Deepwater Port License Application
Blue Marlin Offshore Port (BMOP) Project

Volume IIa – Offshore Project Components Environmental Evaluation (Public)
Topic Report 3: Water and Sediment Quality and Use

Submitted to:

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Deepwater Port License Application
Blue Marlin Offshore Port (BMOP) Project

Volume I:	General (Public), including Deepwater Port License Application and Appendices (*under separate cover*)
Volume IIa:	**Offshore Project Components Environmental Evaluation (Public)** **(*herein*)**
Volume IIb:	Onshore Project Components, Environmental Evaluation (Public) (*under separate cover*)
Volume III:	Technical Information [***Confidential***] (*under separate cover*)
Volume IV:	Company and Financial Information [***Confidential***] (*under separate cover*)

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

DEEPWATER PORT LICENSE APPLICATION APPENDICES

LIST OF APPENDICES	
Topic Report	**Volume I General (Public)**
A	Figures
B	Project Schedule
C	Permit Applications
C-1	U.S. Army Corps of Engineers Section 10/404 Permit Application/Coastal Zone Consistency Form / Louisiana Coastal Use Permit (CUP) Application; Section 408 Application
C-2	U.S. Environmental Protection Agency National Pollutant Discharge Elimination System (NPDES) Permit Applicability Evaluation
C-3	LDEQ General Permit No. LAG670000
C-4	U.S. Environmental Protection Agency Region 6 Prevention of Significant Deterioration (PSD) Air Permit Application (Public)
C-5	Title V Application
C-6	112g Application (Public)
Appendix	**Volume IIa Offshore Project Components Environmental Evaluation (Public)**
A	Offshore Project Mapping
B	Agency and Stakeholder Correspondence
B-1	Agency Correspondence
B-2	Meeting Minutes
C	Cumulative Impacts Analysis – Offshore and Onshore
D	Essential Fish Habitat Assessment
E	Marine Mammal Assessment
F	Oil Spill Consequence Analysis and Risk Assessment
F-1	Evaluation of Hydrocarbon Discharges from the Blue Marlin Offshore Port Project Using OILMAPLAND and SIMAP Trajectory, Fate, and Effects Modeling (Public Version)
F-2	Oil Spill Risk (Probability) Assessment for Blue Marlin Offshore Port (BMOP) Project
F-3	Blue Marlin Offshore Port Tactical Response Plan (Public Version)
G	Air Emissions Calculations
G-1	Emissions Calculations for Offshore Construction, Stationary, and Mobile Sources
G-2	National Environmental Policy Act Air Dispersion Modeling Report
Appendix	**Volume IIb Onshore Project Components Environmental Evaluation (Public)**
A	Onshore Project Mapping
A-1	USGS Topographic Quadrangle Maps
A-2	Aerial Alignment Sheets
A-3	National Wetland Inventory (NWI) Maps
A-4	Natural Resource Conservation (NRCS) Soils Maps
A-5	Land Use Maps
B	Typical and Site-Specific Detail Drawings

LIST OF APPENDICES	
B1	Typical Drawings
B1-1	Typical Upland Crossing ROW Configuration
B1-2	Typical Upland Workspace Construction Area - Parallel Transmission Line & Foreign Pipeline
B1-3	Typical Upland Workspace Construction Area - Parallel Transmission Line & Foreign Pipeline
B1-4	Typical Agricultural Crossing ROW Configuration
B1-5	Typical Push/Pull Wetland Crossing ROW Configuration
B1-6	Typical Saturated Wetland Crossing ROW Configuration
B1-7	Typical Unsaturated Wetland Crossing ROW Configuration
B1-8	Typical Lake Construction ROW Configuration
B1-9	Typical Waterbody Wet Open Cut Construction Configuration
B1-10	Typical Construction Bored Road Crossing
B1-11	Typical Construction Shore to Shore HDD
B1-12	Typical Shore to Water HDD Construction
B1-13	Typical Construction Water to Shore HDD
B1-14	Typical Water to Water HDD Construction
B1-15	Typical 42-inch Pipeline Dredged HDD Hole Overbend Tie-In Method
B1-16	Typical Lake Barge Dredging
B1-17	Typical Lake Barge Pipe Lay
B1-18	Typical Construction Straw Bale Dewatering Structure
B1-19	Typical Construction Filter Bag
B1-20	Typical Onshore Pipeline Launcher
B1-21	Typical Mainline Valve
B1-22	Typical Mainline Valve on Platform
B2	Site-Specific Drawings of Onshore Facility Components
B2-1	Site-Specific Drawing – BMOP Pump Station
B2-2	Site-Specific Drawing – Station 501
B2-3	Site-Specific Drawing – Stingray Tap Removal Site
B2-4	Site-Specific Drawing - Station 701
B3	Site-Specific HDD Drawings
C	Onshore Project Construction and Mitigation Plans
C-1	Onshore Construction Best Management Practice (BMP) Plan
C-2	Revegetation Plan
C-3	Spill Prevention and Response (SPAR) Plan
C-4	Unanticipated Discovery Plan
C-5	Horizontal Directional Drill (HDD) Contingency Plan
D	Natural Resource Field Survey Reports
D-1	Wetland and Waterbody Delineation Report
D-2	Listed Species Report (Public Version)

LIST OF APPENDICES	
D-3	Benthic (Oyster) Survey Report [Final Report to be submitted at a later date] TPWD and LDWF correspondence included.
E	Onshore Air Quality Calculations
F	Noise Assessment for HDD Operations
Appendix	**Volume III Confidential Information**
A	Landowner List
B	Oil Spill Consequence Analysis
B-1	Evaluation of Hydrocarbon Discharges from the Blue Marlin Offshore Port Project Using OILMAPLAND and SIMAP Trajectory, Fate, and Effects Modeling (Full Version)
B-2	Blue Marlin Offshore Port Tactical Response Plan (Full Version)
C	Geotechnical Investigation
D	Geophysical and Hazard Survey
E	Archeological Investigations (Onshore and Offshore)
E-1	Onshore Texas Archeological Investigations
E-2	Onshore Louisiana Archeological Investigations
E-3	Offshore Archeological Investigations
E-4	Sabine Lake Archeological Investigations
F	DWP Design Basis
G	Port Operations Manual
H	MetOcean Criteria Report
I	DWP Components and Layout
J	Pipeline Conversion Study with Stingray Mainline Integrity Assessment
K	BSEE ROW and Conversion Application Material
L	Listed Species Report (Full Version)
M	Air Permit Applications
M-1	U.S. Environmental Protection Agency Region 6 Prevention of Significant Deterioration (PSD) Air Permit Application (Full Version)
M-2	112g Application (Full Version)
Appendix	**Volume IV Confidential Company and Financial Information**
A	Applicant, Affiliate, and Consultant Information
B	Affidavit of Citizenship
C	Certificate of Formation
D	Limited Liability Company Operating Agreement
E	Financial Plan, Annualized Projections and Operating Costs, Throughput
F	Affiliate Financial Reports
G	Cost Estimates
G-1	Construction Cost Estimate
G-2	Decommissioning Cost Estimate
G-3	Operations Cost Estimate
H	Proposals and Agreements

ABBREVIATIONS AND ACRONYMS

°C	degrees Celsius
°F	degrees Fahrenheit
ABS	American Bureau of Shipping
AMS	alternate management system
Applicant	Blue Marlin Offshore Port LLC
APPS	Act to Prevent Pollution from Ships
BCO-DMO	Biological and Chemical Oceanography Data Management Office
BICM	Louisiana Barrier Island Comprehensive Monitoring
BMOP	Blue Marlin Offshore Port
BOEM	United States Bureau of Ocean Energy Management
bph	barrels per hour
BSEE	Bureau of Safety and Environmental Enforcement
BWMS	Ballast Water Management System
CALM	Catenary Anchor Leg Mooring
CFR	Code of Federal Regulations
Chl a	Chlorophyll a
CTD	Conductivity-Temperature-Depth
CWA	Clean Water Act
DO	dissolved oxygen
DWP	deepwater port
DWPA	Deepwater Port Act
EC	East Cameron
EPA	United States Environmental Protection Agency
EMAP	Environmental Monitoring and Assessment Program
ERL	Effects-Range Low
ERM	Effects-Range Medium
FERC	Federal Energy Regulatory Commission
FHWA	Federal Highway Administration
FWPCA	Federal Water Pollution Control Act
GOM	Gulf of Mexico
GRIIDC	Gulf of Mexico Research Initiative Information and Data Cooperative
HMTA	Hazardous Materials Transportation Act
IMO	International Maritime Organization
km	kilometer
LDEQ	Louisiana Department of Environmental Quality
LDNR	Louisiana Department of Natural Resources
LOOP	Louisiana Offshore Oil Port
LQ	living quarters
MARAD	Maritime Administration
MARPOL	International Convention for the Prevention of Pollution from Ships
MARPOL 73/78	The International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978
mi	statute mile (5280 ft)
min	minute
µg/g	microgram per gram
mg/g	milligram per gram
µg/L	microgram per liter
mg/L	milligram per liter

MLV	mainline valve
MMS	United States Mineral Management Service
MP	milepost
MSD	marine sanitation device
NBI	National Benthic Inventory
NBIC	National Ballast Information Clearinghouse
NCA	National Coastal Assessment
NCCOS	National Centers for Coastal Ocean Science
NEPA	National Environmental Policy Act
nm	nautical mile (approximately 6076 ft)
NOAA	National Oceanic Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRC	National Research Council
NTL	Notices to Lessees
OCS	Outer Continental Shelf
OCSLA	Outer Continental Shelf Lands Act
PAH	polycyclic aromatic hydrocarbon
PCB	Polychlorinated Biphenyl
pH	potential of hydrogen
PHMSA	Pipeline and Hazardous Materials Safety Administration
PLEM	Pipeline End Manifold
Project	Blue Marlin Offshore Port
PSU	Practical Salinity Unit
REA	Regional Ecological Assessments
ROW	Right-of-way
SPCC	Spill Prevention, Control, and Countermeasures
TOC	total organic carbon
TSS	total suspended solids
U.S.	United States
USACE	United States Army Corps of Engineers
USC	United States Code
USCG	United States Coast Guard
USDOT	United States Department of Transportation
USGS	United States Geological Survey
VBT	Vent Boom Tripods
VGP	2013 Vessel General Permit
VIDA	Vessel Incidental Discharge Act
VLCC	very large crude carrier
WC	West Cameron
WQC	Water Quality Certification

PROJECT FAST FACTS

General Project Terminology	
Applicant	Blue Marlin Offshore Port LLC
Project Name	Blue Marlin Offshore Port (BMOP)

BMOP Location and General Information	
Nederland Terminal (NT)	The location where the oil for BMOP originates. This is the existing Sunoco Partners Marketing & Terminals L.P. facility located in Nederland, Jefferson County, Texas
New 42-inch Pipeline	37.02 miles of 42-inch pipeline from NT to Station 501
Existing Mainline from Cameron parish Louisiana to WC 509	Cameron Parish, Louisiana Louisiana State Blocks: WC 11, 20, 21 OCS Blocks: WC 21, 44, 43, 58, 79, 78, 95, 114, 113, 132, 133, 148, 169, 170, 183, 196, 205, 212, 213, 224, 230, 241, 245, 246, 255, 258, 259, 266, 269, 276, 275, 277, 282, 408, 431, 432, 433, 456, 459, 482, 483, 484, 508, 509
Deepwater Port Location (Platform – CALM Buoys)	West Cameron Block 509 (WC 509) West Cameron 508 (WC 508) East Cameron 263 (EC 263)
Deepwater Port Water Depth	156 to 162 feet water depth
Loading Capacity	80,000 barrels per hour (bph)

BMOP Deepwater Port Components	
Existing Stingray Pipeline (Mainline)	One existing 36-inch Outer Diameter (OD) pipeline, approximately 104 miles long from Station 501 in Cameron Parish, Louisiana to WC 509. This line consists of the existing 36-inch OD subsea line from WC 509 to Station 701 and the existing 36-inch OD onshore line from Station 501 to Station 701.
Deep Water Port (DWP)	The offshore loading facility site located in WC 509, WC 508, and EC 263. The facilities consist of the existing WC 509 Platform Complex; two new PLEMs and CALM Buoys in WC 508 and EC 263; two new Crude Oil Loading Pipelines from the WC 509 Platform Complex to the PLEMs and the flexible hoses attached to the CALM Buoys. The WC 509 Platform Complex will be converted from gas service to oil and gas service. The converted platforms will support oil export and natural gas transportation.
WC 509 Platform Complex (509 Complex)	The existing WC 509 Platform Complex consists of three platforms and two Vent Boom Tripods (VBT). The WC 509A Platform is the natural gas gathering platform. This will also house the 36-inch riser and pig barrel of the crude oil Mainline. The WC 509B Platform currently is the natural gas compression and control platform. It houses natural gas compressors, separators, the Control Room and Platform Complex's utilities. The WC 509B Platform will continue to house the natural gas separation facilities and the Platform Complex's utilities. It will also house the crude oil Control Room, metering facilities, and pig barrels for the two Crude Oil Loading Lines. The WC 509C Platform is the Living Quarters (LQ) platform and will continue in that role. The WC 509 VBTs are utilized to bridge the natural gas vent piping to a point approximately 660 feet from the 509B Platform and will continue in this role for any planned and emergency natural gas blowdowns.

BMOP Deepwater Port Components	
WC 148 Platform	The existing WC 148 Platform will be converted from natural gas transportation service to oil transportation service. All gas piping facilities on the deck will be removed and replaced with new pipe and a new Mainline Valve (MLV). This valve will be able to be remotely operated.
Catenary Anchor Leg Mooring (CALM) System	There will be two floating Calm Buoys installed approximately 4,710 feet and 6,085 feet from the WC 509B Platform. The CALM Buoys will be installed with a minimum of 5,000 feet separation. Each Buoy will be moored in place with 6 or more anchor chains connected to engineered anchors installed at locations around the Buoy. Flexible hoses will be connected from the PLEMs to the Calm Buoys. Floating flexible hoses will also be connected to the CALM Buoy and, during loading, the opposite end will be connected to the ship. CALM Buoy No. 1 will be installed in WC 508 and CALM Buoy No. 2 will be installed in EC 263.
Crude Oil Loading Pipelines	Two 36-inch diameter pipelines from the existing WC 509B Platform to the PLEMs.
Pipeline End Manifold (PLEM)	One PLEM will be installed on the seafloor at each CALM Buoy. Each PLEM will be connected to a 36-inch Crude Oil Loading Pipeline from the WC 509B Platform and a CALM Buoy floating above the PLEM. The two PLEMs will be in WC 508 and EC 263.
VLCC or other Crude Carrier	Very Large Crude Carriers (VLCCs), Suezmax, Aframax or other large capacity seafaring vessels.
Meter for Measuring Departing Crude Oil	The DWP will have two-meter stations with associated prover and lab facilities. One of the meter stations will be located at the new BMOP Pump Station adjacent to the NT and one will be located on the offshore crude export platform (WC 509B Platform).
Pre-fabrication Yards	Existing yards will be used along the northern Gulf of Mexico (GOM) coast.
Support Facility	An onshore support base will be established at an existing port facility to provide the necessary security to support the DWP operations.

