grounds, the most recent species status review (USFWS, 2023b) reported 11 sightings in the Gulf of America from 2017 to 2018 during surveys as part of the Gulf of Mexico Marine Assessment Program for Protected Species. Overall, the population of Black-capped Petrels is declining, largely due to deforestation and urbanization on Hispaniola. Exact population numbers are unknown due to the difficulty in obtaining accurate counts and their nocturnal nature, but BirdLife International (2018) estimated a total of 1,000 to 2,000 mature individuals and an overall population of 2,000 to 4,000 individuals.

IPFs that potentially may affect the Black-capped Petrel include installation vessel presence, marine sound, and lights, support vessel and helicopter traffic; and two types of accidents (a small fuel spill and a large oil spill). Effluent discharges permitted under the NPDES are likely to have negligible impacts on the birds due to rapid dispersion, the small area of ocean affected, the intermittent nature of the discharges, and the mobility of these animals. Compliance with NTL BSEE-2015-G03 is expected to minimize the potential for marine debris-related impacts. The IPFs with potential impacts listed in **Table 2** are discussed below.

Impacts of Installation Vessel Presence, Marine Sound, and Lights

Marine birds that frequent offshore oil and gas operations may be exposed to contaminants including air pollutants and routine discharges, but significant impacts are unlikely due to rapid dispersion. Birds migrating over water have been known to collide with offshore structures, resulting in injury and/or death (Wiese et al., 2001; Russell, 2005). Black-capped Petrels may be attracted to lights on the installation vessel which could increase the risk of a collision.

Mortality of migrant birds at tall towers and other land-based structures has been reviewed extensively, and the mechanisms involved in offshore vessel collisions appear to be similar. In some cases, birds simply do not see a part of the structure until it is too late to avoid it. In other cases, navigation may be disrupted by marine sound (Russell, 2005). On the other hand, offshore structures are suitable stopover perches for most species (Russell, 2005). Due to the low density of Black-capped Petrels in the Gulf of America, no significant impacts are expected.

Impacts of Support Vessel and Helicopter Traffic

Support vessels and helicopters are unlikely to significantly disturb Black-capped Petrels in open, offshore waters. Schwemmer et al. (2011) showed that several marine bird species showed behavioral responses and altered distribution patterns in response to ship traffic, which could potentially cause loss of foraging time and resting habitat. However, it is likely that individuals would experience, at most, only short-term behavioral disruption, and the impact would not be significant on Black-capped Petrels.

Impacts of a Small Fuel Spill

Potential spill impacts on marine birds in general are discussed by BOEM (2017). For this SDOCD, there are no unique site-specific issues with respect to spill impacts on Black-capped Petrels.

The probability of a fuel spill is expected to be minimized by bp's preventative measures during routine operations, including fuel transfer procedures. In the unlikely event of a spill, implementation of bp's ROSRP is expected to reduce the potential for impacts on Black-capped Petrels. SDOCD Appendix G provides details on spill response measures. Given the open ocean location of the project area and the expected short duration of a small fuel spill, the potential exposure period for Black-capped Petrels would be brief.

A small fuel spill in offshore waters would produce a slick on the water surface and increase the concentrations of petroleum hydrocarbons and their degradation products. The extent and persistence of impacts would depend on the meteorological and oceanographic conditions at the time and the effectiveness of spill response measures. **Section A.9.1** discusses the likely fate of a small fuel spill and indicates that over 90% would be evaporated or dispersed naturally within 24 hours (NOAA, 2022). The area of the sea surface with diesel fuel on it would range from 0.5 to 5 ha (1.2 to 12 ac), depending on sea state and weather conditions.

Black-capped Petrels exposed to fuel on the sea surface could experience direct physical and physiological effects including skin irritation; chemical burns of skin, eyes, and mucous membranes; and inhalation of VOCs. Due to the limited areal extent and short duration of water quality impacts from a small fuel spill, secondary impacts due to ingestion of oil via contaminated prey or reductions in prey abundance are unlikely. Due to the low densities of Black-capped Petrels, the small area affected, and the brief duration of the surface slick, minimal if any impacts would be expected.

Impacts of a Large Oil Spill

Potential spill impacts on marine and pelagic birds in general are discussed by BOEM (2017). For this SDOCD, there are no unique site-specific issues with respect to spill impacts on Black-capped Petrels.

Black-capped Petrels could be exposed to oil from a spill at the project area; the number of individuals that could be affected in open, offshore waters would depend on the extent and persistence of the oil slick and the number of Black-capped Petrels in the area.

Following the *Deepwater Horizon* incident in 2010, no Black-capped Petrels were reported as oiled or recovered dead (USFWS, 2023b), but decomposition would likely have made positive identification difficult (Haney et al., 2014). Exposure of marine birds to oil can result in adverse health with severity, depending on the level of oiling. Effects can range from plumage damage and loss of buoyancy from external oiling to more severe effects, such as organ damage, immune suppression, endocrine imbalance, reduced aerobic capacity, and death as a result of oil inhalation or ingestion (NOAA, 2016). Other indirect impacts would also likely occur after a large oil spill, such as a reduction in suitable foraging habitat and the decline in population of prey species (USFWS, 2023b).

Overall, a large oil spill could cause significant impacts on Black-capped Petrel populations if there were numerous individuals in the area of the spill. However, due to the low number of individuals thought to frequent the northern Gulf of America, significant impacts on this species from a large spill are considered unlikely.

C.3.9 Rufa Red Knot (Threatened)

The Rufa Red Knot is a small to medium-sized migratory shorebird that transits each year between breeding grounds in Canada to wintering grounds in the southeast U.S., Caribbean, and along the Gulf of America coast (USFWS, 2020). Listed as Threatened under the ESA in 2015, their primary habitat during the winter along the Gulf of America is in the Laguna Madre estuary system in Mexico and Texas.

The primary threats that are faced by Rufa Red Knot include habitat loss, reduced food availability, and alterations of their migratory timing and patterns due to climate and weather conditions (USFWS, 2020). Precise population numbers are difficult to assess, but USFWS estimated in 2023 that the global population was approximately 42,000 individuals (The Wildlife Society, 2023). Critical habitat was proposed by USFWS in 2023 which includes numerous areas along the U.S. Gulf of America coastline.

IPFs that potentially may affect the Rufa Red Knots include support vessel and helicopter traffic; and two types of accidents (a small fuel spill and a large oil spill). Installation vessel presence, marine sound, and lights, and effluent discharges are not expected to have a significant impact because this species typically is not found in offshore waters and instead is more coastal in nature. The IPFs with potential impacts listed in **Table 2** are discussed below.

Impacts of Support Vessel and Helicopter Traffic

Support vessels and helicopters are unlikely to significantly disturb Rufa Red Knots in offshore waters where they are not common or in nearshore industrial areas near the shorebase. Schwemmer et al. (2011) showed that several marine bird species showed behavioral responses and altered distribution patterns in response to ship traffic, which could potentially cause loss of foraging time and resting habitat. However, it is likely that individuals would experience, at most, only short-term behavioral disruption, and the impact would not be significant.

Impacts of a Small Fuel Spill

Potential spill impacts on coastal birds in general are discussed by BOEM (2017). For this SDOCD, there are no unique site-specific issues with respect to spill impacts on Rufa Red Knots.

The probability of a fuel spill is expected to be minimized by bp's preventative measures during routine operations, including fuel transfer procedures. In the unlikely event of a spill, implementation of bp's ROSRP is expected to reduce the potential for impacts on Black-capped Petrels. SDOCD Appendix G provides details on spill response measures. Given Rufa Red Knots are mostly found in coastal areas and the expected short duration of a small fuel spill, the potential exposure period for Rufa Red Knots would be brief.

A small fuel spill in coastal waters would produce a slick on the water surface and increase the concentrations of petroleum hydrocarbons and their degradation products. The extent and persistence of impacts would depend on the meteorological and oceanographic conditions at the time and the effectiveness of spill response measures. **Section A.9.1** discusses the likely fate of a small fuel spill and indicates that over 90% would be evaporated or dispersed naturally within 24 hours (NOAA, 2022). The area of the sea surface with diesel fuel on it would range from 0.5 to 5 ha (1.2 to 12 ac), depending on sea state and weather conditions.

Rufa Red Knots exposed to fuel on the sea surface could experience direct physical and physiological effects including skin irritation; chemical burns of skin, eyes, and mucous membranes; and inhalation of VOCs. Due to the limited areal extent and short duration of water quality impacts from a small fuel spill, secondary impacts due to ingestion of oil via contaminated prey or reductions in prey abundance are unlikely. It is not expected that a small fuel spill would substantially affect Rufa Red Knot populations.

Impacts of a Large Oil Spill

Potential spill impacts on coastal birds in general are discussed by BOEM (2017). For this SDOCD, there are no unique site-specific issues with respect to spill impacts on Rufa Red Knots.

Rufa Red Knots could be exposed to oil from a spill at the project area that travels into coastal area; the number of individuals that could be affected would depend on the extent and persistence of the oil slick and the number of Rufa Red Knots in the area, which is largely seasonally based.

Following the *Deepwater Horizon* incident in 2010, only a single Rufa Red Knot was reported as oiled (USFWS, 2020), but decomposition would likely have made positive identification difficult (Haney et al., 2014). Exposure of marine and coastal birds to oil can result in adverse health with severity, depending on the level of oiling. Effects can range from plumage damage and loss of buoyancy from external oiling to more severe effects, such as organ damage, immune suppression, endocrine imbalance, reduced aerobic capacity, and death as a result of oil inhalation or ingestion (NOAA, 2016). Other indirect impacts would also likely occur after a large oil spill, such as a reduction in suitable foraging habitat and the decline in population of prey species (USFWS, 2023b).

Overall, a large oil spill could have significant impacts on Rufa Red Knot populations if there were numerous individuals in the area of the spill or in coastal areas that became oiled.

C.3.10 Oceanic Whitetip Shark (Threatened)

The oceanic whitetip shark was listed as Threatened under the ESA on 30 January 2018 (effective 30 March 2018) by NMFS (83 FR 4153). Oceanic whitetip sharks are found worldwide in offshore waters between approximately 30° N and 35° S latitude, and historically were one of the most widespread and abundant species of shark (Rigby et al., 2019). However, based on reported oceanic whitetip shark catches in several major longline fisheries, the global population appears to have suffered substantial declines (Camhi et al., 2008) and the species is now only occasionally reported in the Gulf of America (Rigby et al., 2019).

Oceanic whitetip shark management is complex due to the species being globally distributed, highly migratory, and its range overlapping in areas of high fishing pressure; thus, leaving assessment of population trends on fishery dependent catch-and-effort data rather than scientific surveys (Young and Carlson, 2020). A comparison of historical shark catch rates in the Gulf of America by Baum and Myers (2004) noted that most recent papers dismissed the oceanic whitetip shark as rare or absent in the Gulf of America. NMFS (2025b) noted that there has been an 88% decline in abundance of the species in the Gulf of America since the mid-1990s due to commercial fishing pressure.

IPFs that could affect the oceanic whitetip shark include installation vessel presence, sound, and lights, and a large oil spill. Though NMFS (2025a) lists a small diesel fuel spill as an IPF, in the project area, a small diesel fuel spill would be unlikely to affect oceanic whitetip sharks due to rapid natural dispersion of diesel fuel and the low density of oceanic whitetip sharks potentially present in the project area. Therefore, no significant impacts are expected from small diesel fuel spills and they are not further discussed (**Table 2**).

Impacts of Installation Vessel Presence, Marine Sound, and Lights

Offshore installation activities produce a broad array of sound at frequencies and intensities that may be detected by sharks including the Threatened oceanic whitetip shark. The general frequency range for elasmobranch hearing is approximately between 20 Hz and 1 kHz (Ladich and Fay, 2013) which includes sensitivities for individual species to SPLs between approximately 134 to 148 dB re 1 µPa in nurse sharks (*Ginglymostoma cirratum*) at frequencies between 100 and 1,000 Hz (Casper and Mann, 2006). These frequencies overlap with sound associated with the DP vessels for the proposed installation activities (SPL source levels of 195 dB re 1 µPa m with peak frequencies at 40 to 100 Hz) (Hildebrand, 2005). Impacts from DP vessel activities (i.e., non-impulsive sound) associated with installation operations could include

masking or behavioral changes (Popper et al., 2014). The scientific understanding of shark sound production and behavior is in its infancy, as a smooth-hound shark (*Mustelus lenticulatus*) was found to produce sounds, the first evidence of shark sound production in the scientific literature (Nieder et al., 2025).

Behavioral impacts from offshore installation activities are consistent with the results of the assessment in the NMFS Biological Opinions (NMFS, 2020a, 2025a) which indicate that oceanic whitetip sharks may be able to detect DP vessel sound but are not likely to be adversely affected by it due to their lack of a swim bladder. Therefore, because the propagation distances of SPL sufficient to elicit behavioral disturbances from the installation vessel would be limited in geographic scope, no population-level impacts on oceanic whitetip sharks are expected.

Impacts of a Large Oil Spill

Information regarding the direct effects of oil on elasmobranchs, including the oceanic whitetip shark are largely unknown. However, in the event of a large oil spill, oceanic whitetip sharks could be affected by direct ingestion, ingestion of oiled prey, or the absorption of dissolved petroleum products through the gills. Oil could also potentially harm the functional units of the mechanosensory lateral line system, a nearfield flow-sensing system common across fishes, including sharks. Because oceanic whitetip sharks may be found in surface waters, they could be more likely to be impacted by floating oil than other species which only reside at depth.

It is possible that a large oil spill could affect individual oceanic whitetip sharks and result in injuries or deaths. However, due to the low density of oceanic whitetip sharks thought to exist in the Gulf of America, it is unlikely that a large spill would result in population-level effects.

C.3.11 Giant Manta Ray (Threatened)

The giant manta ray is a Threatened elasmobranch species that is a slow-growing, migratory, planktivorous species than inhabits tropical, subtropical, and temperate bodies of water worldwide (NOAA, 2018). The giant manta ray became listed as Threatened under the ESA in 2018.

Commercial fishing is the primary threat to giant manta rays (NOAA, 2018). The species is targeted and caught as bycatch in several global fisheries throughout its range. Although protected in U.S. waters, protection of populations is difficult as they are highly migratory with sparsely distributed and fragmented populations throughout the world. Some estimated regional population sizes are small (between 100 to 1,500 individuals) (Marshall et al., 2018; NOAA, 2018). Stewart et al. (2018) recently reported that the Flower Garden Banks serves as nursery habitat for aggregations of juvenile manta rays. Approximately 100 unique individuals have been positively identified at the Flower Garden Banks based on unique underbelly coloration (Belter et al., 2020). Genetic and photographic evidence in the Flower Garden Banks over 25 years of monitoring showed that 95% of identified giant manta ray male individuals were smaller than mature size (Stewart et al., 2018).

IPFs that may impact giant manta rays include installation vessel presence, marine sound, and lights, and a large oil spill. Though NMFS (2025a) lists a small diesel fuel spill as an IPF, in the project area a small diesel fuel spill would be unlikely to affect giant manta rays due to rapid natural dispersion of diesel fuel and the low density of giant manta rays potentially present in the project area. Therefore, no significant impacts are expected from small diesel fuel spills and they are not further discussed (See **Table 2**).

Impacts of Installation Vessel Presence, Marine Sound, and Lights

Offshore installation activities produce a broad array of sound at frequencies and intensities that may be detected by elasmobranchs including the Threatened giant manta ray. The general frequency range for elasmobranch hearing is approximately between 20 Hz and 1 kHz (Ladich and Fay, 2013). Studies indicate sensitivities to SPLs between approximately 139 and 153 dB re 1 μ Pa in yellow stingray (*Urobatis jamaicensis*) and SPLs between approximately 120 and 145 dB re 1 μ Pa in little skate (*Erinacea raja*) at frequencies from 100 to 1,000 Hz (Casper et al., 2003; Casper and Mann, 2006). These frequencies overlap with sound associated with DP vessel activities (SPL source levels of 195 dB re 1 μ Pa m with peak frequencies at 40 to 100 Hz) (Hildebrand, 2005). Impacts from DP vessel activities (i.e., non-impulsive sound) associated with installation operations could include masking or behavioral changes (Popper et al., 2014).

The scientific understanding of skate and ray (Batoidea) is in its infancy. Only recently has evidence been presented for active sound production in skates and rays, and only in three species (Almagro and Barría, 2024; Barroil et al., 2024; Fetterplace et al., 2022). Potential behavioral changes subsequent to offshore installation activities are consistent with the results of the assessment in the NMFS Biological Opinion (NMFS, 2020a, 2025a) which indicate that giant manta rays may be able to detect vessel sound but are not likely to be adversely affected by it due to their lack of a swim bladder. Therefore, because the propagation distances of SPL sufficient to elicit behavioral disturbances from the installation vessel would be limited in geographic scope, no population level impacts on giant manta rays are expected.

Impacts of a Large Oil Spill

A large oil spill in the project area could reach coral reefs at the Flower Garden Banks which is the only known location of giant manta ray aggregations in the Gulf of America, although individuals may occur anywhere in the Gulf. In the unlikely event of a large oil spill impacting areas with giant manta rays, individual rays could be affected by direct ingestion of oil which could cover their gill filaments or gill rakers, or by ingestion of oiled plankton. Oil could also potentially harm the functional units of the mechanosensory lateral line system, a nearfield flow-sensing system common across fishes, including elasmobranchs. Giant manta rays typically feed in shallow waters of <10 m (33 ft) depth (NOAA, 2018). Because of this shallow water feeding behavior, giant manta rays would be more likely to be impacted by floating oil than other species which most typically reside at depth.

In the event of a large oil spill, due to the distance between the project area and the Flower Garden Banks (approximately 236 statute miles [380 km]), it is unlikely that oil would impact the Threatened giant manta ray nursery habitat. It is possible that a large oil spill could contact individual giant manta rays, but due to the low density of individuals thought to occur in the Gulf of America, population-level impacts are not expected.

C.3.12 Gulf Sturgeon (Threatened)

The Gulf sturgeon is a Threatened fish species that inhabits major rivers and inner shelf waters from the Mississippi River to the Suwannee River, Florida (Barkuloo, 1988; Wakeford, 2001). Sturgeon are anadromous fish that migrate from the ocean upstream into coastal rivers to spawn in freshwater.

The historic range of the species extended from the Mississippi River to Charlotte Harbor, Florida (Wakeford, 2001). This range has contracted to encompass major rivers and inner shelf waters from the Mississippi River to the Suwannee River, Florida. Populations have been depleted or even extirpated throughout this range by fishing, shoreline development, dam construction, water quality changes, and other factors (Barkuloo, 1988; Wakeford, 2001). These declines prompted the listing of the Gulf sturgeon as a Threatened species in 1991. The best-known populations occur in the Apalachicola and Suwannee Rivers in Florida (Carr, 1996; Sulak and Clugston, 1998), the Choctawhatchee River in Alabama (Fox et al., 2000), and the Pearl River in Mississippi/Louisiana (Morrow et al., 1998). Rudd et al. (2014) reconfirmed the spatial distribution and movement patterns of Gulf sturgeon by surgically implanting acoustic telemetry tags. Critical habitat in the Gulf extends from Lake Borgne, Louisiana (St. Bernard Parish), to Suwannee Sound, Florida (Levy County) (NMFS, 2022) (**Figure 3**). A species description is presented by BOEM (2012a) and in the recovery plan for this species (USFWS et al., 1995).

Vessel strikes and a large oil spills are the IPFs that potentially may affect Gulf sturgeon. There are no IPFs associated with routine project activities that could affect these fish. A small fuel spill in the project area would be unlikely to affect Gulf sturgeon because a small fuel spill would not be expected to make landfall or reach coastal waters prior to dissipating (see explanation in **Section A.9.1**). Vessel collisions to Gulf sturgeon would be unlikely based on the location of the support vessel base and NMFS (2025a) estimated one non-lethal Gulf sturgeon collision in the 45 years of proposed action.

Impacts of Support Vessel and Helicopter Traffic

Vessel strikes to Gulf sturgeon would be unlikely based on the location of the shorebase. NMFS (2025a) estimated 104 Gulf sturgeon would be killed by vessel strikes over 45 years of proposed action. All vessel strikes from oil and gas vessels are assumed to be lethal to Gulf sturgeon due to vessel and propellor size (NMFS, 2025a). Due to the distance of the project area from the nearest Gulf Sturgeon critical habitat (118 statute miles [190 km]) and the shorebase being in Port Fourchon, Louisiana, any impacts from vessel strikes due to project activities will likely be negligible.

Impacts of a Large Oil Spill

Potential spill impacts on Gulf sturgeon are discussed by NMFS (2007) and BOEM (2012a; 2017). For this SDOCD, there are no unique site-specific issues with respect to this species.

The project area is approximately 118 statute miles (190 km) from the nearest Gulf sturgeon critical habitat. The 30-day OSRA modeling (**Table 4**) predicts that a spill in the project area has a 1% conditional probability of contacting any coastal areas containing Gulf sturgeon critical habitat (Jackson County, Mississippi) within 30 days of a spill.

In the event of oil reaching Gulf sturgeon habitat, the fish could be affected by direct ingestion, ingestion of oiled prey, or the absorption of dissolved petroleum products through the gills. Oil could also potentially harm the functional units of the mechanosensory lateral line system, a nearfield flow-sensing system common across fishes. Based on the life history of this species, subadult and adult Gulf sturgeon would be most vulnerable to an estuarine or marine oil spill, and would be vulnerable from approximately October through April when this species is foraging in estuarine and shallow marine habitats (NMFS, 2025a).

C.3.13 Nassau Grouper (Threatened)

The Nassau grouper (*Epinephelus striatus*) is a Threatened, long-lived reef fish typically associated with hard bottom structures such as natural and artificial reefs, rocks, and underwater ledges (NOAA, 2024a). Once one of the most common reef fish species in the coastal waters of the United States and Caribbean (Sadovy, 1997), the Nassau grouper been subject to overfishing and is considered extinct in much of its historical range. Observations of current spawning aggregations compared with historical landings data suggest that the Nassau grouper population is substantially smaller than its historical size (NOAA, 2024a). The Nassau grouper was listed as Threatened under the ESA in 2016 (81 FR 42268).

Nassau groupers are found mainly in the shallow tropical and subtropical waters of eastern Florida, the Florida Keys, Bermuda, the Yucatán Peninsula, and the Caribbean, including the U.S. Virgin Islands and Puerto Rico within water depths up to 130 m (426 ft) (NOAA, 2024a). There has been one confirmed sighting of Nassau grouper from the Flower Garden Banks in the Gulf of America at a water depth of 36 m (118 ft) (Foley et al., 2007). Three additional unconfirmed reports (i.e. lacking photographic evidence) of Nassau grouper have also been documented from mooring buoys and the coral cap region of the West Flower Garden flats (Foley et al., 2007).

There are no IPFs associated with routine project activities that could affect Nassau grouper. A small fuel spill would not affect Nassau grouper because the fuel would float and dissipate on the sea surface and would not be expected to reach the Flower Garden Banks or Florida Keys. A large hydrocarbon spill is the only relevant IPF, although a large oil spill would not be expected to reach grouper habitat, and all new pipelines that overlap with grouper habitat would be subject to step-down review (NMFS, 2025a).

Impacts of a Large Oil Spill

A spill would be unlikely to contact the Flower Garden Banks based on the distance between the project area and the Flower Garden Banks (approximately 236 statute miles [380 km]), and the difference in water depth between the project area (2,113 m [6,934 ft]) and the Banks (approximately 17 to 145 m [56 to 476 ft]). While on the surface, hydrocarbons would not be expected to contact subsurface fish.

In the unlikely event that hydrocarbons contact Nassau grouper habitat, hydrocarbon droplets or contaminated sediment particles could come into contact with Nassau grouper present on the reefs. Individual fish could be affected by direct ingestion of hydrocarbons which could cover their gill filaments or gill rakers, resulting in ingestion of oiled prey, or the absorption of dissolved petroleum products through the gills. Oil could also potentially harm the functional units of the mechanosensory lateral line system, a nearfield flow-sensing system common across fishes. Harm to the lateral line system could lead to behavioral changes and challenges in acquiring prey.

C.3.14 Smalltooth Sawfish (Endangered)

The smalltooth sawfish, named due to their flat, saw-like rostrum, is an elasmobranch ray which lives in shallow coastal tropical seas and estuaries where they feed on fish and invertebrates such as shrimp and crabs (NOAA Fisheries, 2023b). Once found along most of the northern Gulf of America coast from Texas to Florida, their current range in Gulf of America is restricted to areas primarily in southwest Florida (Brame et al., 2019) where several areas of critical habitat have been designated (**Figure 3**). A species description is presented in the recovery plan for this species (NMFS, 2009b).

Listed as Endangered under the ESA in 2003, population numbers have drastically declined over the past century primarily due to accidental bycatch (Seitz and Poulakis, 2006). Although there are no reliable estimates for smalltooth sawfish population numbers throughout its range (NMFS, 2018), data from 1989 to 2004 indicated a slight increasing trend in population numbers in Everglades National Park during that time period (Carlson et al., 2007). More recent data resulted in a similar conclusion, with indications that populations were stable or slightly increasing in southwest Florida (Carlson and Osborne, 2012).

There are no IPFs associated with routine project activities that could affect smalltooth sawfish. A small fuel spill would not affect smalltooth sawfish because the fuel would float and dissipate on the sea surface and would not be expected to reach smalltooth sawfish habitat in coastal areas (see **Section A.9.1**). A large oil spill was not considered an IPF for smalltooth sawfish in the 2025 NMFS Biological Opinion (NMFS, 2025a) but is briefly considered below.

Impacts of a Large Oil Spill

The project area is approximately 372 miles (599 km) from the nearest smalltooth sawfish critical habitat in Charlotte County, Florida. Based on the 30-day OSRA modeling, a spill in the project area has a <0.5% conditional probability of contacting any coastal areas containing smalltooth sawfish critical habitat within 30 days of a spill.

Information regarding the direct effects of oil on elasmobranchs, including the smalltooth sawfish, are largely unknown. A recent study by Cave and Kajiura (2018) reported that when exposed to crude oil, the Atlantic stingray (*Hypanus sabinus*) experienced impaired olfactory function which could lead to decreased fitness. In the event of oil reaching smalltooth sawfish habitats, the smalltooth sawfish could be affected by direct ingestion, ingestion of oiled prey, or the absorption of dissolved petroleum products through the gills as well as impaired olfactory function. Oil could also potentially harm the functional units of the mechanosensory lateral line system, a nearfield flow-sensing system common across fishes, including elasmobranchs. Based on the shallow, coastal habitats preferred by smalltooth sawfish, individuals in areas subject to coastal oiling could be more likely to be impacted than other species that reside at depth.

C.3.15 Beach Mice (Endangered)

Four subspecies of Endangered beach mouse occur on the barrier islands of Alabama and the Florida Panhandle: the Alabama (*Peromyscus polionotus ammobates*), Choctawhatchee (*P. p. allophrys*), Perdido Key (*P. p. trissyllepsis*), and St. Andrew beach mouse (*P. p. peninsularis*). Critical habitat has been designated for all four subspecies and is shown combined in **Figure 3**. One additional subspecies of *Peromyscus* beach mouse inhabiting dunes on the western Florida Panhandle, the Santa Rosa beach mouse (*P. p. leucocephalus*), is not listed under the ESA. A large oil spill is the only IPF that potentially may affect beach mice. There are no IPFs associated with routine project activities that could affect these animals due to the distance from shore and the lack of any onshore support activities near their habitat. A small fuel spill in the project area would not affect beach mice because a small fuel spill would not be expected to reach beach mice habitat prior to dissipating (see **Section A.9.1**).

Impacts of a Large Oil Spill

Potential spill impacts on Endangered beach mice are discussed by BOEM (2017; 2023a,b). For this SDOCD, there are no unique site-specific issues with respect to these species that were not analyzed in these documents.

Beach mouse critical habitat in Baldwin County, Alabama, is approximately 119 statute miles (192 km) from the project area. The 30-day OSRA modeling (**Table 4**) predicts that a spill in the project area has a 1% conditional probability of contacting any coastal areas containing beach mouse critical habitat within 30 days of a spill.

