



U.S. Department
of Transportation
**Maritime
Administration**

Southeast Federal Center
1200 New Jersey Avenue, SE
Washington, DC 20590

August 17, 2023

Mike Oetker
Acting Regional Director, Southeast Region
U.S. Fish & Wildlife Service
1875 Century Boulevard
Atlanta, Georgia 30345

Re: Request for Reinitiation of Section 7 Consultation for the Delfin LNG LLC Deepwater Port (USCG-2015-0472), and Request for Concurrence with Determinations of Effect

Dear Mr. Oetker:

The Maritime Administration (MARAD) requests reinitiation of consultation under Section 7(a)(2) of the Endangered Species Act (ESA) for the construction, operation, and maintenance of the Delfin LNG LLC Deepwater Port (Port).

On May 8, 2015, Delfin applied for a license under the Deepwater Port Act of 1974 to own, construct, operate, and eventually decommission a deepwater port approximately 37.4 to 40.8 nautical miles (or 43 to 47 statute miles) off the coast of Cameron Parish, Louisiana. The Delfin Port would consist of four moored floating liquefied natural gas vessels (FLNGVs) with independent propulsion, two existing offshore natural gas pipelines (the former U-T Operating System (UTOS) and the High Island Operating System (HIOS)), and four new pipeline laterals connecting the HIOS pipeline to each of the FLNGVs. The feed gas would be supplied through these new pipeline laterals to each of the FLNGVs where it would be cooled sufficiently to totally condense the gas to produce LNG that would then be stored in membrane-type LNG storage tanks aboard each of the FLNGVs. The stored LNG would be offloaded to side-by-side moored LNG carriers for export to locations worldwide. On April 11, 2022, Delfin provided a project update that identified several changes to the design of the Port including installation of a Submerged Swivel and Yoke mooring system instead of a Tower Yoke Mooring System.

The onshore facility would consist of approximately 1.1 miles of the existing UTOS pipeline; the addition of four onshore compressors totaling 120,000 horsepower of new compression; activation of associated metering and regulation facilities; and the installation of new supply header pipelines. The supply header would consist of 0.25 miles of new 42-inch diameter pipeline to connect the former UTOS line to the new meter station and 0.6 miles of new twin 30-

inch pipelines between Transco Station 44 and the new compressor station site. The April 11, 2022, update made no changes to the proposed project's onshore components.

On January 8, 2016, the United States Coast Guard (USCG) and MARAD submitted a request to the United States Fish and Wildlife Service (FWS) for technical assistance regarding the presence of Federally listed species and designated critical habitat within the project area. On July 14, 2016, MARAD sent a letter to FWS requesting concurrence with a determination that the proposed onshore activities of the Port are not likely to adversely affect the listed species under the purview of FWS, or their designated critical habitat. This determination was based on a Draft Environmental Impact Statement, the final version of which, issued on November 28, 2016, also serves as the Biological Assessment for the proposed action. The Delfin Final Environmental Impact Statement (FEIS) is available for viewing and downloading at <http://www.regulations.gov>, Docket Number USCG-2015-0472. On August 10, 2016, MARAD received a letter from FWS concurring with the determination.

MARAD subsequently issued Delfin a Record of Decision (ROD) approving the application with conditions on March 13, 2017; however, to date, Delfin has not satisfied the ROD's conditions, whereafter a license may be issued. In 2022, Delfin submitted a project update to MARAD and the USCG describing design changes to the proposed Port's mooring system, to its floating liquefaction facilities, and minor changes to other design elements. In response to these changes, on March 27, 2023, MARAD requested an Environmental Impact Assessment (EIA) that detailed the proposed changes to the project and evaluated the probable environmental consequences, adverse or beneficial, and analyzed any newly listed species or critical habitats under the ESA. MARAD and USCG received the EIA on April 7, 2023. The EIA compares the 2016 analysis to the 2022 project changes with regards to newly listed species, critical habitat designations, and impacts to existing species. FWS managed species analyzed include the Eastern Black Rail, Monarch Butterfly,¹ Alligator Snapping Turtle, West Indian Manatee, and Nesting Marine Turtles. The EIA also includes the analysis of impacts by engineering refinements to migratory birds managed by the FWS under the Migratory Bird Treaty Act.

Eastern Black Rail (*Laterallus jamaicensis* spp. *jamaicensis*)

The eastern black rail was Federally listed in 2020. The species is found in higher elevation wetland zones with some shrubby vegetation. Impounded and un-impounded intermediate marshes also provide habitat for the subspecies. Inland coastal prairies and associated wetlands may also provide habitat for the eastern black rail. Louisiana is not currently known to support a breeding eastern black rail population. Due to the rarity of eastern black rails in Louisiana, it is unlikely that they would occur near the Louisianian onshore facilities utilized by Delfin, which are characterized by previously disturbed areas and pre-existing facilities. Therefore, MARAD concludes that the Delfin onshore facility may affect, but is not likely to adversely affect the eastern black rail.