BMOP Onshore Pipeline Components	
BMOP Pump Station	The onshore metering, pumping, and pig launcher station will be located in Nederland, Texas, adjacent to the existing NT.
Onshore Crude Oil Pipeline	A new, approximate 37.02-mile, 42-inch OD pipeline connecting the existing NT in Jefferson County, extending across Orange County, Texas to the existing 36-inch OD Mainline at Station 501 in Cameron Parish, Louisiana.
Station 501	The existing NGPL/Stingray interconnect facility (Station 501) will be abandoned and demolished. A new pig receiver and launcher will be installed to connect the new 42-inch OD onshore pipeline with the existing 36-inch OD onshore Stingray Mainline.
Station 701	The existing compressor Station 701 in Cameron Parish, Louisiana will be demolished. All existing natural gas equipment will be removed from the Station except for several large 10,000-barrel storage tanks. Approximately 1,000 feet of new 36-inch pipe, surge tanks, surge valves, and a new MLV will be installed. The existing 10,000-barrel tanks located at Station 701 will be converted to surge relief tanks.
Stingray ANR Tap Removal Site	BMOP will remove the tap and install 36-inch pipe in its place.

BMOP Onshore Pipeline Components	
Mainline Valves (MLV)	Six new MLVs will be installed within the permanent pipeline right-of-way (ROW) of the new build pipeline. MLVs will also be installed at the BMOP Pump Station, Station 501, and Station 701. These valves will be used for isolation and spill control purposes.
Pipeline Pig Launchers and Receivers	Pig Launchers/Receivers will be located at the BMOP Pump Station, Station 501, and the DWP. These are utilized for cleaning the pipelines and running intelligent devices to assess pipeline integrity.
Access Roads and Canals	The Project will utilize existing access roads and canals. One new temporary access road and four new permanent access roads will be required.
Pipe and Contractor Yards	BMOP will utilize existing facilities along the northern GOM coast, U.S. or international locations for manufacturing pipe and for fabricating the PLEMs, CALM Buoys, and end connectors. Pipe coating activities will be performed at existing facilities along the northern GOM coast. Selection of the marine contractor will be completed after the MARAD filing; however, the successful contractor(s) will utilize existing fabrication and logistical facilities located along the northern GOM coast.

PROJECT ENVIRONMENTAL EVALUATION ASSESSMENT CRITERIA

Environmental Evaluation Assessment Criteria		
Criteria	**Values**	**Definition**
Outcome	**Direct**	***Direct effects*** are "caused by the action and occur at the same time and place" of the Project (40 CFR § 1508.8).
	Indirect	***Indirect effects*** are "caused by an action and are later in time or farther removed in distance but are still reasonably foreseeable. Indirect impacts may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems" (40 CFR § 1508.8). Indirect impacts are caused by the Project, but do not occur at the same time or place as the direct impacts.
	Cumulative	***Cumulative impact*** is "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR § 1508.7).
Type	**Adverse (Negative)**	***Adverse*** would cause unfavorable or undesirable outcomes for the natural or social environment. Negative impacts result in a net loss to the resource.
	Beneficial (Positive)	***Beneficial*** impact would cause positive or desirable outcomes for the natural or social environment. Beneficial impacts result in a net benefit to the resource.
Duration	**Short-term (Temporary)**	***Short-term (or temporary)*** impacts are those that would occur only during a specific phase of the proposed Project, such as noise during construction or certain installation activities. Short-term impacts would end at the time, or shortly after, construction activities ceased. The duration of most short-term impacts would be a few hours to a few days.
	Long-term	***Long-term*** impacts would occur either continually or periodically throughout the life of the Project (e.g., operational air emissions, stormwater discharge), or would last for years after an impact-producing activity occurred (e.g., removal of wildlife habitat).
Magnitude	**Negligible**	***Negligible*** impacts are generally those that might be perceptible, but in certain cases may be undetectable.
	Minor	***Minor*** effects are those that could be perceptible but are of very low intensity and may be too small to measure.
	Moderate	***Moderate*** impacts are more perceptible, can often be quantified, and may approach the thresholds for major impacts.
	Major	***Major*** impacts, based on their context and intensity (or severity), have the potential to meet the thresholds for significance set forth in CEQ regulations (40 CFR § 1508.27). Major impacts warrant additional attention in a NEPA analysis and a review of potential mitigation measures that would fulfill the policies set forth in NEPA, which include avoiding, minimizing, or mitigating major impacts.
Likelihood	**Unlikely**	Low probability.

Environmental Evaluation Assessment Criteria		
Criteria	**Values**	**Definition**
	Potential	Possible or probable.
	Likely	Certain.

3.0 WATER AND SEDIMENT QUALITY AND USE

3.1 PROJECT OVERVIEW

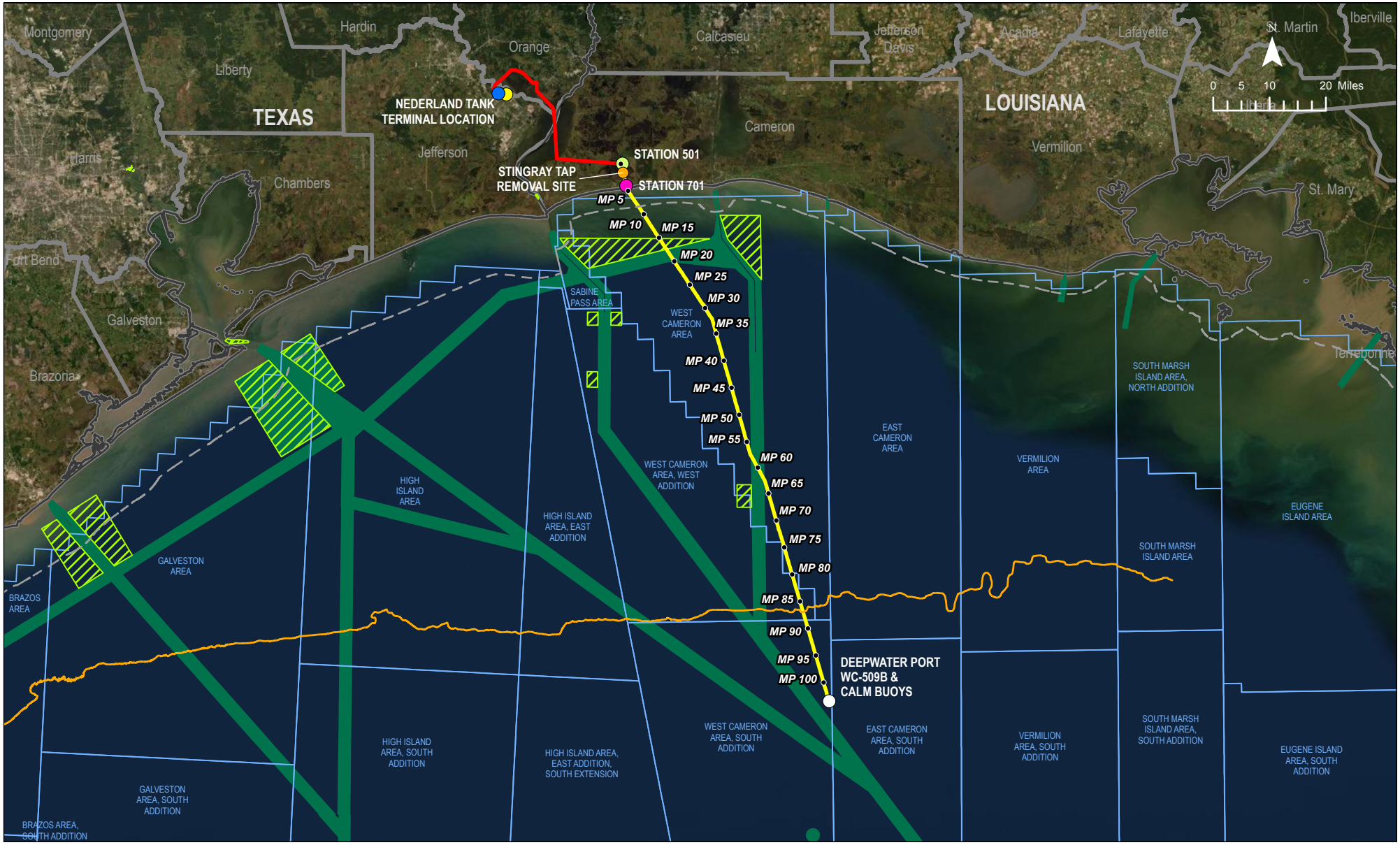
Blue Marlin Offshore Port LLC (the Applicant) is proposing to develop the Blue Marlin Offshore Port (BMOP) Project (Project) in the Gulf of Mexico (GOM) to provide crude oil transportation and loading services for crude oil produced in the continental United States (U.S.). A Project overview map is provided in **Figure 3-1**. The Deepwater Port (DWP) will be utilized to load the transported crude oil onto very large crude carriers (VLCCs) (and other crude oil carriers) for export to the global market. The Applicant is filing this application for a license to construct, own, and operate the DWP pursuant to the Deepwater Port Act (DWPA) of 1974, as amended, and in accordance with U.S. Coast Guard (USCG) and U.S. Maritime Administration (MARAD) implementing regulations.

The primary purpose of the Project will be to provide for safe and reliable long-term supply of crude oil for export to the global market. Oil for export will be transported out of the existing Sunoco Partners Marketing and Terminals, L.P. terminal and storage facility in Jefferson County, Texas (Nederland Terminal or NT). This terminal is connected to multiple crude oil pipelines connecting to production from across the U.S. In addition, an affiliate of the Applicant owns the Stingray Pipeline System and has confirmed that its subsea pipeline and offshore platforms are suitable for converting to facilitate crude oil export from a DWP in the northern GOM. The Applicant has the exclusive right to lease or purchase the Stingray Pipeline System for use in the Project.

The DWP will be located in federal waters within and adjacent to the Outer Continental Shelf (OCS) in West Cameron Lease Blocks (WC) 509 and 508 and East Cameron (EC) Block 263. Following the existing Stingray pipeline, the DWP will be approximately 99 statute miles off the coast of Cameron Parish, Louisiana, with an approximate water depth of 162 feet. Crude oil will be routed from pumps at Nederland, through a new 42-inch outer diameter (OD) onshore pipeline to the existing Stingray Mainline at Station 501, and from there through the existing Stingray Mainline to the DWP. The crude oil will be metered at the BMOP Pump Station at the NT and on the existing WC 509B Platform and routed through two Crude Oil Loading Lines to Pipeline End Manifolds (PLEMs) located on the seafloor below two Catenary Anchor Leg Mooring (CALM) Buoys located in WC 508 and in EC 263. From each PLEM, the crude oil will be routed to its respective floating CALM Buoy through submerged flexible hoses. VLCCs (or other large seafaring crude oil vessels) will moor at a CALM Buoy, retrieve and connect the floating crude oil hoses connected to the CALM Buoy and the crude oil will then route from the Buoy to the VLCC for loading. Up to 365 VLCCs (or other crude oil carriers) will load per year.

In summary, the BMOP facilities consist of the pumps and meters at NT; a new approximate 37-mile, 42-inch OD pipeline; the existing 36-inch OD Mainline; an existing fixed, manned platform complex at WC 509; an existing platform at WC 148; two new Crude Oil Loading Pipelines; and two new PLEM and CALM Buoys located in WC 508 and EC 263. A schematic of the proposed DWP is provided in **Figure 3-2**. The crude oils that would be exported range from light to heavy grade crudes from the existing the NT facility.

BMOP PROJECT - FIGURE 3-1 - PROJECT OVERVIEW MAP



LEGEND

- EXISTING OFFSHORE PIPELINE MILEPOSTS
- STINGRAY TAP REMOVAL SITE
- NEDERLAND TANK TERMINAL LOCATION
- NEDERLAND PUMP STATION
- STATION 701 (TO BE CONVERTED TO OIL SERVICE)
- STATION 501 (TO BE CONVERTED TO OIL SERVICE)
- DEEPWATER PORT WC-509B AND CALM BUOYS
- EXISTING PIPELINE TO BE CONVERTED TO OIL SERVICE
- PROPOSED ONSHORE PIPELINE (NEW BUILD)
- DEPTH CONTOUR -108'
- STATE WATERS BOUNDARY
- SAFETY ANCHORAGES
- PROTRACTION AREA
- SHIPPING FAIRWAY
- COUNTY / PARISH
- STATE BOUNDARY

BLUE MARLIN OFFSHORE PORT PROJECT

PROJECT OVERVIEW MAP

COUNTY/PARISH:	VARIOUS	DRAWN BY:	CA
STATE:	TX/LA	CHECKED BY:	CW
DATE:	2020/09/17	PROJECTION:	NAD 1983 UTM Zone 15N

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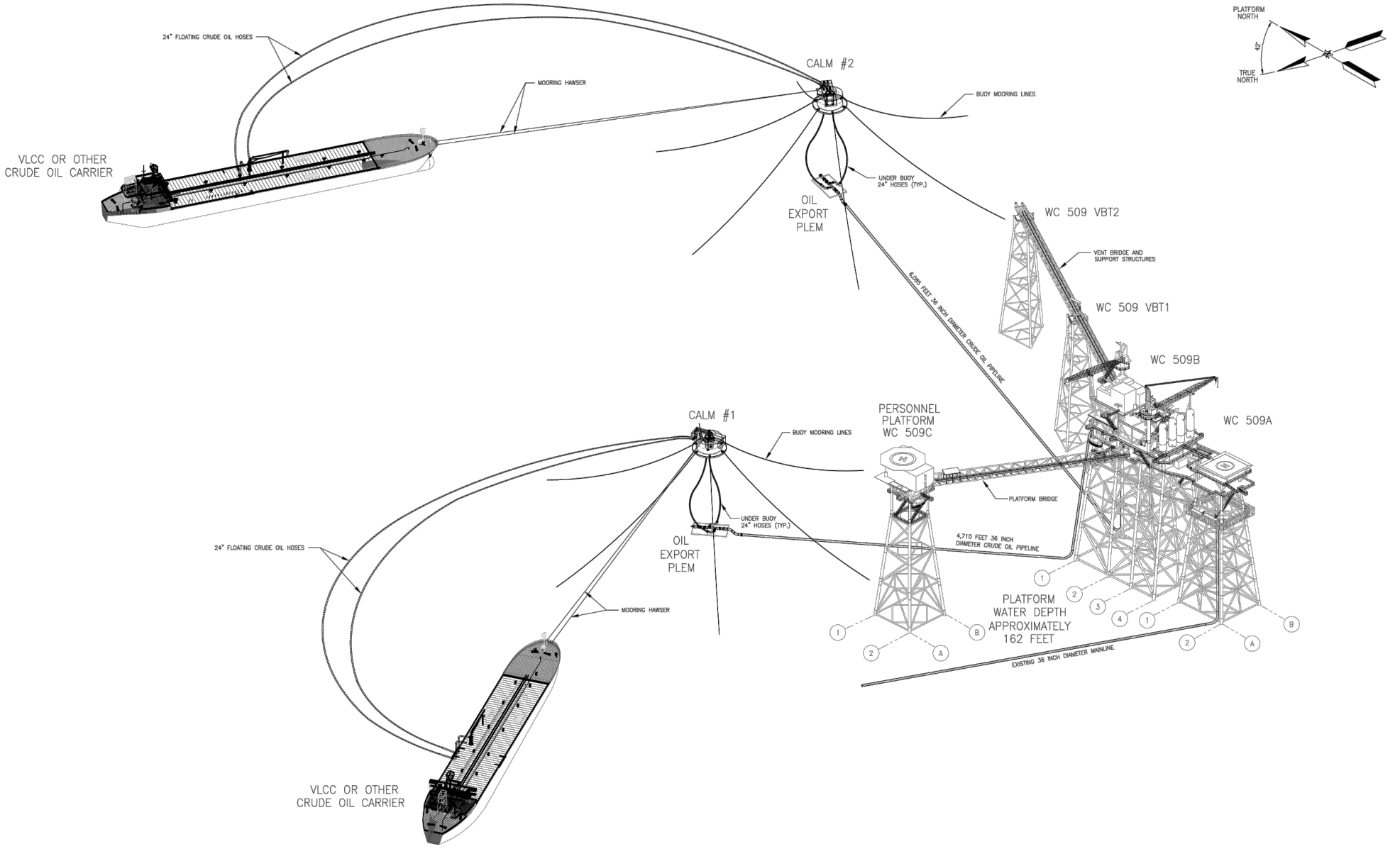
BLUE MARLIN OFFSHORE PORT PROJECT
FIGURE 3-1

DWG:	0802-01-005	SHEET:	1 OF 1

FIGURE 3-2 - BMOP DWP SCHEMATIC WITH VLCCs



3.1.1 Abandonment and Conversion of Existing Facilities

The Stingray Pipeline is currently comprised of a 36-inch pipeline (Mainline) that is fed natural gas and natural gas liquids by multiple lateral pipelines from various suppliers and producers. Stingray transports natural gas and liquids on the Mainline from the WC 509 Platform Complex to the onshore compressor station facility (Station 701) near Holly Beach in Cameron, Louisiana, and northward approximately four additional miles to the Natural Gas Pipeline Co. (NGPL)/Stingray interconnect (Station 501). The Stingray facilities from WC 509 to Station 501 will be abandoned through a FERC 7(b) Order and converted to use as DWP facilities (the filing has been made for abandonment). The Applicant intends to use all existing records and inspection data and perform additional engineering studies to obtain the appropriate agency approvals for converting all existing, reusable facilities. This includes updating the facilities to meet current regulations and guidelines, where appropriate. Abandonment under FERC 7(b) will be considered complete when the Mainline is completely isolated from all-natural gas sources and all-natural gas and produced liquids have been removed from the pipeline. This work will be completed by Stingray. Stingray will assign the existing right-of-way (ROW) Grant (and associated facilities—platforms at WC 148 and WC 509) to BMOP or another affiliate of ET for use in the BMOP Project. The Applicant intends to operate the new facilities under 49 Code of Federal Regulations (CFR) Part 195.