In the event of oil contacting these beaches, beach mice could experience several types of direct and indirect impacts. Contact with spilled oil could cause skin and eye irritation and subsequent infection; matting of fur; irritation of sweat glands, ear tissues, and throat tissues; disruption of sight and hearing; asphyxiation from inhalation of fumes; and toxicity from ingestion of oil and contaminated food. Indirect impacts could include reduction of food supply, destruction of habitat, and fouling of nests. Impacts could also occur from vehicular traffic and other activities associated with spill cleanup. However, any such impacts are unlikely due to the distance from shore and response actions that would occur in the event of a spill.

C.3.16 Florida Salt Marsh Vole (Endangered)

The Florida salt marsh vole is a small, dark brown or black rodent found only in saltgrass (*Distichlis spicata*) meadows in the Big Bend region of Florida that was listed as Endangered under the ESA in 1991. Only two populations of Florida salt marsh vole are known to exist: one near Cedar Key in Levy County, Florida and one in the Lower Suwanee NWR in Dixie County, Florida (Florida Fish and Wildlife Conservation Commission, nd-d). No critical habitat has been established for the Florida salt marsh vole in part due to concerns over illegal trapping or trespassing if the location of the populations were publicly disclosed (USFWS, 2001b).

A large oil spill is the only IPF that potentially may affect the Florida salt marsh vole. There are no IPFs associated with routine project activities that could affect these animals due to the distance from the project area to their habitat and the lack of any onshore support activities near their habitat. A small fuel spill in the project area would not affect the Florida salt marsh vole because a small fuel spill would not be expected to reach their habitat prior to dissipating (see **Section A.9.1**).

Impacts of a Large Oil Spill

Florida salt marsh vole habitat in Levy and Dixie counties, Florida is approximately 301 miles (484 km) from the project area. The 30-day OSRA modeling (**Table 4**) predicts that a spill in the project area has <0.5% or less conditional probability of contacting any coastal areas containing Florida salt marsh vole habitat within 30 days.

In the event of oil contacting beaches containing these animals, Florida salt marsh voles could experience several types of direct and indirect impacts. Contact with spilled oil could cause skin and eye irritation and subsequent infection; matting of fur; irritation of sweat glands, ear tissues, and throat tissues; disruption of sight and hearing; asphyxiation from inhalation of fumes; and toxicity from ingestion of oil and contaminated food. Indirect impacts could include reduction of food supply, destruction of habitat, and fouling of nests. Impacts could also occur from vehicular traffic and other activities associated with spill cleanup. Impacts associated with an extensive oiling of coastal habitat containing Florida salt marsh voles from a large oil spill are expected to be significant. Due to the extremely low population numbers (thirty years of trapping efforts collected only 43 voles [USFWS, 2019]), extensive oiling of Florida salt marsh vole habitat could result in the extinction of the species. However, any such impacts are unlikely due to the distance from the project area to Florida salt marsh vole habitat and response actions that would occur in the event of a spill.

C.3.17 Panama City Crayfish (Threatened)

The USFWS issued a Final Rule designating the Panama City crayfish as Threatened under the ESA in 2022. The Panama City crayfish is a semi-terrestrial crayfish that grows up to 2 inches (51 mm) in size and is found in south-central Bay County, Florida. Medium to dark brown in color, the crayfish prefers areas dominated by herbaceous vegetation and shallow or fluctuating water levels (Keppner and Keppner, 2004). Historically prevalent in shallow freshwater bodies in pine and prairie communities, urban development has largely replaced these habitats. The Panama City crayfish is now generally found in wet or semi-wet swales, ditches, slash pine plantations, undeveloped utility rights-of-way, and remnant wetlands (Florida Fish and Wildlife Conservation Commission, 2016).

A large oil spill is the only IPF that potentially may affect the Panama City crayfish. There are no IPFs associated with routine project activities that could affect these animals due to the distance from the project area to their habitat and the lack of any onshore support activities near their habitat. A small fuel spill in the project area would not affect the Panama City crayfish because a small fuel spill would not be expected to reach their habitat prior to dissipating (see **Section A.9.1**).

Impacts of a Large Oil Spill

Panama City crayfish critical habitat in Bay County, Florida is approximately 183 miles (295 km) from the project area. The 30-day OSRA modeling (**Table 4**) predicts that a spill in the project area has a 1% conditional probability of contacting any coastal areas containing Panama City crayfish critical habitat within 30 days.

Effects of oiling on the Panama City crayfish are largely unknown. In general, crayfishes use chemoreception to orient themselves in their environment, to find food, and to avoid predators (Bergman and Moore, 2005). Exposure to hydrocarbons has been shown to damage receptor cells that crayfish use for chemoreception, thus decreasing their fitness (Tierney et al., 2010).

Indirect impacts of oiling of Panama City crayfish habitat could include reduction of food supply, destruction of habitat, and fouling of burrows. Impacts could also occur from vehicular traffic and other activities associated with spill cleanup. Impacts associated with an extensive oiling of coastal habitat containing Panama City crayfish from a large oil spill are expected to be significant. Due to the low population numbers and restricted range, extensive oiling of Panama City crayfish habitat could be significant at the species level. However, any such impacts are unlikely due to the distance from the project area to Panama City crayfish habitat and response actions that would occur in the event of a spill.

C.3.18 Threatened and Endangered Coral Species

There are six Threatened coral species (elkhorn coral, staghorn coral, lobed star coral, mountainous star coral, boulder star coral, and rough cactus coral), and one Endangered coral species (pillar coral) known to occur in the northern Gulf of America. Elkhorn coral, lobed star coral, mountainous star coral, and boulder star coral have been reported from the coral cap region of the Flower Garden Banks (NOAA, 2014), but are unlikely to be found in deeper areas of the northern Gulf of America because they typically inhabit coral reefs in shallow, clear tropical, or subtropical waters. Staghorn coral, pillar coral, and rough cactus coral are only known from the Florida Keys and Dry Tortugas (Florida Fish and Wildlife Conservation Commission, nd-e). Other Caribbean coral species evaluated by NMFS in 2014 (79 FR 53852) either do not meet the criteria for ESA listing or are not known from the Flower Garden Banks, Florida Keys, or Dry Tortugas.

NMFS has designated critical habitat for the boulder star coral, lobed star coral, mountainous star coral, pillar coral, and rough cactus coral in the Atlantic Ocean, Gulf of America, and Caribbean Sea per 88 FR 54026, effective in September 2023. For the areas in the Gulf of America, this includes the Flower Garden Banks and the waters near Miami-Dade and Monroe counties, Florida, and the Dry Tortugas (**Figure 3**).

There are no IPFs associated with routine project activities that could affect Threatened corals in the northern Gulf of America. A small fuel spill would not affect Threatened coral species because the oil would float and dissipate on the sea surface. A large oil spill is the only relevant IPF.

Impacts of a Large Oil Spill

A spill would be unlikely to contact the corals of the Flower Garden Banks based on the distance between the project area and the Flower Garden Banks (approximately 236 statute miles [380 km]), and the difference in water depth between the project area (2,113 m [6,934 ft]) and the Banks (approximately 17 to 145 m [56 to 476 ft]). NMFS (2025a) noted that listed corals are not likely to be adversely affected by oil spills. While on the surface, oil would not be expected to contact corals on the seafloor. Natural or chemical dispersion of oil could cause a subsurface plume which would have the remote possibility of contacting seafloor corals.

If a subsurface plume were to occur, impacts on the Flower Garden Banks would be unlikely due to the distance between the project area and corals within the Flower Garden Banks.

Near-bottom currents in the region are predicted to flow along the isobaths (Nowlin et al., 2001) and typically would not carry a plume upward onto the continental shelf. Valentine et al. (2014) observed the spatial distribution of excess hopane, a crude oil tracer from *Deepwater Horizon* spill sediment core samples, to be in the deeper waters and not transported up the shelf, thus confirming that near-bottom currents flow along the isobaths.

In the unlikely event that a subsurface plume reached reefs at the Flower Garden Banks or other Gulf of America reefs, oil droplets or oiled sediment particles could come into contact with reef organisms or corals. As discussed by BOEM (2017), impacts relevant to these corals could include loss of habitat, biodiversity, and live coral coverage. Sublethal effects could be long-lasting and affect the resilience of coral colonies to natural disturbances (e.g., elevated water temperature and diseases) (BOEM, 2017).

Due to the distance between the project area and coral habitats, there is a low chance of oil contacting Threatened and Endangered coral critical habitat in the event of a spill, and no significant impacts on ESA-listed coral species are expected.

C.3.19 Queen Conch (Threatened)

The Queen conch is a large gastropod that occurs throughout the Caribbean Sea, Gulf of America, and Bermuda which was listed as Threatened under the ESA in 2024 (NOAA, 2024b). The species is slow moving and found in a variety of habitats including seagrass beds, sands flats, algal beds, and rubble areas up to 30 m (98.4 ft) in water depth. Larval conch feed primarily on phytoplankton, while juvenile and adults feed on a mix of seagrass and macroalgae (Stoner and Appeldoorn, 2022). Overall, the population of Queen conch is declining, largely due to overfishing and illegal fishing practices. Exact population numbers are unknown due to the difficulty in obtaining accurate counts. The majority of available density estimates suggest that conch populations are below minimum thresholds necessary to maintain or increase populations (Horn et al., 2022).

There are no IPFs associated with routine project activities that could affect Queen conch. A small fuel spill would not affect queen conch because the fuel would float and dissipate on the sea surface. A large oil spill is the only relevant IPF.

Impacts of a Large Oil Spill

A large oil spill in the project area could potentially reach Queen conch habitat and affect the substrate. These effects would be of particular concern where the species occurs in shallower waters. There is some information available on the effects of oil spills on seagrass meadows and other marine gastropods, but little information available on the direct effects of oil on queen conch (Horn et al., 2022). In the event of a large oil spill, due to the low density of individual Queen conch thought to occur in the Gulf of America, any population-level impacts are considered unlikely.

C.4 Coastal and Marine Birds

C.4.1 Marine Birds

Marine birds include seabirds and other species that may occur in the pelagic environment of the project area (Clapp et al., 1982a; Clapp et al., 1982b; 1983; Davis and Fargion, 1996; Davis et al., 2000). Seabirds spend much of their lives offshore over the open ocean, except during breeding season when they nest along the coast (on the mainland and on barrier islands). In addition, other birds such as waterfowl, marsh birds, and shorebirds may occasionally be present over open ocean areas. No Endangered or Threatened bird species are likely to occur at the project area due to the distance from shore. For a discussion of shorebirds and coastal nesting birds, see **Section C.4.2**.

Seabirds of the northern Gulf of America were surveyed from ships during the GulfCet II program (Davis et al., 2000) which reported that terns, storm-petrels, shearwaters, and jaegers were the most frequently sighted seabirds in deepwater areas of the Gulf of America. From these surveys, four ecological categories of seabirds were documented in the deepwater areas of the Gulf: summer migrants (shearwaters, storm petrels, boobies); summer residents that breed in the Gulf (Sooty Tern [*Onychoprion fuscatus*], Least Tern [*Sternula antillarum*], Sandwich Tern [*Thalasseus sandvicensis*], Magnificent Frigatebird [*Fregata magnificens*])); winter residents (gannets, gulls, jaegers); and permanent resident species (Laughing Gulls [*Leucophaeus atricilla*], Royal Terns [*Thalasseus maximus*], Bridled Terns [*Onychoprion anaethetus*]) (Davis et al., 2000).

Common marine bird species include Wilson's Storm-Petrel (*Oceanites oceanicus*), Magnificent Frigatebird, Northern Gannet (*Morus bassanus*), Masked Booby (*Sula dactylatra*), Brown Booby (*Sula leucogaster*), Cory's Shearwater (*Calonectris borealis*), Greater Shearwater (*Puffinus gravis*), and Audubon's Shearwater (*Puffinus lherminieri*). Seabirds are distributed Gulf-wide and are not specifically associated with the project area.

Relationships with hydrographic features were found for several marine bird species, possibly due to effects of hydrography on nutrient levels and productivity of surface waters where birds forage. The GulfCet II study did not estimate bird densities; however, Haney et al. (2014) indicated that marine bird densities over the open ocean were estimated to be 1.6 birds km^{-2} .

IPFs that potentially may affect marine birds include installation vessel presence, marine sound and lights, support vessel and helicopter traffic; and two types of accidents (a small fuel spill and a large oil spill). Effluent discharges permitted under the NPDES are likely to have negligible impacts on the birds due to rapid dispersion, the small area of ocean affected, the intermittent nature of the discharges, and the mobility of these animals. Compliance with NTL BSEE-2015-G03 is expected to minimize the potential for marine debris-related impacts on birds. The IPFs with potential impacts listed in **Table 2** are discussed below.

Impacts of Installation Vessel Presence, Marine Sound, and Lights

Marine birds that frequent offshore oil and gas operations may be exposed to contaminants including air pollutants and routine discharges, but significant impacts are unlikely due to rapid dispersion. Birds migrating over water have been known to collide with offshore structures, resulting in injury and/or death (Wiese et al., 2001; Russell, 2005). Mortality of migrant birds at tall towers and other land-based structures has been reviewed extensively, and the mechanisms involved in rig collisions appear to be similar. In some cases, migrants simply do not see a part of

the rig until it is too late to avoid it. In other cases, navigation may be disrupted by marine sound (Russell, 2005). On the other hand, offshore structures are suitable stopover perches for most trans-Gulf migrant species, and most of the migrants that stop over on rigs probably benefit from their stay, particularly in spring (Russell, 2005). Due to the limited scope and short duration of activities described in this SDOCD, any impacts on populations of either seabirds or trans-Gulf migrant birds are not expected to be significant.

Trans-Gulf migrant birds including shorebirds, wading birds, and terrestrial birds may also be present in the project area. Migrant birds may use offshore structures, including platforms and semisubmersibles for resting, feeding, or as temporary shelter from inclement weather (Russell, 2005). Some birds may be attracted to offshore structures because of the lights and the fish populations that aggregate around these structures. A study in the North Sea indicated that rig lighting causes circling behavior in various birds, especially on cloudy nights; apparently the birds' geomagnetic compass is upset by the red part of the spectrum from the lights currently in use (Van de Laar, 2007; Poot et al., 2008). The numbers varied greatly, from none to some tens of thousands of birds per night per rig, with an apparent effect radius of up to 3 miles (5 km) (Poot et al., 2008). A study in the Gulf of America also noted the phenomenon but did not recommend mitigation (Russell, 2005). One factor to consider in evaluating this impact in the Gulf of America would include the lower incidence of cloudy and foggy days in the Gulf of America versus the North Sea. In laboratory experiments, Poot et al. (2008) found the magnetic compass of migratory birds to be wavelength dependent. Migratory birds require light from the blue-green part of the spectrum for magnetic compass orientation, whereas red light (visible long-wavelength) disrupts their magnetic orientation. They designed a field study to test if and how changing light color influenced migrating birds under field conditions. During field studies they found that nocturnally migrating birds were disoriented and attracted by red and white light (containing visible long-wavelength radiation), whereas they were clearly less disoriented by blue and green light (containing less or no visible long-wavelength radiation) (Poot et al., 2008).

Overall, potential negative impacts to birds from installation vessel lighting, sound, collisions, or other adverse effects are highly localized and may affect individual birds during migration periods.

Impacts of Support Vessel and Helicopter Traffic

Support vessels and helicopters are unlikely to significantly disturb marine birds in open, offshore waters, although bird strikes by helicopters could theoretically occur. Schwemmer et al. (2011) showed that several marine bird species exhibited behavioral responses and altered distribution patterns in response to ship traffic, which could potentially cause loss of foraging time and resting habitat. However, it is likely that individual birds would experience, at most, only short-term behavioral disruption, and the impact would not be significant.

Impacts of a Small Fuel Spill

Potential spill impacts on marine birds are discussed by BOEM (2017). For this SDOCD, there are no unique site-specific issues with respect to spill impacts on these animals.

The probability of a fuel spill is expected to be minimized by bp's preventative measures during routine operations, including fuel transfer procedures. In the unlikely event of a spill, implementation of bp's ROSRP is expected to reduce the potential for impacts on marine birds. SDOCD Appendix G provides details on spill response measures. Given the open ocean location of the project area and the expected short duration of a small fuel spill, the potential exposure period for marine birds would be brief.

A small fuel spill in offshore waters would produce a slick on the water surface and increase the concentrations of petroleum hydrocarbons and their degradation products. The extent and persistence of impacts would depend on the meteorological and oceanographic conditions at the time and the effectiveness of spill response measures. **Section A.9.1** discusses the likely fate of a small fuel spill and indicates that over 90% would be evaporated or dispersed naturally within 24 hours (NOAA, 2022). The area of the sea surface with diesel fuel on it would range from 0.5 to 5 ha (1.2 to 12 ac), depending on sea state and weather conditions.

Marine birds exposed to oil on the sea surface could experience direct physical and physiological effects including skin irritation; chemical burns of skin, eyes, and mucous membranes; and inhalation of VOCs. Due to the limited areal extent and short duration of water quality impacts from a small fuel spill, secondary impacts due to ingestion of oil via contaminated prey or reductions in prey abundance are unlikely. Due to the low densities of birds in open ocean areas, the small area affected, and the brief duration of the surface slick, minimal if any impacts on pelagic birds would be expected.

Impacts of a Large Oil Spill

Potential spill impacts on marine and pelagic birds are discussed by BOEM (2017). For this SDOCD, there are no unique site-specific issues with respect to spill impacts on these animals.

Pelagic seabirds could be exposed to oil from a spill at the project area. Davis et al. (2000) reported that terns, storm-petrels, shearwaters, and jaegers were the most frequently sighted seabirds in the deepwater Gulf of America (>200 m [656.2 ft]). Haney et al. (2014) estimated that seabird densities over the open ocean were approximately 1.6 birds km⁻². The number of pelagic birds that could be affected in open, offshore waters would depend on the extent and persistence of the oil slick.

Data following the *Deepwater Horizon* incident provides relevant information about the species of pelagic birds that may be affected in the event of a large oil spill. Birds that were treated for oiling include several pelagic species such as the Northern Gannet, Magnificent Frigatebird, and Masked Booby. The Northern Gannet is among the species with the largest numbers of birds affected by the spill. Exposure of marine birds to oil can result in adverse health with severity, depending on the level of oiling. Effects can range from plumage damage and loss of buoyancy from external oiling to more severe effects, such as organ damage, immune suppression, endocrine imbalance, reduced aerobic capacity, and death as a result of oil inhalation or ingestion (NOAA, 2016).

C.4.2 Coastal Birds

Threatened and Endangered bird species (Piping Plover, Whooping Crane, and Red Rufa Knot) have been discussed previously in **Sections C.3.6 and C.3.7**, and **C.3.9**. Various species of non-endangered birds are also found along the northern Gulf Coast, including diving birds, shorebirds, marsh birds, wading birds, and waterfowl. Gulf Coast marshes and beaches also provide important feeding and nesting habitats. Species that nest on beaches, flats, dunes, bars, barrier islands, and similar coastal and nearshore habitats include the Sandwich Tern, Wilson's Plover (*Charadrius wilsonia*), Black Skimmer (*Rynchops niger*), Forster's Tern (*Sterna forsteri*), Gull-Billed Tern (*Gelochelidon nilotica*), Laughing Gull, Least Tern, and Royal Tern. Additional information is presented by BOEM (2017).

The Eastern Brown Pelican was delisted from federal Endangered status in 2009 (USFWS, 2016b) and was delisted from state species of special concern status by the State of Florida in 2017 (Florida Fish and Wildlife Conservation Commission, 2021) and Louisiana (Louisiana Wildlife and Fisheries, 2020). However, this species remains listed as Endangered by the state of Mississippi (Mississippi Natural Heritage Program, 2018). Brown Pelicans inhabit coastal habitats and forage within both coastal waters and waters of the inner continental shelf. Aerial and shipboard surveys, including GulfCet and GulfCet II, indicate that Brown Pelicans do not occur in deep offshore waters (Fritts and Reynolds, 1981; Davis and Fargion, 1996; Davis et al., 2000).

The Bald Eagle was delisted from its Threatened status in the lower 48 states on 28 June 2007 but still receives protection under the Migratory Bird Treaty Act of 1918 and the Bald and Golden Eagle Protection Act of 1940. The Bald Eagle is a terrestrial raptor widely distributed across the southern U.S., including coastal habitats along the Gulf of America. The Gulf Coast is inhabited by both wintering migrant and resident Bald Eagles (Johnsgard, 1990; Ehrlich et al., 1992).

IPFs that potentially may affect shorebirds and coastal nesting birds include support vessel and helicopter traffic and a large oil spill. A small fuel spill in the project area would be unlikely to affect shorebirds or coastal nesting birds, as the project area is 69 statute miles (111 km) from the nearest shoreline. As explained in **Section A.9.1**, a small fuel spill would not be expected to make landfall or reach coastal waters prior to dissipating. Compliance with NTL BSEE-2015-G03 is expected to minimize the potential for marine debris-related impacts on shorebirds.

Impacts of Support Vessel and Helicopter Traffic

Support vessels and helicopters will transit coastal areas near Port Fourchon and Houma, Louisiana, where shorebirds and coastal nesting birds may be found. These activities could periodically disturb individuals or groups of birds within coastal habitats (e.g., wetlands that may support feeding, resting, or breeding birds), and bird strikes could theoretically occur.

Vessel traffic may disturb some foraging and resting birds with flushing distances varying among species and among individuals (Rodgers and Schwikert, 2002; Schwemmer et al., 2011; Mendel et al., 2019). The disturbances will be limited to flushing birds away from vessel pathways; known distances are from 20 to 49 m (65 to 160 ft) for personal watercrafts and 23 to 58 m (75 to 190 ft) for outboard-powered boats (Rodgers and Schwikert, 2002). Support vessels will not approach nesting or breeding areas on the shoreline, so disturbances to nesting birds, eggs, and chicks is not expected. Vessel operators are expected to use designated navigation channels and comply with posted speed and wake restrictions while transiting sensitive inland

waterways. Due to the limited scope and short duration of installation activities, any short-term impacts are not expected to be significant to coastal bird populations.

Helicopter traffic can cause some disturbance to birds onshore and offshore. Responses are highly dependent on the type of aircraft, the bird species, the activities that the animals were previously engaged in, and previous exposures to overflights (Efroymson et al., 2003). Helicopters seem to cause the most intense responses over other human disturbances (Bélanger and Bédard, 1989; Rojek et al., 2008; Fuller et al., 2018). The Federal Aviation Administration recommends (Advisory Circular No. 91-36D) that pilots maintain a minimum altitude of 610 m (2,000 ft) when flying over sound-sensitive areas such as parks, forest, primitive areas, wilderness areas, National Seashores, or NWRs, and maintain flight paths to reduce aircraft marine sound in these marine sound-sensitive areas. The 2,000-feet altitude minimum is greater than the distance (slant range) at which aircraft overflights have been reported to cause behavioral effects on most species of birds studied by Efroymson et al. (2000). It is assumed that adherence to these guidelines would reduce potential behavioral disturbances (such as temporary displacement or avoidance behavior) of individual birds in coastal and inshore areas. The potential impacts from helicopter traffic are not expected to be significant to coastal bird populations or species in the project area.

Impacts of Large Oil Spill

The 30 day OSRA modeling (**Table 4**) indicates nearshore waters and embayments from Cameron Parish, Louisiana to Bay County, Florida, could be affected within 30 days of a spill (1% to 21% conditional probability within 30 days).

Coastal birds can be exposed to oil as they float on the water surface, dive during foraging, or wade in oiled coastal waters. Oil interferes with the water repellency of feathers and can cause hypothermia in the right conditions. As birds groom themselves, they can ingest and inhale the oil on their bodies. Scavengers such as Bald Eagles and gulls can be exposed to oil by feeding on carcasses of contaminated fish and wildlife. While ingestion can kill animals immediately, more often it results in lung, liver, and kidney damage, which can lead to death (BOEM, 2017). Bird eggs may be damaged if an oiled adult sits on the nest.

Brown Pelicans and White Pelicans (*Pelecanus erythrorhynchos*) are especially at risk from direct and indirect impacts from spilled oil within inner shelf and inshore waters, such as embayments. The range of Brown Pelicans and White Pelicans is generally limited to these waters and surrounding coastal habitats. Brown Pelicans feed on mid-sized fish that they capture by diving from above ("plunge diving") and then scooping the fish into their expandable gular pouch, while White Pelicans feed from the surface by dipping their beaks in the water. These behaviors make pelicans susceptible to plumage oiling if they feed in areas with surface oil or an oil sheen. They may also capture prey that has been physically contaminated with oil or has ingested oil. Issues for Brown and White Pelicans include direct contact with oil, disturbance by cleanup activities, and long-term habitat contamination (BOEM, 2017).

Coastal fishing birds of prey such as Bald Eagles, ospreys (*Pandion haliaetus*), etc. may also be at risk from direct and indirect impacts from spilled oil. This species often captures fish within shallow water areas (snatching prey from the surface or wading into shallow areas to capture prey with their bill) and so may be susceptible to plumage oiling and, as with the Brown and White Pelicans, they may also capture prey that has been physically contaminated with oil or

has ingested oil (BOEM, 2017). It is expected that impacts to coastal birds from a large oil spill resulting in the death of individual birds would be adverse but not significant at population levels.

C.5 Fisheries Resources

C.5.1 Pelagic Communities and Ichthyoplankton

Biggs and Ressler (2000) reviewed the biology of pelagic communities in the deepwater environment of the northern Gulf of America. The biological oceanography of the region is dominated by the influence of the Loop Current, whose surface waters are among the most oligotrophic in the world's oceans. Superimposed on this low-productivity condition is productive "hot spots" associated with entrainment of nutrient-rich Mississippi River water and mesoscale oceanographic features. Anticyclonic and cyclonic hydrographic features play an important role in determining biogeographic patterns and controlling primary productivity in the northern Gulf of America (Biggs and Ressler, 2000).

Most fishes inhabiting shelf or oceanic waters of the Gulf of America have planktonic eggs and larvae often considered planktonic (Ditty, 1986; Ditty et al., 1988; Richards et al., 1989; Richards et al., 1993). Recent ichthyological work has been shedding light on the mobility of ichthyological larvae: for example, work from Shiroza et al. (2021) has demonstrated that bluefin tuna larvae (*Thunnus thynnus*), even <10 mm standard length, have mobility significant enough that they are able to pursue prey, refuting the classic assumption that fish larvae are planktonic. Larvae may be more capable of avoiding certain impacts than previously expected. However, larval mobility is still being understood across fish species, and drift is still a major source of distribution of larval tuna (Muhling et al., 2013), and likely for other fishes that occur in this area.

A study by Ross et al. (2012) on midwater fauna to characterize vertical distribution of mesopelagic fishes in selected deepwater areas in the Gulf of America substantiated high species richness but general domination by relatively few families and species. These results were confirmed by Wang et al. (2021) during surveys in the northern Gulf finding that although several families were detected in a survey of the ichthyological larval composition of the northern Gulf in waters from 200 to 1,500 m deep, the larval assemblage was dominated by just three deep-sea finfish families.

IPFs that potentially may affect pelagic communities and ichthyoplankton include installation vessel presence, marine sound, and lights; effluent discharges; water intake; and two types of accidents (a small fuel spill and a large oil spill). These IPFs with potential impacts listed in **Table 2** are discussed below.

Impacts of Installation Vessel Presence, Marine Sound, and Lights

Installation vessel presence, as a floating structure in the deepwater environment, will act as a fish aggregating device (FAD). In oceanic waters, the FAD effect would be most pronounced for epipelagic fishes such as tunas, dolphin (*Coryphaena* spp.), billfishes, and jacks, which are commonly attracted to fixed and drifting surface structures (Holland, 1990; Higashi, 1994; Relini et al., 1994). Positive fish associations with offshore rigs and platforms in the Gulf of America are well documented (Gallaway and Lewbel, 1982; Wilson et al., 2003; 2006; Edwards and Sulak, 2006). The FAD effect could possibly enhance the feeding of epipelagic predators by attracting

and concentrating smaller fish species. Installation vessel sound could potentially cause masking in fishes, thereby reducing their ability to hear biologically relevant sounds (Radford et al., 2014). The only defined acoustic threshold levels for non-impulsive sound are given by Popper et al. (2014) and apply only to species of fish with swim bladders that provide some hearing (pressure detection) function. All fishes can also detect particle motion from substrate-borne vibration, but the scientific understanding of detection thresholds and behavioral responses from particle motion is in its infancy and there are currently no accepted thresholds available (Hawkins et al., 2021).