Conversion of the Stingray facilities involves converting service to crude oil and changing flow direction in the Mainline; converting the platform at WC 148, herein referred to as the WC 148 Platform, to crude oil service from natural gas service; and converting the platform complex at WC 509, herein referred to as the WC 509 Platform Complex, to crude oil and natural gas service.

3.1.2 Major Offshore Project Components

All facilities for the proposed BMOP Project will be designed, constructed, tested, operated, and maintained in accordance with the U.S. Department of Transportation (USDOT) regulations in 49 CFR Part 195 (Transportation of Hazardous Liquids by Pipeline) and other applicable federal and state regulations. The Project will consist of both onshore supply components and offshore/marine components. Offshore components are described below and depicted in **Figure 3-1**.

Conversion of Existing Facilities

- The existing Station 501 is located at approximate MP 37 of the new 42-inch pipeline in Cameron Parish, Louisiana. All existing natural gas-related equipment owned by BMOP will be removed from the Station and new pipeline facilities will be installed. The new 42-inch pipeline will tie into the existing 36-inch Mainline at the site. The conversion of Station 501 will be expanded to include:
    - New pig receiver for the new 42-inch pipeline termination;
    - New pig launcher for existing 36-inch Mainline; and
    - New MLV.
- The existing compressor Station 701 in Cameron Parish, Louisiana, will be demolished. All existing natural gas equipment will be removed from the Station except for two 10,000-barrel storage tanks. The new facility will maintain office space, a natural gas interconnect, and surge tanks. Approximately 1,500 feet of new pipe, surge tanks, surge valves, and a new MLV will be installed. The existing 10,000-barrel tanks located at Station 701 will be converted to surge relief tanks.
- The existing ANR Tap (Stingray Tap Removal Site) is located at approximately Stingray Mainline MP 1.61 on the Stingray Mainline in Cameron Parish, Louisiana (approximate MP 38.6 on the BMOP pipeline system). BMOP will install a 36-inch OD pipe segment following removal of the tap.

- The existing Mainline from Station 501 to the WC 509 Platform Complex will be converted to crude oil service.
- The WC 148 Platform will be converted to crude oil service and a new mainline valve installed.
- The existing WC 509 Platform Complex will be converted from a gas transmission facility to a dual-purpose gas transmission and crude oil export facility. The existing equipment that will remain at the Platform Complex will include:
    - Existing natural gas piping and risers on WC 509A Platform;
    - Natural gas Vent Boom on WC 509 VBTs;
    - Natural gas separation facilities on WC 509B Platform;
    - and
    - Heliport and helicopter fuel tank on WC 509A Platform.

New Offshore Facilities

- Two new CALM Buoys installed, one in WC 508 (CALM Buoy No. 1) and the other in EC 263 (CALM Buoy No. 2). The CALM Buoys will be anchored to the seafloor via an engineered mooring system capable of accommodating mooring forces exerted by a VLCC or other large seafaring vessels during loading operations. Two 24-inch diameter floating hoses will be connected to each CALM Buoy. The hoses will be approximately 1,500 feet long and used for loading operations.
- Two new PLEMs installed and anchored on the seafloor under the CALM Buoys. Two 24-inch undersea flexible hoses will be connected to each PLEM and associated CALM Buoy.
- Two Crude Oil Loading Pipelines, approximately 4,710 feet long to PLEM / CALM Buoy No. 1 and 6,085 feet long to PLEM / CALM Buoy No. 2, installed from the WC 509 Platform Complex to the PLEM and CALM locations, one for each PLEM and CALM Buoy (see **Figure 3-2**). The pipelines will be installed with the top of pipe at least three feet below the natural seafloor.
- New MLV on WC 148 Platform;
- Two new 36-inch risers connected to the Crude Oil Loading Pipelines on WC 509B Platform;
- New control room on WC 509B Platform;
- Three new pig barrels, one on the WC 509A Platform and two on WC 509B Platform;
- Meter station for crude oil on the WC 509B Platform;
- New living quarters (LQ) and heliport on WC 509C Platform;
- Surge valves and tank on the WC 509B Platform; and
- New ancillary equipment for the 509 Platform Complex (e.g., power generators, instrument/utility air system, fuel tanks, ac units, freshwater makers, firewater system, seawater and freshwater system, sewage treatment unit, fuel gas system, diesel system, closed drain system, open drain system, hydraulic power unit, hypochlorite system, cranes, communications tower and system, radar) to support operation of the offshore facilities.

Offshore Support Facilities

Support facilities for the Project will include:

- Safety Zone - The Applicant is requesting that the USCG Captain of the Port establish a Safety Zone around the entire DWP operations area. The Safety Zone will only be open to entry for VLCCs

or other crude oil carriers prepared for connection for loading of crude oil, and the necessary service vessels supporting that process.

- Anchorage area – Existing USCG-designated anchorage areas will be utilized for VLCCs (or other crude carriers) awaiting mooring at a CALM Buoy or if they must disconnect from the CALM Buoys for safety reasons.
- Support vessel mooring area – A designated Service Vessel Mooring Area will be established in proximity to the offshore WC 509 facilities.
- Temporary pre-fabrication yards – Component fabrication will occur at multiple existing fabrication facilities within the GOM coastal region.
- Support facilities – Facilities within the GOM coastal region providing support for offshore operations and maintenance activities (e.g., helicopters, supply vessels, work boats, equipment suppliers, and maintenance workers).

3.2 MARITIME REGULATIONS AND JURISDICTION

The proposed DWP will be located on the OCS of the northern GOM, approximately 100 nautical miles south of the Louisiana shoreline of Cameron Parish. The Outer Continental Shelf Lands Act (OCSLA), per 43 U.S. Code (USC) § 1333(d)(1) et seq., gives the USCG jurisdiction over the seafloor and water column of the OCS where the DWP will be located, including jurisdiction over vessels engaged in DWP activities. In addition to USCG regulations, the DWP will also need to comply with the International Convention for the Prevention of Pollution from Ships (MARPOL) adopted in 1973 by the International Maritime Organization (IMO), as modified by the Protocol of 1978 (MARPOL 73/78). All signatories of the MARPOL Convention must be compliant with regulations that prevent and minimize pollution from ships. Currently, the U.S. is signatory to Annexes I, II, III, V and VI. Annexes I, II, V and VI have been incorporated into U.S. law by the Act to Prevent Pollution from Ships (APPS) and implemented within 33 USC § 1901 and 33 CFR Part 151. The U.S. incorporates Annex III by the Hazardous Materials Transportation Act (HMTA) implemented within 46 USC § 2101 and 49 CFR Parts 171 to174 and 176. Although the U.S. has not ratified Annex IV, the U.S. has equivalent regulations for the treatment and discharge standards of shipboard sewage: the Federal Water Pollution Control Act (FWPCA) as amended by the Clean Water Act (CWA) and implemented by 33 USC § 1251 and 33 CFR Part 159.

The CWA establishes the basic structure for regulating discharges of pollutants into the waters of the U.S. and regulating quality standards for surface waters. In compliance with the CWA, the proposed DWP will be required to obtain permits under the jurisdiction of the U.S. Environmental Protection Agency (EPA) Region 6 and U.S. Army Corps of Engineers (USACE) New Orleans and Galveston Districts. Additional details on the required permits and CWA are provided in Topic Report 1 (Volume IIa).

The State of Louisiana's jurisdiction extends 3 nautical miles from the shoreline, herein referred to as State Waters. The existing Mainline will cross through State Waters which are under the jurisdiction of the Louisiana Department of Natural Resources (LDNR) and Louisiana Department of Environmental Quality (LDEQ). A CWA Section 401 Water Quality Certification (WQC) will be required from the LDEQ to ensure that the proposed Project complies with the State's water quality standards and criteria. Within federal waters, the proposed Project will be under the jurisdiction of the EPA and require a National Pollutant Discharge Elimination System (NPDES) Permit from EPA Region 6 to discharge wastewater, including hydrostatic test water. Additional details are provided in Section 1.7.9 of Topic Report 1 (Volume IIa).

3.2.1 Interim Guidelines for Vessel Discharges

Vessels associated with the proposed DWP will be required to adhere to all discharge regulations. The Vessel Incidental Discharge Act (VIDA) is a relatively new law that was enacted on December 4, 2018 and establishes a framework for regulating incidental discharges from commercial vessels. Incidental discharges cover a broad range of discharges including ballast water, bilgewater, graywater (e.g., water from sinks, showers), and deck washdown and runoff. Specifically, VIDA amends CWA Section 312 to include a new subsection (p) titled, "Uniform National Standards for Discharges Incidental to Normal Operation of Vessels." VIDA has not been implemented to date and the provisions of the EPA 2013 Vessel General Permit (VGP), USCG ballast water regulations, and state and local government requirements still remain in effect for large non-fishing commercial vessels, until at such time the VIDA regulations are implemented.

The 2013 VGP, which remains in effect, is a CWA NPDES permit that authorizes, on a nationwide basis, discharges incidental to the normal operation of non-military and non-recreational vessels greater than or equal to 79 feet in length. The 2013 VGP establishes requirements for 27 specific types of incidental discharges from vessels including ballast water, bilgewater, graywater, and deck washdown and runoff. It

also includes training, inspection, monitoring, recordkeeping, and reporting requirements. If biocides are included as part of a ballast water management technique, the concentration of the residual biocides in the ballast water discharge is required by the VGP to be below specified limits.

All vessels that enter or operate within U.S. waters are equipped with a ballast water system, and discharge water from a source other than a U.S. public water system into U.S. waters are required to install and operate a ballast water management system that has been approved by the USCG under 40 CFR § 162.060 and meets the applicable ballast water discharge standards in 33 CFR § 151.2030. An alternate management system (AMS) that meets the requirements of 33 CFR § 151.2026 may also be used, so long as it was installed on the vessel prior to the date that the vessel is required to comply with the ballast water discharge standard per 33 CFR § 151.2035(b). Approved ballast water systems involve a filtration step to physically remove organisms and a biological disinfection step to kill or render harmless organisms that pass through the filters. Disinfection processes used in USCG-approved systems include treatments using ultraviolet light, electrolysis, electrodialysis, and chemical injection (chlorine dioxide). Included in the USCG approval criteria is a requirement that the "ballast water discharge, preparation, active substance, or relevant chemicals are not found to be persistent, bioaccumulative, or toxic when discharged."

CWA section 312(a)-(m) provides the statutory framework under which the EPA and USCG domestically regulate sewage discharges from vessels. However, sewage discharges from certain vessels may also be subject to regulation under other federal statutes or MARPOL annexes. Section 312(a) requires the use of an USCG-certified marine sanitation device (MSD) onboard vessels that are equipped with installed toilets and operating on U.S. navigable waters. Untreated sewage discharges are prohibited within 3 nautical miles from shore unless the vessel is equipped with an USCG-approved Type II MSD as listed in **Table 3-1**.

TABLE 3-1
USCG Pollution Regulations

Discharge/Disposal	Stipulations[a]
Oil	• Vessels are permitted to discharge oil wastes only when the vessel is underway and only after processing the oil waste through an oil/water separator, resulting in an effluent having a concentration less than 15 parts per million (ppm) and does not cause a visible sheen.
Hazardous substances	• ≤ 3 nautical miles (nm) (0 - 3.4 statute miles [mi], or 0 - 6 kilometers [km]) - discharge of materials greater than the "reportable quantity" (allowed by law) is prohibited.
Sewage	• ≤ 3 nm (0 - 3.4 mi, or 0 - 6 km) – sewage discharge is permitted but must be treated through a USCG-approved MSD except in designated no-discharge zone areas. • ≥ 3nm (3.4 mi, or 6 km) – untreated sewage discharge is permitted.
Graywater	• Defined as drainage water from shower/sink/laundry; there are no general federal restrictions regarding normal operation "graywater" discharge for non-recreational vessels less than 79 feet (24 meters), except in no-discharge zone areas.
Food wastes	• ≤ 3 nm (0 - 3.4 mi, or 0 – 6kn) - no discharge allowed. • 3 – 12 nm (3.4 - 13.8 mi, or 6 - 22 km) - discharge permitted, but food waste must be ground and capable of passing through a ≤ 1-inch (25 millimeters) screen. • ≥ 12 nm (13.8 mi, or 22 km) - discharge permitted without restrictions.
Non-plastic trash	• ≤ 3 nm (0 - 3.4 mi, or 0 - 6 km) – not permitted. • 3 – 12 nm (3.4 - 13.8 statute miles, or 6 - 22 km) – capable of passing through a ≤ 1-inch (25 millimeters) screen. • 12 – 25 nm (13.8 - 28.8 mi, or 22 – 46 km) – discharge permitted except for dunnage. • ≥ 25 nm (28.8 mi, or 46 km) – discharge is permitted.

TABLE 3-1
USCG Pollution Regulations

Discharge/Disposal	Stipulations[a]
Plastics (includes synthetic ropes and fishing nets)	• Plastic discharge is prohibited from being discharged in all areas (33 CFR § 151.67). • All garbage containing plastics requiring disposal must be discharged onshore or incinerated.

Notes:
[a] Includes stipulations per the Clean Water Act, MARPOL 73/78, and Oil Pollution Act of 1990.

3.3 EXISTING ENVIRONMENT

Coastal waters are defined as nearshore waters and generally extend up to 12 nautical miles offshore. They are dominated by tides, nearshore circulation, freshwater discharge from rivers, and local precipitation. Coastal waters are also influenced by inflows of freshwater interacting with the tidal actions of saltwater. The area of mixing between freshwater and saltwater forms estuarine habitats such as marshes, mangroves, and coastal wetlands around the GOM coast (USCG, 2016).