Popper et al. (2014) estimated an SPL threshold level of 170 dB re 1 μ Pa over a 48-hour period for onset of recoverable injury and 158 dB re 1 μ Pa over a 12-hour period for onset temporary auditory threshold shifts. However, no consistent behavioral thresholds for fish resulting from non-impulsive sound have been established (Hawkins and Popper, 2014) and the most widely recommended behavioral threshold for fish for all sound sources is SPL of 150 dB re 1 μ Pa as defined by the Fisheries Hydroacoustic Working Group (2008). Sound may also influence fish behaviors, such as predator-avoidance, foraging, reproduction, and intraspecific interactions (Picciulin et al., 2010; Bruintjes and Radford, 2013; McLaughlin and Kunc, 2015). Fish aggregation is likely to occur to some degree due to the presence of the installation vessel, but the impacts would be limited in geographic scope and no population level impacts are expected.

Limited data exist regarding the impacts of sound on pelagic larvae and eggs. Generally, it is believed that larval fish will have similar hearing sensitivities as adults, but may be more susceptible to barotrauma injuries associated with impulsive sound (Popper et al., 2014). Larval fish were experimentally exposed to simulated impulsive sounds by Bolle et al. (2012). The controlled playbacks produced SEL_{24h} of 206 dB re 1 μ Pa² s but resulted in no increased mortality between the exposure and control groups. Non-impulsive sound sources (such as installation vessel operations) are expected to be far less injurious than impulsive sources given the characteristics of these source types. Because of the periodic and transient nature of ichthyoplankton, they are not expected to remain in proximity to the source for a full 24-hour period to receive above-threshold sound, and no substantial impacts to these life stages are expected.

Impacts of Effluent Discharges

Muds and cuttings discharges may have a slight effect on the benthic environment near the wellsite, including a localized increase in water turbidity, the limited blanketing of seafloor sediments, and slightly increased concentrations of hydrocarbons and metals. Treated cuttings are monitored for visible sheen prior to discharge. Contaminants released into the water column will be diluted rapidly within the open ocean environment. Minimal impacts on pelagic communities are anticipated.

Treated sanitary and domestic wastes may have a slight effect on the pelagic environment in the immediate vicinity of these discharges. These wastes may have elevated levels of nutrients, organic matter, and chlorine, but should be diluted rapidly to undetectable levels within tens to hundreds of meters from the source. Minimal impacts on water quality, plankton, and nekton are anticipated.

Deck drainage may have a slight effect on the pelagic environment in the immediate vicinity of these discharges. Deck drainage from contaminated areas will be passed through an

oil-and-water separator prior to release, and discharges will be monitored for visible sheen. The discharges may have slightly elevated levels of hydrocarbons but should be diluted rapidly to undetectable levels within tens to hundreds of meters from the source. Minimal impacts on water quality, plankton, and nekton are anticipated.

Other discharges in accordance with the NPDES permit, such as desalination unit brine and uncontaminated cooling water, fire water, and ballast water, are expected to be diluted rapidly and have little or no impact on pelagic communities.

Impacts of Water Intake

Seawater will be drawn from the ocean for once-through, non-contact cooling of machinery on the installation vessel. The intake of seawater for cooling water will entrain plankton though per the NPDES permit GMG290000 the linear velocities should be <5 ft second $^{-1}$. The low intake velocity should allow most strong-swimming juvenile fishes and smaller adults to escape entrainment or impingement (Electric Power Research Institute, 2000). However, drifting plankton would not be able to escape entrainment with the exception of a few fast-swimming larvae of certain taxonomic groups. Those organisms entrained may be stressed or killed (Cada, 1990; Mayhew et al., 2000), primarily through changes in water temperature during the route from cooling intake structure to discharge structure and mechanical damage (turbulence in pumps and condensers). The cooling water systems and operating procedures are designed such that a maximum return temperature of the seawater being discharged back into the ocean does not exceed 120°F; thus, minimizing the chance that plankton will be stressed/killed. Due to the limited scope and short duration of installation activities, any short-term impacts of entrainment are not expected to be significant to plankton or ichthyoplankton populations (BOEM, 2017). The installation vessel ultimately chosen for this project is expected to be in compliance with all cooling water intake requirements including NPDES permit GMG290000.

Impacts of a Small Fuel Spill

Potential spill impacts on fisheries resources are discussed by BOEM (2017). For this SDOCD, there are no unique site-specific issues with respect to spill impacts.

The probability of a fuel spill is expected to be minimized by bp's preventative measures during routine operations, including fuel transfer procedures. In the unlikely event of a spill, implementation of bp's ROSRP is expected to mitigate the potential for impacts on pelagic communities, including ichthyoplankton. SDOCD Appendix G provides details on spill response measures. Given the open ocean location of the project area, the duration of a small spill will be brief and the potential for impacts to occur would be minimal.

A small fuel spill in offshore waters would produce a slick on the water surface and increase the concentrations of petroleum hydrocarbons and their degradation products. The extent and persistence of impacts would depend on the meteorological and oceanographic conditions at the time of the release and the effectiveness of spill response measures. **Section A.9.1** discusses the likely fate of a small fuel spill and indicates that over 90% would dissipate naturally within 24 hours (NOAA, 2022). The area of the sea surface with diesel fuel on it would range from 0.5 to 5 ha (1.2 to 12 ac), depending on sea state and weather conditions.

A small fuel spill could have localized impacts on phytoplankton, zooplankton, and nekton. Determining the impact of a diesel spill on phytoplankton is a complex issue as some phytoplankton species are more tolerant of oil exposure than others (Ozhan et al., 2014). Phytoplankton populations can change quickly on small temporal and spatial scales, making it difficult to predict how a phytoplankton community as a whole will respond to an oil spill. Due to the limited areal extent and short duration of water quality impacts, a small fuel spill would be unlikely to produce detectable impacts on pelagic communities and ichthyoplankton.

Impacts of a Large Oil Spill

Potential spill impacts on pelagic communities and ichthyoplankton are discussed by BOEM (2017). A large oil spill could affect water column biota including phytoplankton, zooplankton, ichthyoplankton, and nekton. A large spill that persisted for weeks or months would be more likely to affect these communities. While adult and juvenile fishes may actively avoid a large spill, planktonic eggs and larvae would be unable to avoid contact. Eggs and larvae of fishes are especially vulnerable to oiling because they inhabit the upper layers of the water column, and they will die if exposed to certain toxic fractions of spilled oil. Impacts potentially would be greater if local-scale currents retained planktonic larval assemblages (and the floating oil slick) within the same water mass. Impacts to ichthyoplankton from a large spill would be greatest during spring and summer when shelf concentrations peak (BOEM, 2016b).

Oil spill impacts to phytoplankton include changes in community structure and increases in biomass, which have been attributed to the effects of oil contamination and of decreased predation due to zooplankton mortality (Abbriano et al., 2011; Ozhan et al., 2014). Ozhan et al. (2014) reported that the formation of oil films on the water surface can limit gas exchange through the air-sea interface and can reduce light penetration into the water column which will limit phytoplankton photosynthesis.

Mortality of zooplankton has been shown to be positively correlated with oil concentrations (Lennuk et al., 2015). Spills that are not immediately lethal can have short- or long-term impacts on biomass and community composition, behavior, reproduction, feeding, growth and development, immune response and respiration (Harvell et al., 1999; Wootton et al., 2003; Auffret et al., 2004; Hannam et al., 2010; Bellas et al., 2013; Blackburn et al., 2014). Zooplankton are especially vulnerable to acute oil pollution, showing increased mortality and sublethal changes in physiological activities (e.g., egg production; Moore and Dwyer, 1974; Linden, 1976; Lee et al., 1978; Suchanek, 1993). Bioaccumulation of hydrocarbons can lead to additional impacts among those higher trophic level consumers that rely on zooplankton as a food source (Almeda et al., 2013; Blackburn et al., 2014).

Planktonic communities have a high capacity for recovery from the effects of oil spill pollution due to their short life cycle and high reproductive capacity (Abbriano et al., 2011). Planktonic communities drift with water currents and recolonize from adjacent areas. Because of these attributes, plankton usually recover relatively rapidly to normal population levels following hydrocarbon spill events. Research in the aftermath of the *Deepwater Horizon* incident found that phytoplankton population recovered within weeks to months and zooplankton populations may have only been minimally affected (Abbriano et al., 2011).

C.5.2 Essential Fish Habitat

Essential Fish Habitat (EFH) is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. Under the Magnuson-Stevens Fishery Conservation and Management Act, as amended, federal agencies are required to consult on activities that may adversely affect EFH designated in Fishery Management Plans developed by the regional Fishery Management Councils.

The Gulf of Mexico Fishery Management Council (GMFMC) has prepared Fishery Management Plans for corals and coral reefs, shrimps, spiny lobster (*Panulirus argus*), reef fishes, coastal migratory pelagic fishes, and red drum (*Sciaenops ocellatus*). In 2005, the EFH for these managed species was redefined in Generic Amendment No. 3 to the various Fishery Management Plans (GMFMC, 2005). The EFH for most of these GMFMC-managed species is on the continental shelf in waters shallower than 183 m (600 ft). The shelf edge is the outer boundary for coastal migratory pelagic fishes, reef fishes, and shrimps. EFH for corals and coral reefs includes some shelf-edge topographic features on the Texas-Louisiana OCS located approximately 44 statute miles (71 km) from the project area (Figure 3).

Highly migratory pelagic fishes, which occur as transients in the project area, are the only remaining group for which EFH has been identified in the deepwater Gulf of America. Species in this group, including tunas, swordfishes, billfishes, and sharks, are managed by NMFS. **Table 7** lists the highly migratory fish species and their life stages with EFH at or near the project area.

Table 7. Migratory fish species with designated Essential Fish Habitat (EFH) at or near Mississippi Canyon Block 522, including life stage(s) potentially present within the project area.

Common Name	Scientific Name	Life Stage(s) Potentially Present Within or Near the Project Area
Atlantic bluefin tuna	<i>Thunnus thynnus</i>	Spawning, eggs, larvae, Adult
Bigeye thresher shark	<i>Alopias superciliosus</i>	All
Bigeye tuna	<i>Thunnus obesus</i>	Juveniles
Blue marlin	<i>Makaira nigricans</i>	All
Longbill spearfish	<i>Tetrapturus pfluegeri</i>	All
Oceanic whitetip shark	<i>Carcharhinus longimanus</i>	All
Sailfish	<i>Istiophorus albicans</i>	Spawning, eggs, larvae, adults
Scalloped hammerhead shark	<i>Sphyrna lewini</i>	Juveniles, adults
Shortfin mako shark	<i>Isurus oxyrinchus</i>	All
Silky shark	<i>Carcharhinus falciformis</i>	All
Skipjack tuna	<i>Katsuwonus pelamis</i>	All
Swordfish	<i>Xiphias gladius</i>	All
Tiger shark	<i>Galeocerdo cuvier</i>	Juveniles, adults
Whale shark	<i>Rhincodon typus</i>	All
White marlin	<i>Tetrapturus albidus</i>	Juveniles, adults
Yellowfin tuna	<i>Thunnus albacares</i>	All

Research indicates the central and western Gulf of America may be important spawning habitat for Atlantic bluefin tuna (*Thunnus thynnus*), and (NMFS, 2009c) has designated a Habitat Area of Particular Concern (HAPC) for this species. The HAPC covers much of the deepwater Gulf of

America, including the project area (**Figure 3**). The areal extent of the HAPC is approximately 300,000 km² (115,831 mi²). Atlantic bluefin tuna follow an annual cycle of foraging in June through March off the eastern U.S. and Canadian coasts, followed by migration to the Gulf of America to spawn in April, May, and June (NMFS, 2009c). The Atlantic bluefin tuna has also been designated as a species of concern (NMFS, 2011). An amendment to the original EFH Generic Amendment was finalized in 2005 (GMFMC, 2005). One of the most significant proposed changes in this amendment reduced the extent of EFH relative to the 1998 Generic Amendment by removing the EFH description and identification from waters between 100 fathoms and the seaward limit of the EEZ. The Highly Migratory Species Fisheries Management Plan was amended in 2009 to update EFH and HAPC to include the bluefin tuna spawning area (NMFS, 2009c). The northern Gulf of America in particular contains habitat for the western stock of larval bluefin tuna (Muhling et al., 2013).

NTLs 2009-G39 and 2009-G40 provide guidance and clarification of the regulations (i.e., 50 CFR 600 Subpart J) with respect to biologically sensitive underwater features and areas and benthic communities that are considered EFH. As part of an agreement between BOEM and NMFS to complete a new programmatic EFH consultation for each new Five-Year Program, an EFH consultation was initiated between BOEM's Gulf of America Region and NOAA's Southeastern Region during the preparation, distribution, and review of BOEM's 2024-2029 National OCS oil and gas leasing program Final Programmatic EIS (BOEM, 2023a).

Other HAPCs to protect corals and coral reefs have been identified by the GMFMC (2005). These include the Florida Middle Grounds, Madison-Swanson Marine Reserve, Tortugas North and South Ecological Reserves, Pulley Ridge, and several individual reefs and banks of the northwestern Gulf of America. Madison Swanson Marine Reserve is the HAPC located nearest to the project area (approximately 141 statute miles [227 km]).

IPFs that potentially may affect EFH include installation vessel presence, marine sound, and lights; effluent discharges; water intake; and two types of accidents (a small fuel spill and a large oil spill).

Impacts of Installation Vessel Presence, Marine Sound, and Lights

The installation vessel, as a floating structure in the deepwater environment, will act as a FAD with most pronounced effects on epipelagic fishes that include species with EFH designation (Holland, 1990; Higashi, 1994; Relini et al., 1994; Gates et al., 2017). The FAD effect would likely attract and concentrate smaller fish species and thus enhance feeding of epipelagic predators.

Installation vessel sound could potentially cause acoustic masking for fishes, thereby reducing their ability to hear biologically relevant sounds (Radford et al., 2014). Sound may also influence fish behaviors related to activities such as predator avoidance, foraging, reproduction, and intraspecific interactions (Picciulin et al., 2010; Bruintjes and Radford, 2013; McLaughlin and Kunc, 2015). The only defined acoustic threshold levels for non-impulsive sound are given by Popper et al. (2014) and apply only to species of fish with swim bladders, including some species with EFH designation, that provide some hearing (pressure detection) function. Popper et al. (2014) recommended SPL threshold levels of 170 dB re 1 µPa over a 48-hour period for onset of recoverable injury and an SPL threshold of 158 dB re 1 µPa over a 12-hour period for onset temporary auditory threshold shifts. No consistent behavioral thresholds for fish resulting from

non-impulsive sound have been established (Hawkins and Popper, 2014) and the most widely recommended behavioral threshold for fish for all sound sources is SPL of 150 dB re 1 μ Pa as defined by the Fisheries Hydroacoustic Working Group (2008). Because the installation vessel is a temporary structure, any impacts on EFH for managed species are considered negligible.

Impacts of Effluent Discharges

Other effluent discharges affecting EFH by diminishing ambient water quality include treated sanitary and domestic wastes, deck drainage, and miscellaneous discharges such as desalination unit brine and uncontaminated cooling water, fire water, and ballast water. Impacts on water quality have been discussed previously. No detectable impacts on EFH for managed species are expected from these discharges.

Impacts of Water Intake

As noted previously, cooling water intake will cause entrainment and impingement of plankton, including fish eggs and larvae (ichthyoplankton). Due to the limited scope and short duration of installation activities, any short-term impacts on EFH for highly migratory pelagic fishes are not expected to be biologically significant. The multisale EIS (BOEM, 2017) discusses cooling water discharge. Water with an elevated temperature may accumulate around the discharge pipe. However, the warmer water should be diluted rapidly to ambient temperature levels within 100 m (328 ft) of the discharge pipe. Any impacts to pelagic species would be localized and brief (BOEM, 2014a).

Impacts of a Small Fuel Spill

Potential spill impacts on EFH are discussed by BOEM (2017). For this SDOCD, there are no unique site-specific issues with respect to spill impacts.

The probability of a fuel spill is expected to be minimized by bp's preventative measures during routine operations, including fuel transfer procedures. In the unlikely event of a spill, implementation of bp's ROSRP is expected to help diminish the potential for impacts on EFH. SDOCD Appendix G provides details on spill response measures. Given the open ocean location of the project area, the duration of a small spill would be brief and the potential for impacts to EFH minimal.

A small fuel spill in offshore waters would produce a slick on the water surface and increase the concentrations of petroleum hydrocarbons and their degradation products. The extent and persistence of impacts would depend on the meteorological and oceanographic conditions at the time of the release and the effectiveness of spill response measures. **Section A.9.1** discusses the likely fate of a small fuel spill and indicates that over 90% would be dissipated naturally within 24 hours (NOAA, 2022). The area of the sea surface with diesel fuel on it would range from 0.5 to 5 ha (1.2 to 12 ac), depending on sea state and weather conditions.

A small fuel spill could have localized impacts on EFH for highly migratory pelagic fishes, including tunas, swordfishes, billfishes, and sharks. These species occur as transients in the project area. A spill would produce short-term impact on water quality in the HAPC for spawning bluefin tuna, which covers much of the deepwater Gulf of America. The areal extent of impact from a small fuel spill would represent a negligible portion of the HAPC.

A small fuel spill would not likely affect EFH for corals and coral reefs, the nearest EFH being the topographic features located approximately 44 statute miles (71 km) from the project area. A small fuel spill would float and dissipate on the sea surface and would not contact these features.

Impacts of a Large Oil Spill

Potential spill impacts on EFH are discussed by BOEM (2017; 2023). For this SDOCD, there are no unique site-specific issues with respect to EFH.

An oil spill in offshore waters would temporarily increase hydrocarbon concentrations on the water surface and potentially in the subsurface as well. Given the extent of EFH designations in the Gulf of America (GMFMC, 2005; NMFS, 2009c), some impact from a large oil spill on EFH would be unavoidable.

A large spill could affect EFH for many managed species including shrimps, stone crab, spiny lobster, reef fishes, coastal migratory pelagic fishes, and red drum. It would result in adverse impacts on water quality and consequentially on water column biota including phytoplankton, zooplankton, and nekton. In coastal waters, sediments could be contaminated and result in persistent degradation of the seafloor habitat for managed demersal fish and shellfish species.

The project area is within the HAPC for spawning Atlantic bluefin tuna (NMFS, 2009c). A large spill could temporarily degrade the HAPC due to increased hydrocarbon concentrations in the water column, with the potential for lethal or sublethal impacts on spawning tuna and their eggs and larvae. Potential impacts would depend in part on the timing of a spill, as this species migrates to the Gulf of America to spawn in April, May, and June (NMFS, 2009c).

The topographic features located 44 statute miles (71 km) from the project area are designated as EFH under the corals and coral reefs management plan (GMFMC, 2005). An accidental spill would be unlikely to affect these features, since an oil spill plume or surface slick would be unlikely to reach them due to their shallower depth relative to the project area.

C.6 Archaeological Resources

C.6.1 Shipwreck Sites

The archaeological assessment identified no archaeologically significant artifacts or shipwrecks within 610 m (2,000 ft) of the proposed project activities based on an autonomous underwater vehicle survey (bp, 2025). bp and its contractors will abide by the applicable requirements of 30 CFR § 550.1941, which stipulate that work be stopped at the project site if any previously undetected archaeological resource is discovered after work has begun until appropriate surveys and evaluations have been completed. Per the Final Rule presented in 89 FR 71160, bp has previously submitted an archaeological report that determined that none of the sonar contacts in the project area were identified as being archaeologically significant.

Because there are no shipwreck sites within 610 m (2,000 ft) of the proposed wellsites, there are no routine IPFs that are likely to affect shipwrecks. The only IPF of relevance to shipwrecks is a large oil spill as listed in **Table 2** are discussed below. A small fuel spill would not affect shipwrecks because the fuel would float and dissipate on the sea surface.

Impacts of a Large Oil Spill

The 2017–2023 EIS (BOEM, 2017) estimated that a severe subsurface blowout could resuspend and disperse sediments within a 300-m (984-ft) radius. Because there are no historic shipwrecks within a 300-m (984-ft) radius of the proposed wellsite, this impact would not be relevant. Should there be any indication that potential shipwreck sites could be affected, in accordance with NTL 2005-G07, bp will immediately halt project operations, take steps to ensure that the site is not disturbed in any way, and contact the BOEM Regional Supervisor, Leasing and Environment, within 48 hours of its discovery. Following shipwreck discovery, all operations within 305 m (1,000 ft) of the site would cease until the Regional Supervisor provides instructions on steps to take to protect the site and assess the potential historic significance.

Beyond this 300-m (984-ft) radius, there is the potential for impacts from oil, dispersants, and depleted oxygen levels. These impacts could include chemical contamination, alteration of the rates of microbial activity (BOEM, 2017), and reduced biodiversity at shipwreck-associated sediment microbiomes (Hamdan et al., 2018). During the *Deepwater Horizon* incident, subsurface plumes were reported at a water depth of about 1,100 m (3,600 ft), extending at least 22 miles (35 km) from the wellsite and persisting for more than a month (Camilli et al., 2010). While the behavior and impacts of subsurface plumes are not well known, a subsurface plume could have the potential to contact shipwreck sites beyond the 300-m (984-ft) radius estimated by BOEM (2012a), depending on its extent, trajectory, and persistence.

A spill entering shallow coastal waters could conceivably contaminate an undiscovered or known coastal shipwreck site. BOEM (2012a) stated that if an oil spill contacted a coastal historic site, such as a fort or a lighthouse, the major impact would be a visual impact from oil contact and contamination of the site and its environment.

C.6.2 Prehistoric Archaeological Sites

With a water depth at the location of the proposed wellsites of approximately 2,113 m (6,934 ft), the proposed project area is well beyond the 60-m (197-ft) depth contour used by BOEM as the seaward extent for potential prehistoric archaeological sites in the Gulf of America. Because prehistoric archaeological sites are not found in the project area, the only relevant IPF is a large oil spill. A small fuel spill would not affect prehistoric archaeological resources because the oil would float and dissipate on the sea surface.

Impacts of a Large Oil Spill

Because prehistoric archaeological sites are not found in the project area, they would not be affected by the physical effects of a subsea blowout. BOEM (2012a) estimated that a severe subsurface blowout could resuspend and disperse sediments within a 300-m (984-ft) radius.

Along the northern Gulf Coast, prehistoric sites exist along the barrier islands and mainland coast and along the margins of bays and bayous (BOEM, 2017). The 30-day OSRA modeling (**Table 4**) indicates nearshore waters and embayments from Cameron Parish, Louisiana to Bay County, Florida, could be affected within 30 days of a spill (1% to 21% conditional probability within 30 days).

If a spill did reach a prehistoric site along these shorelines, it could coat fragile artifacts or site features and compromise the potential for radiocarbon dating of organic materials (other dating methods are available, and it is possible to decontaminate an oiled sample for radiocarbon

dating). Coastal prehistoric sites could also be damaged by spill cleanup operations (e.g., by destroying fragile artifacts and disturbing the provenance of artifacts and site features).

C.7 Coastal Habitats and Protected Areas

Coastal habitats in the northeastern Gulf of America that may be affected by oil and gas activities are described by BOEM (2017) and by Mendelssohn et al (2017). Coastal habitats inshore of the project area include barrier beaches and dunes, wetlands, oyster reefs, and submerged seagrass beds. Generally, most of the northeastern Gulf is fringed by barrier beaches, with wetlands, oyster reefs and/or submerged seagrass beds occurring in sheltered areas behind the barrier islands and in estuaries.

Due to the distance from shore, the only IPF associated with routine activities in the project area that potentially may affect beaches and dunes, wetlands, oyster reefs, seagrass beds, coastal wildlife refuges, wilderness areas, or any other managed or protected coastal area is support vessel traffic from support bases at Port Fourchon and Houma, Louisiana that are not in wildlife refuges or wilderness areas. Potential impacts of support vessel traffic are addressed briefly below.

The only other IPF of relevance for coastal habitats and protected areas is an accidental large oil spill. A small fuel spill in the project area would not affect coastal habitats, as the project area is 69 statute miles (111 km) from the nearest shoreline (Louisiana). As explained in **Section A.9.1**, a small fuel spill would not be expected to make landfall or reach coastal waters prior to dissipating. These IPFs with potential impacts listed in **Table 2** are discussed below.

Impacts of Support Vessel Traffic

Support operations, including crew boats and supply boats as detailed in SDOCD Section 13, may have a minor incremental impact on barrier beaches and dunes, wetlands, oyster reefs and protected areas. Over time, with a large number of vessel trips, vessel wakes can erode shorelines along inlets, channels, and harbors, resulting in localized land loss. Impacts to barrier beaches and dunes, wetlands, oyster reefs and protected areas will be minimized by following the speed and wake restrictions in harbors and channels.

Support operations, including crew boats and supply boats are not anticipated to have a significant impact on submerged seagrass beds. While submerged seagrass beds could be uprooted, scarred, or lost due to direct contact from vessels, use of navigation channels and adherence to local requirements and implemented programs will decrease the likelihood of impacts to these resources (BOEM, 2017).

Impacts of a Large Oil Spill

Potential spill impacts on coastal habitats are discussed by BOEM (2017; 2023a,b). Coastal habitats inshore of the project area include barrier beaches and dunes, wetlands, oyster reefs and submerged seagrass beds. For this SDOCD, there are no unique site-specific issues with respect to coastal habitats.

The 30-day OSRA modeling (**Table 4**) indicates nearshore waters and embayments from Cameron Parish, Louisiana to Bay County, Florida, could be affected within 30 days of a spill (1% to 21% conditional probability within 30 days).

NWRs and other protected areas along the coast are discussed in BOEM (2017) and bp's ROSRP. Coastal and near-coastal wildlife refuges, wilderness areas, and state and national parks within the geographic range of the potential shoreline contacts based on the 30-day OSRA model (**Table 4**) are presented in **Table 8**. The level of impacts from oil spills on coastal habitats depends on many factors, including the oil characteristics, the geographic location of the landfall, and the weather and oceanographic conditions at the time of the spill (BOEM, 2017).

Table 8. Wildlife refuges, wilderness areas, and state and national parks within the geographic range of the potential shoreline contacts after 30 days of a hypothetical spill from Launch Area 57 based on the 30-day OSRA model.

County or Parish, State	Wildlife Refuge, Wilderness Area, or State/National Park
Cameron, Louisiana	Lacassine National Wildlife Refuge
	Sabine National Wildlife Refuge
	Rockefeller State Wildlife Refuge and Game Preserve
	Peveto Woods Sanctuary
Vermilion, Louisiana	Paul J. Rainey Wildlife Refuge and Game Preserve
	Rockefeller State Wildlife Refuge and Game Preserve
	State Wildlife Refuge
Terrebonne, Louisiana	Isles Dernieres Barrier Islands Refuge
	Pointe aux Chenes Wildlife Management Area
Lafourche, Louisiana	Pointe aux Chenes Wildlife Management Area
	Wisner Wildlife Management Area (Includes Picciola Tract)
St. Bernard, Louisiana	Biloxi Wildlife Management Area
	Breton National Wildlife Refuge
Hancock, Mississippi	Buccaneer State Park
	Grand Bayou Preserve
	Jourdan River Preserve
	Hancock County Marshes Preserve
Harrison, Mississippi	Bayou Portage Preserve
	Biloxi River Marshes Preserve
	Cat Island Preserve
	Deer Island Preserve
	Gulf Islands National Seashore
	Hiller Park Recreation Area
	Jourdan River Preserve
	Sandhill Crane Refuge Preserve
	Ship Island Preserve
	Wolf River Preserve
Jackson, Mississippi	Bellefontaine Marsh Preserve
	Davis Bayou Preserve
	Escatawpa River Marsh Preserve
	Grand Bay National Estuarine Research Reserve
	Grand Bay Savanna Preserve
	Graveline Bay Preserve
	Gulf Islands National Seashore
	Gulf Islands Wilderness
	Horn Island Preserve

Table 8. (Continued).

County or Parish, State	Wildlife Refuge, Wilderness Area, or State/National Park
Jackson, Mississippi (cont'd)	Old Fort Bayou Preserve
	Pascagoula River Marsh Preserve
	Petit Bois Island Preserve
	Round Island Preserve
	Shepard State Park
Mobile, Alabama	Grand Bay National Wildlife Refuge
	Grand Bay Savanna State Nature Preserve
	Mobile-Tensaw Delta WMA
	Penalver Park
	The Grand Bay Savanna Tract (and Addition Tract)
Baldwin, Alabama	W.L. Holland WMA
	Betty and Crawford Rainwater Perdido River Nature Preserve
	Bon Secour NWR
	Gulf State Park
	Meaher State Park
	Mobile-Tensaw Delta CIAP Parcel State Habitat Area
	Mobile-Tensaw Delta WMA
	Perdido River Water Management Area
	W.L. Holland WMA
	Weeks Bay Harris and Worcester Tracts
	Weeks Bay National Estuarine Research Reserve
	Weeks Bay Reserve Addition - Beck Tract
Escambia, Florida	Bayou Marcus Wetlands
	Big Lagoon State Park
	Blue Angel Recreation Park
	Bay Bluffs Park
	Ft. Pickens Aquatic Preserve
	Gulf Islands National Seashore
	Mallory Heights Park #3
	Perdido Bay/Crown Pointe Preserve
	Perdido Key State Park
	Tarkiln Bayou Preserve State Park
	USS Massachusetts (BB-2) Underwater Archaeological Preserve
	Wayside Park
Okaloosa, Florida	Eglin Beach Park
	Fred Gannon Rocky Bayou State Park
	Gulf Islands National Seashore
	Henderson Beach State Park
	Rocky Bayou Aquatic Preserve
	Yellow River Wildlife Management Area

Table 8. (Continued).

County or Parish, State	Wildlife Refuge, Wilderness Area, or State/National Park
Walton, Florida	Choctawhatchee River Delta Preserve
	Choctawhatchee River Water Management Area
	Deer Lake State Park
	Grayton Beach State Park
	Point Washington State Forest
	Topsail Hill Preserve State Park
Bay, Florida	Camp Helen State Park
	SS Tarpon Underwater Archaeological Preserve
	St. Andrews Aquatic Preserve
	St. Andrews State Park
	Vamar Underwater Archaeological Preserve

Coastal wetlands are highly sensitive to oiling and can be significantly affected because of the inherent toxicity of hydrocarbon and non-hydrocarbon components of the spilled substances (Beazley et al., 2012; Lin and Mendelsohn, 2012; Mendelsohn et al., 2012). Numerous variables such as oil concentration and chemical composition, vegetation type and density, season or weather, pre-existing stress levels, soil types, and water levels may influence the impacts of oil exposure on wetlands. Impacts to slightly oiled vegetation are considered short term and reversible as recent studies suggest that they will experience plant die-back, followed by recovery without replanting (BOEM, 2012a). Vegetation exposed to oil that persists in wetlands could take years to recover (BOEM, 2017). Vegetation coated with oil experiences the highest mortality rates due to decreased photosynthesis (BOEM, 2012a). A review of the literature and new studies indicated that oil spill impacts to seagrass beds are often limited and may be limited to when oil is in direct contact with these plants (Fonseca et al., 2017). Entrained oil within the sediments of a submerged vegetation area may pose the risk of periodic re-releases of oil in the area, causing potential secondary impacts to the localized area (BOEM, 2023). In addition to the direct impacts of oil, cleanup activities in marshes may accelerate rates of erosion and retard recovery rates (BOEM, 2017). Impacts associated with an extensive oiling of coastal wetland habitat from a large oil spill are expected to be significant.

C.8 Socioeconomic and Other Resources

C.8.1 Recreational and Commercial Fishing

Potential impacts to recreational and commercial fishing were assessed by BOEM (2017). The main commercial fishing activity in deep waters of the northern Gulf of America is pelagic longlining for tunas, swordfishes, and other billfishes (Continental Shelf Associates, 2002; Beerkircher et al., 2009). Pelagic longlining has occurred historically in the project area, primarily during spring and summer seasons. In August 2000, the federal government closed two areas, outside the project area, in the northeastern Gulf of America to longline fishing (65 FR 47214).

Longline gear consists of monofilament line deployed from a moving vessel and generally allowed to drift for 4 to 5 hours (Continental Shelf Associates, 2002). As the mainline is put out, baited leaders and buoys are clipped in place at regular intervals. It takes 8 to 10 hours to deploy a longline and about the same time to retrieve it. Longlines are often set near oceanographic features such as fronts or downwellings, with the aid of sophisticated on-board

temperature sensors, depth finders, and positioning equipment. Vessels typically are 10 to 30 m (33 to 98 ft) long, and their fishing trips last from about 1 to 3 weeks.

It is unlikely that any commercial fishing activity other than longlining occurs at or near the project area. Benthic species targeted by commercial fishers occur predominantly on the upper continental slope, well inshore of the project area. Royal red shrimp (*Pleoticus robustus*) are caught by trawlers in water depths of about 250 to 550 m (820 to 1,804 ft) (Stiles et al., 2007). Tilefishes (primarily the golden tilefish, *Lopholatilus chamaeleonticeps*) are caught by bottom longlining in water depths from about 165 to 450 m (540 to 1,476 ft) (Continental Shelf Associates, 2002).

Most recreational fishing activity in the region occurs in water depths <200 m (656 ft) (Continental Shelf Associates, 1997; 2002; Keithly and Roberts, 2017). In deeper water, the main attraction to recreational fishers would be petroleum platforms offshore Texas and Louisiana. Due to the distance from shore, it is unlikely that recreational fishing activity is occurring in the project area.

The only IPFs associated with routine operations that potentially may affect fishing are installation vessel presence, which may present an entanglement risk for pelagic longlining. Two types of potential accidents (a small fuel spill and a large oil spill) are the other IPFs of relevance. These IPFs with potential impacts listed in **Table 2** are discussed below.

Impacts of Installation Vessel Presence, Marine Sound, and Lights

There is a slight possibility of pelagic longlines drifting into and becoming entangled in the installation vessel. For example, in January 1999, a portion of a pelagic longline snagged on the acoustic Doppler current profiler of a drillship working in the Gulf of America (Continental Shelf Associates, 2002) and the line was removed without incident. Generally, longline fishers use radar and are aware of offshore structures and ships when placing their sets. Therefore, little or no impact on pelagic longlining is expected.

Because it is unlikely that any recreational fishing activity is occurring in the project area, no adverse impacts are anticipated. Other rig-related factors such as marine sound and lights are not relevant IPFs to commercial or recreational fishing.

Impacts of a Small Fuel Spill

The probability of a fuel spill is expected to be minimized by bp's preventative measures during routine operations, including fuel transfer. In the unlikely event of a spill, implementation of bp's ROSRP is expected to potentially mitigate and reduce the potential for impacts. SDOCD Appendix G provides details on spill response measures. Given the open ocean location of the project area, the duration of a small spill would be brief and opportunity for impacts to fishing activities would be minimal.

Pelagic longlining activities in the project area, if any, could be interrupted in the event of a small fuel spill. The area of the sea surface with diesel fuel on it would range from 0.5 to 5 ha (1.2 to 12 ac), depending on sea state and weather conditions (see **Section A.9.1**). Fishing activities could be interrupted due to the activities of response vessels operating in the project area. A small fuel spill would not affect coastal water quality because the spill would not be expected to make landfall or reach coastal waters prior to dissipating (see **Section A.9.1**).

Impacts of a Large Oil Spill

Potential spill impacts on fishing activities are discussed by BOEM (2017; 2023a,b). For this SDOCD, there are no unique site-specific issues with respect to this activity.

Pelagic longlining activities in the project area and other fishing activities in the northern Gulf of America could be interrupted in the event of a large oil spill. A spill may or may not result in fishery closures, depending on the duration of the spill, the oceanographic and meteorological conditions at the time of the spill, and the effectiveness of spill response measures. The *Deepwater Horizon* incident provides information about the maximum potential extent of fishery closures in the event of a large oil spill in the Gulf of America (NMFS, 2021c). At its peak on 12 July 2010, closures encompassed 217,821 km² (84,101 mi²), or 34.8% of the U.S. Gulf of America EEZ.

According to BOEM (2012a; 2017), the potential impacts on commercial and recreational fishing activities from an accidental oil spill are anticipated to be minimal because the potential for oil spills is very low, the most typical events are small and of short duration, and the effects are so localized that fishers are typically able to avoid the affected area. Fish populations may be affected by an oil spill event should it occur, but they would be primarily affected if the oil reaches the productive shelf and estuarine areas where many fishes spend a portion of their life cycle (BOEM, 2012a). The probability of an offshore spill affecting these nearshore environments is also low. Should a large oil spill occur, economic impacts on commercial and recreational fishing activities would likely occur, but are difficult to predict because impacts would differ by fishery and season (BOEM, 2016b).

C.8.2 Public Health and Safety

There are no IPFs associated with routine operations that are expected to affect public health and safety. A small fuel spill would be unlikely to cause any impacts on public health and safety because it would affect only a small area of the open ocean 69 statute miles (111 km) from the nearest shoreline, and nearly all of the diesel fuel would evaporate or disperse naturally within 24 hours (see **Section A.9.1**). Impacts of a large oil spill are addressed below.

Impacts of a Large Oil Spill

In the event of a large spill from a blowout, the main safety and health concerns are those of the offshore personnel involved in the incident and those responding to the spill. Once released into the water column, crude oil weathers rapidly (National Research Council, 2003a). Depending on many factors such as spill rate and duration, the physical/chemical characteristics of the oil, meteorological, and oceanographic conditions at the time, and the effectiveness of spill response measures, weathered oil may remain present on the sea surface and reach coastal shorelines.

Based on data collected during the *Deepwater Horizon* incident, the health risks resulting from a large oil spill appear to be minimal (Centers for Disease Control and Prevention, 2010). Health risks for spill responders and wildlife rehabilitation workers responding to a major oil spill are similar to the health risks incurred by response personnel during any large-scale emergency or disaster response (U.S. Department of Homeland Security, 2014), which includes the following:

- Possible accidents associated with response equipment;
- Hand, shoulder, or back pain, along with scrapes and cuts;

- Itchy or red skin or rashes due to potential chemical exposure;
- Heat or cold stress depending upon the working environment; and
- Possible upper respiratory symptoms due to potential dust inhalation, allergies, or potential chemical exposure.

C.8.3 Employment and Infrastructure

There are no IPFs associated with routine operations that are expected to affect employment and infrastructure. The project involves subsea installation activities with support from existing shorebase facilities in Louisiana. No new or expanded facilities will be constructed, and no new employees are expected to move permanently into the area. The project will have a negligible impact on socioeconomic conditions such as local employment, existing offshore and coastal infrastructure (including major sources of supplies, services, energy, and water), and minority and lower income groups. A small fuel spill that dissipates within a few days would have little or no economic impact as the spill response would use existing facilities, resources, and personnel. Impacts of a large oil spill are addressed below.

Impacts of a Large Oil Spill

Potential socioeconomic impacts of an oil spill are discussed by BOEM (2017). For this SDOCD, there are no unique site-specific issues with respect to employment and coastal infrastructure. A large spill could cause economic impacts in several ways: it could result in extensive fishery closures that put fishermen out of work; it could result in temporary employment as part of the response effort (including the establishment of spill response staging areas); it could result in adverse publicity that affects employment in coastal recreation and tourism industries; and it could result in suspension of OCS activities, including service and support operations that are an important part of local economies.

Non-market effects such as traffic congestion, strains on public services, shortages of commodities or services, and disruptions to the normal patterns of activities or expectations could also occur in the short-term. These negative, short-term social and economic consequences of a spill are expected to be modest in terms of projected cleanup expenditures and the number of people employed in cleanup and remediation activities (BOEM, 2017). Net employment impacts from a spill would not be expected to exceed 1% of baseline employment in any given year (BOEM, 2017).

C.8.4 Recreation and Tourism

There are no known recreational uses of the project area. Recreational resources and tourism in coastal areas would not be affected by any routine activities due to the distance from shore. Compliance with NTL BSEE-2015-G03 is intended to minimize the chance of trash or debris being lost overboard from the installation vessel and subsequently washing up on beaches. A small fuel spill in the project area would be unlikely to affect recreation and tourism because, as explained in **Section A.9.1**, it would not be expected to make landfall or reach coastal waters prior to dispersing naturally.

Impacts of a Large Oil Spill

Potential impacts of an oil spill on recreation and tourism are discussed by BOEM (2017; 2023). For this SDOCD, there are no unique site-specific issues with respect to these impacts.

Impacts on recreation and tourism would vary depending on the duration of the spill and its fate, including the effectiveness of response measures. A large spill that reached coastal waters and shorelines could adversely affect recreation and tourism by contaminating beaches and wetlands, resulting in negative publicity that encourages people to stay away. The 30-day OSRA modeling (**Table 4**) indicates nearshore waters and embayments from Cameron Parish, Louisiana to Bay County, Florida, could be affected within 30 days of a spill (1% to 21% conditional probability within 30 days).

According to BOEM (2017), should an oil spill occur and contact a beach area or other recreational resource, it could cause some disruption during the impact and cleanup phases of the spill. In the unlikely event that a spill occurs that is sufficiently large to affect large areas of the coast and, through public perception, have effects that reach beyond the damaged area, effects to recreation and tourism could be significant (BOEM, 2012a).

C.8.5 Land Use

Land use along the northern Gulf Coast is discussed by BOEM (2017; 2023a,b). There are no routine IPFs that potentially may affect land use. The project will use existing onshore support facilities in Louisiana where land use is industrial. The project will not involve any new construction or changes to existing land use and, therefore, will not have any impacts. Levels of boat and helicopter traffic as well as demand for goods and services including scarce coastal resources, will represent a small fraction of the level of activity occurring at the shorebases.

A large oil spill is the only relevant IPF. A small fuel spill should not have any impacts on land use, as the response would be staged out of existing shorebases and facilities.

Impacts of a Large Oil Spill

The initial response for a large oil spill would be staged out of existing facilities, with no expected effects on land use. A large spill could have limited temporary impacts on land use along the coast if additional staging areas were needed. For example, during the *Deepwater Horizon* incident, temporary staging areas were established in Louisiana, Mississippi, Alabama, and Florida for spill response and cleanup efforts. In the event of a large spill in the project area, similar temporary staging areas could be needed. These areas would eventually return to their original use as the response is demobilized. It is not expected that a large oil spill and subsequent cleanup would substantially reduce available space in nearby landfills or decrease their usable life (BOEM, 2014a).

An accidental oil spill is not likely to significantly affect land use and coastal infrastructure in the region, in part because an offshore spill would have a small probability of contacting onshore resources. BOEM (2016b) states that landfill capacity would probably not be an issue at any phase of an oil spill event or the long-term recovery. In the case of the *Deepwater Horizon* incident and response, the USEPA reported that existing landfills receiving oil spill waste had plenty of capacity to handle waste volumes; the wastes that were disposed of in landfills represented <7% of the total daily waste normally accepted at these landfills (USEPA, 2016).

C.8.6 Other Marine Uses

The project area is not located within any USCG-designated fairway, shipping lane, or Military Warning Area. bp intends to comply with BOEM requirements and lease stipulations to avoid impacts on uses of the area by military vessels and aircraft. The site clearance letter identified existing infrastructure near the proposed location. Existing infrastructure includes a sled jumper about 17 m (57 ft) north of "A" wellsite and a flowline about 16 m (54 ft) northwest of "B" wellsite (bp, 2025).

There are no IPFs from routine project activities that are likely to affect other marine uses of the project area. A large oil spill is the only relevant IPF. A small fuel spill would not have any impacts on other marine uses because spill response activities would be mainly within the project area and the duration would be brief.

Impacts of a Large Oil Spill

A large accidental spill would be unlikely to significantly affect shipping or other marine uses. In the event of a large spill requiring numerous response vessels, coordination would be required to manage the vessel traffic for safe operations. bp and its contractors intend to comply with BOEM requirements and lease stipulations to avoid impacts on uses of the area by military vessels and aircraft.

C.9 Cumulative Impacts²

Prior Studies. BOEM prepared a multi-lease sale EIS in which it analyzed the environmental impact of activities that might occur in the multi-lease sale area. The level and types of activities planned in bp's EP are within the range of activities described and evaluated by BOEM in the 2024 to 2029 Programmatic EIS for the OCS Oil and Gas Leasing Program (BOEM, 2023a) and the 2017 to 2022 Programmatic EIS for the OCS Oil and Gas Leasing Program (BOEM, 2016a), and the Final Programmatic EIS for Gulf of Mexico OCS Oil and Gas Lease Sales 2017 to 2022 (BOEM, 2017). Past, present, and reasonably foreseeable activities were identified in these documents, which are incorporated by reference. The proposed action should not result in any additional impacts beyond those evaluated in the multi-lease sale and Final EISs (BOEM, 2012a; 2013; 2014a; 2015; 2016b; 2017; 2023a,b).

Description of Activities Reasonably Expected to Occur in the Vicinity of Project Area. Other exploration and development activities may occur in the vicinity of the project area but bp does not anticipate other projects beyond the types analyzed in the lease sale and Supplemental EISs (BOEM, 2012a; 2013; 2014a; 2015; 2016b; 2017; 2023a,b).

² On May 20, 2022, the National Environmental Policy Act (NEPA) original requirements came into effect and were reinstated by the Council on Environmental Quality (CEQ), which is responsible for Federal agency implementation of NEPA.

Cumulative Impacts of Planned Actions. The BOEM (2017) Final EIS included a discussion of cumulative impacts, which analyzed the incremental environmental and socioeconomic impacts of the 10 proposed lease sales, in addition to all activities (including non-OCS activities) projected to occur from past, proposed, and future lease sales. The EIS considered exploration, delineation, and development wells; platform installation; service vessel trips; and oil spills. The EIS examined the potential cumulative effects on each specific resource for the entire Gulf of America.

The level and type of activity proposed in bp's SDOCD are within the range of activities described and evaluated in the recent lease sale EI^ss. The EIA incorporates and builds on these analyses by examining the potential impacts on physical, biological, and socioeconomic resources from the work planned in bp's SDOCD, in conjunction with the other reasonably foreseeable activities expected to occur in the Gulf of America. For all impacts, the incremental contribution of bp's proposed actions to the analyses in these prior reports are not expected to be significant.

D. Environmental Hazards

D.1 Geologic Hazards

The shallow hazards assessments did not identify geologic hazards at the location of the proposed project activities (bp, 2025). See SDOCD Section 3 for supporting geological and geophysical information.

D.2 Severe Weather

Under most circumstances, weather is not expected to have any effect on the proposed activities. Extreme weather, including high winds, strong currents, and large waves, was considered in the design criteria for the installation vessel selected for this project. High winds and limited visibility during a severe storm could disrupt support activities (vessel and helicopter traffic) and make it necessary to implement bp contingency plans to suspend some activities on the installation vessel for safety reasons until the storm or weather event passes. From 2011 to 2024, 22 tropical storms and/or hurricanes have shut down oil and gas activities in the Gulf of America (BSEE, 2024b). Damage was minimal from the storms in 2017 to 2023, and only Hurricane Ida in 2021 caused an accidental release from a ruptured pipeline and wellhead off the Louisiana coastline (BOEM, 2023b).

In the event of severe weather, guidance as outlined in bp's and/or bp's contractor's site-specific Environmental Emergency Plan, its site-specific hurricane preparation checklist, and the Gulf of America Region Severe Weather Contingency Plan would be adhered to.

D.3 Currents and Waves

Meteorology and physical oceanography conditions such as sea states, wind speed, ocean currents, etc. will be continuously monitored. Under most circumstances, physical oceanographic conditions are not expected to have any effect on the proposed activities. Strong currents (e.g., caused by Loop Current eddies and intrusions) and large waves were considered

in the design criteria for the installation vessel selected for this project. High waves during a severe storm could disrupt support activities (i.e., vessel and helicopter traffic), and risks to the program brought on by such conditions would be closely monitored and managed by the team managing the project. In some cases, it may be necessary to suspend some activities on the installation vessel for safety reasons until the storm or weather event passes.

E. Alternatives

No formal alternatives were evaluated in the EIA for the proposed project. However, various technical and operational options, including the location of the wellsite and the selection of a potential installation vessel, were considered by bp. The activity being proposed is the result of a rigorous screening and right-scoping process. It was selected as the best design candidate to reduce risk and optimize deliverability, chosen from numerous options with varying well locations, trajectories, construction designs, and installation strategies, amongst other variables.

F. Mitigation Measures

The proposed program includes numerous processes and actions that are intended to mitigate potential impact on the environment. The project is expected to comply with applicable federal, state, and local requirements as well as permit conditions of approval concerning protected species, air pollutant emissions, discharges to water, and waste management.

In addition, bp and its contractor intend to implement the following specific measures to prevent marine pollution:

- Proper job planning is an important overall mitigation measure. The fundamental concept and discussion in the pre-tour and pre-job safety meetings is the prevention of harm to people and the environment. Personnel are reminded daily to inspect work areas for safety issues as well as potential pollution issues.
- Conformance to bp operating management system procedures and environmental management plans for pollution prevention and control.
- Per Safety and Environmental Management System requirements, the skills and knowledge of personnel are assessed prior to working offshore for bp.
- Equipment transferred to and from the installation vessel will be inspected to ensure pollution pans have been cleaned and to confirm that plugs have been installed prior to leaving the dock and prior to loading on the boat.
- Preventative maintenance of rig and vessel equipment and other service equipment, including visual inspection of hydraulic lines and reservoirs, will be conducted on a scheduled basis.
- Items deemed safety and environmentally critical are listed and managed on a schedule recommended by the manufacturer/operator.

- Waste generation and storage will be managed as per the bp Gulf of America Waste Management procedures and/or the contractor's waste management procedures. Wastes are expected to be categorized, packaged, labeled, stored, manifested, and shipped to an appropriately permitted disposal site.
- Municipal trash containers will be kept covered. Where applicable, trash destined for recycling will be compacted.
- Chemical drums and totes will be stored on containment skids in designated areas of the project vessels.
- Hazardous waste shall be placed in approved containers on the project vessels.
- All municipal, non-hazardous, hazardous, and universal wastes are placed in waste category-appropriate recycling bag or box, Omega bin, Department of Transportation Drum, cutting box, universal box, waste bin, E&P Drum, tote tank or NORM container, labeled, and shipped to shore via a the main DP vessel or other support vessel.
- Tank overflow, discharge overflow spill prevention fittings, and quick disconnect hoses will be installed on hydrocarbon-based fluid hoses and liquid mud hoses to ensure isolation of any hose failures.
- On-site spill kits are inspected regularly and re-stocked as needed.
- Drills are conducted regularly, often engaging the IMT onshore to measure the effectiveness and quality of processes deployed to address oil spill scenarios.
- Fuel hoses and SBM hoses will be changed based on the maintenance schedule of the installation vessel and in accordance with USCG regulation annual inspection.

G. Consultation

No persons or agencies other than those listed as Preparers (**Section H**) were consulted during the preparation of the EIA.

H. Preparers

The EIA was prepared by CSA Ocean Sciences Inc. Contributors included:

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I. References

- Abbriano, R.M., M.M. Carranza, S.L. Hogle, R.A. Levin, A.N. Netburn, K.L. Seto, S.M. Snyder, and P.J.S. Franks. 2011. *Deepwater Horizon* oil spill: A review of the planktonic response. *Oceanography* 24(3): 294-301.
- Accomando A, Finneran J, Henderson E, Jenkins K, Kotecki S, Martin C, Mulsow J, Zapetis M, Carlin K, Schreher V. 2025. Criteria and Thresholds for U.S. Navy Acoustic and Explosive Effects Analysis (Phase 4) Revision 2025.1. San Diego, CA 92152-5001: NIWC Pacific. 239 p. Report No.: April 2025.
- Almagro, A., and C. Barría. 2024. The end of silent predators: first cases of active sound production in batoids from the Mediterranean Sea and its potential implications. *Marine Biology* 171: 208.
- Almeda, R., Z. Wambaugh, Z. Wang, C. Hyatt, Z. Liu, and E.J. Buskey. 2013. Interactions between zooplankton and crude oil: toxic effects and bioaccumulation of polycyclic aromatic hydrocarbons. *PLoS ONE* 8(6): e67212.
- Anderson, C.M., M. Mayes, and R. LaBelle. 2012. Update of Occurrence Rates for Offshore Oil Spills. U.S. Department of the Interior, Bureau of Ocean Energy Management and Bureau of Safety and Environmental Enforcement. OCS Report BOEM 2012-069, BSEE 2012-069.
- Auffret, M., M. Duchemin, S. Rousseau, I. Boutet, A. Tanguy, D. Moraga, and A. Marhic. 2004. Monitoring of immunotoxic responses in oysters reared in areas contaminated by the Erika oil spill. *Aquatic Living Resources* 17(3): 297-302.
- Azzara, A.J., W.M. von Zharen, and J.J. Newcomb. 2013. Mixed-methods analytic approach for determining potential impacts of vessel noise on sperm whale click behavior. *Journal of the Acoustical Society of America* 134(6): 4566-4574.
- Barkaszi, M.J. and C.J. Kelly. 2019. Seismic Survey Mitigation Measures and Protected Species Observer Reports: Synthesis Reports. U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region. New Orleans, LA. OCS Study BOEM 2019-012. 141 pp. + apps.
- Barkaszi, M.J., M. Butler, R. Compton, A. Unietis, and B. Bennett. 2012. Seismic Survey Mitigation Measures and Marine Mammal Observer Reports. New Orleans, LA. OCS Study BOEM 2012-015.
- Barkuloo, J.M. 1988. Report on the Conservation Status of the Gulf of Mexico sturgeon, *Acipenser oxyrinchus desotoi*. U.S. Department of the Interior, U.S. Fish and Wildlife Service. Panama City, FL.
- Barroil, A., J. Deter, F. Holon, and F. Bertucci. 2024. Sound production in wild Mediterranean blonde ray *Raja brachyura*. *Ecology* 105: e440.
- Baum, J.K. and R.A. Myers. 2004. Shifting baselines and the decline of pelagic sharks in the Gulf of Mexico. *Ecology Letters* 7(2): 135-145.
- Beazley, M.J., R.J. Martinez, S. Rajan, J. Powell, Y.M. Piceno, L.M. Tom, G.L. Andersen, T.C. Hazen, J.D. Van Nostrand, J. Zhou, B. Mortazavi, and P.A. Sobecky. 2012. Microbial community analysis of a coastal salt marsh affected by the *Deepwater Horizon* oil spill. *PLoS ONE* 7(7): e41305.
- Beerkircher, L., C.A. Brown, and V. Restrepo. 2009. Pelagic observer program data summary, Gulf of Mexico bluefin tuna (*Thunnus thynnus*) spawning season 2007 and 2008; and analysis of observer coverage levels. NOAA Technical Memorandum NMFS-SEFSC-588. 33 pp.
- Bélanger, L. and J. Bédard. 1989. Responses of staging greater snow geese to human disturbance. *Journal of Wildlife Management* 53(3): 713-719.
- Belter, M., J. Blondeau, C. Donovan, K. Edwards, I. Enochs, N. Formel, E. Geiger, S. Gittings, J. Grove, S. Groves, E. Hickerson, M. Johnston, H. Kelsey, K. Lohr, N. Miller, M. Nuttall, G.P. Schmahl, E. Towle, and S. Viehman. 2020. Coral Reef Condition: A Status Report for the Flower Garden Banks. NOAA Coral Reef Conservation Program. 7 pp.