Marine waters are defined as the offshore waters of the continental shelf and beyond. Marine waters generally lie seaward of coastal waters; are hydraulically dominated by tides and currents; have salinity levels representative of natural seas; and merge into and become part of the deepwater environment of the GOM (USCG, 2016). The proposed DWP will be located in marine waters on the OCS and the existing Mainline crosses both coastal and marine waters off of Louisiana between Sabine Pass and the Calcasieu River. A discussion of inland waters, including Sabine Lake, is included in Topic Report 2, "Water and Sediment Quality and Use" (Volume IIb).

3.3.1 Water Quality

Water quality can be described as the overall condition of water, reflecting the particular biological, chemical, and physical characteristics of a waterbody. Natural marine processes, which include internal mixing and circulation patterns in the water column, act to influence water quality (both positively and negatively). Factors such as severe weather events also affect water quality, but in a manner often difficult to measure. In the case of coastal and marine environments of the northern GOM, the quality of the water is heavily influenced by multiple river drainages that contribute sediments into the area. Besides natural inputs, anthropogenic activities can also contribute to water quality through industrial discharges, sewage discharges, runoff, dumping, air emissions, burning, and spills. Contaminants, which are initially associated with suspended particles, may ultimately reside in the sediments rather than the water column. Offshore sediment quality is discussed in Section 3.2.1, Interim Guidelines for Vessel Discharges.

Evaluation of water quality is determined by measurement of factors that are considered important to the health of an ecosystem. The primary factors influencing coastal and marine environments are temperature, salinity, dissolved oxygen (DO), nutrients, potential of hydrogen (pH), pathogens, and turbidity or total suspended solids (TSS). Trace constituents, such as metals and organic compounds, can also affect water quality. Several metals, such as zinc and iron, in low natural concentrations, are essential for life processes in the marine environment. While the various parameters measured to evaluate water quality vary in marine waters, one parameter—pH—does not. The buffering capacity of the marine environment is controlled by carbonate and bicarbonate, which maintain a typical pH of 8.1 in the GOM (EPA, 2019; NOAA, 2018).

With conversion of the Mainline, the BMOP Project will avoid the need for construction within coastal waters. Construction activities will be limited to marine waters where the DWP will be located (conversion of an existing platform complex). The following description details the water quality of the coastal and

marine environment in the vicinity of the Project as well as deeper waters farther offshore. Additional details on the physical oceanography of the Project area, including salinity and temperature conditions, are provided in Topic Report 4, "Marine Environment" (Volume IIa).

3.3.1.1 Coastal Waters

The EPA's National Coastal Condition Report IV categorizes coastal waters based on an evaluation of five indices including water and sediment quality. The water quality index for the GOM's coastal waters was rated as fair based on data collected from locations in Florida, Alabama, Mississippi, Louisiana, and Texas (EPA, 2012; Kennicutt II, 2017a).

The Mississippi River, as well as a number of other major drainage systems, strongly influences the region where the Project is located. A major source of contaminants to the coastal and nearshore waters is from upstream runoff into the Mississippi River-Atchafalaya River system. A complex geography of sounds and bays and extensive tidal marshes act to delay mixing, resulting in extensive areas of mesohaline (middle salinity) conditions (MMS, 1991). In general, compared with the waters of other states bordering the northern GOM, Louisiana's estuaries and open nearshore waters are low in salinity and high in nutrient concentrations (MMS, 1990). Elevated nutrient levels can result in eutrophication, causing algal blooms and fish kills (USGS, 2020). There is also a surface turbidity layer associated with the freshwater plume of the Mississippi River that carries suspended particles in the river discharge, especially during seasonal periods of heavy precipitation. A nepheloid layer composed of suspended clay material from the underlying sediment is always present (MMS, 2008).

In addition to the Mississippi River influence, the Project occurs within a coastal environment also influenced by the Calcasieu Lake estuarine systems (BOEM, 2017). The Lower Calcasieu Basin receives discharges from numerous municipal and industrial point sources. In comparison to other coastal sites, Lower Calcasieu monitoring locations exhibit low DO and intermediate nutrient levels (Waldon, 1996).

Hypoxic Zone

As discussed above, water quality on the continental shelf west of the Mississippi River is predominantly influenced by the input of sediment, nutrients, and pollutants from the Mississippi and Atchafalaya Rivers (Mississippi River/Gulf of Mexico Watershed Nutrient Task Force, 2017). During summer months, shelf stratification results in a large hypoxic zone along the Louisiana – Texas shelf in bottom waters, commonly referred to as the GOM's "Dead Zone." Hypoxia is a condition of having low DO concentration in the water (less than 2 milligrams per liter [mg/L]). The hypoxic zone is caused by excessive nutrients (nitrogen, phosphorus, sewage) and other oxygen-demanding contaminants (BOEM, 2017; Turner and Rabalais, 2019). The nutrients, in combination with sunlight and warm waters in the GOM, trigger algal blooms. When the algae die off and decompose, the DO level within the bottom water layers drops (Turner and Rabalais, 2019). Hypoxia then forms when the water column becomes vertically stratified and mixing between oxygenated surface waters and bottom waters does not occur. The hypoxic zone persists until wind-driven circulation mixes the water column (BOEM, 2017).

DO concentrations greater than 5.0 mg/L (good) provide healthy conditions for aquatic life. Concentrations between 5.0 mg/L - 3.5 mg/L (fair) are generally healthy, except for the most sensitive species. When concentrations fall below 3.5 mg/L, conditions become unhealthy. The most severe effects occur if concentrations fall below 2.0 mg/L (poor), even for short periods of time. The proposed DWP is located in the portion of the GOM that exhibits generally healthy DO levels, including during the summer of 2019. Over the past five measured summers (2014, 2015, 2017-2019), DO levels near the DWP area varied from 4 to 5.5 mg/L with an average of 4.65 mg/L.

The GOM hypoxic zone along the Louisiana – Texas shelf occurs seasonally, influenced by the timing of the Mississippi and Atchafalaya Rivers discharge and is directly correlated with the flux of nitrogen from the Mississippi River (BOEM, 2017; NOAA, 2019). The size of the zone during the summer period of 2019 was forecasted to be up to 7,829 square miles and measured in August to be 6,952 square miles (NOAA, 2019; Turner and Rabalais, 2019). A depiction of the 2019 GOM hypoxic zone is provided in **Figure 3-3**.

3.3.1.2 Marine Waters

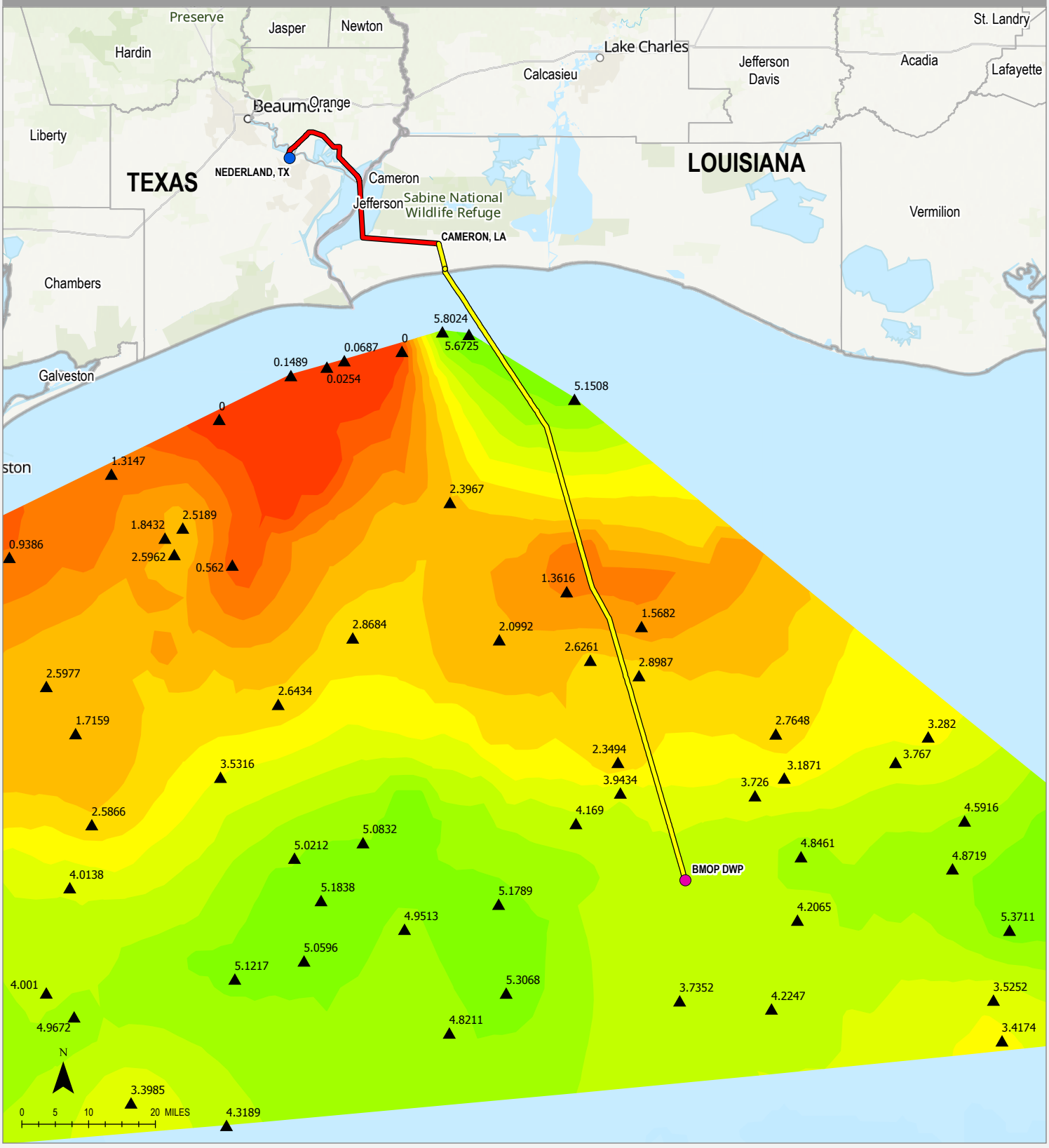
Lack of oxygen in bottom waters causes sediment to release dissolved nutrients including orthophosphorus, ammonia, and toxic hydrogen sulfide (Bathis et al., 2013). Low levels of DO (< 2 mg/L), potentially harmful to benthic fauna and fish, were observed at two stations, representing approximately 4 percent of the sampling points depicted in **Figure 3-4**. Concentrations of DO in nearshore waters ranged from 0.9 – 9.0 mg/L (mean of 5.6 mg/L). Marine concentrations were less variable, with values ranging from 3.5 – 9.0 mg/L and averaging 5.8 mg/L.

Nearshore salinities range from 24.3 – 35.9 Practical Salinity Units (PSUs), while marine/open-ocean salinities varied between 35.9 and 36.7 PSU, with lowest values occurring at shallow, inner-shelf stations. PSUs are a unitless number but essentially equivalent to the traditional "parts per thousand" unit of salinity. Nearshore water temperatures range from 73.1 degrees Fahrenheit (ºF) to 87.8 ºF with an average of 82.2 ºF. Marine water temperatures were more variable and somewhat colder, ranging from 66.2 ºF to 83.1 ºF and averaging 72.9 ºF (Bathis et al., 2013).

With increasing distance from shore, oceanic circulation patterns play an increasingly large role in dispersing and diluting anthropogenic contaminants and determining water quality. Details on the predominant currents in the Project area are provided in Topic Report 4 (Volume IIa). The Applicant evaluated publicly available water quality sampling locations near the proposed DWP conducted between 2016-2018 (see **Figure 3-4)**. A summary of the physicochemical and nutrient data that was collected within 30 nautical miles of the DWP is provided in **Table 3-2**. Other sampling locations, from nearshore coastal areas (water depths less than 100 feet) to marine open-ocean areas (water depths greater than 100 feet), are discussed below.

Between 2010 and 2018, physicochemical (temperature and salinity) and nutrient data (oxygen, phosphate, and silicate) were collected offshore along the Louisiana coast by the Louisiana University's Marine Consortium, NOAA/Texas A&M University, Gulf of Mexico Research Initiative Information and Data Cooperative (GRIIDC), and Louisiana Barrier Island Comprehensive Monitoring (BICM) Program (**Figure 3-4**). Samples were collected throughout the year and the raw data from these studies are available online through the Biological and Chemical Oceanography Data Management Office (BCO-DMO) and GRIIDC (BCO-DMO 2020; GRIIDC 2020). **Table 3-2** summarizes the near surface water and near bottom water data from sites within 30 nautical miles of the DWP. Profiles of Conductivity-Temperature-Depth (CTD), along with salinity, DO, depth, pH, and turbidity were recorded directly from a CTD unit during its descent and ascent through the water column, and only surface and bottom values for these parameters are included (Campbell and Knap, 2019). Samples for analysis of dissolved inorganic nutrients were collected at discrete water depths and analyzed following standard methods (U.S. EPA, 1997; U.S. EPA, 1995).

BMOP TOPIC REPORT 3 - FIGURE 3-3 HYPOXIA EXTENT IN 2019



VICINITY MAP

LEGEND

- BMOP DEEPWATER PORT
- NEDERLAND TANK TERMINAL LOCATION
- EXISTING PIPELINE TO BE CONVERTED TO OIL SERVICE
- PROPOSED ONSHORE PIPELINE (NEW BUILD)
- COUNTY BOUNDARY
- STATE BOUNDARY

CTD (CONDUCTIVITY, TEMPERATURE, DEPTH) STATIONS

- BOTTOM DISSOLVED OXYGEN (MG/L)

CONTOURS OF DISSOLVED OXYGEN CONTENT DERIVED FROM THE POINT MEASUREMENTS

DISSOLVED OXYGEN CONTOURS (MG/L)

0.5, 1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6

DRAWING INFORMATION

DRAWN BY:	JRA	COUNTY/PARISH:	N/A
CHECKED BY:	CW	STATE:	TEXAS/LOUISIANA
DATE:	9/18/2020	SHEET:	1 OF 1
DWG #:	0802-01-048	SCALE:	1:1,279,297