- Bergman, D.A. and P.A. Moore. 2005. The role of chemical signals in the social behavior of crayfish. *Chemical Senses* 30: i305-i306.
- Berry, M., D.T. Booth, and C.J. Limpus. 2013. Artificial lighting and disrupted sea-finding behaviour in hatching loggerhead turtles (*Caretta caretta*) on the Woongarra coast, south-east Queensland, Australia. *Australian Journal of Zoology* 61(2): 137-145.
- Biggs, D.C. and P.H. Ressler. 2000. Water column biology. In: Deepwater: Gulf of Mexico Environmental and Socioeconomic Data Search and Literature Synthesis. Volume I: Narrative Report. U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region. New Orleans, LA. OCS Study MMS 2000-049. 340 pp.
- BirdLife International 2020. *Charadrius melanotos*. The IUCN Red List of Threatened Species 2020. <http://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T22693811A131930146.en>.
- BirdLife International. 2018. *Pterodroma hasitata*. The IUCN Red List of Threatened Species 2018: e.T22698092A132624510. <https://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T22698092A132624510.en>.
- Blackburn, M., C.A.S. Mazzacano, C. Fallon, and S.H. Black. 2014. Oil in Our Oceans. A Review of the Impacts of Oil Spills on Marine Invertebrates. The Xerces Society for Invertebrate Conservation, Portland, OR. 160 pp.
- Blackwell, S.B. and C.R. Greene Jr. 2003. Acoustic measurements in Cook Inlet, Alaska, during August 2001. Greeneridge Sciences, Inc., for NMFS, Anchorage, AK. 43 pp.
- Boehm, P., D. Turton, A. Raval, D. Caudle, D. French, N. Rabalais, R. Spies, and J. Johnson. 2001. Deepwater Program: Literature Review, Environmental Risks of Chemical Products used in Gulf of Mexico Deepwater Oil and Gas Operations. Volume I: Technical Report. U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region. New Orleans, LA. OCS Study MMS 2001-011. 326 pp.
- Bolle, L.J., C.A.F. de Jong, S.M. Bierman, P.J.G. Van Beek, O.A. van Keeken, P.W. Wessels, C.J.G. van Damme, H.V. Winter, D. de Haan, and R.P.A. Dekeling. 2012. Common sole larvae survive high levels of pile-driving sound in controlled exposure experiments. *PLoS ONE* 7(3): e33052.
- Bonde, R.K. and T.J. O'Shea. 1989. Sowerby's beaked whale (*Mesoplodon bidens*) in the Gulf of Mexico. *Journal of Mammalogy* 70: 447-449.
- bp. 2025. Site Clearance Letter, Proposed Well Locations MC522-F007 "A" and MC522-F007 "B". Block MC 522 (OCS-G-08823). Mississippi Canyon Protraction Area, Gulf of America, USA.
- Brame, A.B., T.R. Wiley, J.K. Carlson, S.V. Fordham, R.D. Grubbs, J. Osborne, R.M. Scharer, D.M. Bethea, and G.R. Poulakis. 2019. Biology, ecology, and status of the smalltooth sawfish *Pristis pectinata* in the USA. *Endangered Species Research* 39: 9-23.
- Brooke, S. and W.W. Schroeder. 2007. State of deep coral ecosystems in the Gulf of Mexico region: Texas to the Florida Straits, pp 271-306. In: S.E. Lumdsen, T.F. Hourigan, A.W. Bruckner and G. Dorr (Eds.), *The State of Deep Coral Ecosystems of the United States*. NOAA Technical Memorandum CRCP-3, Silver Spring, MD.
- Brooks, J.M., C. Fisher, H. Roberts, E. Cordes, I. Baums, B. Bernard, R. Church, P. Etnoyer, C. German, E. Goehring, I. McDonald, H. Roberts, T. Shank, D. Warren, S. Welsh, and G. Wolff. 2012. 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. U.S. Dept. of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region. New Orleans, LA. OCS Study BOEM 2012-106. 126 pp.
- Bruynjes, R. and A.N. Radford. 2013. Context-dependent impacts of anthropogenic noise on individual and social behaviour in a cooperatively breeding fish. *Animal Behaviour* 85(6): 1343-1349.
- Bureau of Ocean Energy Management. 2012a. Gulf of Mexico OCS Oil and Gas Lease Sales: 2012-2017. Western Planning Area Lease Sales 229, 233, 238, 246, and 248. Central Planning Area Lease Sales 227, 231, 235, 241, and 247. Final Environmental Impact Statement. U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region. New Orleans, LA. OCS EIS/EA BOEM 2012-019. 3 volumes.

Bureau of Ocean Energy Management. 2012b. Gulf of Mexico OCS Oil and Gas Lease Sale: 2012. Central Planning Area Lease Sale 216/222. Final Supplemental Environmental Impact Statement. U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region. New Orleans, LA. OCS EIS/EA BOEM 2012-058. 2 volumes.

Bureau of Ocean Energy Management. 2013. Gulf of Mexico OCS Oil and Gas Lease Sales: 2013-2014. Western Planning Area Lease Sale 233. Central Planning Area 231. Final Supplemental Environmental Impact Statement. U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region. New Orleans, LA. OCS EIS/EA BOEM 2013-0118. 526 pp.

Bureau of Ocean Energy Management. 2014a. Gulf of Mexico OCS Oil and Gas Lease Sales: 2015-2017. Central Planning Area Lease Sales 235, 241, and 247. Final Supplemental Environmental Impact Statement. U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region. New Orleans, LA. OCS EIS/EA BOEM 2014-655.

Bureau of Ocean Energy Management. 2014b. Programmatic Environmental Impact Statement for Atlantic OCS Proposed Geological and Geophysical Activities in the Mid-Atlantic and South Atlantic Planning Areas. www.boem.gov/Oil-and-Gas-Energy-Program/GOMR/GandG.aspx.

Bureau of Ocean Energy Management. 2015. Gulf of Mexico OCS Oil and Gas Lease Sales: 2016 and 2017. Central Planning Area Lease Sales 241 and 247; Eastern Planning Area Lease Sale 226. Final Supplemental Environmental Impact Statement. U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region. New Orleans, LA. OCS EIS/EA BOEM 2015-033. 748 pp.

Bureau of Ocean Energy Management. 2016a. Outer Continental Shelf Oil and Gas Leasing Program: 2017-2022. Final Programmatic Environmental Impact Statement. U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region. New Orleans, LA. OCS EIS/EIA BOEM 2016-060.

Bureau of Ocean Energy Management. 2016b. Gulf of Mexico OCS Oil and Gas Lease Sale: 2016. Western Planning Area Lease Sale 248. Final Supplemental Environmental Impact Statement. U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region. New Orleans, LA. OCS EIS/EA BOEM 2016-005.

Bureau of Ocean Energy Management. 2017. Gulf of Mexico OCS Oil and Gas Lease Sales: 2017-2022. Gulf of Mexico Lease Sales 249, 250, 251, 252, 253, 254, 256, 257, 259, and 261. Final Multisale Environmental Impact Statement. U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region. New Orleans, LA. OCS EIS/EA BOEM 2017-009. 3 volumes.

Bureau of Ocean Energy Management. 2023a. 2024-2029 National Outer Continental Shelf Oil and Gas Leasing Program. Final Programmatic Environmental Impact Statement. OCS EIS/EA BOEM 2023-054. 2 Volumes.

Bureau of Ocean Energy Management. 2023b. Gulf of Mexico OCS Oil and Gas Lease Sale: Lease Sales 259 and 261. Final Supplemental Environmental Impact Statement. U.S. Department of the Interior, Bureau of Ocean Energy Management, New Orleans Office. OCS EIS/EA BOEM 2023-001.

Bureau of Ocean Energy Management. 2025. Gulf of America Regional OCS Oil and Gas Lease Sales and Post-Lease Activities: Final Programmatic Environmental Impact Statement. U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of America OCS Region. New Orleans, LA. OCS EIS/EA BOEM 2025-042. 917 pp.

Bureau of Safety and Environmental Enforcement (BSEE). 2024a. Offshore Incident Statistics. U.S. Department of the Interior, Bureau of Safety and Environmental Enforcement. <https://www.bsee.gov/stats-facts/offshore-incident-statistics>.

Bureau of Safety and Environmental Enforcement (BSEE). 2024b. Hurricane History. <https://www.bsee.gov/resources-tools/planning-preparedness/hurricane/hurricane-history>.

Cada, G. 1990. A review of studies relating to the effects of propeller-type turbine passage on fish early life stages. North American Journal of Fisheries Management 10(4): 418-426.

- Camhi, M.D., E.K. Pikitch, and E.A. Babcock, (eds.) 2008. *Sharks of the Open Ocean: Biology, Fisheries, and Conservation*. Blackwell Publishing Ltd. Oxford, UK.
- Camilli, R., C.M. Reddy, D.R. Yoerger, B.A. Van Mooy, M.V. Jakuba, J.C. Kinsey, C.P. McIntyre, S.P. Sylva, and J.V. Maloney. 2010. Tracking hydrocarbon plume transport and biodegradation at *Deepwater Horizon*. *Science* 330(6001): 201-204.
- Carlson, J.K. and J. Osborne. 2012. Relative abundance of smalltooth sawfish (*Pristis pectinata*) based on Everglades National Park Creel Survey. NOAA Technical Memorandum NMFS-SEFSC-626. 15 pp.
- Carlson, J.K., J. Osborne, and T.W. Schmidt. 2007. Monitoring of the recovery of smalltooth sawfish, *Pristis pectinata*, using standardized relative indices of abundance. *Biological Conservation* 136: 195-202.
- Carr, A. 1996. Suwanee River sturgeon, pp 73-83. In: M.H. Carr, *A Naturalist in Florida*. Yale University Press, New Haven, CT.
- Carvalho, R., C.-L. Wei, G.T. Rowe, and A. Schulze. 2013. Complex depth-related patterns in taxonomic and functional diversity of polychaetes in the Gulf of Mexico. *Deep Sea Research Part I: Oceanographic Research Papers* 80: 66-77.
- Casper et, J., L. Saco-Álvarez, Ó. Nieto, J.M. Bayona, J. Albaigés, and R. Beiras. 2013. Evaluation of artificially-weathered standard fuel oil toxicity by marine invertebrate embryo-genesis bioassays. *Chemosphere* 90: 1103-1108.
- Casper, B.M. and D.A. Mann. 2006. Evoked potential audiograms of the nurse shark (*Ginglymostoma cirratum*) and the yellow stingray (*Urobatis jamaicensis*). *Environmental Biology of Fishes* 76: 101-108.
- Casper, B.M., P.S. Lobel, and H.Y. Yan. 2003. The hearing sensitivity of the little skate, *Raja erinacea*: a comparison of two methods. *Environmental Biology of Fishes* 68: 371-379.
- Cave, E.J. and S.M. Kajiura. 2018. Effect of *Deepwater Horizon* crude oil water accommodated fraction on olfactory function in the Atlantic stingray, *Hypanus sabinus*. *Scientific Reports* 8:15786.
- Centers for Disease Control and Prevention. 2010. Health Hazard Evaluation of Deepwater Horizon Response Workers. HETA 2010-0115. http://www.cdc.gov/niosh/hhe/pdfs/interim_report_6.pdf.
- Center for Marine Acoustics. 2023. Sound source list: a description of sounds commonly produced during ocean exploration and industrial activity. Sterling (VA): U.S. Department of the Interior, Bureau of Ocean Energy Management. 69 p. Report No.: BOEM OCS 2023-016.
- Clapp, R.B., D. Morgan-Jacobs, and R.C. Banks. 1982b. Marine Birds of the Southeastern United States and Gulf of Mexico. Part II. Anseriformes. U.S. Fish and Wildlife Service, Office of Biological Services. Washington, DC. FWS/OBS 82/20.
- Clapp, R.B., D. Morgan-Jacobs, and R.C. Banks. 1983. Marine Birds of the Southeastern United States and Gulf of Mexico. Part III. Charadriiformes. U.S. Fish and Wildlife Service, Office of Biological Services. Washington, DC. FWS/OBS-83/30.
- Clapp, R.B., R.C. Banks, D. Morgan-Jacobs, and W.A. Hoffman. 1982a. Marine Birds of the Southeastern United States and Gulf of Mexico. Part I. Gaviiformes through Pelicaniformes. U.S. Fish and Wildlife Service, Office of Biological Services. Washington, DC. FWS/OBS-82/01.
- Colman, L.P., P.H. Lara, J. Bennie, A.C. Broderick, J.R. de Freitas, A. Marcondes, M.J. Witt, and B.J. Godley. 2020. Assessing coastal artificial light and potential exposure of wildlife at a national scale: the case of marine turtles in Brazil. *Biodiversity and Conservation* 29: 1135-1152.
- Conn, P.B., and G.K. Silber. 2013. Vessel speed restrictions reduce risk of collision-related mortality for North Atlantic right whales. *Ecosphere* 4(4): 1-16.

- Continental Shelf Associates, Inc., 1997. Characterization and Trends of Recreational and Commercial Fishing from the Florida Panhandle. U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region. New Orleans, LA. USGS/BRD/CR 1997 0001 and OCS Study MMS 97-0020.
- Continental Shelf Associates, Inc. 2002. Deepwater Program: Bluewater fishing and OCS Activity, Interactions Between the Fishing and Petroleum Industries in Deepwaters of the Gulf of Mexico. U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region. New Orleans, LA. OCS Study MMS 2002 078. 193 pp. + apps.
- Continental Shelf Associates, Inc. 2004. Final Report: Gulf of Mexico Comprehensive Synthetic Based Muds Monitoring Program. 3 volumes.
- Continental Shelf Associates, Inc. 2006. Effects of Oil and Gas Exploration and Development at Selected Continental Slope Sites in the Gulf of Mexico. Volume II: Technical Report. U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region. New Orleans, LA. OCS Study MMS 2006-045.
- Cruz-Kaegi, M.E. 1998. Latitudinal Variations in Biomass and Metabolism of Benthic Infaunal Communities. Ph.D. Dissertation, Texas A&M University, College Station, TX.
- CSA International, Inc. 2007. Characterization of Northern Gulf of Mexico Deepwater Hard-bottom Communities with Emphasis on Lophelia Coral. U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region. New Orleans, LA. OCS Study MMS 2007-044.
- Daling, P.S., F. Leirvik, I.K. Almås, P.J. Brandvik, B.H. Hansen, A. Lewis, and M. Reed. 2014. Surface weathering and dispersability of MC252 crude oil. *Marine Pollution Bulletin* 15(87): 1-2.
- Davis, R.W. and G.S. Fargion, (Eds.). 1996. Distribution and Abundance of Cetaceans in the North-central and Western Gulf of Mexico: Technical report. U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region. New Orleans, LA. OCS Study MMS 96-0026.
- Davis, R.W., W.E. Evans, and B. Würsig. 2000. Cetaceans, Sea Turtles, and Seabirds in the Northern Gulf of Mexico: Distribution, Abundance and Habitat Associations. Volume II: Technical Report. U.S. Geological Survey, Biological Resources Division, USGS/BRD/CR 1999-0006 and U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region. New Orleans, LA. OCS Study MMS 2000-003.
- De Guise, S., M. Levin, E. Gebhard, L. Jasperse, L. Burdett Hart, C.R. Smith, S. Venn-Watson, R. Townsend, R. Wells, B. Balmer, E. Zolman, T. Rowles, and L. Schwacke. 2017. Changes in immune functions in bottlenose dolphins in the northern Gulf of Mexico associated with the *Deepwater Horizon* oil spill. *Endangered Species Research* 33: 291-303.
- Ditty, J.G. 1986. Ichthyoplankton in neritic waters of the northern Gulf of Mexico off Louisiana: Composition, relative abundance, and seasonality. *Fishery Bulletin* 84(4): 935-946.
- Ditty, J.G., G.G. Zieske, and R.F. Shaw. 1988. Seasonality and depth distribution of larval fishes in the northern Gulf of Mexico above 26°00'N. *Fishery Bulletin* 86(4): 811-823.
- Dow Piniak, W.E., D.A. Mann, S.A. Eckert, and C.A. Harms. 2012b. Amphibious hearing in sea turtles. In: A.N. Popper, A. Hawkins (Eds.), *The Effects of Noise on Aquatic Life. Advances in Experimental Medicine and Biology*. Springer, New York, NY. pp. 83-87.
- Dow Piniak, W.E., S.A. Eckert, C.A. Harms, and E.M. Stringer. 2012a. Underwater hearing sensitivity of the leatherback sea turtle (*Dermochelys coriacea*): Assessing the potential effect of anthropogenic noise. U.S. Department of the Interior, Bureau of Ocean Energy Management. Herndon, VA. OCS Study BOEM 2012-01156. 35 pp.
- Du, M. and J.D. Kessler. 2012. Assessment of the spatial and temporal variability of bulk hydrocarbon respiration following the *Deepwater Horizon* oil spill. *Environmental Science & Technology* 46: 10499-10507.

- Dubinsky, E.A., M.E. Conrad, R. Chakraborty, M. Bill, S.E. Borglin, J.T. Hollibaugh, O.U. Mason, Y.M. Piceno, F.C. Reid, W.T. Stringfellow, L.M. Tom, T.C. Hazen, and G.L. Andersen. 2013. Succession of hydrocarbon-degrading bacteria in the aftermath of the *Deepwater Horizon* oil spill in the Gulf of Mexico. *Environmental Science & Technology* 47(19): 10860-10867.
- Edwards, R.E. and K.J. Sulak. 2006. New paradigms for yellowfin tuna movements and distributions - implications for the Gulf and Caribbean region. *Proceedings of the Gulf and Caribbean Fisheries Research Institute* 57: 283-296.
- Efroymson, R.A., J.P. Nicolette, and G.W. Sutter II. 2003. A Framework for Net Environmental Benefit Analysis for Remediation or Restoration of Petroleum-contaminated Sites. ORNL/TM- 2003/17.
- Efroymson, R.A., W.H. Rose, S. Nemeth, and G.W. Sutter II. 2000. Ecological Risk Assessment Framework for Low Altitude Overflights by Fixed-wing and Rotary-wing Military Aircraft. Oak Ridge National Laboratory. Oak Ridge, TN. ORNL/TM-2000/289 ES-5048. 116 pp.
- Ehrlich, P.R., D.S. Dobkin, and D. Wheye. 1992. *Birds in Jeopardy: The Imperiled and Extinct Birds of the United States and Canada, including Hawaii and Puerto Rico*. Stanford University Press. Palo Alto, CA. 259 pp.
- Electric Power Research Institute. 2000. Technical Evaluation of the Utility of Intake Approach Velocity as an Indicator of Potential Adverse Environmental Impact under Clean Water Act Section 316(b). Technical Report 1000731.
- Ellison, W.T., B.L. Southall, C.W. Clark, and A.S. Frankel. 2012. A new context-based approach to assess marine mammal behavioral responses to anthropogenic sounds. *Conservation Biology*, 26(1): 21-28.
- Equinor Australia B.V. (Equinor). 2019. Environment plan, Appendix 6-1, Underwater Sound Modelling Report. Stromlo-1 Exploration Drilling Program. Rev 1. April 2019. 49 pp.
- Fertl, D., A.J. Schiro, G.T. Regan, C.A. Beck, and N. Adimey. 2005. Manatee occurrence in the northern Gulf of Mexico, west of Florida. *Gulf and Caribbean Research* 17(1): 69-94.
- Fetterplace, L.C., J.J.D. Esteban, J. Pini-Fitzsimmons, J. Gaskell, and B.E. Wueringer. 2022. Evidence of sound production in wild stingrays. *Ecology* 103: e3812.
- Fink, J. (Ed.). 2015. Chapter 10 – Cement Additives, pp. 317-367. In: *Petroleum Engineer's Guide to Oil Field Chemicals and Fluids*, Second Edition. Elsevier Science, San Diego, CA.
- Finneran JJ, Henderson EE, Houser DS, Jenkins K, Kotecki S, Mulsow J. 2017. Criteria and Thresholds for U.S. Navy Acoustic and Explosive Effects Analysis (Phase III). Technical report by Space and Naval Warfare Systems Center Pacific (SSC Pacific). 183 pp.
- Fisheries Hydroacoustic Working Group (FHWG). 2008. Agreement in Principle for Interim Criteria for Injury to Fish from Pile Driving Activities. Memorandum to Applicable Agency Staff. 12 June 2008. 4 pp.
- Florida Fish and Wildlife Conservation Commission. 2016. Draft Panama City Crayfish Management Plan. *Procambarus econfinae*.
- Florida Fish and Wildlife Conservation Commission. 2021. Florida's Endangered and Threatened Species. <https://myfwc.com/media/1945/threatened-endangered-species.pdf>.
- Florida Fish and Wildlife Conservation Commission. nd-a. Loggerhead Nesting in Florida. <http://myfwc.com/research/wildlife/sea-turtles/nesting/loggerhead/>.
- Florida Fish and Wildlife Conservation Commission. nd-b. Statewide Atlas of Sea Turtle Nesting Occurrence and Density. <https://myfwc.com/research/wildlife/sea-turtles/nesting/nesting-atlas/>.
- Florida Fish and Wildlife Conservation Commission. nd-c. Leatherback Nesting in Florida. <http://myfwc.com/research/wildlife/sea-turtles/nesting/leatherback/>.
- Florida Fish and Wildlife Conservation Commission. nd-d. Florida Salt Marsh Vole, *Microtus pennsylvanicus dekecampbelli*. <https://myfwc.com/wildlifehabitats/profiles/mammals/land/florida-salt-marsh-vole/>.

Florida Fish and Wildlife Conservation Commission. nd-e. Listed Invertebrates.

<https://myfwc.com/wildlifehabitats/profiles/>.

Foley, K.A., C. Caldow, and E.L. Hickerson. 2007. First confirmed record of Nassau Grouper *Epinephelus striatus* (Pisces: Serranidae) in the Flower Garden Banks National Marine Sanctuary. Gulf of Mexico Science 25(2): 162-165.

Fonseca, M., G.A. Piniak, and N. Cosentino-Manning. 2017. Susceptibility of seagrass to oil spills: A case study with eelgrass, *Zostera marina*, in San Francisco Bay, USA. Marine Pollution Bulletin 115(1-2): 29-38.

Fox, D.A., J.E. Hightower, and F.M. Parauka. 2000. Gulf sturgeon spawning migration and habitat in the Choctawhatchee River System, Alabama–Florida. Transactions of the American Fisheries Society 129(3): 811-826.

Fritts, T.H. and R.P. Reynolds. 1981. Pilot Study of the Marine Mammals, Birds, and Turtles in OCS Areas of the Gulf of Mexico. U.S. Department of the Interior, Fish and Wildlife Service, Biological Services Program. FWS/OBS 81/36. 150 pp.

Fuller, A.R., G.J. McChesney, and R.T. Golightly. 2018. Aircraft disturbance to Common Murres (*Uria aalge*) at a breeding colony in central California, USA. Waterbirds 41(3): 257-267.

Gallaway, B.J. and G.S. Lewbel. 1982. The Ecology of Petroleum Platforms in the Northwestern Gulf of Mexico: a Community Profile. U.S. Fish and Wildlife Service, Biological Services Program and U.S. Department of the Interior, Bureau of Land Management. Washington, D.C. FWS/OBS-82/27 and USGS Open File Report 82-03.

Gallaway, B.J., (Ed.). 1988. Northern Gulf of Mexico Continental Slope Study, Final report: Year 4. Volume II: Synthesis report. U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region. New Orleans, LA. OCS Study MMS 88-0053.

Gallaway, B.J., J.G. Cole, and R.G. Fechhelm. 2003. Selected Aspects of the Ecology of the Continental Slope Fauna of the Gulf of Mexico: A Synopsis of the Northern Gulf of Mexico Continental Slope Study, 1983-1988. U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region. New Orleans, LA. OCS Study MMS 2003-072. 44 pp.

Gates, A.R., M.C. Benfield, D.J. Booth, A.M. Fowler, D. Skropeta, and D.O.B. Jones. 2017. Deep-sea observations at hydrocarbon drilling locations: Contributions from the SERPENT Project after 120 field visits. Deep-Sea Research Part II: Topical Studies in Oceanography 137: 463-479.

Geraci, J.R. and D.J. St. Aubin. 1990. Sea Mammals and Oil: Confronting the Risks. Academic Press, San Diego, CA. 282 pp.

Gibson, D., D.H. Catlin, K.L. Hunt, J.D. Fraser, S.M. Karpanty, M.J. Friedrich, M.K. Bimbi, J.B. Cohen, and S.B. Maddock. 2017. Evaluating the impact of man-made disasters on imperiled species: Piping plovers and the Deepwater Horizon oil spill. Biological Conservation 2012: 48-62.

Gitschlag, G., B. Herczeg, and T. Barcack. 1997. Observations of sea turtles and other marine life at the explosive removal of offshore oil and gas structures in the Gulf of Mexico. Gulf Research Reports 9(4): 247-262.

Gomez, C., J.W. Lawson, A.J. Wright, A.D. Buren, D. Tollit, and V. Lesage. 2016. A systematic review on the behavioural responses of wild marine mammals to noise: the disparity between science and policy. Canadian Journal of Zoology 94: 801-819.

Greene Jr C. 1986. Underwater sounds from the semisubmersible drill rig SEDCO 708 drilling in the Aleutian Islands. Sect. 1. API Publication. 4438.

Gulf of Mexico Fishery Management Council. 2005. Generic Amendment Number 3 for addressing Essential Fish Habitat Requirements, Habitat Areas of Particular Concern, and adverse effects of fishing in the following Fishery Management Plans of the Gulf of Mexico: Shrimp fishery of the Gulf of Mexico, United States waters red drum fishery of the Gulf of Mexico, reef fish fishery of the Gulf of Mexico coastal migratory pelagic resources (mackerels) in the Gulf of Mexico and South Atlantic, stone crab fishery of the Gulf of Mexico, spiny lobster in the Gulf of Mexico and South Atlantic, coral and coral reefs of the Gulf of Mexico. Tampa, FL. Gulf of Mexico Fishery Management Council. 104 pp. https://gulfcouncil.org/wp-content/uploads/FISHERY%20MANAGEMENT/GENERIC/FINAL3_EFH_Amendment.pdf.

Hamdan, L.J., J.L. Salerno, A. Reed, S.B. Joye, and M. Damour. 2018. The impact of the *Deepwater Horizon* blowout on historic shipwreck-associated sediment microbiomes in the northern Gulf of Mexico. *Scientific Reports* 8: 9057.

Haney, C.J., H.J. Geiger, and J.W. Short. 2014. Bird mortality from the *Deepwater Horizon* oil spill. Exposure probability in the Gulf of Mexico. *Marine Ecology Progress Series* 513: 225-237.

Hannam, M.L., S.D. Bamber, A.J. Moody, T.S. Galloway, and M.B. Jones. 2010. Immunotoxicity and oxidative stress in the Arctic scallop *Chlamys islandica*: Effects of acute oil exposure. *Ecotoxicology and Environmental Safety* 73: 1440-1448.

Harvell, C.D., K. Kim, J.M. Burkholder, R.R. Colwell, P.R. Epstein, D.J. Grimes, E.E. Hoffmann, E.K. Lipp, A.D.M.E. Osterhaus, R.M. Overstreet, J.W. Porter, G.W. Smith, and G.R. Vasta. 1999. Emerging marine diseases: climate links and anthropogenic factors. *Science* 285(5433): 1505-1510.

Hawkins, A.D. and A.N. Popper. 2014. Assessing the impact of underwater sounds on fishes and other forms of marine life. *Acoustics Today*. Spring 2014: 30-41.

Hawkins, A.D., R.A. Hazelwood, A.N. Popper, and P.C. Macey. 2021. Substrate vibrations and their potential effects upon fishes and invertebrates. *The Journal of the Acoustical Society of America* 149: 2782-90.

Hayes, S.A., E. Josephson, K. Maze-Foley, P.E. Rosel, B. Byrd, S. Chavez-Rosales, L.P. Garrison, J. Hatch, A. Henry, S.C. Horstman, J. Litz, M.C. Lyssikatos, K.D. Mullin, C. Orphanides, R.M. Pace, D.L. Palka, J. Powell, and F.W. Wenzel. 2019. US Atlantic and Gulf of Mexico Marine Mammal Stock Assessments - 2018. U.S. Department of Commerce. NOAA Technical Memorandum NMFS-NE-258.

Hayes, S.A., E. Josephson, K. Maze-Foley, P.E. Rosel, B. Byrd, S. Chavez-Rosales, T.V.N. Cole, L.P. Garrison, J. Hatch, A. Henry, S.C. Horstman, J. Litz, M.C. Lyssikatos, K.D. Mullin, C. Orphanides, R.M. Pace, D.L. Palka, J. Powell, and F.W. Wenzel. 2020. US Atlantic and Gulf of Mexico Marine Mammal Stock Assessments - 2019. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. NOAA Technical Memorandum NMFS-NE-264. 479 pp.

Hayes, S.A., E. Josephson, K. Maze-Foley, P.E. Rosel, J. McCordic, J.W. Wallace, A. Brossard, S. Chavez-Rosales, T.V.N. Cole, L.P. Garrison, J. Hatch, A. Henry, S.C. Horstman, D. Linden, J. Litz, M.C. Lyssikatos, K.D. Mullin, K. Murray, C. Orphanides, R.M. Pace, D.L. Palka, J. Powell, K. Precoda, M. Soldevilla, and F.W. Wenzel. 2023. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments - 2022. U.S. Department of Commerce. NOAA Technical Memorandum NMFS-NE-304. 262 pp.

Hayes, S.A., E. Josephson, K. Maze-Foley, P.E. Rosel, J. Turek, B. Byrd, S. Chavez-Rosales, T.V.N. Cole, L.P. Garrison, J. Hatch, A. Henry, S.C. Horstman, J. Litz, M.C. Lyssikatos, K.D. Mullin, C. Orphanides, J. Ortega-Ortiz, R.M. Pace, D.L. Palka, J. Powell, G. Rappucci, and F.W. Wenzel. 2021. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments - 2020. U.S. Department of Commerce. NOAA Technical Memorandum NMFS-NE-271.

Hayes, S.A., E. Josephson, K. Maze-Foley, P.E. Rosel, J.W. Wallace, A. Brossard, S. Chavez-Rosales, T.V.N. Cole, L.P. Garrison, J. Hatch, A. Henry, S.C. Horstman, J. Litz, M.C. Lyssikatos, K.D. Mullin, K. Murray, C. Orphanides, J. Ortega-Ortiz, R.M. Pace, D.L. Palka, J. Powerll, G. Rappucci, M. Soldevilla, and F.W. Wenzel. 2022. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments - 2021. U.S. Department of Commerce. NOAA Technical Memorandum NMFS-NE-288. 387 pp.

- Hazel, J., I. R. Lawler, H. Marsh, and S. Robson. 2007. Vessel speed increases collision risk for the green turtle *Chelonia mydas*. *Endangered Species Research* 3: 105-113.
- Hazen, T.C., E.A. Dubinsky, T.Z. DeSantis, G.L. Andersen, Y.M. Piceno, N. Singh, J.K. Jansson, A. Probst, S.E. Borglin, J.L. Fortney, W.T. Stringfellow, M. Bill, M.E. Conrad, L.M. Tom, K.L. Chavarria, T.R. Alusi, R. Lamendella, D.C. Joyner, C. Spier, J. Baelum, M. Auer, M.L. Zemla, R. Chakraborty, E.L. Sonnenthal, P. D'Haeseleer, H.Y. Holman, S. Osman, Z. Lu, J.D. Van Nostrand, Y. Deng, J. Zhou, and O.U. Mason. 2010. Deep-sea oil plume enriches indigenous oil-degrading bacteria. *Science* 330(6001): 204-208.
- HDR (Athens AL). 2022. Passive acoustic monitoring program for the Northern Gulf of Mexico: project report. U.S. Department of the Interior, Bureau of Ocean Energy Management, New Orleans, LA. Contract No: M17PC00001. Report No: OCS Study BOEM 2022-074. 337 pp.
- Higashi, G.R. 1994. Ten years of fish aggregating device (FAD) design development in Hawaii. *Bulletin of Marine Science* 55(2-3): 651-666.
- Hildebrand, J.A. 2005. Impacts of anthropogenic sound, pp 101-124. In: J.E. Reynolds III, W.F. Perrin, R.R. Reeves, S. Montgomery and T.J. Ragen (Eds.), *Marine Mammal Research: Conservation Beyond Crisis*. Johns Hopkins University Press, Baltimore, MD.
- Hildebrand, J.A. 2009. Anthropogenic and natural sources of ambient noise in the ocean. *Marine Ecology Progress Series* 395: 5-20.
- Hildebrand, J.A., S. Baumann-Pickering, K.E. Frasier, J.S. Trickey, K.P. Merkens, S.M. Wiggins, M.A. McDonald, L.P. Garrison, D. Harris, T.A. Marques, and L. Thomas. 2015. Passive acoustic monitoring of beaked whale densities in the Gulf of Mexico. *Scientific Reports* 5: 16343.
- Hinwood, J.B., A.E. Poots, L.R. Dennis, J.M. Carey, H. Houridis, R.J. Bell, J.R. Thomson, P. Boudreau, and A.M. Ayling. 1994. Part 3: Drilling activities, pp. 123-207. In: J.M. Swan, J.M. Neff and P.C. Young (eds.) *Environmental Implications of Offshore Oil and Gas Development in Australia: Findings of an Independent Scientific Review*. Australian Petroleum Production and Exploration Association. Canberra, Australia.
- Holland, K.N. 1990. Horizontal and vertical movements of yellowfin and bigeye tuna associated with fish aggregating devices. *Fishery Bulletin* 88: 493-507.
- Horn, K.N., C. Karnauskas, M. Doerr, J. C. Miller, M. H. Neuman, M. Hill, R. McCarthy, K. J. 2022. Endangered species act status review report: Queen conch (*Aliger gigas*). NOAA Technical Memorandum NMFS-SEFSC-756.
- Intergovernmental Panel on Climate Change. 2014. *Climate Change 2014: Impacts, Adaptation and Vulnerability*. <http://www.ipcc.ch/report/ar5/wg2/>.
- International Association of Oil & Gas Producers. 2010. Risk assessment data directory: Blowout frequencies. OGP Report No. 434-02. 13 pp.
- International Tanker Owners Pollution Federation Limited. 2018. Weathering. <https://www.itopf.org/knowledge-resources/documents-guides/fate-of-oil-spills/weathering/>.
- Jensen, A.S. and G.K. Silber. 2004. Large Whale Ship Strike Database. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Office of Protected Resources, Silver Spring, Maryland. NOAA Technical Memorandum NMFS-OPR-25. 39 pp.
- Ji, Z.-G., W.R. Johnson, C.F. Marshall, and E.M. Lear. 2004. Oil-Spill Risk Analysis: Contingency Planning Statistics for Gulf of Mexico OCS Activities. U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region. New Orleans, LA. OCS Report MMS 2004-026. 62 pp.
- Jochens, A., D.C. Biggs, D. Benoit-Bird, D. Engelhaupt, J. Gordon, C. Hu, N. Jaquet, M. Johnson, R.R. Leben, B. Mate, P. Miller, J.G. Ortega-Ortiz, A. Thode, P. Tyack, and B. Würsig. 2008. Sperm Whale Seismic Study in the Gulf of Mexico: Synthesis Report. U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region. New Orleans, LA. OCS Study MMS 2008-006. 341 pp.

- Johnsgard, P.A. 1990. Hawks, Eagles, and Falcons of North America; Biology and Natural History. Washington, D.C., Smithsonian Institution Press. 456 pp.
- Keithly, W.R. and K.J. Roberts. 2017. Commercial and recreational fisheries of the Gulf of Mexico., pp 1039-1188. In: C.H. Ward (Ed.), Habitats and Biota of the Gulf of Mexico: Before the *Deepwater Horizon* Oil Spill. Volume 2: Fish Resources, Fisheries, Sea Turtles, Avian Resources, Marine Mammals, Diseases and Mortalities. Springer, New York, NY.
- Kennicutt, M.C. 2000. Chemical oceanography, pp. 123-139. In: Continental Shelf Associates, Inc., Deepwater Program: Gulf of Mexico deepwater Information Resources Data Search and Literature Synthesis. Volume I: Narrative Report. U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region. New Orleans, LA. OCS Study MMS 2000-049. 340 pp.
- Keppner, E.J. and L.A. Keppner. 2004. A Summary of the Panama City Crayfish, *Procambarus econfina* Hobbs, 1942. Prepared for The Candidate Conservation Agreement with Assurances.
- Kessler, J.D., D.L. Valentine, M.C. Redmond, M. Du, E.W. Chan, S.D. Mendes, E.W. Quiroz, C.J. Villanueva, S.S. Shusta, L.M. Werra, S.A. Yvon-Lewis, and T.C. Weber. 2011. A persistent oxygen anomaly reveals the fate of spilled methane in the deep Gulf of Mexico. *Science* 331: 312-315.
- Ketten, D.R. and S.M. Bartol. 2005. Functional Measures of Sea Turtle Hearing, Woods Hole Oceanographic Institution, Woods Hole, MA. ONR Award No: N00014-02-0510.
- Kiszka, J., M. Caputo, J. Vollenweider, M.R. Heithaus, L.A. Dias, and L.P. Garrison. 2023. Critically endangered Rice's whales (*Balaenoptera ricei*) selectively feed on high-quality prey in the Gulf of Mexico. *Scientific Reports* 13: 6710. <https://www.nature.com/articles/s41598-023-33905-6#Abs1>.
- Krishnamurthy J., L.S. Engel, L. Wang, E.G. Schwartz, K. Christenbury, B. Kondrup, J. Barrett, and J.A. Rusiecki. 2019. Neurological symptoms associated with oil spill response exposures: results from the *Deepwater Horizon* Oil Spill Coast Guard Cohort Study. *Environment International*. 131: 104963. doi:10.1016/j.envint.2019.104963.
- Kyhn, L.A., S. Sveegaard, and J. Tougaard. 2014. Underwater noise emissions from a drillship in the Arctic. *Marine Pollution Bulletin* 86: 424-433.
- Ladich, F. and R.R. Fay. 2013. Auditory evoked potential audiometry in fish. *Reviews in Fish Biology and Fisheries* 23(3): 317-364.
- Laist, D.W., A.R. Knowlton, J.G. Mead, A.S. Collet, and M. Podesta. 2001. Collisions between ships and whales. *Marine Mammal Science* 17(1): 35-75.
- Lee, W.Y., K. Winters, and J.A.C. Nicol. 1978. The biological effects of the water soluble fractions of a No. 2 fuel oil on the planktonic shrimp, *Lucifer faxoni*. *Environmental Pollution* 15: 167-183.
- Lennuk, L., J. Kotta, K. Taits, and K. Teeveer. 2015. The short-term effects of crude oil on the survival of different size-classes of cladoceran *Daphnia magna* (Straus, 1820). *Oceanologia* 57(1): 71-77.
- Lin, Q. and I.A. Mendelsohn. 2012. Impacts and recovery of the *Deepwater Horizon* oil spill on vegetation structure and function of coastal salt marshes in the northern Gulf of Mexico. *Environmental Science & Technology* 46(7): 3737-3743.
- Linden, O. 1976. Effects of oil on the reproduction of the amphipod *Gammarus oceanicus*. *Ambio* 5: 36-37.
- Liu, J., H.P. Bacosa, and Z. Liu. 2017. Potential environmental factors affecting oil-degrading bacterial populations in deep and surface waters of the northern Gulf of Mexico. *Frontiers in Microbiology* 7: 2131.
- Lohofener, R., W. Hoggard, K.D. Mullin, C. Roden, and C. Rogers. 1990. Association of Sea Turtles with Petroleum Platforms in the North Central Gulf of Mexico. U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region. New Orleans, LA. OCS Study MMS 90-0025. 90 pp.
- Louisiana Wildlife & Fisheries. 2020. Rare Species and Natural Communities by Parish. <https://www.wlf.louisiana.gov/page/rare-species-and-natural-communities-by-parish>.

- Lutcavage, M.E., P. Plotkin, B. Witherington, and P.L. Lutz. 1997. Human impacts on sea turtle survival, pp. 387-409. In: P.L. Lutz and J.A. Musick (Eds.), *The Biology of Sea Turtles*. CRC Press, Boca Raton, FL.
- Lutcavage, M.E., P.L. Lutz, G.D. Bossart, and D.M. Hudson. 1995. Physiologic and clinicopathologic effects of crude oil on loggerhead sea turtles. *Archives of Environmental Contamination and Toxicology* 28(4): 417-422.
- MacDonald, I.R. 2002. Stability and Change in Gulf of Mexico Chemosynthetic Communities. Volume II: Technical Report. U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region. New Orleans, LA. OCS Study MMS 2002-036. 456 pp.
- Main, C.E., H.A. Ruhl, D.O.B. Jones, A. Yool, B. Thornton, and D.J. Mayor. 2015. Hydrocarbon contamination affects deep-sea benthic oxygen uptake and microbial community composition. *Deep Sea Research. Part I: Oceanographic Research Papers* 100: 79-87.
- Marine Mammal Commission. 2011. Assessing the long-term effects of the BP *Deepwater Horizon* oil spill on marine mammals in the Gulf of Mexico: A statement of research needs. http://www.mmc.gov/wp-content/uploads/longterm_effects_bp_oilspil.pdf.
- Marshall, A., M.B. Bennett, G. Kodja, S. Hinojosa-Alvarez, F. Galvan-Magana, M. Harding, G. Stevens, and T. Kashiwagi. 2018. *Mobula birostris* (amended version of 2011 assessment). The IUCN Red List of Threatened Species. <http://www.iucnredlist.org/details/198921/0>.
- Martin KJ, Alessi SC, Gaspard JC, Tucker AD, Bauer GB, Mann DA. 2012. Underwater hearing in the loggerhead turtle (*Caretta caretta*): A comparison of behavioral and auditory evoked potential audiograms. *Journal of Experimental Biology* 215(17): 3001-3009.
- Mayhew, D.A., L.D. Jensen, D.F. Hanson, and P.H. Muessig. 2000. A comparative review of entrainment survival studies at power plants in estuarine environments, pp. S295-S302. In: J. Wisniewski (Ed.), *Environmental Science & Policy; Power Plants & Aquatic Resources: Issues and Assessment*, Vol. 3, Supplement 1. Elsevier Science Ltd., New York, NY.
- McCauley, R. 1998. Radiated Underwater Noise Measured from the Drilling Rig Ocean General, Rig Tenders Pacific Ariki and Pacific Frontier, Fishing Vessel Reef Venture and Natural Sources in the Timor Sea, northern Australia. Prepared for Shell Australia, Melbourne. 52 pp. <http://cmst.curtin.edu.au/local/docs/pubs/1998-19.pdf>.
- McDonald, T.L., F.E. Hornsby, T.R. Speakman, E.S. Zolman, K.D. Mullin, C. Sinclair, P.E. Rosel, L. Thomas, and L.H. Schwacke. 2017. Survival, density, and abundance of common bottlenose dolphins in Barataria Bay (USA) following the *Deepwater Horizon* oil spill. *Endangered Species Research* 33: 193-209.
- McGowan, C.J., R.K. Kwok, L.S. Engel, M.R. Stenzel, P.A. Stewart, and D.P. Sandler. 2017. Respiratory, Dermal, and Eye Irritation Symptoms Associated with Corexit™ EC9527A/EC9500A following the *Deepwater Horizon* Oil Spill: Findings from the GuLF STUDY. *Environmental Health Perspectives*. 125(9): 097015-1-097015-7. <https://ehp.niehs.nih.gov/doi/10.1289/EHP1677>.
- McKenna, M.F., D. Ross, S.M. Wiggins, and J.A. Hildebrand. 2012. Underwater radiated noise from modern commercial ships. *Journal of the Acoustical Society of America* 131: 92-103.
- McLaughlin, K.E. and H.P. Kunc. 2015. Changes in the acoustic environment alter the foraging and sheltering behaviour of the cichlid *Amititlania nigrofasciata*. *Behavioural Processes* 116: 75-79.
- Mendel, B., P. Schwemmer, V. Peschko, S. Muller, H. Schwemmer, M. Mercker, and S. Garthe. 2019. Operational offshore wind farms and associated ship traffic cause profound changes in distribution patterns of Loons (*Gavia* spp.). *Journal of Environmental Management* 231: 429-438.
- Mendelssohn, I.A., G.L. Andersen, D.M. Baltx, R.H. Caffey, K.R. Carman, J.W. Fleeger, S.B. Joyce, Q. Lin, E. Maltby, E.B. Overton, and L.P. Rozas. 2012. Oil impacts on coastal wetlands: Implications for the Mississippi River delta ecosystem after the *Deepwater Horizon* oil spill. *BioScience* 62(6): 562-574.

- Mendelssohn, I.A., M.R. Byrnes, R.T. Kneib, and B.A. Vittor. 2017. Coastal Habitats of the Gulf of Mexico, pp. 359-640. In: C.H. Ward (Ed.), *Habitats and Biota of the Gulf of Mexico: Before the Deepwater Horizon Oil Spill*. Springer, New York, NY.
- Mississippi Natural Heritage Program. 2018. Natural Heritage Program Online Database. Museum of Natural Science, Mississippi Department of Wildlife, Fisheries, and Parks. <https://www.mdwfp.com/ms-museum-nature-science/mississippi-natural-heritage-program/about-natural-heritage-database>.
- Møhl, B., M. Wahlberg, and P.T. Madsen. 2003. The monopulsed nature of sperm whale clicks. *Journal of the Acoustical Society of America* 114(2): 1143-1154.
- Moore, S.F. and R.L. Dwyer. 1974. Effects of oil on marine organisms: a critical assessment of published data. *Water Research* 8: 819-827.
- Morrow, J.V.J., J.P. Kirk, K.J. Killgore, H. Rugillio, and C. Knight. 1998. Status and recovery of Gulf sturgeon in the Pearl River system, Louisiana-Mississippi. *North American Journal of Fisheries Management* 18: 798-808.
- Muhling, B.A., P. Reglero, L. Ciannelli, D. Alvarez-Berastegui, F. Alemany, J.T. Lamkin, and M.A. Roffer. 2013. Comparison between environmental characteristics of larval bluefin tuna *Thunnus thynnus* habitat in the Gulf of Mexico and western Mediterranean Sea. *Marine Ecology Progress Series* 486: 257-76.
- Mullin, K.D. 2007. Abundance of Cetaceans in the Oceanic Gulf of Mexico Based on 2003-2004 Ship Surveys. U.S. Department of Commerce, National Marine Fisheries Service, Southeast Fisheries Science Center. Pascagoula, MS. <https://repository.library.noaa.gov/view/noaa/12805>.
- Mullin, K.D., W. Hoggard, C. Roden, R. Lohofener, C. Rogers, and B. Taggart. 1991. Cetaceans on the Upper Continental Slope in the North-central Gulf of Mexico. U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region. New Orleans, LA. OCS Study MMS 91-0027. 118 pp.
- National Marine Fisheries Service and National Oceanic and Atmospheric Administration. 2005. Endangered fish and wildlife: Notice of intent to prepare an environmental impact statement. *Federal Register* 70(7): 1871-1875. <https://www.govinfo.gov/content/pkg/FR-2005-01-11/pdf/05-525.pdf>
<https://www.federalregister.gov/documents/2005/01/11/05-525/endangered-fish-and-wildlife-notice-of-intent-to-prepare-an-environmental-impact-statement>.
- National Marine Fisheries Service and U.S. Fish and Wildlife Service. 2008. Recovery Plan for the Northwest Atlantic Population of the Loggerhead Sea Turtle (*Caretta caretta*), Second Revision. <https://www.fisheries.noaa.gov/action/recovery-plans-loggerhead-sea-turtle>.
- National Marine Fisheries Service, U.S. Fish and Wildlife Service and Secretaría de Medio Ambiente y Recursos Naturales. 2011. Bi-National Recovery Plan for the Kemp's Ridley Sea Turtle (*Lepidochelys kempii*), Second Revision. <https://www.fisheries.noaa.gov/resource/document/bi-national-recovery-plan-kemps-ridley-sea-turtle-2nd-revision>.
- National Marine Fisheries Service. 2007. Endangered Species Act, Section 7 Consultation – Biological Opinion. Gulf of Mexico Oil and Gas Activities: Five Year Leasing Plan for Western and Central Planning Areas 2007 2012. U.S. Department of Commerce, National Oceanic and Atmospheric Administration. St. Petersburg, FL.
- National Marine Fisheries Service. 2009a. Sperm Whale (*Physeter macrocephalus*) 5-Year Review: Summary and Evaluation. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Office of Sustainable Fisheries, Highly Migratory Species Management Division. Silver Spring, MD. 61 pp.
- National Marine Fisheries Service. 2009b. Smalltooth Sawfish Recovery Plan (*Pristis pectinata*). Prepared by the Smalltooth Sawfish Recovery Team for the National Marine Fisheries Service, Silver Spring, MD. 102 pp. <https://repository.library.noaa.gov/view/noaa/15983>.
- National Marine Fisheries Service. 2009c. Final Amendment 1 to the Consolidated Atlantic Highly Migratory Species Fishery Management Plan Essential Fish Habitat. Highly Migratory Species Management Division, Office of Sustainable Fisheries. Silver Spring, MD. <http://pbadupws.nrc.gov/docs/ML1219/ML1219A241.pdf>.

- National Marine Fisheries Service. 2010. Final Recovery Plan for the Sperm Whale (*Physeter macrocephalus*). Silver Spring, MD. <https://www.fisheries.noaa.gov/resource/document/recovery-plan-sperm-whale-physeter-macrocephalus>.
- National Marine Fisheries Service. 2011. Species of concern: Western Atlantic bluefin tuna, *Thunnus thynnus*. <https://www.fisheries.noaa.gov/resource/document/endangered-species-act-status-review-atlantic-bluefin-tuna-thunnus-thynnus>.
- National Marine Fisheries Service. 2018. Smalltooth Sawfish (*Pristis pectinata*) 5-Year Review: Summary and Evaluation of United States Distinct Population Segment of Smalltooth Sawfish. Southeast Regional Office, St. Petersburg, Florida. 63 pp. <https://repository.library.noaa.gov/view/noaa/19253/Print>.
- National Marine Fisheries Service. 2020a. Endangered Species Act, Section 7 Consultation – Biological Opinion on the Federally Regulated Oil and Gas Program Activities in the Gulf of Mexico. U.S. Department of Commerce, National Oceanic and Atmospheric Administration. St. Petersburg, FL. <https://www.fisheries.noaa.gov/resource/document/biological-opinion-federally-regulated-oil-and-gas-program-activities-gulf-mexico>.
- National Marine Fisheries Service. 2020b. Sea turtles, dolphins, and whales - 10 years after the *Deepwater Horizon* oil spill. <https://www.fisheries.noaa.gov/national/marine-life-distress/sea-turtles-dolphins-and-whales-10-years-after-deepwater-horizon-oil>.
- National Marine Fisheries Service. 2021a. Amended ITS on BOEM Gulf of Mexico Oil and Gas Program. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Office of Protected Resources. Tracking No. FPR-2017-92341, Amended 26 April 2021. 245 pp.
- National Marine Fisheries Service. 2021b. Critical Habitat for Loggerhead Sea Turtle. <https://www.fisheries.noaa.gov/action/critical-habitat-loggerhead-sea-turtle>.
- National Marine Fisheries Service. 2021c. *Deepwater Horizon*/BP oil spill: size and percent coverage of fishing area closures due to BP oil spill. <https://www.fisheries.noaa.gov/content/deepwater-horizon-oil-spill-2010-size-and-percent-coverage-fishing-area-closures-due>.
- National Marine Fisheries Service. 2022. Gulf Sturgeon (*Acipenser oxyrinchus desotoi*). <https://www.fisheries.noaa.gov/species/gulf-sturgeon>.
- National Marine Fisheries Service. 2024. 2024 Update to: Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 3.0); Underwater and In-Air Criteria for Onset of Auditory Injury and Temporary Threshold Shifts. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Office of Protected Resources. NOAA Technical Memorandum NMFS-OPR-71 October 2024. 193 pp.
- National Marine Fisheries Service (NMFS). 2025a. Endangered Species Act, Section 7 Consultation – Biological Opinion on the Federally Regulated Oil and Gas Program Activities in the Gulf of Mexico. U.S. Department of Commerce, National Oceanic and Atmospheric Administration. Silver Spring, MD. <https://www.fisheries.noaa.gov/resource/document/biological-and-conference-opinion-bureau-ocean-energy-management-and-bureau>.
- National Marine Fisheries Service. 2025b. Oceanic Whitetip Shark. <https://www.fisheries.noaa.gov/species/oceanic-whitetip-shark>.
- National Marine Fisheries Service. 2025c. National Marine Fisheries Service: Summary of Recommended Marine Mammal Protection Act Acoustic Thresholds. <https://www.fisheries.noaa.gov/s3/2025-09/MM-Acoustic-Thresholds-508-secure-SEPT-2025-OPR1.pdf>.
- National Marine Fisheries Service. 2025d. National Marine Fisheries Service: Summary of Endangered Species Act Recommended Acoustic Thresholds (Marine Mammals, Fishes, and Sea Turtles). <https://www.fisheries.noaa.gov/s3/2025-09/ESA-AllSpeciesThresholdSummary-2025-508-OPR1-9.16.25-.pdf>.

- National Oceanic and Atmospheric Administration. 2010. Oil and Sea Turtles. Biology, Planning, and Response. U.S Department of Commerce, National Ocean Service, Office of Response and Restoration. 111 pp. https://response.restoration.noaa.gov/sites/default/files/Oil_Sea_Turtles_2021.pdf.
- National Oceanic and Atmospheric Administration. 2011a. Joint Analysis Group. *Deepwater Horizon Oil Spill: Review of Preliminary Data to Examine Subsurface Oil in the Vicinity of MC252#1, May 19 to June 19, 2010.* U.S. Department of Commerce, National Ocean Service. Silver Spring, MD. NOAA Technical Report NOS OR&R 25. 169 pp.
- National Oceanic and Atmospheric Administration. 2011b. Joint Analysis Group, *Deepwater Horizon Oil Spill: Review of R/V Brooks McCall Data to Examine Subsurface Oil.* U.S. Department of Commerce, National Ocean Service. Silver Spring, MD. NOAA Technical Report NOS OR&R 24. 69 pp.
- National Oceanic and Atmospheric Administration. 2011c. Joint Analysis Group, *Deepwater Horizon Oil Spill: Review of Preliminary Data to Examine Oxygen Levels in the Vicinity of MC252#1 May 8 to August 9, 2010.* U.S. Department of Commerce, National Ocean Service. Silver Spring, MD. NOAA Technical Report NOS OR&R 26. 107 pp. <https://repository.library.noaa.gov/view/noaa/133>.
- National Oceanic and Atmospheric Administration. 2014. Flower Garden Banks National Marine Sanctuary. <http://flowergarden.noaa.gov/about/cnidarianlist.html>.
- National Oceanic and Atmospheric Administration. 2016. *Deepwater Horizon Oil Spill: Final Programmatic Damage Assessment and Restoration Plan and Final Programmatic Environmental Impact Statement.* <http://www.gulfspillrestoration.noaa.gov/restoration-planning/gulf-plan/>.
- National Oceanic and Atmospheric Administration. 2017. Oil Types. Office of Response and Restoration. <http://response.restoration.noaa.gov/oil-and-chemical-spills/oil-spills/oil-types.html>.
- National Oceanic and Atmospheric Administration. 2018. Giant Manta Ray. <https://www.fisheries.noaa.gov/species/giant-manta-ray>.
- National Oceanic and Atmospheric Administration. 2022. WebGNOME. <https://gnome.orr.noaa.gov/>.
- National Oceanic and Atmospheric Administration. 2023. Small Diesel Spills (500 - 5,000 gallons). U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Office of Response and Restoration. <https://response.restoration.noaa.gov/sites/default/files/Small-Diesel-Spills.pdf>.
- National Oceanic and Atmospheric Administration. 2024a. Nassau Grouper. <https://www.fisheries.noaa.gov/species/nassau-grouper>.
- National Oceanic and Atmospheric Administration. 2024b. Queen Conch. <https://www.fisheries.noaa.gov/species/queen-conch>.
- National Oceanic and Atmospheric Administration. 2025. ESA Threatened and Endangered Species: Species Directory. <https://www.fisheries.noaa.gov/species-directory/threatened-endangered>.
- National Research Council. 1983. Drilling Discharges in the Marine Environment. Washington, DC. National Academy Press. 180 pp.
- National Research Council. 2003a. Oil in the Sea III: Inputs, Fates, and Effects. Washington, DC. National Academy Press. 182 pp. + app.
- National Research Council. 2003b. Ocean Noise and Marine Mammals. Washington, DC. National Academy Press. 204 pp.
- National Wildlife Federation. 2016. Wildlife Library: Whooping Crane. <https://www.nwf.org/Educational-Resources/Wildlife-Guide/Birds/Whooping-Crane>.
- Natural Resources Defense Council. 2014. A petition to list the Gulf of Mexico Bryde's whale (*Balaenoptera edeni*) as endangered under the Endangered Species Act. https://www.nrdc.org/sites/default/files/wil_14091701a.pdf.