REVISIONS

PREPARED BY

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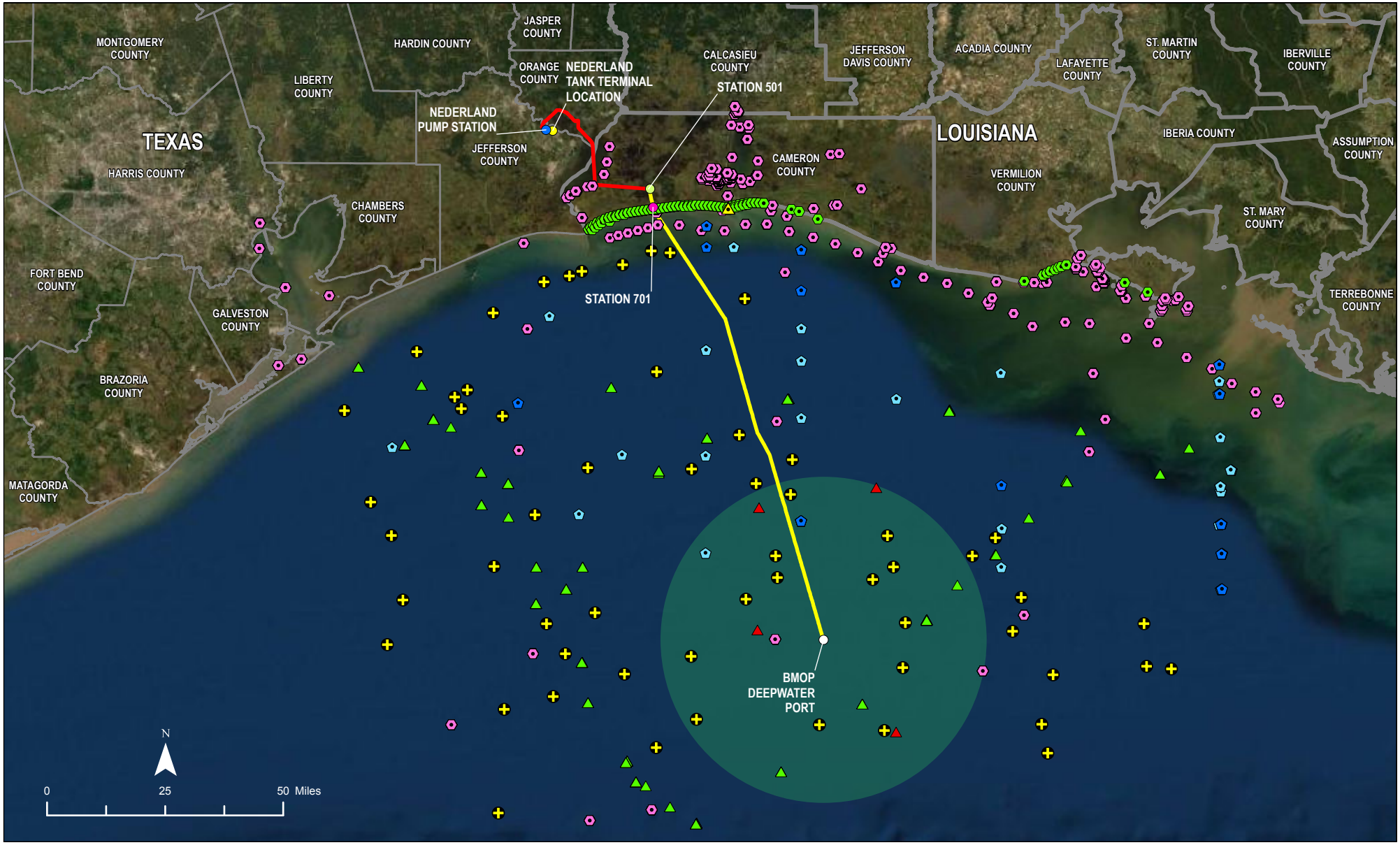
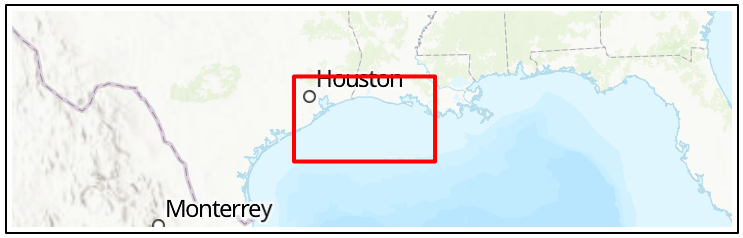
BLUE MARLIN OFFSHORE PORT PROJECT
FIGURE 3-3
Hypoxia Extent in 2019

BMOP PROJECT - FIGURE 3-4 HISTORICAL WATER QUALITY AND SEDIMENT SAMPLING LOCATIONS NEAR THE PROPOSED DWP





LEGEND

- STATION 701 (TO BE CONVERTED TO OIL SERVICE)
- DEEPWATER PORT WC-509B AND CALM BUOYS
- NEDERLAND PUMP STATION
- NEDERLAND TANK TERMINAL LOCATION
- STATION 501 (TO BE CONVERTED TO OIL SERVICE)
- PHYSIOCHEMICAL SAMPLE LOCATION
- BARRIER ISLAND COMPREHENSIVE MONITORING SEDIMENT SAMPLE LOCATION
- HYPOXIA CTD SAMPLING STATION - 2019
- COASTAL WATERS CONSORTIUM SAMPLING STATION - 2016-2018
- NCCOS REA SAMPLING LOCATION
- PAH SAMPLING LOCATION - 2015-2018
- PAH SAMPLING LOCATION - 2010-2014
- SEDIMENT CHEMISTRY SAMPLING LOCATION
- EXISTING PIPELINE TO BE CONVERTED TO OIL SERVICE
- PROPOSED 42-INCH PIPELINE
- AREA OF INTEREST (30 NAUTICAL MILES)
- COUNTY / PARISH

BLUE MARLIN OFFSHORE PORT PROJECT

FIGURE 3-4 HISTORICAL WATER QUALITY AND SEDIMENT SAMPLING LOCATIONS NEAR THE PROPOSED DWP

COUNTY/PARISH:	VARIOUS	DRAWN BY:	CA
STATE:	TX/LA	CHECKED BY:	CW
DATE:	2020/09/17	PROJECTION:	NAD 1983 UTM Zone 15N

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BLUE MARLIN OFFSHORE PORT PROJECT
FIGURE 3-4

DWG:	0802-01-057	SHEET:	1 OF 1

TABLE 3-2
Physicochemical and Nutrient Data for Select Sites Near the BMOP DWP

Parameter	Near Surface[a]					Near Bottom[a]				
	Mean	Range	StDev	StErr	Con. Level	Mean	Range	StDev	StErr	Con. Level
Sample Depth (ft)	3.77	0.7 – 6.3	2.69	0.95	0.95	203.7	147.9 – 317.3	79.54	39.77	0.95
Temperature (ºF)	82.32	81.9 - 82.7	0.39	0.18	0.95	70.46	66.7 - 72.3	2.67	1.33	0.95
Sample Salinity (PSU)	34.32	34.1 - 34.5	0.17	0.10	0.95	36.50	36.3 - 36.7	0.26	0.19	0.95
CTD Salinity (PSU)	34.15	33.8 -34.6	0.42	0.24	0.95	36.28	36.2 - 36.4	0.11	0.06	0.95
Nitrate (mg/L)	0.00	0 - 0.01	0.00	0.00	0.95	0.05	0 - 0.2	0.07	0.04	0.95
Orthophosphate (mg/L)	0.03	0 - 0.1	0.03	0.01	0.95	0.03	0.02 - 0.03	0.01	0.00	0.95
Silicate (mg/L)	0.40	0.2 - 1.1	0.27	0.10	0.95	0.48	0.4 - 0.6	0.11	0.05	0.95
Ammonium (mg/L)	0.96	0.1 - 3.2	1.50	0.75	0.95	0.04	0 - 0.2	0.09	0.04	0.95
Nitrite (mg/L)	0.04	0.01 - 0.1	0.03	0.01	0.95	0.13	0.1 - 0.3	0.09	0.05	0.95
Urea (mg/L)	0.01	0 - 0.0	0.00	0.00	0.95	0.01	0.01 - 0.01	0.00	0.00	0.95
Dissolved Oxygen (mg/L)	6.57	6.5 - 6.7	0.05	0.02	0.95	5.07	4.1 - 5.8	0.80	0.40	0.95
Nitrate+Nitrite (µm)	0.10	0.01 - 0.5	0.17	0.06	0.95	3.92	0.1 - 10.7	5.04	2.52	0.95
Chlorophyll a (µg/L)	0.15	0.1 - 0.2	0.02	0.01	0.95	1.21	0.3 - 1.9	0.81	0.41	0.95

Notes:
[a] StDev – Standard Deviation; StErr – Standard Error; Con. Level – Confidence Level
Source – Campbell and Knap, 2019

Surface water concentrations of chlorophyll a (Chl a), an indicator of phytoplankton biomass and abundance, ranged from <0.12 microgram per liter (µg/L) to 0.16 µg/L and averaged 0.15 µg/L. Bottom-water concentrations of chlorophyll were higher than concentrations in surface waters, ranging between <0.30 µg/L and 1.92 µg/L and averaging 1.21 µg/L.

Surface salinities ranged from 34.1 - 34.5 PSU while bottom salinities varied between 36.1 - 36.7 PSU, with lowest values occurring at shallow, inner-shelf stations. Surface-water temperatures varied between 81.9 ºF to 82.7 ºF, while near-bottom waters ranged in temperature from 66.7 ºF to 72.3 ºF. DO ranged from 6.5 - 6.7 mg/L in surface waters, and 4.1 - 5.8 mg/L for bottom waters, providing healthy conditions for aquatic species.

Deepwater Environment

Water quality generally improves beyond the limits of nearshore influences along the GOM continental shelf. However, in deeper waters, water quality can be affected by trace metals and hydrocarbons within the water column and sediments sourced from natural hydrocarbon seeps (USCG, 2020). As summarized

in Kennicutt II (2017b), seepage of oil and gas is a natural phenomenon that occurs when deeply generated oil and gas migrates to the earth's surface. Offshore seeps are widespread in the northern GOM, with most petroleum seepage in the northwestern and north-central offshore region. Contribution of hydrocarbons from the bottom sediments to the water column contribute additional carbon loading to the deeper waters, contributing to enhanced chemical and biological oxygen demand (USCG, 2016).

In deeper waters, water quality can also be affected by the discharge of produced waters around oil and gas platforms. As noted above, the offshore oil and gas industry operates hundreds of platforms throughout the northern GOM. However, the effects to water quality are localized to the discharge points and intermittent. This is principally due to the low volume of discharge and the large volume and mixing rates of the GOM (Kennicutt II, 2017a).

3.3.1 Sediment Quality

The quality of coastal and marine sediments is influenced substantially by inputs from adjacent watersheds (Turner et al., 2003). The concentration of oxygen in sediments strongly influences sediment quality through its effect on the binding of materials to sediment particles. At the sediment surface, the concentration of oxygen is usually the same as that of the overlying water. Deeper sediment layers, however, are often low in oxygen (i.e., hypoxic) or have no oxygen (i.e., anoxic) and have a low oxidation-reduction potential which predicts the stability of various compounds that regulate nutrient and metal availability in sediments.

Elevated concentrations of contaminants can adversely degrade sediment quality, which may affect organisms and ecosystems and possibly human health. Polycyclic aromatic hydrocarbons (PAH) and some metals have natural as well as human-related sources in the GOM and are generally restricted to hot spots of limited spatial extent associated with unique contaminant sources (Kennicutt II, 2017b).

3.3.1.1 Coastal Waters

In the northern GOM, the presence and influence of the Mississippi River has a defining influence on the origins and deposition of sediments (Kennicutt II, 2017b). In the mid-2000s the Mississippi River was transporting approximately 136 million metric tons (~150 million tons) of sediment per year to the GOM (Thorne et al., 2008). The discharged water is very turbid and high in nutrients, principally nitrogen and phosphorus. In addition, toxic substances and pesticides are also discharged into the GOM from industrial and municipal discharges, urban and agricultural runoff, accidental spills, and atmospheric deposition. Turner et al. (2003) analyzed shelf sediments off the coast of Louisiana and found trace organic pollutants, including PAHs, herbicides such as Atrazine, chlorinated pesticides, PCBs, and trace inorganic (metal) pollutants.

The EPA's National Coastal Condition Report IV categorizes coastal waters based on an evaluation of five indices including sediment quality. The sediment quality index for the northern GOM's coastal waters was rated overall as poor (EPA, 2012; Kennicutt II, 2017b). However, the poor rating is mostly due to measured sediment toxicity which, likely due to sample locations in Florida Bay. Three locations in Florida Bay had high sediment concentrations of silver (Ag) that may have been the cause of the poor ratings for sediment toxicity. The sediment contaminants indicator overall was rated as good (Kennicutt II, 2017b).

The sediment quality index ratings for the western Louisiana region where the Project is located were rated is good (Kennicutt II, 2017b). With conversion of the Mainline, the BMOP Project will avoid the need for construction within coastal waters and have minimal disturbance to the bottom sediments (where existing side taps will be sealed) and the removal of the MLV at WC 277.

3.3.1.2 Marine Waters

The Applicant conducted a geophysical and hazard survey of the proposed DWP area and the alternative location in May of 2020. The survey results are included in **Appendix D** of Volume III (*Confidential*). The area of the DWP consists of soft bottom sediments. The upper sediment layer consists of generally well-layered, parallel bedded sediments, which are interpreted as predominantly clays and silts. This stratigraphy is interrupted periodically by cut and fill channel complexes just beneath the seafloor. The seafloor itself has sporadic drag and trawl scars and numerous pockmarks.

Concentrations of contaminants rapidly decrease with distance offshore as activities that have the potential to contaminate sediments mostly occur in coastal areas and/or on adjacent land surfaces. Drill mud and cutting discharges by offshore platforms can lead to elevated contaminant concentrations in sediments; however, the effects have been found to generally be limited to within a few hundred meters of a platform (Kennicutt II, 2017b; Neff, 2005).

The Applicant evaluated publicly available sediment sampling locations near the proposed DWP conducted between 2015-2018 (see **Figure 3-4)**. With conversion of the Mainline, sediment disturbance will primarily be restricted to the area where the Crude Oil Loading Pipelines, PLEMs, and CALM Buoy anchors will be installed. One historic sediment sample was identified within 10 nautical miles of the DWP location. The sediment sample was taken in 2014 approximately 9 miles west of the WC 509 Platform Complex. The sample was 37 percent clay, 36 percent sand, and 27 percent silt.

Data obtained from the National Centers for Coastal Ocean Science (NCCOS) Regional Ecological Assessments (REA) and National Benthic Inventory (NBI) include observations of sediment quality (grain size, total organic carbon [TOC], chemical contaminant concentrations, toxicity) from studies conducted by NOAA and partnering institutions in nearshore and marine coastal-ocean areas. Sediments were collected using a Young-modified Van Veen grab sampler (0.4 square feet) and the specific methods for determining sediment grain size, TOC, and chemical contaminants can be found in Balthis et al. (2013). A summary of select physical and chemical parameters of sediment samples collected within a 30 nautical mile DWP study area (see **Figure 3-4)** is provided below.

Physical sediment within the DWP study area consisted of sediments composed mainly of sands (< 20 percent silt+clay content) representing 25 percent of the area. A quarter (25 percent of study area) had sediments consisting of muddy sand (20 – 80 percent silt+clay), with the remaining 50 % of the area characterized by muddy sediments (> 80 percent silt+clay). Sediments at one site also included a gravel component, but this was typically < 1 percent.

TOC content of sediments in general was low, ranging from 1.3 – 6.8 milligram per gram (mg/g) and averaging 5.2 mg/g throughout the DWP study area. All of the sampling locations (4 sites, 100 percent area) had sediment TOC concentrations in the low range, < 20 mg/g based on Environmental Monitoring and Assessment Program (EMAP) and National Coastal Assessment (NCA) thresholds (EPA 2008). Of the four stations sampled, one site (representing 25 % of the area) had sediment TOC < 5 mg/g and the remaining three stations (representing 75 percent of the area) had TOC < 6.8 mg/g.

Bottom sediments appeared to be relatively uncontaminated. No contaminants were found in excess of their corresponding Effects-Range Medium (ERM) sediment quality guideline values within the DWP study area. The entire DWP study area was rated in good condition (no chemicals above corresponding ERM values and < 5 chemicals above corresponding Effects-Range Low [ERL] values). Arsenic was the only chemical that exceeded the corresponding ERL guidelines (> 8.2 microgram per gram (µg/g) dry weight) at one nearshore site (27 nautical miles from the DWP), while the concentration of arsenic at all sites (4 – 9 µg/g dry mass) was within the range typical of uncontaminated nearshore/marine sediments (5 – 15 µg/g

dry weight total arsenic) reported by Neff (1997) and reflects its natural presence at low to moderate concentrations in crustal rocks of the region.