- Nedwell, J.R. and B. Edwards. 2004. A Review of Measurements of Underwater Man-Made Noise carried out by Subacoustech Ltd, 1993 - 2003. Prepared by Subacoustech Report Reference: 565R00109, September 2004; prepared for ChevronTexaco Ltd, Total Final Elf Exploration UK PLC, DSTL, DTI, Shell UK.
- Nedwell, J.R. and D. Howell. 2004. A Review of Offshore Windfarm Related Underwater Noise Sources. Report No. 544 R 0308. Subacoustech Ltd., Southampton, UK. 63 pp.
- Nedwell, J.R., K. Needham, and B. Edwards. 2001. Report on Measurements of Underwater Noise from the Jack Bates Drill Rig. Report No. 462 R 0202. Subacoustech Ltd., Southampton, UK. 49 pp.
- Neff, J.M. 1987. Biological effects of drilling fluids, drill cuttings and produced waters, pp 469-538. In: D.F. Boesch and N.N. Rabalais (Eds.), Long Term Effects of Offshore Oil and Gas Development. Elsevier Applied Science Publishers, London, UK.
- Neff, J.M., A.D. Hart, J.P. Ray, J.M. Limia, and T.W. Purcell (2005). An Assessment of Seabed Impacts of Synthetic Based Drilling-mud Cuttings in the Gulf of Mexico. 2005 SPE/EPA/DOE Exploration and Production Environmental Conference, 7-9 March 2005, Galveston, TX. SPE 94086.
- Neff, J.M., S. McKelvie, and R.C. Ayers. 2000. Environmental Impacts of Synthetic Based Drilling Fluids. U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region. New Orleans, LA. OCS Study MMS 2000-064. 141 pp.
- Nieder, C., E. Parmentier, A.G. Jeffs, and C. Radford. 2025. Evidence of active sound production by a shark. Royal Society Open Science 12: 242212.
- NOAA Fisheries (National Marine Fisheries Service). 2023b. Smalltooth Sawfish. <https://www.fisheries.noaa.gov/species/smalltooth-sawfish>.
- NOAA Fisheries. 2023a. Endangered Species Act Rice's Whale Critical Habitat Report: Proposed Information Basis and Impact Considerations of Critical Habitat Designation. July 2023. <https://www.fisheries.noaa.gov/s3/2023-07/Critical-Habitat-Report-508-Final.pdf>.
- Nowlin, W.D.J., A.E. Jochens, S.F. DiMarco, R.O. Reid, and M.K. Howard. 2001. Deepwater Physical Oceanography Reanalysis and Synthesis of Historical Data: Synthesis Report. U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region. New Orleans, LA. OCS Study MMS 2001-064. 528 pp.
- Operational Science Advisory Team, 2011. Summary Report for Fate and Effects of Remnant Oil Remaining in the Beach Environment. Prepared for Lincoln D. Stroh, Capt., U.S. Coast Guard, Federal On-Scene Coordinator, *Deepwater Horizon* MC252.
- Ozhan, K., M.L. Parsons, and S. Bargu. 2014. How were phytoplankton affected by the *Deepwater Horizon* oil spill? Bioscience 64: 829-836.
- Pabody, C.M., R.H. Carmichael, L. Rice, and M. Ross. 2009. A new sighting network adds to 20 years of historical data on fringe West Indian Manatee (*Trichechus manatus*) populations in Alabama waters. Gulf of Mexico Science 1: 52-61.
- Picciulin, M., L. Sebastianutto, A. Codarin, A. Farina, and E.A. Ferrero. 2010. In situ behavioural responses to boat noise exposure of *Gobius cruentatus* (Gmelin, 1789; fam. Gobiidae) and Chromis (Linnaeus, 1758; fam. Pomacentridae) living in a Marine Protected Area. Journal of Experimental Marine Biology and Ecology 386(1): 125-132.
- Piniak, W.E.D., D.A. Mann, C.A. Harms, T.T. Jones, and S.A. Eckert. 2016. Hearing in the juvenile green sea turtle (*Chelonia mydas*): A comparison of underwater and aerial hearing using auditory evoked potentials. PLoS ONE 11(10): e0159711.
- Pitman, R.L. and R.L. Brownell Jr. 2020. *Mesoplodon bidens*. The IUCN Red List of Threatened Species 2020: eT13241A50363686. <https://dx.doi.org/10.2305/IUCN.UK.2020-3.RLTS.T13241A50363686.en>.
- Poot, H., B.J. Ens, H. de Vries, M.A. Donners, M.R. Wernand, and J.M. Marquenie. 2008. Green light for nocturnally migrating birds. Ecology and Society 13(2): 47.

- Popper, A.N., A.D. Hawkins, R.R. Fay, D. Mann, S. Bartol, T.J. Carlson, S. Coombs, W.T. Ellison, R.L. Gentry, M.B. Halvorsen, S. Lokkeborg, P. Rogers, B.L. Southall, D. Zeddes, and W.N. Tavolga. 2014. Sound Exposure Guidelines for Fishes and Sea Turtles: A Technical Report. ASA S3/SC1.4 TR-2014 prepared by ANSI-Accredited Standards Committee S3/SC1 and registered with ANSI. ASA Press, Springer.
- Powers, S.P., F.J. Hernandez, R.H. Condon, J.M. Drymon, and C.M. Free. 2013. Novel pathways for injury from offshore oil spills: Direct, sublethal and indirect effects of the *Deepwater Horizon* oil spill on pelagic Sargassum communities. *PLoS ONE* 8(9): e74802.
- Prince, R.C. 2014. Crude oil Releases to the Environment: Natural Fate and Remediation Options. Reference Module in Earth Systems and Environmental Sciences. Elsevier.
<https://doi.org/10.1016/B978-0-12-409548-9.09112-0>.
- Pritchard, P.C.H. 1997. Evolution, phylogeny, and current status, pp. 1-28. In: P.L. Lutz and J.A. Musick (Eds.), *The Biology of Sea Turtles*. CRC Press, Boca Raton, FL.
- Radford, A.N., E. Kerridge, and S.D. Simpson. 2014. Acoustic communication in a noisy world: Can fish compete with anthropogenic noise? *Behavioral Ecology* 25(5): 1,022-1,030.
- Ramseur, J.L. 2011. *Deepwater Horizon* Oil Spill: The Fate of the Oil. Congressional Research Service Report prepared for Members and Committees of Congress. <https://crsreports.congress.gov/product/pdf/R/R41531>.
- Rappucci, G., A. Martinez, J. Litz, L. Aichinger Dias, M. Soldevilla, K. Ternus, L.P. Garrison, K.D. Mullin, and S. Privoznik. GoMMAPPS Summer 2017 Research Cruise Report GU17-03. Southeast Fisheries Science Center Reference Document Number PRBD-2019-05. U.S. Department of Commerce, National Marine Fisheries Service. 25 pp.
- Rathbun, G.B. 1988. Fixed-wing airplane versus helicopter surveys of manatees. *Marine Mammal Science* 4(1): 71-75.
- Reddy, C.M., J.S. Arey, J.S. Seewald, S.P. Sylva, K.L. Lemkau, R.K. Nelson, C.A. Carmichael, C.P. McIntyre, J. Fenwick, G.T. Ventura, A.S. Van Mooy, and R. Camilli. 2012. Composition and fate of gas and oil released to the water column during the *Deepwater Horizon* oil spill. *Proceedings of the National Academy of Sciences USA* 109(50): 20229-20234.
- Relini, M., L.R. Orsi, and G. Relini. 1994. An offshore buoy as a FAD in the Mediterranean. *Bulletin of Marine Science* 55(2-3): 1099-1105.
- Reşitoğlu, İ.A., K. Altinişik, and A. Keskin. 2015. The pollutant emissions from diesel-engine vehicles and exhaust after treatment systems. *Clean Technologies and Environmental Policy* 17(1): 15-27.
- Richards, W.J., M.F. McGowan, T. Leming, J.T. Lamkin, and S. Kelley-Farga. 1993. Larval fish assemblages at the Loop Current boundary in the Gulf of Mexico. *Bulletin of Marine Science* 53(2): 475-537.
- Richards, W.J., T. Leming, M.F. McGowan, J.T. Lamkin, and S. Kelley-Farga. 1989. Distribution of fish larvae in relation to hydrographic features of the Loop Current boundary in the Gulf of Mexico. *ICES Marine Science Symposia* 191: 169-176.
- Richardson, W.J., C.R. Greene Jr., C.I. Malme, and D.H. Thomson. 1995. *Marine Mammals and Noise*. San Diego, CA, Academic Press. 592 pp.
- Rigby, C.L., Barreto, R., Carlson, J., Fernando, D., Fordham, S., Francis, M.P., Herman, K., Jabado, R.W., Liu, K.M., Marshall, A., Pacourea, N., Romanov, E., Sherley, R.B. & Winker, H. 2019. *Carcharhinus longimanus*. The IUCN Red List of Threatened Species 2019: e.T39374A2911619.
- Rodgers, J.A. and S.T. Schwikert. 2002. Buffer-Zone Distances to protect foraging and loafing waterbirds from disturbance by personal watercraft and outboard-powered boats. *Conservation Biology* 16(1): 216-224.
- Rojek, N.A., M.W. Parker, H.R. Carter, and G.J. McChesney. 2007. Aircraft and vessel disturbances to Common Murres *Uria aalge* at breeding colonies in central California, 1997-1999. *Marine Ornithology* 35: 61-69.

- Rosel, P.E., L.A. Wilcox, T.K. Yamada, and K.D. Mullin. 2021. A new species of baleen whale (Balnaenoptera) from the Gulf of Mexico, with a review of its geographic distribution. *Marine Mammal Science* 37(2): 577-610.
- Rosel, P.E., P. Corkeron, L. Engleby, D. Epperson, K.D. Mullin, M.S. Soldevilla, and B.L. Taylor. 2016. Status Review of Bryde's Whales (*Balaenoptera edeni*) in the Gulf of Mexico under the Endangered Species Act. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Fisheries Science Center. NOAA Technical Memorandum NMFS-SEFSC-692. 133 pp.
- Ross, S.W., A.W.J. Demopoulos, C.A. Kellogg, C.L. Morrison, M.S. Nizinski, C.L. Ames, T.L. Casazza, D. Gaultier, K. Kovacs, J.P. McClain, A.M. Quattrini, A.Y. Roa-Varón, and A.D. Thaler. 2012. Deepwater Program: Studies of Gulf of Mexico lower Continental Slope Communities Related to Chemosynthetic and Hard Substrate Habitats. U.S. Department of the Interior, U.S. Geological Survey. U.S. Geological Survey Open-File Report 2012-1032. 318 pp.
- Rowe, G.T. and M.C. Kennicutt. 2009. Northern Gulf of Mexico Continental Slope Habitats and Benthic Ecology Study. Final Report. U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region. New Orleans, LA. OCS Study MMS 2009-039. 456 pp.
- Rudd, M.B., R.N.M. Ahrens, W.E. Pine III, and S.K. Bolden. 2014. Empirical spatially explicit natural mortality and movement rate estimates for the threatened Gulf Sturgeon (*Acipenser oxyrinchus desotoi*). *Canadian Journal of Fisheries and Aquatic Sciences* 71: 1407-1417.
- Russell, R.W. 2005. Interactions Between Migrating Birds and Offshore Oil and Gas Platforms in the Northern Gulf of Mexico: Final Report. U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region. New Orleans, LA. OCS Study MMS 2005-009. 348 pp.
- Sadovy, Y. 1997. The case of the disappearing grouper; *Epinephelus striatus*, the Nassau grouper in the Caribbean and western Atlantic. *Proceedings of the Gulf and Caribbean Fisheries Institute* 45: 5-22.
- Salmon, M. and J. Wyneken. 1990. Do swimming loggerhead sea turtles (*Caretta L.*) use light cues for offshore orientation? *Marine and Freshwater Behaviour and Physiology* 17(4): 233-246.
- Samuel, Y., S.J. Morreale, C.W. Clark, C.H. Greene, and M.E. Richmond. 2005. Underwater, low-frequency noise in a coastal sea turtle habitat. *Journal of the Acoustical Society of America* 117(3): 1465-1472.
- Schwemmer, P., B. Mendel, N. Sonntag, V. Dierschke, and S. Garthe. 2011. Effects of ship traffic on seabirds in offshore waters: implications for marine conservation and spatial planning. *Ecological Applications* 21(5): 1851-1860.
- Seitz, J.C. and G.R. Poulakis. 2006. Anthropogenic effects on the smalltooth sawfish (*Pristis pectinata*) in the United States. *Marine Pollution Bulletin* 52(11): 1533-1540.
- Simões, T.N., A. Cândido de Silva, and C. Carneiro de Melo Moura. 2017. Influence of artificial lights on the orientation of hatchlings of *Eretmochelys imbricata* in Pernambuco, Brazil. *Zoologia* 34: e13727.
- Simons, T.R. D.S. Lee, J.C. Haney. 2013. Diablotin *Pterodroma hasitata*: a biography of the endangered Black-capped Petrel. *Marine Ornithology* 41: 3-43.
- Smithsonian Tropical Research Institute. 2015. Species: *Ariomma bondi*, Silver Rag Driftfish, Silver Rage, Silver-rag driftfish. <https://biogeodb.stri.si.edu/caribbean/en/thefishes/species/4273>.
- Smulcea, M.A., J.R. Mobley Jr., D. Fertl, and G.L. Fulling. 2008. An unusual reaction and other observations of sperm whales near fixed wing aircraft. *Gulf and Caribbean Research* 20: 75-80.
- Soldevilla, M.S., Debich, A.J., Garrison, L.P., Hildebrand, J.A., and Wiggins, S.M. 2022a. Rice's whales in the northwestern Gulf of Mexico: call variation and occurrence beyond the known core habitat. *Endangered Species Research* 48: 155-174.
- Soldevilla, M.S., Debich, A.J., Perez-Carballo, I., Jarriel, S., Grasier, K.E., Garrison, L.P., Gracia, A., Hildebrand, J.A., Rosel, P.E., and A. Serrano. 2024. Rice's whale occurrence in the western Gulf of Mexico from passive acoustic recordings. *Marine Mammal Science* 2024: 1-8.

- Soldevilla, M.S., Ternus, K., Cook, A., Hildebrand, J.A., Frasier, K.E., Martinex, A., and L.P. Garrison. 2022b. Acoustic localization, validation, and characterization of Rice's whale calls. *Journal of the Acoustical Society of America* 151(6): 4264.
- Southall, B.L., D.P. Nowacek, A.E. Bowles, V. Senigaglia, L. Bejder, and P.L. Tyack. 2021. Marine mammal noise exposure criteria: assessing the severity of marine mammal behavioral responses to human noise. *Aquatic Mammals* 47(5): 421-464.
- Southall, B.L., D.P. Nowacek, P.J. Miller, and P.L. Tyack. 2016. Experimental field studies to measure behavioral responses of cetaceans to sonar. *Endangered Species Research* 31: 293-315.
- Southall, B.L., J.J. Finneran, C. Reichmuth, P.E. Nachtigall, D.R. Ketten, A.E. Bowles, W.T. Ellison, D.P. Nowacek, and P.L. Tyack. 2019. Marine Mammal Noise Exposure Criteria: Updated Scientific Recommendations for Residual Hearing Effects. *Aquatic Mammals* 45(2): 125-23.
- Spies, R.B., S. Senner and C.S. Robbins. 2016. An Overview of the Northern Gulf of Mexico Ecosystem. *Gulf of Mexico Science* 33(1): 98-121. doi: 10.18785/goms.3301.09.
- Stewart, J.D., M. Nuttall, E.L. Hickerson, and M.A. Johnson. 2018. Important juvenile manta ray habitat at Flower Garden Banks National Marine Sanctuary in the northwestern Gulf of Mexico. *Marine Biology* 165(111).
- Stiles, M.L., E. Harrold-Kolieb, R. Faure, H. Tlitalo-Ward, and M.F. Hirschfield. 2007. Deep Sea Trawl Fisheries of the Southeast U.S. and Gulf of Mexico: Rock Shrimp, Royal Red Shrimp, Calico Scallops. Oceana. Washington DC. 24 pp.
- Stoner, A.W., and R.S. Appeldoorn 2022. Synthesis of Research on the Reproductive biology of Queen conch (*Aliger gigas*): toward the goals of sustainable fisheries and species conservation. *Reviews in Fisheries Science & Aquaculture* 30(3): 346-390.
- Suchanek, T.H. 1993. Oil impacts on marine invertebrate populations and communities. *American Zoologist* 33: 510-523.
- Sulak, K.J. and J.P. Clugston. 1998. Early life history stages of Gulf sturgeon in the Suwanee River, Florida. *Transactions of the American Fisheries Society* 127: 758-771.
- The Wildlife Society. 2023. Are Rufa Red Knots On The Rise? <https://wildlife.org/are-rufa-red-knots-on-the-rise/#:~:text=The%20U.S.%20Fish%20and%20Wildlife,Sync%20in%20recent%20years%2C%20though.>
- Tierney, K.B., Baldwin, D.H., Hara, T.J., Ross, P.S., Scholz, N.L., and C.J. Kennedy. 2010. Olfactory toxicity in fishes. *Aquatic Toxicology* 96: 2-26.
- Todd, V.L.G., W.D. Pearse, N.C. Tegenza, P.A. Lepper, and I.B. Todd. 2009. Diel echolocation activity of harbour porpoises (*Phocoena phocoena*) around North Sea offshore gas installations. *ICES Journal of Marine Science* 66: 734-745.
- Turtle Island Restoration Network. 2025. Kemp's Ridley Sea Turtle Count on the Texas Coast. <https://seaturtles.org/turtle-count-texas-coast/>.
- Tuxbury, S.M. and M. Salmon. 2005. Competitive interactions between artificial lighting and natural cues during seafinding by hatchling marine turtles. *Biological Conservation* 121: 311-316.
- U.S. Department of Homeland Security. 2014. U.S. Coast Guard Incident Management Handbook. COMDTPUB P3120.17B. U.S. Government Printing Office. Washington, DC.
- U.S. Environmental Protection Agency. 2016. Questions and answers about the BP oil spill in the Gulf Coast. <https://archive.epa.gov/emergency/bp spill/web/html/qanda.html>.
- U.S. Environmental Protection Agency. 2025. Nonattainment Areas for Criteria Pollutants (Green Book). <https://www.epa.gov/green-book>.

- U.S. Fish and Wildlife Service, Gulf States Marine Fisheries Commission and National Marine Fisheries Service. 1995. Gulf Sturgeon Recovery/Management Plan. U.S. Department of Interior, U.S. Fish and Wildlife Service, Southeast Region. Atlanta, GA.
- U.S. Fish and Wildlife Service. 2001a. Florida manatee recovery plan (*Trichechus manatus latirostris*), Third Revision. U.S. Department of the Interior, Southeast Region. Atlanta, GA.
- U.S. Fish and Wildlife Service. 2001b. Endangered and threatened wildlife and plants; Endangered status for the Florida salt marsh vole. *Federal Register* 56(9):1457-1459.
- U.S. Fish and Wildlife Service. 2003. Recovery plan for the Great Lakes Piping Plover (*Charadrius melanotos*). U.S. Department of the Interior. Fort Snelling, MN.
- U.S. Fish and Wildlife Service. 2007. International Recovery Plan: Whooping Crane (*Grus americana*), Third Revision. U.S. Department of the Interior. Albequerque, NM.
- U.S. Fish and Wildlife Service. 2014. West Indian Manatee (*Trichechus manatus*) Florida Stock (Florida subspecies, *Trichechus manatus latirostris*). Jacksonville, Florida. https://esadocs.defenders-cci.org/ESAdocs/misc/FR00001606_Final_SAR_WIM_FL_Stock.pdf.
- U.S. Fish and Wildlife Service. 2016a. Hawksbill Sea Turtle (*Eretmochelys imbricata*). <https://www.fws.gov/species/hawksbill-sea-turtle-eretmochelys-imbricata>.
- U.S. Fish and Wildlife Service. 2016b. Find Endangered Species. <http://www.fws.gov/endangered/>.
- U.S. Fish and Wildlife Service. 2019. Florida salt marsh vole (*Microtus pennsylvanicus dukecampbelli*): 5-year review: summary and evaluation. Department of the Interior, USFWS Southeast Region, North Florida Ecological Services Field Office, Jacksonville, FL. 25 pp.
- U.S. Fish and Wildlife Service. 2020. FWS-Listed U.S. Species by Taxonomic Group. <https://ecos.fws.gov/ecp/report/species-listings-by-tax-group-totals>.
- U.S. Fish and Wildlife Service. 2020. Species Status Assessment Report for the Rufa Red Knot (*Calidris canutus rufa*). Version 1.1. September 2020, North Atlantic-Appalachian Region (Interior Region 1), New Jersey Field Office, Galloway, New Jersey.
- U.S. Fish and Wildlife Service. 2023a. Whooping Crane Survey Results: Winter 2022-2023. <https://www.fws.gov/sites/default/files/documents/WHCR%20Update%20Winter%202022-2023.pdf>.
- U.S. Fish and Wildlife Service. 2023b. Species Status Assessment Report for the Black-capped Petrel (*Pterodroma hasitata*). Version 1.3, May 2023. <https://ecos.fws.gov/ServCat/DownloadFile/242904>.
- U.S. Fish and Wildlife Service. 2025. Environmental Conservation Online System (ECOS). Threatened and Endangered Species. <https://ecos.fws.gov/ecp/>.
- U.S. Fish and Wildlife Service. nd. Rufa Red Knot. <https://www.fws.gov/species/rufa-red-knot-calidris-canutus-rufa>.
- Valentine, D.L., G.B. Fisher, S.C. Bagby, R.K. Nelson, C.M. Reddy, S.P. Sylva, and M.A. Woo. 2014. Fallout plume of submerged oil from *Deepwater Horizon*. *Proceedings of the National Academy of Sciences USA* 111(45): 906-915.
- Van de Laar, F.J.T. 2007. Green Lights to Birds: Investigations into the Effect of Bird Friendly Lighting. NAM LOCATIE L15-FA-1. 23 pp. <https://tethys.pnnl.gov/sites/default/files/publications/van-de-Laar-2007.pdf>.
- Vanderlaan, A. S. and C. T. Taggart. 2007. Vessel collisions with whales: The probability of lethal injury based on vessel speed. *Marine Mammal Science* 23(1): 144-156.
- Wakeford, A. 2001. State of Florida Conservation Plan for Gulf sturgeon (*Acipenser oxyrinchus desotoi*). Florida Fish and Wildlife Conservation Commission, St. Petersburg, FL. FMRI Technical Report TR-8. 106 pp.
- Wang VH, Zapfe CR, Hernandez FJ. 2021. Assemblage structure of larval fishes in epipelagic and mesopelagic waters of the northern Gulf of Mexico. *Frontiers in Marine Science*, 8: 766369.

- Waring, G.T., E. Josephson, K. Maze-Foley, and P.E.E. Rosel. 2016. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments – 2015. U.S. Department of Commerce, National Oceanic and Atmospheric Administration. NOAA Technical Memorandum NMFS NE 238. 361 pp.
- Wartzok, D. and D.R. Ketten. 1999. Marine mammal sensory systems, pp 117-175. In: J.E. Reynolds III and S. Rommel (Eds.), *Biology of Marine Mammals*. Smithsonian Institution Press, Washington, DC.
- Wei, C.-L. 2006. The Bathymetric Zonation and Community Structure of Deep-sea Macrobenthos in the Northern Gulf of Mexico. M.S. Thesis, Texas A&M University. <http://repository.tamu.edu/handle/1969.1/4927>.
- Wei, C.-L., G.T. Rowe, G.F. Hubbard, A.H. Scheltema, G.D.F. Wilson, I. Petrescu, J.M. Foster, M.K. Wickstein, M. Chen, R. Davenport, Y. Soliman, and Y. Wang. 2010. Bathymetric zonation of deep-sea macrofauna in relation to export of surface phytoplankton production. *Marine Ecology Progress Series* 39: 1-14.
- Wiese, F.K., W.A. Montevecchi, G.K. Davoren, F. Huettmann, A.W. Diamond, and J. Linke. 2001. Seabirds at risk around offshore oil platforms in the north-west Atlantic. *Marine Pollution Bulletin* 42(12): 1285-1290.
- Wilson, C.A., A. Pierce, and M.W. Miller. 2003. Rigs and Reefs: A Comparison of the Fish Communities at Two Artificial Reefs, a Production Platform, and a Natural Reef in the Northern Gulf of Mexico. U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region. New Orleans, LA. OCS Study MMS 2003-009. 105 pp.
- Wilson, C.A., M.W. Miller, Y.C. Allen, K.M. Boswell, and D.L. Nieland. 2006. Effects of Depth, Location, and Habitat Type on Relative Abundance and Species Composition of Fishes Associated with Petroleum Platforms and Sonnier Bank in the Northern Gulf of Mexico. U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region. New Orleans, LA. OCS Study MMS 2006-037. 97 pp.
- Wilson, J. 2003. Manatees in Louisiana. *Louisiana Conservationist* July/August 2003: 7 pp.
- Witherington, B., S. Hirama, R. Hardy. 2012. Young sea turtles of the pelagic Sargassum-dominated drift community: Habitat use, population density, and threats. *Marine Ecology Progress Series*. 463:1-22. <https://www.int-res.com/articles/feature/m463p001.pdf>.
- Wootton, E.C., E.A. Dyrynda, R.K. Pipe, and N.A. Ratcliffe. 2003. Comparisons of PAH-induced immunomodulation in three bivalve molluscs. *Aquatic Toxicology* 65(1): 13-25. Würsig, B., S.K. Lynn, T.A. Jefferson, and K.D. Mullin. 1998. Behaviour of cetaceans in the northern Gulf of Mexico relative to survey ships and aircraft. *Aquatic Mammals* 24(1): 41-50.
- Würsig, B. 2017. Marine mammals of the Gulf of Mexico, pp. 1489-1587. In: C. Ward (Ed.), *Habitats and Biota of the Gulf of Mexico: Before the Deepwater Horizon Oil Spill*. Springer, New York, NY.
- Würsig, B., T.A. Jefferson, and D.J. Schmidly. 2000. *The Marine Mammals of the Gulf of Mexico*. College Station, TX, Texas A&M University Press. 232 pp.
- Young, C.N. and J.K. Carlson. 2020. The biology and conservation status of the oceanic whitetip shark (*Carcharhinus longimanus*) and future directions for recovery. *Reviews in Fish Biology and Fisheries* 30: 293-321.
- Zykov, M.M. 2016. Modelling Underwater Sound Associated with Scotian Basin Exploration Drilling Project: Acoustic Modelling Report. JASCO Document 01112, Version 2.0. Technical report by JASCO Applied Sciences for Stantec Consulting Ltd. 90 pp.

Appendix E: Air Emissions Information – Form BOEM-0139

Fuel Usage Conversion Factors		Natural Gas Turbines		SCF/Unit/hr		SCF/Unit/hr		7.743		Natural Gas Engines		Diesel Recip. Engine		Diesel turbines	
Equipment/Emission Factors	units	TSP	PM10	PM2.5	SOx	NOx	VOC	Pb	CO	NH3	REF.				
Natural Gas Turbine	g/hr-hr		0.0086	0.0026	0.4515	0.0095	N/A	0.3719	N/A		AP42 3.1-3.1-2a				
RECIP 2-Cycle, Lean Natural Gas	g/hr-hr	0.1293	0.0020	6.596B	0.4082	N/A	1.2009	N/A			AP42 3.2-1				
RECIP 4-Cycle, Rich Natural Gas	g/hr-hr	0.0002	0.0020	2.8814	0.4014	N/A	1.8949	N/A			AP42 3.2-2				
RECIP 4-Cycle, Rich Natural Gas	g/hr-hr	0.00323	0.0023	7.7224	0.1021	N/A	11.9408	N/A			AP42 3.2-3				
Diesel Recip. < 600 hp	g/hr-hr	1	1	0.0279	1.41	1.04	N/A	3.03	N/A		AP42 3.3-1				
Diesel Recip. > 600 hp	g/hr-hr	0.182	0.178	0.0056	10.9	0.29	N/A	2.5	N/A		AP42 3.4-1 & 4-2				
Diesel Boiler	lb/std-hr	0.0040	0.0005	0.0089	5.14E-05	0.0000	0.0084	5.14E-05	0.0036		AP42 3.1-3.1-2a				
Diesel Turbine	lb/std-hr	0.0381	0.0137	0.0048	2.7941	0.0013	4.45E-05	0.0105	N/A		AP42 3.1-1.8.3-1-2a				
Dual Fuel Turbine	lb/std-hr	0.0381	0.0137	0.0048	2.7941	0.0095	4.45E-05	0.3719	0.0000		AP42 3.1-1.8.3-1-2a				
Vessels – Propulsion	g/hr-hr	0.320	0.1873	0.0047	7.6669	0.2204	2.24E-05	1.2025	0.0022		USEPA 2017 NEI TSP refer to Diesel Recip. > 600 hp reference				
Vessels – Drilling/Piping Engine, Auxiliary	g/hr-hr	0.320	0.1873	0.0047	7.6669	0.2204	2.24E-05	1.2025	0.0022		USEPA 2017 NEI TSP refer to Diesel Recip. > 600 hp reference				
Vessels – Diesel Boiler	g/hr-hr	0.0466	0.1491	0.4400	1.4914	0.0820	3.73E-05	0.1491	0.0003		USEPA 2017 NEI TSP (units converted) refer to Diesel Boiler Reference				
Vessels – Well Stimulation	g/hr-hr	0.320	0.1873	0.0047	7.6669	0.2204	2.24E-05	1.2025	0.0022		USEPA 2017 NEI TSP refer to Diesel Recip. > 600 hp reference				
Natural Gas Heater/Burner	lb/std-Mscf	7.60	1.90	1.90	0.60	190.00	5.50	5.00E-04	84.00	3.2	AP42 1.4-1.8.1-2.2. Ph and NH3: Web FIRE (08/2018)				
Combustion/Fire (no smoke)	lb/std-Mscf	0.00	0.00	0.00	0.57	71.40	35.93	N/A	328.5	N/A	AP42 1.3-5.1-1.5-2				
Combustion/Fire (light smoke)	lb/std-Mscf	2.10	2.10	0.57	71.40	35.93	N/A	328.5	N/A		AP42 1.3-5.1-1.5-2				
Combustion/Fire (medium smoke)	lb/std-Mscf	10.50	10.50	0.57	71.40	35.93	N/A	328.5	N/A		AP42 1.3-5.1-1.5-2				
Combustion/Fire (heavy smoke)	lb/std-Mscf	21.00	21.00	0.57	71.40	35.93	N/A	328.5	N/A		AP42 1.3-5.1-1.5-2				
Liquid Flaring	lb/std-hr	0.42	0.0866	0.0651	5.964	0.164	0.01426	5.14E-05	0.21	0.0336	AP42 3.1 through 1.3-3 and 1.5				
Storage Tank	tons/yr/tank							4.300			2014 Gulfwide Inventory: Arng emis (upper bound of 95% CI)				
Fugitives	lb/std/component							0.0005			API Study				
Glycol Dehydrator	tons/yr/dehydrator							19.240			2011 Gulfwide Inventory: Arng emis (upper bound of 95% CI)				
Cold Vent	tons/yr/vent										2014 Gulfwide Inventory: Arng emis (upper bound of 95% CI)				
Waste Incinerator	lb/std	15.0	15.0	2.5	0.040	0.6004	0.049	N/A	20.0	N/A	AP42 1.1-1.2				
On-ice – Loader	lbs/gal	0.043	0.043	0.043	0.043	0.040	0.040	0.049	N/A	0.130	0.003	USEPA NONROAD2008 model: TSP (units converted) refer to Diesel Recip. <400	2009		
On-ice – Other Construction Equipment	lbs/gal	0.043	0.043	0.043	0.043	0.040	0.040	0.049	N/A	0.130	0.003	USEPA NONROAD2008 model: TSP (units converted) refer to Diesel Recip. <400	2009		
On-ice – Other Survey Equipment	lbs/gal	0.043	0.043	0.043	0.043	0.040	0.040	0.049	N/A	0.130	0.003	USEPA NONROAD2008 model: TSP (units converted) refer to Diesel Recip. <400	2009		
On-ice – Tractor	lbs/gal	0.043	0.043	0.043	0.043	0.040	0.040	0.049	N/A	0.130	0.003	USEPA NONROAD2008 model: TSP (units converted) refer to Diesel Recip. <400	2009		
On-ice – Truck (for gravel island)	lbs/gal	0.043	0.043	0.043	0.043	0.040	0.040	0.049	N/A	0.130	0.003	USEPA NONROAD2008 model: TSP (units converted) refer to Diesel Recip. <400	2009		
On-ice – Truck for surveys)	lbs/gal	0.043	0.043	0.043	0.043	0.040	0.040	0.049	N/A	0.130	0.003	USEPA NONROAD2008 model: TSP (units converted) refer to Diesel Recip. <400	2009		
Man Camp – Operation (max people/day)	tons/person/day							0.0004	0.0004	0.006	0.001	N/A	0.001	BOEM 2014-1001	
Vessels - Ice Management Diesel	g/hr-hr	0.320	0.1873	0.0047	7.6669	0.2204	2.24E-05	1.2025	0.0022		USEPA 2017 NEI TSP refer to Diesel Recip. >600 hp reference				
Vessels - Hovercraft Diesel	g/hr-hr	0.320	0.1873	0.0047	7.6669	0.2204	2.24E-05	1.2025	0.0022		USEPA 2017 NEI TSP refer to Diesel Recip. >600 hp reference				

Sulfur Content Source	Value	Units
Fuel Gas	3.38	ppm
Diesel Fuel	0.0015	% weight
Produced Gas (Flare)	3.38	ppm
Produced Oil (Liquid Flaring)	1	% weight

Natural Gas Flare Parameters	Value	Units
VOC Content of Flare Gas	0.6816	lb VOCs/mol gas
Natural Gas Flare Efficiency	98	%

Density and Heat Value of Diesel Fuel	Density	Heat Value
	7.05	11030
	lb/ft ³	BTU/lb

Heat Value = 1.050

MMBtu/MMscf

9.98 and 5.70

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Appendix F: Coastal Zone Management Certifications (AL)

Appendix G Service Processing Fee

Alabama Department of Environmental Management
adem.alabama.gov

1400 Coliseum Blvd. 36110-2400 ■ Post Office Box 301463
Montgomery, Alabama 36130-1463
(334) 271-7700 ■ FAX (334) 271-7950

April 30, 2019

Mr. Robert Arpino
Bureau of Ocean Energy Management
Gulf of Mexico, OCS Region
1201 Elmwood Park Blvd.
New Orleans, Louisiana 70123-2394

Ms. Betsy Cleland
BP Exploration & Production Inc.
501 Westlake Park Boulevard
Houston, Texas 77079

RE: State of Alabama Coastal Consistency Concurrence
BP Exploration & Production Inc., Mississippi Canyon Area Block 522
OCS-G08823, BOEM Control # S-07936
Alabama Department of Environmental Management (ADEM) Tracking Code: ACAMP-2019-183-FC-OCS-BOEM

Dear Mr. Arpino and Ms. Cleland:

On April 5, 2019, the ADEM received BP Exploration & Production Inc.'s coastal consistency certification that its proposal, referenced above, is consistent with the Alabama Coastal Area Management Program (ACAMP). Public noticing requirements under Title 15 C.F.R. §930.77 have been completed. Pursuant to Title 15 C.F.R. §930.78, by this letter the ADEM hereby notifies BP Exploration & Production Inc. and the Bureau of Ocean Energy Management that it **concurs** with the BP Exploration & Production Inc.'s certification, conditional upon continued compliance with the ACAMP and the following conditions:

1. Pursuant to ADEM Admin. Code r.335-8-2-01(1), to protect water quality all necessary permits are obtained from EPA for discharges into Federal Waters.
2. Pursuant to ADEM Admin. Code r.335-8-2-01(1), to protect water quality, discharges associated with this activity must not result in a violation of Water Quality Standards in state waters.

In addition to the comments above, please review the enclosed Geological Survey of Alabama comment that the project occurs in an area that may contain chemosynthetic communities. Contact the Mobile-Coastal office anytime with questions. Always include the ADEM tracking code above when corresponding on this matter. C. Allen Phelps is the Mobile-Coastal office contact for this project; he may be reached by phone at (251)-304-1176 or by e-mail at cap@adem.alabama.gov.

Sincerely,



Anthony Scott Hughes, Chief
Field Operations Division

cc: BOEM, Idrissa Boube - (Via Email Only: Idrissa.Boube@boem.gov)
BOEM, Brian Cameron Jr. - (Via Email Only: Brian.CameronJr@boem.gov)
BOEM, Catherine Rosa - (Via Email Only: Catherine.Rosa@boem.gov)
BOEM, Tershara Matthews - (Via Email Only: Tershara.Matthews@boem.gov)
ADCNR-SLD, Hank Burch - (Via Email Only: Hank.Burch@dcnr.alabama.gov)
GSA | Dr. Berry (Nick) H. Tew, Jr. - (Via Email Only: ntew@gsa.state.al.us)

ASH/jsb/cap

File: CZCERT/2061



Birmingham Branch
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(205) 941-1603 (FAX)

Decatur Branch
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Decatur, AL 35603-1333
(256) 353-1713
(256) 340-9359 (FAX)

Mobile Branch
2204 Perimeter Road
Mobile, AL 36615-1131
(251) 450-3400
(251) 479-2593 (FAX)

Mobile-Coastal
3664 Dauphin Street, Suite B
Mobile, AL 36608
(251) 304-1176
(251) 304-1189 (FAX)

**Geological Survey of Alabama
State Oil and Gas Board of Alabama**



Berry H. (Nick) Tew, Jr.
State Geologist and
Oil and Gas Supervisor



April 10, 2019

Mr. Allen Phelps
ADEM, Coastal/Facility Section
3664 Dauphin Street, Suite B
Mobile, AL 36608

Re: BP Exploration & Production, Inc.
2019-183
OCS Federal Waters Mississippi Canyon Area Block 522
Supplemental Exploration Plan

Dear Mr. Phelps:

We have reviewed the above-captioned document and have the following comments on this material.

Under this proposed Supplemental Exploration Plan, BP Exploration & Production, Inc. proposes to drill one well at location 'A' with a mirror location 'B' only for re-spud purposes. The proposed activities would occur in an area that may contain chemosynthetic communities. We believe that the Bureau of Ocean Energy Management should enforce any reasonable restrictions that are necessary to protect these unique and sensitive communities from any potential adverse impact due to the proposed oil and gas operations contained in the proposed Supplemental Exploration Plan. Failure to institute proper and reasonable restrictions could result in irreparable damage to these fragile and biologically complex environments.

We appreciate the opportunity to review BP Exploration & Production, Inc.'s Supplemental Exploration Plan and look forward to safe, successful operations in the Federal waters off Alabama's coast.

Very truly yours,

Berry H. (Nick) Tew, Jr.
State Geologist and
Oil & Gas Supervisor

**Coastal Zone Management Consistency Certification
State of Alabama**

Supplemental Exploration Plan
Type of OCS Plan

Mississippi Canyon Block 520
Area and Block

OCS-G 09821
Lease Number

October 2018

CSA-BP-FL-18-80861-3334-02-REP-01-FIN

The proposed activities described in detail in this OCS Plan comply with Alabama's approved Coastal Management Program and will be conducted in a manner consistent with such Program.

BP Exploration & Production Inc.

Lessee or Operator

Betsy Celand

Certifying Official

01/16/2019

Date

Evaluation of Consistency with Alabama Enforceable Policies

1 Background

BP Exploration & Production Inc. (BP) is submitting a Supplemental Exploration Plan (EP) to the Bureau of Ocean Energy Management (BOEM). Under this EP, BP proposes to drill one (1) well (MC 520 005) at primary location "D". Surface and bottom hole locations will be in Mississippi Canyon (MC) Block 520. The plan also includes several alternate surface locations to the "D" well referred to as the "E", "H", "I", "G", and "F" wells. All surface locations target the same bottom hole location and the same production horizon. A dynamically positioned (DP) semisubmersible drilling rig or a DP drillship is anticipated to be on site for approximately 100 days. It is estimated that drilling activities will occur starting in 2019.

This regulatory analysis and consistency determination evaluates BP's EP for any reasonably foreseeable coastal effects on the land, water uses, or natural resources of the coastal zone of Alabama, pursuant to the enforceable policies of the Alabama Coastal Area Management Program (ACAMP). The analysis is submitted pursuant to 15 Code of Federal Regulations (CFR) 930.76 and is supported by documentation provided in the accompanying Environmental Impact Analysis (EIA) prepared in accordance with applicable regulations, including 30 CFR 550.212(o) and 550.227 as well as Notice to Lessees and Operators (NTL) 2008-G04, extended by NTL 2015-N02, and 2015-N01.

MC 520 is located within the Central Gulf of Mexico Outer Continental Shelf (OCS) Planning Area, approximately 117 statute miles (188 km) from the nearest Alabama shoreline. BP does not expect the proposed activities to affect the State of Alabama. The proposed activities will be conducted in accordance with the regulations of BOEM, the Bureau of Safety and Environmental Enforcement, and the U.S. Environmental Protection Agency as well as applicable NTLs, conditions in the approved permits, and lease stipulations.

2 Evaluation

Table 1 evaluates the proposed activities with respect to the enforceable policies of the ACAMP according to 15 CFR 930.76 (b), (c), and (d). The ACAMP was approved and has been in effect since 1979 (National Oceanic and Atmospheric Administration and Alabama Coastal Area Board, 1979), and was most recently updated in 2017 (Alabama Department of Conservation & Natural Resources, 2017). Its purpose is to promote, improve, and safeguard the lands and waters located in Alabama's coastal area through a comprehensive and cooperative program designed to preserve, enhance, and develop these valuable resources for present and future generations. The enforceable policies of the program regulate various activities on coastal lands and waters in Baldwin and Mobile Counties of Alabama.

3 Consistency Certification

The analysis indicates that BP's EP for MC 520 is consistent with the guidelines and policies provided by the ACAMP. Routine operations will have limited environmental impacts in the project area. All land-based support activities, including transport to and from the site, will be from Mississippi, Alabama, Louisiana, or Texas.

Table 1. Evaluation of the Supplemental Exploration Plan (EP) relative to the enforceable policies of the Alabama Coastal Area Management Program (ACAMP).

Policy	Cross Reference to the EP	Comments	Consistent with ACAMP Policies? (Yes/No)
Coastal Resource Use Policies			
Coastal Development	EP Section 1 – Plan Contents	Routine activities are not anticipated to affect Alabama's coastal development. The proposed activities will occur in Federal Outer Continental Shelf (OCS) waters approximately 117 statute miles (188 km) from the nearest Alabama shoreline, and BP will use existing onshore support facilities in Louisiana. Equipment may be shipped to the lease area from Alabama, but no impacts on coastal development are expected.	Yes
Mineral Resource Exploration and Extraction	EP Section 1 – Plan Contents	Routine activities are not anticipated to affect mineral resource exploration and extraction in Alabama's coastal zone. The proposed activities will occur in Federal OCS waters approximately 117 statute miles (188 km) from the nearest Alabama shoreline and do not include any extraction of minerals from the Alabama coastal zone.	Yes
Commercial Fishing	EP Appendix G – Oil Spill Discussion EP Appendix I – Environmental Impact Analysis (C.8.1 – Recreational and Commercial Fishing)	<p>Routine activities are not anticipated to affect commercial fishing in Alabama's coastal zone. Routine activities may have limited environmental impacts in Federal OCS waters, approximately 117 statute miles (188 km) from the nearest Alabama shoreline.</p> <p>Pelagic longlining activities in the lease area and other commercial fishing activities in the northern Gulf of Mexico, including Alabama's coastal zone, could be interrupted in the event of a large oil spill. A spill may or may not result in fishery closures depending on the duration of the spill, the oceanographic and meteorological conditions at the time, and the effectiveness of spill response measures. The potential impacts of an oil spill on Alabama's coastal zone are analyzed in the EIA.</p> <p>In the event of a spill, BP will implement the plans and procedures of its Regional Oil Spill Response Plan (OSRP). The precautions addressed in BP's standard safety and environmental operating procedures and Regional OSRP are consistent with the protection of Alabama's fishery resources and commercial fishing industry.</p>	Yes

Table 1. (Continued).

Policy	Cross Reference to the EP	Comments	Consistent with ACAMP Policies? (Yes/No)
Coastal Hazard Management	EP Section 3 – Geological and Geophysical Information EP Appendix G – Oil Spill Discussion EP Appendix I – Environmental Impact Analysis (D. Environmental Hazards)	<p>Site clearance surveys indicated seafloor conditions are suitable for proposed activities in the lease block.</p> <p>Routine activities are not anticipated to increase the susceptibility of Alabama's coastal zone to natural hazards due to the location of the proposed activities in Federal OCS waters, approximately 117 statute miles (188 km) from the nearest Alabama shoreline. Onshore support facilities may be located in Alabama; however, no new development in coastal areas, construction, dredging, or filling on Alabama's lands or waters are anticipated.</p> <p>In the event of a spill, BP will implement the plans and procedures of its Regional OSRP. Any cleanup or recovery activities in Alabama would be conducted using applicable best management practices to minimize shoreline erosion.</p>	Yes
Shoreline Erosion	EP Appendix I – Environmental Impact Analysis (C.7 Coastal Habitats and Protected Areas)	<p>Routine activities are not anticipated to affect Alabama's shoreline due to the location of the proposed activities in Federal OCS waters, approximately 117 statute miles (188 km) from the nearest Alabama shoreline. Onshore support facilities may be located in Alabama; however, no new development in coastal areas, construction, dredging, or filling on Alabama's lands or waters are anticipated that could cause shoreline erosion.</p> <p>In the event of a spill, any cleanup or recovery activities in Alabama would be conducted using applicable best management practices to minimize shoreline erosion, as addressed in the Regional OSRP.</p>	Yes
Recreation	EP Appendix G – Oil Spill Discussion EP Appendix I – Environmental Impact Analysis (C.8.4 Recreation and Tourism)	<p>There will be no routine activities in the Alabama coastal zone that could interfere with or diminish public access to coastal lands and waters for recreation. Recreational resources and tourism in coastal areas would not be affected by any routine activities due to the distance from shore. There are no known recreational uses of the lease area. Compliance with NTL BSEE-2015-G03 will minimize the chance of trash or debris being lost overboard and subsequently washing up on beaches.</p> <p>In the event of a spill, BP will implement the plans and procedures of its Regional OSRP. The precautions addressed in BP's standard safety and environmental operating procedures and its Regional OSRP are consistent with the ACAMP policy of safeguarding public access to coastal lands and waters for recreation.</p>	Yes
Transportation	EP Section 10 – Lease Stipulations Information EP Appendix I – Environmental Impact Analysis (C.8.6 Other Marine Uses)	<p>Routine activities are not anticipated to affect transportation. The lease area is not located within any United States Coast Guard-designated fairway or shipping lane, or within any Military Warning Area. BP will comply with the Bureau of Ocean Energy Management requirements and lease stipulations to avoid impacts on uses of the area by military vessels and aircrafts. Onshore support facilities may be located in Alabama; however, no impacts on Alabama transportation routes or infrastructure are expected to occur.</p>	Yes

Table 1. (Continued).

Policy	Cross Reference to the EP	Comments	Consistent with ACAMP Policies? (Yes/No)
Natural Resource Protection Policies			
Biological Productivity	EP Section 6 – Wastes and Discharges Information EP Appendix G – Oil Spill Discussion EP Appendix I – Environmental Impact Analysis (C.7 Coastal Habitats and Protected Areas)	<p>Routine activities are not anticipated to affect biologically productive coastal habitats, including estuaries. The proposed activities will be conducted in Federal OCS waters approximately 117 statute miles (188 km) from the nearest Alabama shoreline. BP will potentially use onshore support facilities in Alabama.</p> <p>In the event of a spill, BP will implement the plans and procedures of its Regional OSRP. The precautions addressed in BP's standard safety and environmental operating procedures and its Regional OSRP are consistent with the ACAMP policy of protecting and preserving biologically productive coastal habitats.</p>	Yes
Water Quality and Water Resources	EP Appendix G – Oil Spill Discussion EP Appendix I – Environmental Impact Analysis (C.1.2 Water Quality)	<p>Routine activities are not anticipated to affect Alabama's coastal water quality or water resources. The proposed activities will be conducted in Federal OCS waters, approximately 117 statute miles (188 km) from the nearest Alabama shoreline. All discharges for the proposed activity will be governed by a National Pollutant Discharge Elimination System General Permit or by U.S. EPA Vessel General Permits and MARPOL. The authorized overboard discharges during the proposed activities will be localized in offshore waters and are not expected to affect Alabama's water quality or water resources. BP will be using onshore support facilities in Louisiana.</p> <p>In the event of a spill, BP will implement the plans and procedures of its Regional OSRP. The precautions addressed in BP's standard safety and environmental operating procedures and its Regional OSRP are consistent with the core policies of conserving surface and ground waters for full beneficial use.</p>	Yes
Air Quality	EP Section 7 – Air Emissions Information EP Appendix I – Environmental Impact Analysis (C.1.1 Air Quality)	<p>Routine activities are not anticipated to affect Alabama's coastal air quality. The proposed activities will be conducted in Federal OCS waters, approximately 117 statute miles (188km) from the nearest Alabama shoreline.</p> <p>In the event of a spill, BP will implement the plans and procedures of its Regional OSRP. The precautions addressed in BP's standard safety and environmental operating procedures and its Regional OSRP are consistent with the protection of coastal air quality.</p>	Yes

Table 1. (Continued).

Policy	Cross Reference to the EP	Comments	Consistent with ACAMP Policies? (Yes/No)
Wetlands and Endemic Submerged Aquatic Vegetation	EP Section 5 – Biological, Physical, and Socioeconomic Information EP Appendix G – Oil Spill Discussion EP Appendix I – Environmental Impact Analysis (C.7 Coastal Habitats and Protected Areas)	<p>Routine activities are not anticipated to affect Alabama's wetlands and endemic submerged aquatic vegetation. The proposed activities will be conducted in Federal OCS waters approximately 117 statute miles (188 km) from the nearest Alabama shoreline. BP will potentially use onshore support facilities in Alabama. However, there will be no new construction, dredging, or filling on Alabama's lands or waters that could affect wetlands or submerged seagrass beds.</p> <p>In the event of a spill, BP will implement the plans and procedures of its Regional OSRP. Any cleanup or recovery activities in Alabama would be conducted using applicable best management practices to minimize impacts on wetlands, grassbeds, and other coastal habitats.</p>	Yes
Beach and Dune Protection	EP Section 5 – Biological, Physical, and Socioeconomic Information EP Appendix G – Oil Spill Discussion EP Appendix I – Environmental Impact Analysis (C.7 Coastal Habitats and Protected Areas)	<p>Routine activities are not anticipated to affect Alabama's beaches and dunes. The proposed activities will be conducted in Federal OCS waters approximately 117 statute miles (188 km) from the nearest Alabama shoreline. BP will potentially use onshore support facilities in Alabama. However, there will be no new construction, dredging, or filling on Alabama's lands or waters that could weaken, damage, or destroy the integrity of the coastal areas or cause erosion of beaches or dunes.</p> <p>In the event of a spill, BP will implement the plans and procedures of its Regional OSRP. Any cleanup or recovery activities in Alabama would be conducted using applicable best management practices to minimize shoreline erosion and impacts on beach and dune systems.</p>	Yes
Wildlife Habitat Protection	EP Section 5 – Biological, Physical, and Socioeconomic Information EP Appendix G – Oil Spill Discussion EP Appendix I – Environmental Impact Analysis (C.3 Threatened, Endangered, and Protected Species and Critical Habitat and C.7 Coastal Habitats and Protected Areas)	<p>Routine activities are not anticipated to affect Alabama's wildlife habitat. The proposed activities will be conducted in Federal OCS waters approximately 117 statute miles (188 km) from the nearest Alabama shoreline. BP will potentially use onshore support facilities in Alabama. However, there will be no new construction, dredging, or filling on Alabama's lands or waters that could affect coastal wildlife habitats, including critical habitats for endangered or threatened species.</p> <p>In the event of a spill, BP will implement the plans and procedures of its Regional OSRP. Any cleanup or recovery activities in Alabama would be conducted using applicable best management practices to minimize impacts on wildlife habitats.</p>	Yes

Table 1. (Continued).

Policy	Cross Reference to the EP	Comments	Consistent with ACAMP Policies? (Yes/No)
Threatened and Endangered Species	EP Section 5 – Biological, Physical, and Socioeconomic Information EP Section 9 – Environmental Monitoring and Mitigation Measures EP Appendix G – Oil Spill Discussion EP Appendix I – Environmental Impact Analysis (C.3 Threatened, Endangered, and Protected Species and Critical Habitat)	Routine activities are not anticipated to affect Alabama's endangered species. The proposed activities will be conducted in Federal OCS waters approximately 117 statute miles (188 km) from the nearest Alabama shoreline. BP will potentially use onshore support facilities in Alabama. However, there will be no new construction, dredging, or filling on Alabama's lands or waters that could affect endangered or threatened species or their coastal wildlife habitats. In the event of a spill, BP will implement the plans and procedures of its Regional OSRP. Any cleanup or recovery activities in Alabama would be conducted using applicable best management practices to minimize impacts on endangered and threatened species and their habitats.	Yes
Cultural Resources Protection	EP Section 5 – Biological, Physical, and Socioeconomic Information EP Appendix G – Oil Spill Discussion EP Appendix I – Environmental Impact Analysis (C.6 Archaeological Resources)	Routine activities are not anticipated to affect Alabama's cultural resources located within the coastal zone. The proposed activities will be conducted in Federal OCS waters approximately 117 statute miles (188 km) from the nearest Alabama shoreline. BP will potentially use onshore support facilities in Louisiana. However, BP does not anticipate the proposed activities will affect any sunken or abandoned ships or objects of historical or archaeological value located on Alabama lands or waters. In the event of a spill, BP will implement the plans and procedures of its Regional OSRP. Any cleanup or recovery activities in Alabama would be conducted using applicable best management practices to minimize impacts to sensitive resources.	Yes

EIA = Environmental Impact Analysis; EP = Exploration Plan.

4 References Cited

Alabama Department of Conservation & Natural Resources. 2017. Alabama Coastal Area Management Program IV. Effective January 25, 2017.

National Oceanic and Atmospheric Administration and Alabama Coastal Area Board. 1979. The Alabama Coastal Area Management Program and Final Environmental Impact Statement.

From: notification@pay.gov
To: Gamiotea, Kathi
Subject: Pay.gov Payment Confirmation: BOEM Development/DOCD Plan - BD
Date: Wednesday, May 14, 2025 1:01:56 PM



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Application Name: BOEM Development/DOCD Plan - BD

Pay.gov Tracking ID: 2703DQVQ

Agency Tracking ID: 77044618437

Transaction Type: Sale

Transaction Date: 05/14/2025 02:01:49 PM EDT

Account Holder Name: Kathi Gamiotea

Transaction Amount: \$5,565.00

Card Type: MasterCard

Card Number: *****8416

Region: Gulf of America

Contact: Kathi Gamiotea (346) 640-6725

Company Name/No: BP Exploration & Production, Inc., 02481

Lease Number(s): 08823

Area-Block: Mississippi Canyon MC, 522

Type-Well: Supplemental Plan, 1

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