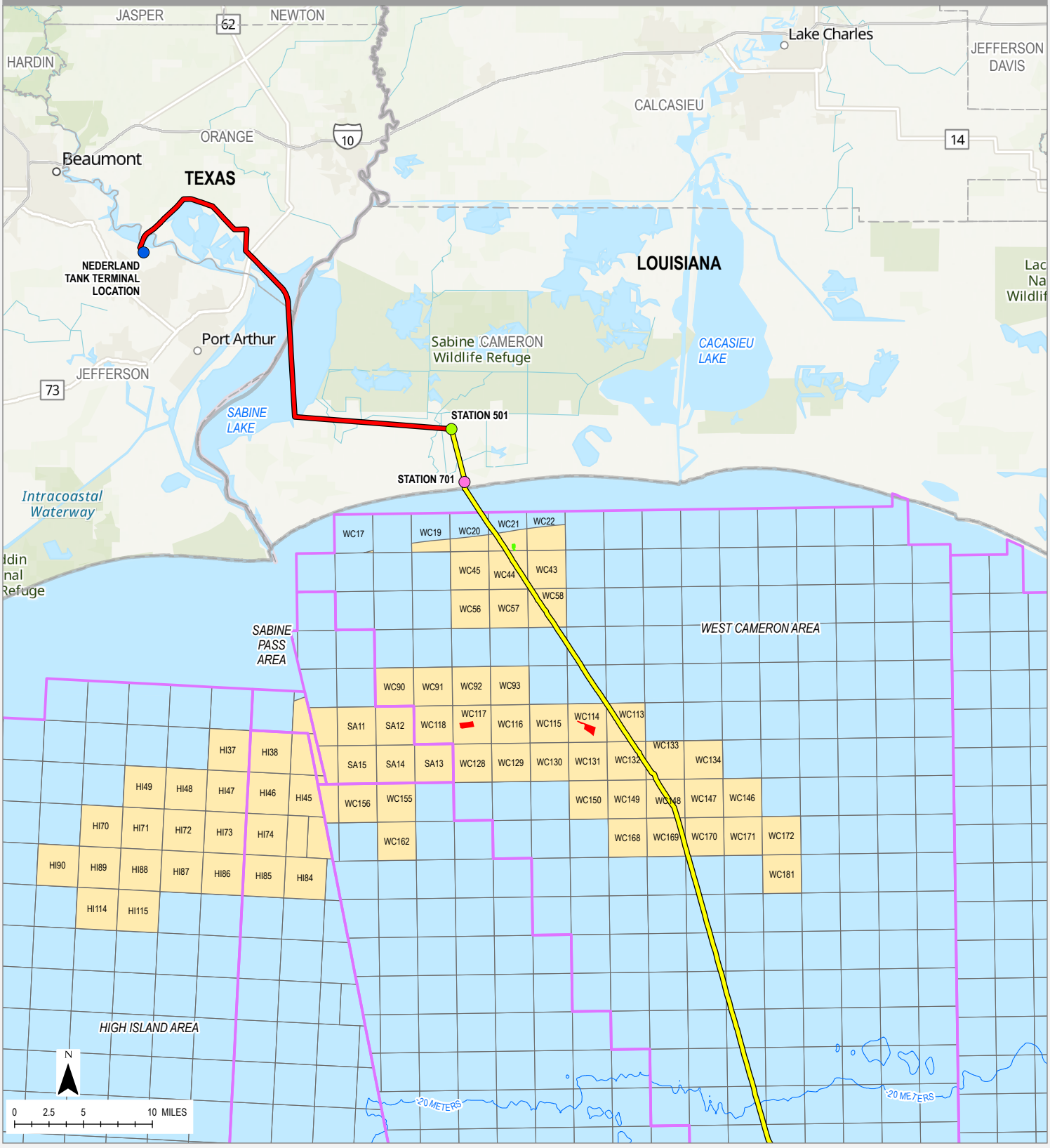
Significant Sediment Resources

Under the OCSLA, Notices to Lessees (NTLs) have been developed by the United States Bureau of Ocean Energy Management (BOEM), which provide implementation guidelines for a special lease stipulation or regional requirement. NTL No. 2009-G04 identifies Significant OCS Sediment Resources in the Gulf of Mexico. OCS sediment resources refer to the sediment deposit(s), including clay, silt, sand, and gravel size particles and shell, found on or below the surface of the seabed on the OCS, as defined in Section 2(a) of the OCSLA (43 USC § 1331(a)). Per NTL No. 2009-G04, coastal restoration, beach nourishment, and levee reconstruction are crucial to mitigate future coastal erosion, land loss, flooding, and storm damage in the GOM. The success of that long-term effort depends on locating and securing significant quantities of OCS sediment resources that are compatible with environments that are targeted for restoration. Offshore sand resources, like upland sources, are extremely scarce where most needed. Additionally, sizable areas of these relatively small offshore sand resources are not extractable because of the presence of oil and gas infrastructure, archaeologically sensitive areas, and biologically sensitive areas. NTL No. 2009-G04 provides for the protection of these significant sediment resource areas and bottom-disturbing activities, such as surface or near-surface placement of platforms, pipelines, and cables, should avoid these significant sediment resources to the maximum extent practicable. The existing Mainline traverses defined significant OCS sediment resource areas as shown in **Figure 3-5**; however, no construction will be required in these areas, except the work required to seal existing side taps (15 locations) which requires epoxy sealing and the removal of a MLV at WC 277. Epoxy sealing will be done by divers and the amount of disturbance will be minimal. Removal of the MLV at WC277 will involve lifting the pipeline, cutting and removing the MLV, and replacing it with straight pipe and then lowering the Mainline to the seafloor.

Deepwater Environment

As noted above, natural oil and gas seepage are common offshore in the northern GOM and some of the highest sediment concentrations of PAH are on the continental shelf/slope (Kennicutt II, 2017b; NRC, 2003), with the immediate effects of oil and gas seepage generally found in close proximity to seeps (Kennicutt II, 2017b). Based on a review of BOEM's mapping of seep related anomalies and the U.S. Geological Survey's seeps database, the DWP is not in proximity to any known seeps (BOEM, 2020; USGS, 2019). The BOEM database identifies four classes of seafloor seismic acoustic amplitude anomalies interpreted to be caused by hydrocarbon seepage: 1) high-positive, 2) low-positive/negative, 3) pockmarks, and 4) water-column gas plumes. The USGS database includes the location of hydrocarbon seep sites that have chemosynthetic organisms. The seep locations from these two databases are shown in **Figure 3-6**. The closest feature is a seismic high-positive amplitude response (i.e., high-positive class) located approximately 10.6 miles west of the DWP. Most of these anomalies that have been directly investigated by submersible or Remotely Operated Vehicle exhibit a slow to moderate rate of hydrocarbon seepage. The positive amplitude response on the seismic data has been found to be caused by the presence of authigenic carbonate hard grounds created by bacteria living off the hydrocarbon in the sediments at these locations (BOEM, 2020).

BMOP TOPIC REPORT 3 - FIGURE 3-5 SIGNIFICANT SEDIMENT RESOURCE BLOCKS



VICINITY MAP

LEGEND

- NEDERLAND TANK TERMINAL LOCATION
- STATION 501 (TO BE CONVERTED TO OIL SERVICE)
- STATION 701 (TO BE CONVERTED TO OIL SERVICE)
- EXISTING PIPELINE TO BE CONVERTED TO OIL SERVICE
- PROPOSED ONSHORE PIPELINE (NEW BUILD)
- DEPTH CONTOUR
- BOEM OCS AREA

SEDIMENT LEASE AREAS

- BORROW AREA HF, BORROW AREA JF
- PEVETO CHANNEL
- SIGNIFICANT SEDIMENT RESOURCE AREAS
- OFFSHORE BLOCK BOUNDARY
- COUNTY BOUNDARY
- STATE BOUNDARY

U.S. Department of Interior, Bureau of Ocean Energy Management, Marine Minerals Program

DRAWING INFORMATION

DRAWN BY:	JRA	COUNTY/PARISH:	N/A
CHECKED BY:	CW	STATE:	TEXAS/LOUISIANA
DATE:	9/18/2020	SHEET:	1
DWG #:	0802-01-042	SCALE:	1:620,000

REVISIONS

PREPARED BY

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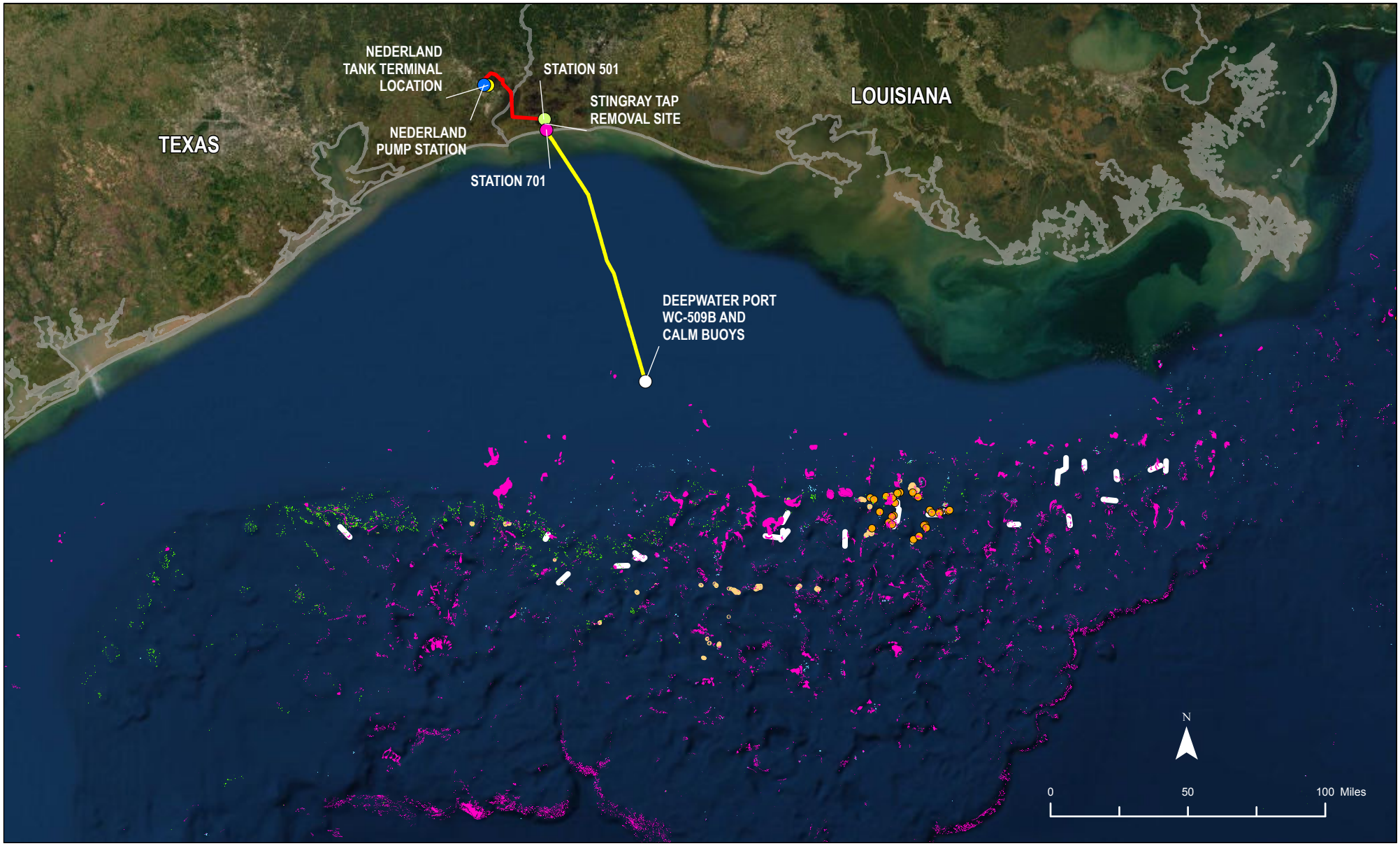
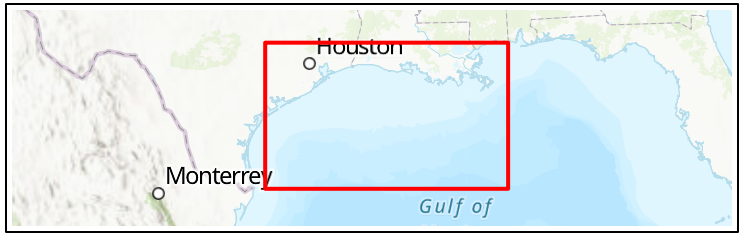
1800 WEST LOOP SOUTH, SUITE 850
HOUSTON, TX 77027, USA

BLUE MARLIN OFFSHORE PORT PROJECT
FIGURE 3-5

SIGNIFICANT SEDIMENT RESOURCE BLOCKS

BMOP PROJECT - FIGURE 3-6 - SEISMIC WATER BOTTOM ANOMALIES





LEGEND

- STATION 701 (TO BE CONVERTED TO OIL SERVICE)
- DEEPWATER PORT WC-509B AND CALM BUOYS
- NEDERLAND PUMP STATION
- NEDERLAND TANK TERMINAL LOCATION
- STATION 501 (TO BE CONVERTED TO OIL SERVICE)
- EXISTING PIPELINE TO BE CONVERTED TO OIL SERVICE
- PROPOSED 42-INCH PIPELINE
- BOEM - WATER-COLUMN GAS PLUMES CLASS - EX60
- USGS - HYDOCARBON SEEP DATA
- BOEM - POCKMARKS CLASS
- BOEM - HIG-POSITIVE CLASS
- BOEM - LOW POSITIVE/ NEGATIVE CLASS
- BOEM - WATER-COLUMN GAS PLUMES CLASS
- STATE BOUNDARY

BLUE MARLIN OFFSHORE PORT PROJECT

FIGURE 3-6 - SEISMIC WATER BOTTOM ANOMALIES

COUNTY/PARISH:	VARIOUS	DRAWN BY:	CA
STATE:	TX/LA	CHECKED BY:	CW

DATE:	2020/09/17	PROJECTION:	NAD 1983 UTM Zone 15N

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BLUE MARLIN OFFSHORE PORT PROJECT
FIGURE 3-6

DWG:	0802-01-062	SHEET:	1 OF 1

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3.4 ENVIRONMENTAL CONSEQUENCES

This section includes a discussion of the potential impacts that would likely result from the construction and operation of the offshore components of the Project. The study area within which potential impacts were assessed includes the area that could be affected physically by Project activities during construction and operation. As described in **Table 1-19** in Section 1.9.2, Evaluation Criteria, of Topic Report 1 (Volume IIa), the Project's potential effects on water and sediment quality have been evaluated based on their potential to:

- Violate a federal, state, local, or federally recognized international water quality criterion or waste discharge requirement;
- Cause irreparable harm to human health, aquatic life, or beneficial uses of aquatic ecosystems;
- Degrade marine or coastal water quality;
- Degrade marine, coastal, or terrestrial (lakes, rivers, wetlands, tidal environments) water quality; and/or
- Increase contaminant levels in the water column, sediment, or biota to levels shown to have the potential to harm marine organisms, even if the levels do not exceed the formal water quality criteria.

Activities associated with construction, operation, and decommissioning of the DWP components that may have environmental consequences on water and sediment quality are included in **Table 3-3**. The following sections provide further information and discussion of potential environmental consequences.

Appendix F (Volume IIa) contains a Project-specific Oil Spill Trajectory and Fate Modeling Report. In addition, **Appendix F** (Volume IIa) also contains a Tactical Response Assessment, which provides a discussion of potential response tactics that would facilitate a rapid and effective incident response to a spill. In the event of a large spill offshore, an emergency response would be mobilized from shore in cooperation with the appropriate State and/or Federal response agencies.

TABLE 3-3
Potential Impacts on Water and Sediment Quality

Activity	Details	Duration of Impact	Mitigation Measures	Anticipated Level of Impact
Construction				
Mainline Conversion	• The amount of potential turbidity and sedimentation from pipeline construction is significantly reduced due to the Project's ability to convert the existing Mainline. Minimal impacts from sealing existing side taps and removal of an MLV at WC 277. • Hydrostatic test water discharge.	Short-term	Hydrostatic test water will be discharged through a neutralization and filtration spread and discharged overboard or retained in frac tanks and disposed of onshore, if required for compliance with EPA Permit	Negligible to minor localized

TABLE 3-3
Potential Impacts on Water and Sediment Quality

Activity	Details	Duration of Impact	Mitigation Measures	Anticipated Level of Impact
Crude Oil Loading Pipeline Construction	• Turbidity and sedimentation during pipeline burial and lay barge anchoring. • Localized and temporary changes in water quality due to hydrostatic testing. • Potential disturbance of unexpected contaminated sediments.	Short-term	Compliance with USACE Permit, EPA Permit, and BOEM Right-Of-Way (ROW) grant conditions	Negligible to minor and localized
Platform Conversion	• Pollution due to potential spills of fuels or other hazardous materials. • Pollutants in stormwater runoff from the platform.	Short-term	Compliance with MARAD and BOEM/BSEE Permit conditions; Adherence to SPCC Plan	Negligible to minor and localized
CALM Buoy and PLEM Installation	• Turbidity and sedimentation during PLEM and anchor installation. • Potential disturbance of unexpected contaminated sediments.	Short-term	Compliance with USACE Permit and BOEM ROW grant conditions	Negligible to minor and localized
Construction Vessel Operations	• Localized changes in water temperature due to cycling of cooling water. • Localized changes in water quality due to ballast water exchange. • Increase in turbidity and sedimentation due to anchoring and prop wash/scour (shallow areas). • Potential disturbance of unexpected contaminated sediments due to anchoring and prop wash/scour (shallow areas). • Pollution due to potential spills of fuels or other hazardous materials.	Short-term	Compliance with federal regulations for vessel operations; Adherence to SPCC Plan	Negligible to minor and localized
Operations				
Crude Oil Transfer	• Pollution due to a potential oil spill from the offloading buoy or pipeline.	Lifetime of Project	Compliance with USCG regulations and Energy Transfer's Sea Robin Oil Spill Response Plan (O-726), modified to include BMOP	Negligible and localized
Platform Operations	• Changes in water quality due to water discharges, including stormwater runoff. • Pollution due to potential spills of fuels or other hazardous materials.	Lifetime of Project	Compliance with EPA Permit and MARAD License conditions; Energy Transfer's Sea	Negligible to minor and localized

TABLE 3-3
Potential Impacts on Water and Sediment Quality

Activity	Details	Duration of Impact	Mitigation Measures	Anticipated Level of Impact
			Robin Oil Spill Response Plan (O-726), modified to include BMOP	
Crude Oil Carrier Operations	• Changes in water temperature due to cycling of cooling water. • Changes in water quality due to ballast water discharge. • Pollution due to potential spills of fuels or other hazardous materials.	Lifetime of Project	Compliance with federal regulations for vessel operations; Adherence to Energy Transfer's Sea Robin Oil Spill Response Plan (O-726), modified to include BMOP	Negligible to minor and localized
Support Vessel Operations	• Changes in water temperature due to cycling of cooling water. • Changes in water quality due to ballast water exchange. • Pollution due to potential spills of fuels or other hazardous materials.	Lifetime of Project	Compliance with federal regulations for vessel operations; Adherence to Energy Transfer's Sea Robin Oil Spill Response Plan (O-726), modified to include BMOP	Negligible to minor and localized
Upsets and Accidents				
Pipeline and Platform Operations	• Pollution due to potential oil spill.	Lifetime of Project	Continuous monitoring of pipeline operations, SCADA, early detection of abnormal operations, and remote shutdown; Adherence to Energy Transfer's Sea Robin Oil Spill Response Plan (O-726), modified to include BMOP, MARAD License conditions, and USCG requirements	Minor to major and localized, depending on the volume of oil released
Vessel Operations	• Pollution due to potential oil spill.	Lifetime of Project	Compliance with Energy Transfer's Sea Robin Oil Spill Response Plan (O-726), modified to	Minor to major and localized, depending on the volume of oil released

TABLE 3-3
Potential Impacts on Water and Sediment Quality

Activity	Details	Duration of Impact	Mitigation Measures	Anticipated Level of Impact
			include BMOP, and USCG regulations	
Decommissioning				
Platform and CALM Buoy Removal	• Turbidity and sedimentation during removal. • Potential disturbance of unexpected contaminated sediments. • Potential vessel related impacts, similar to facility construction. • Pollution due to potential spills of fuels or other hazardous materials.	Short-term	Compliance with USACE and EPA Permits, BOEM ROW grant conditions and MARAD license	Negligible to minor and localized
Facility Abandonment in Place	• Turbidity and sedimentation while disconnecting from the facilities that will be removed (e.g., PLEM). • Potential disturbance of unexpected contaminated sediments while disconnecting from the facilities that will be removed (e.g., PLEM). • Localized changes in water quality due to pipeline purging.	Short-term	Compliance with USACE and BOEM/BSEE Permit conditions; Adherence to Energy Transfer's Sea Robin Oil Spill Response Plan (O-726), modified to include BMOP; MARAD license conditions	Negligible to minor and localized
Support Vessel Operations	• Localized changes in water temperature due to cycling of cooling water. • Localized changes in water quality due to ballast water exchange. • Increase in turbidity and sedimentation due to anchoring and prop wash/scour (shallow areas). • Potential disturbance of unexpected contaminated sediments due to anchoring and prop wash/scour (shallow areas). • Pollution due to potential spills of fuels or other hazardous materials.	Short-term	Compliance with federal regulations for vessel operations	Negligible to minor and localized

3.4.1 Construction and Installation

Activities required for construction and development of the DWP will include installation of fixed structures (e.g., Crude Oil Loading Pipelines, PLEMs, CALM Buoys), including anchor placement and pile driving; converting of an existing subsea pipeline; converting of existing platforms, including removal and installation of equipment; minor bottom disturbances to permanently seal existing side taps on the Mainline and removal of the MLV at WC 277; construction vessel traffic, including vessel anchoring; and hydrostatic testing, including test water discharge. These activities have potential environmental consequences to water and sediment quality as described in the subsections below. Additional impacts could also be caused by

accidental releases (i.e., spills). None of the potential environmental consequences from Project construction are expected to have irreversible or significant impacts to water or sediment quality. Further, the amount of construction disturbance required and potential impacts to water and sediment quality have been significantly reduced with the planned conversion of the existing Mainline, WC 509 Platform Complex, and WC 148 Platform.

3.4.1.1 Seafloor Disturbance

An overview of the extent of seafloor disturbance that will be required during Project construction is provided in **Table 1-5** of Topic Report 1 (Volume IIa) and a discussion of those disturbances is provided in Topic Report 4 (Volume IIa). Sealing side-taps on the existing Mainline, installation of the proposed Crude Oil Loading Pipelines, PLEMs, CALM Buoy anchors, removal of the MLV at WC 277, and service vessel mooring blocks may result in temporary increases in turbidity levels and sedimentation in proximity to the work area due to re-suspension of sediments. Construction vessel anchoring may also result in a localized increase in turbidity and sediment displacement due to anchor placement and drag. Details of these construction activities are provided in Section 1.4 of Topic Report 1, "Project Description, Purpose, and Need" (Volume IIa).

The construction activity with the greatest potential for sediment disturbance is the use of a pipe jet sled to lower the Crude Oil Loading Pipelines beneath the seafloor to the required burial depth. During pipeline lowering, up to 44,711 cubic yards of seafloor sediments could be mobilized with up to 35 percent of the sediments temporarily suspended in the water column (Foreman, 2002; Swanson et al., 2015). TSS loads can increase to as much as 1,000-5,000 mg/L (Swanson et al., 2015) in immediate proximity to the jet sled but within 65 feet of the jetting, the maximum TSS load is expected to be 235 mg/L. To put this in perspective, Schubel et al. (1978) documented increases in TSS of 100-550 mg/L at 6 feet above a shrimp trawl. Jetting of the pipelines is expected to be completed within 10 days with elevated TSS loads likely lasting less than 24-48 hours at any one location along the pipeline (NOAA Fisheries, 2020).

The increase in turbidity and TSS loads that may occur from anchor pile installation for the PLEM and CALM Buoys, as well as from vessel anchoring, will be at lower levels, occur over a smaller area, and be of shorter duration than those caused by pipeline lowering. Pile driving activities may produce TSS concentrations of approximately 5.0-10.0 mg/L above background levels within approximately 300 feet of the pile being driven (FHWA, 2012; NOAA Fisheries, 2020).

Following resuspension during construction, coarse sediments will fall out and resettle quickly (within hours) while fine sediments may remain suspended for a longer period of time (hours to days) depending on the prevailing currents. The potential impacts to water quality are anticipated to be short-term, localized, and minor. Due to the negligible amount of the water column that could be affected relative to the volume of the GOM within a half-mile of the site, the potential impacts will not be significant. Although sediments may be transported over a short distance, there will be no anticipated change in sediment quality as a result of these construction activities. In addition, with the exception of epoxy sealing of the existing side tap in WC 44, the area where sediments will be disturbed is outside of any OCS sediment resource areas.

3.4.1.2 Hydrostatic Testing

Before the pipelines and DWP piping are placed into service, the Applicant will conduct hydrostatic testing to verify their structural integrity. Details of the proposed hydrostatic testing and test water discharge (dewatering) activities are provided in Section 1.4.3.3, Hydrostatic Testing, of Topic Report 1 (Volume IIa). The Mainline will be filled with seawater for the duration of the conversion and new construction activities. The Crude Oil Loading Pipelines will also be filled with seawater following installation but prior to operation. While the pipelines are filled with seawater, the water may be treated with chemicals to prevent

corrosion. A typical biocide, (like BIOC16779A) is a microbial agent that hydrolyzes rapidly into acetic acid and hydrogen peroxide which can safely be discharged. Following hydrotesting of the Mainline and before performing a Nitrogen purge, a second biocide, possibly in the form of a biocide pill (like BIOC11139A) might be used. The biocide pill (i.e., biocide combined with freshwater), if used, will be contained between two pigs as it is sent through the Mainline. Biocides like BIOC11139A are usually a combination of glutaraldehyde and quaternary amine actives which may not meet regulations for overboard discharge. Therefore, the Applicant would stage frac tanks at the WC 509 Platform Complex to gather and treat the fluids between the two pigs and then transfer them to shore for appropriate disposal. Discharges will be to the water column near the surface through an aerating device and will not reach the seafloor (>160 feet) to cause scour.

To ensure that water quality standards are met, all test water will be required to meet EPA NPDES permit requirements prior to discharge. With adherence to permit requirements, potential impacts to water and sediment quality from hydrostatic testing and test water discharge are anticipated to be negligible.

To limit the amount of hydrostatic test water discharges that are necessary offshore, all new pipe assemblies and skids containing pressurized pipe that were pre-fabricated in an onshore, third-party fabrication yard (e.g., pipe assemblies, DWP platform piping, WC 148 Platform piping, PLEMs, tie-in spools, risers) will have already been hydrostatically pressure tested prior to transport offshore.

3.4.1.3 Accidental Release

Inadvertent spills of hydrocarbons or other hazardous substances from construction vessels pose a risk to water quality. The extent of the potential impacts from an accidental release would be related to a number of factors, including what the spilled material was, the currents and winds, and the size of the spill. Vessels associated with construction of the DWP will be equipped with spill containment and cleanup equipment to respond to small, accidental releases from fuel bunkers, lubricants, or other chemicals in accordance with a Spill Prevention, Control, and Countermeasures (SPCC) Plan each contractor will be required to prepare. In the event of a large spill, an emergency response would be mobilized from shore in accordance with Energy Transfer's Sea Robin Oil Spill Response Plan (O-726), modified to include BMOP. These measures would minimize the extent and impacts from a spill in marine waters and the impacts to water and sediment quality are anticipated to be minimal.

3.4.2 Operation

Operation of the Project's offshore facilities will result in seafloor disturbance, seawater withdrawals, and operational discharges. These activities will have potential environmental consequences to water and sediment quality as described in the subsections below. Additional impacts could also be caused by accidental releases (i.e., spills). To minimize and avoid potential impacts, the Project will follow the Best Management Practices (BMPs) in its Port Operations Manual (see **Appendix G**, Volume III [*Confidential*]) and Energy Transfer's Sea Robin Oil Spill Response Plan (O-726), modified to include BMOP.

The BMOP Project involves converting the existing WC 509 Platform Complex, which is currently in operation and already has associated seawater withdrawals and discharges. Modification of those discharges for the new facilities will be addressed in an individual NPDES Permit issued by EPA Region 6. None of the anticipated environmental consequences from DWP operations are expected to have irreversible or significant impacts to water or sediment quality.

3.4.2.1 Seafloor Disturbance

Pipelines

During operations, the existing Mainline and Crude Oil Loading Pipelines will be below the seafloor. Any maintenance activities that require pipeline excavation are anticipated to have similar impacts to those described for pipeline construction. However, they will affect a much smaller area and the work will likely be performed by divers. If necessary, excavation and subsequent reburial of an area along the pipeline may result in a localized increase in turbidity and sediment displacement. Although sediments may be transported over a short distance, changes in sediment quality are not anticipated as a result of maintenance activities. Any impacts to water quality (e.g., turbidity) from pipeline maintenance will be intermittent, short-term, and minor.

Platforms

Scour is the removal, by hydrodynamic forces, of granular bed material in the vicinity of a structure and can occur when the hydrodynamic bottom shear stresses are greater than the sediment critical shear stress. Scour can cause changes in local turbidity concentrations and result in sediment disruption and movement due to changing tides and currents. The Applicant is converting the existing WC 509 Platform Complex and the existing WC 148 Platform. The foundations of these existing structures will not change from current conditions and the Project will not require the placement of new platforms (i.e., piles, jackets) in the area.

CALM Buoys and PLEMs

The small changes to currents that could occur around the CALM Buoy anchors and PLEMs could result in local scour. The presence of relatively slow tidal/current speeds combined with the soft-bottom sediments in the northern GOM generally indicates that the potential for scour is minimal. Further, as noted above, the results of the geophysical and hazard survey of the proposed DWP area indicate that the upper sediments on the seafloor are predominantly clays and silts (see **Appendix D** of Volume III (*Confidential*)). These fine-grained sediments are expected to be cohesive in nature (compared to sandy substrates) and not prone to scour.

The CALM Buoy anchor chains will be susceptible to movement due to waves, currents, and VLCC or other crude carrier movement and could sweep across the seafloor in proximity to the anchors. As the chains sweep along the seafloor, they could cause an increase in turbidity levels and sedimentation in proximity to the anchors due to re-suspension of sediments. However, CALM Buoy movement is expected to be minimal and the potential for anchor chain sweeps negligible.

Service Vessel Mooring Area

The small changes to currents that could occur around the mooring blocks could result in local scour. However, as described above, the potential for scour is minimal. The area consists of fine-grained sediments which are expected to be cohesive in nature and not prone to scour.

Similar to the CALM Buoy chains, the chain between the mooring blocks and associated mooring buoys in the Service Vessel Mooring Areas could also result in disturbance to the seafloor as the chain sweeps along the bottom in a 360 area around the mooring block. As the chains sweep along the seafloor, they will result in an increase in turbidity levels and sedimentation in proximity to the mooring due to re-suspension of sediments. Although sediments may be transported over a short distance, changes in sediment quality are not anticipated as a result of the chain sweeps. The area that could be affected will be limited to the maximum swing of the chain. Potential adverse impacts to water quality (i.e., turbidity) from the chain

sweeps will be long-term but intermittent, minor, and localized. Due to the negligible amount of the water column that will be affected relative to the size of the GOM, the potential impacts will not be significant.

3.4.2.2 Operational Seawater Withdrawals

During operations, seawater withdrawals will occur at the WC 509 Platform Complex and also by the VLCCs, other crude carriers, and service vessels. The VLCCs and other crude oil carriers that will call on the DWP will not be part of the BMOP Project. Shippers who transport oil through the BMOP DWP will use the worldwide fleet of available crude oil carriers. VLCCs and other crude oil carriers will maneuver to the CALM Buoys and moor via hawser lines to the Buoys. Flexible hoses will be used to load crude oil from the DWP to the VLCCs or other crude oil carriers. Once the crude oil cargo is loaded, the flexible hoses will be disconnected and the VLCC or other crude oil carrier will depart the DWP to transport the cargo to various global export markets. Although not part of the BMOP Project, for general information purposes, potential water and sediment quality impacts associated with VLCCs and other crude oil carriers are discussed below.

DWP

Seawater intake at the WC 509 Platform Complex will be limited to the withdrawal of water needed for the firewater and seawater pumps. Details of the proposed seawater uptake, including volumes, are provided in Section 1.5.1.2, Water Use and Discharge on the DWP Platform, and **Table 1-13** of Topic Report 1 (Volume IIa). The intake locations will be within the WC 509 Platform Complex's platform jacket framing and below the water surface.

There will be two firewater pumps that will be operated only in the case of an emergency or during maintenance and testing. Maintenance and testing of the firewater system will require each firewater pump to be run for thirty minutes per week. A seawater pump will also be used to support various systems and facilities, providing water to the potable water converter, utility water, and sewage treatment systems, and also maintaining charging pressure on the firewater header system. The seawater pump will be run on demand at a flow rate of approximately 20 gallons per minute.

Operation of the WC 509 Platform Complex will result in long-term seawater withdrawal from the GOM. However, the estimated volume of seawater in the GOM is approximately 634 quadrillion gallons (Davis, 2017). Relative to this volume, the proposed DWP withdrawals will be negligible in volume, resulting in negligible impacts on water quality in the GOM. Because of the water depth, the seawater withdrawals are anticipated to have no impact on sediment quality in the GOM.

Vessels

Ballast water is seawater used to stabilize a ship when loading/unloading cargo and to maintain optimal vessel speed. Since the BMOP Project will involve crude oil loading onto VLCCs or other crude carriers, these vessels will likely discharge ballast water during DWP operations rather than uptake seawater for ballast. A discussion of ballast water discharges is provided below. Service vessels offloading supplies at the DWP may require the uptake of ballast water; however, the uptake would be intermittent and any impacts from the withdrawal are anticipated to be localized and minimal.

VLCCs, other crude carriers, and service vessels visiting the DWP will withdraw seawater for use as cooling water while at the DWP. Vessels require cooling water systems to manage the heat generated during operation of their engines. For example, at a surface water temperature of 72 ºF, a VLCCs or other crude carrier moored at the DWP is estimated to require 400,000 to 530,000 gallons per hour of cooling water (USCG, 2020). Compared to the large volume of seawater in the GOM as a whole (634 quadrillion gallons), these water withdrawals will be minimal in volume.

Seawater withdrawals to support vessel operations at the DWP will result in long-term but negligible impacts on water quality in the GOM. Because of the water depth, the withdrawals are anticipated to have no impact on sediment quality in the GOM.

3.4.2.3 Operational Discharges

Operational discharges will be made at the WC 509 Platform Complex, WC 148 Platform, and by the VLCCs, other crude carriers, and service vessels.

Pipelines

During the operational life of the proposed Project, maintenance of the Crude Oil Loading Pipelines and Mainline will require periodic pigging to comply with Pipeline and Hazardous Materials Safety Administration (PHMSA) monitoring requirements. It is anticipated that such internal inspections will be conducted in accordance with PHMSA regulations. The materials pushed through the system during pigging will be collected at the WC 509 Platform Complex and any hydrocarbon liquids transferred to the closed drain or a temporary storage tank for transport and safe disposal.

Platforms

A summary of the planned discharges that will be made at the WC 509 Platform Complex during operations is provided in **Table 1-14** of Topic Report 1 (Volume IIa). They include discharges from the firewater system, seawater pump, and marine sanitation/sewage treatment system. There will also be a discharge of stormwater from the WC 509 Platform Complex. The discharge locations will be within the platform jacket framing and below the water surface.

During testing and maintenance of the firewater system, the firewater pump intake will be treated with biocide. Similarly, the seawater pump's intake will also be treated with biocide. Discharges from these two systems will be required to meet EPA NPDES permit requirements prior to their release, ensuring that they will not significantly impact water or sediment quality.

Wastewater discharges can introduce additional nutrients (e.g., phosphorus and nitrates) into the water column. Sanitary wastes and graywater (i.e., galley, bath, and shower water, as well as wastewater from lavatory sinks, laundry, and water fountains) generated at the WC 509 Platform Complex will be collected and treated by a USCG Type II certified MSD(s). Following treatment, the domestic and sanitary water will be routinely discharged in accordance with EPA NPDES permit requirements and USCG regulations.

At the WC 509 Platform Complex, stormwater will be captured with a system of drain piping that routes the run-off into a capture sump and then into the oily water separator system. Hydrocarbons removed from the drain system will be routed into the crude oil export system and clean water will be routed to an overboard discharge system. Similar to the other operational discharges, the discharge of stormwater will be required to meet EPA NPDES permit requirements prior to release.

Although water quality could be impacted from discharges at the WC 509 Platform Complex and WC 148 Platform, the discharges are expected to be localized, being rapidly diluted and dispersed (BOEM, 2017). The USCG (2020) estimated that discharges from similar platform operations would be diluted by a factor of 16 to 1,267 times less than at the discharge source within a distance of several hundred feet. Dilution will occur more quickly for discharges of seawater than for freshwater or concentrated seawater.

Compared to the large volume of seawater surrounding the discharge locations, the ambient currents, and tidal mixing, the proposed discharges from the WC 509 Platform Complex and WC 148 Platform during operations will be negligible in volume. Potential impacts on water quality from the discharges will be long-

term but intermittent, highly localized, and minor. With adherence to EPA NPDES permit requirements and USCG regulations, significant impacts to water quality are not anticipated. Because of the water depth, the discharges are anticipated to have no impact on sediment quality in the GOM.

Vessels

Discharges will occur at the DWP as a result of VLCCs, other crude carriers, and service vessels. These discharges could include ballast water, non-contact cooling water, sanitary water, and bilge water. The Applicant expects that vessels discharging at the DWP will comply with all applicable regulations. Vessel related discharges are expected to be rapidly diluted to ambient levels with any water quality impacts highly localized because of the ambient currents, tidal mixing, and volume of water available for dilution. With adherence to regulatory requirements, no significant impacts to water or sediment quality are anticipated.

Ballast Water

Ballast water can contain bacteria, local plankton, mud, and sand from the unloading port where the ballast water has been taken in. Therefore, as ballast water is released, it is required to exchange ballast water in accordance with IMO Standards; these standards include having a ship-specific ballast water management plan, carrying a record book, and exchange of water mid-ocean or with an on-board ballast water treatment system.

Per the IMO, the control and management of ships' ballast water exchange for VLCCs and other crude oil carriers should occur in international waters prior to arriving at the DWP; however, there is potential for water discharge during loading operations at the DWP. Typical maximum ballast water capacities for VLCCs and other crude oil carriers (e.g., Suezmax) are 23,775,485 and 14,265,290 gallons, respectively. Typical ballast pump rates for VLCCs and other crude oil carriers (e.g., Suezmax) are 1,320 and 826 gallons per hour, respectively (ABS, 2019). The Applicant assumes that approximately 21 million gallons of ballast water could be discharge during crude loading of a VLCC. According to the National Ballast Information Clearinghouse (NBIC), VLCC Shaden (IMO 9779848) discharged approximately 20.6 million gallons of ballast water previously treated by a USCG-approved Ballast Water Management System (BWMS) while loading at the Louisiana Offshore Oil Port (LOOP).

Ballast water discharge standards (33 CFR § 151.2030(a)) require vessels calling at U.S. ports to be equipped with a USCG-approved BWMS. This applies to all new ships constructed in or after December 2013. All vessels over 300 gross tons, or that have the capacity to discharge 2,113 gallons of ballast water, must submit a Notice of Intent (NOI) to the EPA for the 2013 VGP (see Section 3.2.1). Discharged ballast water will be of a similar temperature as the ambient water temperature and sedimentation and turbidity from ballast water is not expected to be substantial because of the required treatment (USCG, 2020). While the discharge of ballast water could cause highly localized impacts on water quality, based on the regulatory BMPs required for discharge, any effects from ballast discharge at the DWP are expected to be long-term (life of the Project) but intermittent and minor. Compared to the ambient currents and tidal mixing of the seawater in the GOM as a whole, the impact of ballast water discharge on water and sediment quality will be negligible to the immediate area of discharge.

Cooling Water

Vessel cooling water discharges can create thermal plumes. The USCG (2020) estimated that one VLCC moored for crude oil loading in the northern GOM would discharge at a maximum rate of 8,806 gallons per minute, and the discharge would typically be approximately 10 ºC above ambient temperatures. At a distance of 328 feet, it was estimate that the temperature increase in the discharge plume would be reduced to approximately 0.25 to 0.4 ºC above ambient in the winter and 0.25 to 0.36 ºC in summer. The radius of

the plume at a distance of 328 feet was estimated to be up to approximately 98 feet. Therefore, discharges from VLCC and other smaller vessels are anticipated to result in an increase in temperature within a relatively small area immediately surrounding the vessel. Although long-term, impacts on water quality from cooling water discharges are anticipated to be intermittent, localized, and minor. Mixing through currents and tidal exchange with the large volume of seawater in the GOM as a whole, the impact of vessel cooling water discharge on water and sediment quality will be negligible.

Domestic and Sanitary Water

Untreated sewage discharges are prohibited within 3 nautical miles from shore. In order to discharge within 3 nautical miles, sewage must be treated using a USGS Type II MSD. On the VLCCs and other crude oil carriers, the sewage treatment system will vary in size and class. However, it is expected that they will contain sewage holding tanks large enough to collect all drains during a port stay; therefore, these ships are expected to have no need for liquid over-boarding at the DWP. No impacts to water or sediment quality are expected from domestic (gray) or sanitary water vessel discharge.

Bilge Water

It is anticipated that the *Port Operations Manual* prepared in the post-DWPA phase of the proposed Project will not allow VLCCs or other crude carriers to discharge bilge within the safety zone of the DWP. If discharged, all bilge water discharges must be in compliance with the regulations in 40 CFR Parts 110 (Discharge of Oil), 116 (Designation of Hazardous Substances), and 117 (Determination of Reportable Quantities for Hazardous Substances) and 33 CFR § 151.10 (Control of Oil Discharges). Therefore, no impacts to water or sediment quality are expected from bilge water discharge.

3.4.2.4 Marine Debris

Increased marine debris is a potential operational impact that may be associated with the DWP and associated vessel traffic. Guidance for minimizing marine debris during vessel operation is provided by MARPOL and NTL No. 2007-G03, Marine Trash and Debris Awareness and Elimination, and will be implemented during operation. Discharge of debris from the DWP will be strictly prohibited. No impacts to water or sediment quality are expected, therefore, from the release of marine debris.

3.4.3 Upsets and Accidents

Water and sediment quality could be impacted if an inadvertent release of oil, diesel, lubricants, or other chemicals were to occur. The fate and transport of a spill is dependent on the size of the spill and the type of material spilled, in addition to other factors. Potential spills during all phases of the Project are likely to be small or minor.

The types and quantities of chemicals and lubricants that are expected to be stored on the WC 509 Platform Complex are discussed in Topic Report 1 (Volume IIa). Hazardous materials will be stored and managed in accordance with all applicable regulations. The proposed DWP will not include refueling capabilities for personnel and supply vessels. Limited amounts of fuel will be stored at the DWP for emergency needs to support vessels and helicopters, and for use during startup. In the event of an inadvertent release, a Project-specific Spill Contingency Plan and the Port Operations Manual would be followed. Based on this requirement, and the fact that large quantities of petroleum hydrocarbons or other hazardous waste will not be stored on the DWP, the risk of impacts to the coastal and marine environment from a spill is considered negligible.

Appendix F (Volume IIa) contains a Project-specific Oil Spill Trajectory and Fate Modeling Report. In addition, **Appendix F** (Volume IIa) also contains a Tactical Response Assessment which provides a

discussion of potential response tactics that would facilitate a rapid and effective incident response to a spill. In the event of a large spill, an emergency response would be mobilized from shore in cooperation with applicable State and/or Federal response agencies.

3.4.4 Decommissioning

Decommissioning will involve removal of the DWP Platform jacket as well as the piles to approximately 15 feet below the seabed and abrasive cutters, explosives, or water cutters may be used during the decommissioning. After removal, the jacket will likely be used as an artificial reef as part of the Rigs to Reef program which would provide a long-term benefit to fish and other marine life. The offshore pipelines will be abandoned in place, and all other offshore components (i.e., PLEMs, CALM Buoys, moorings) will be removed and transported to shore for reuse or disposal.

Potential impacts to the water and sediment quality from decommissioning will be similar to those described for construction. Removal of the DWP Platform and anchor piles will temporarily disturb the seafloor. Vessel anchoring to support the decommissioning activities will also result in disturbance to the seafloor. Turbidity and sedimentation levels may temporarily increase due to re-suspension of sediments; however, the increase will be short-term and will return to background levels without mitigation. Potential deposition of suspended sediments in soft bottom habitats is expected to migrate only a short distance and cover a small area relative to the total habitat available.

Overall, decommissioning activities may involve localized, short-term, and negligible to minor effects to the water and sediment quality. No significant impacts are anticipated as a result of Project decommissioning.

3.5 CUMULATIVE IMPACTS

A complete discussion of cumulative impacts is included in **Appendix C,** Framework for Cumulative Impacts Analysis (Volume IIa).

3.6 MITIGATION MEASURES

All Project-related activities will comply with federal regulations (i.e., USCG and EPA) to ensure that significant effects to water and sediment quality do not occur. Further, converting the existing Mainline, converting the existing WC 509 Platform Complex, converting the WC 148 Platform, limiting product storage on the DWP Platform, and adhering to all regulations and permit requirements, as well as spill contingency planning, will limit potential impacts from construction and operation of the proposed DWP. Therefore, no mitigation measures specifically directed at offshore water and sediment quality are proposed.

3.7 SUMMARY OF POTENTIAL IMPACTS

The Project is not expected to:

- Violate a federal, state, local, or federally recognized international water quality criterion or waste discharge requirement;
- Cause irreparable harm to human health, aquatic life, or beneficial uses of aquatic ecosystems;
- Degrade marine or coastal water quality;
- Degrade marine, coastal, or terrestrial (lakes, rivers, wetlands, tidal environments) water quality; and/or
- Increase contaminant levels in the water column, sediment, or biota to levels shown to have the potential to harm marine organisms, even if the levels do not exceed the formal water quality criteria.

Repurposing of the Mainline, WC 509 Platform Complex, and WC 148 Platform will result in a reduction in the amount of potential impacts during Project construction. Potential impacts on water and sediment quality from Project construction, operation, and decommissioning are expected to be negligible to minor with most impacts short-term (**Table 3-3**). None of the potential impacts to the water and sediment quality are expected to be significant or irreversible.

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