¹ MARAD recognizes that the monarch is a candidate species and not yet listed or proposed for listing. Consultation with U.S. Fish and Wildlife Service under section 7 of the Endangered Species Act is not required for candidate species, like the monarch. *Monarch butterfly* (*Danaus plexippus*), U.S. FISH & WILDLIFE SERV., <https://ecos.fws.gov/ecp/species/9743> (last visited, Aug. 17, 2023).

Alligator Snapping Turtle (*Macrochelys temminckii*)

The alligator snapping turtle was listed as a proposed Federally threatened species in 2021 due to overharvesting and habitat destruction. Alligator snapping turtles are found in freshwater lakes and bayous and are known to occur throughout Louisiana, but less commonly in marshes. The Delfin onshore facility is previously disturbed and actively being used for both commercial and industrial operations and does not contain suitable habitat for the species. There is currently no designated critical habitat for the alligator snapping turtle. Informal consultation was undertaken by the applicant with the Louisiana Department of Wildlife and Fisheries (LDWF) to analyze the known occurrences of alligator snapping turtles within the onshore facility and within a 2-mile buffer. LDWF provided a response dated December 9, 2022, stating that LDWF has not identified any known occurrences of alligator snapping turtles within the onshore facility or the 2-mile buffer (EIA: Appendix D). The lack of habitat, combined with no known occurrences of the species leads MARAD to conclude that the project may affect, but is not likely to adversely affect the alligator snapping turtle.

West Indian Manatee (*Trichechus manatus*)

The West Indian manatee is a Federal threatened marine mammal that is provided protections under both the ESA and the MMPA. Manatees are primarily found in warm coastal rivers and estuaries of no less than 68°F. During the summer, manatees expand their range and, on rare occasions, are seen as far north as Massachusetts on the Atlantic Coast, and as far west as Texas on the Gulf Coast. While manatees are not common in coastal Louisiana waters, the West Indian manatee has the potential for crossing coastal waters in the vicinity of construction and decommissioning vessels steaming to the Port facility.

In addition to the general marine mammal conditions adopted in the Final Environmental Impact Statement (FEIS) (BMP 17-19), Delfin will be required, as a License condition, to adopt the FWS' *Standard Manatee Conditions for In-Water Activities* to mitigate impacts during construction and decommissioning. The impacts of any potential LNG product spills are anticipated to be short-term and minor, and limited to the immediate vicinity of the Port. As stated in the FEIS:

If an LNG spill were to occur, potential impacts would include exposure to low temperature LNG at the water surface, possibly resulting in rapidly dropping water temperatures near the surface. These impacts would likely occur in the immediate vicinity of the spill location; the time frame of the impact is limited. Since LNG would boil off as natural gas at the surface, depth and pressure required for gas to dissolve in surface waters would not be sufficient and gas vapors would disperse. In addition, the time frame for these impacts would be limited, and adverse toxic impacts would be expected to be minor after the LNG boiled off and the vapors dispersed.

With the above conditions, the nature of potential LNG spill impacts, and the rarity of manatees in the western Gulf of Mexico, MARAD concludes that the potential impacts from the Project may affect, but are not likely to adversely affect the West Indian manatee.

Nesting Marine Turtles

Five species of marine turtles found in the Gulf of Mexico have the potential to be found within the project area. These include the Green Turtle (*Chelonia mydas*), Hawksbill Turtle (*Eretmochelys imbricata*), Kemp's Ridley Turtle (*Lepidochelys kempii*), Leatherback Turtle (*Dermochelys coriacea*), and Loggerhead Turtle (*Caretta caretta*). All species are listed as either threatened or endangered under the ESA and are under the joint jurisdiction of NOAA Fisheries and the FWS. All species of sea turtles nest on coastal beaches and, as such, no suitable nesting habitat can be found near the Delfin onshore facility.

Since there are no proposed changes to the onshore facility, and no information indicating a change to the 2016 conclusion that the required habitat conditions to support nesting turtles do not exist within the proposed project area, MARAD concludes that the construction of the onshore facility may affect, but is not likely to adversely affect marine turtles. MARAD will also consult with NOAA Fisheries on potential impacts concerning these species in the marine environment.

Migratory Birds

The FEIS determined that construction of the Port would cause minor short-term impacts on the area's coastal and migratory birds due to increased vessel traffic, noise, marine debris, and lighting. However, the FEIS concluded that after mitigation measures, all impacts analyzed in the FEIS may affect, are not likely to adversely affect, ESA-listed birds, including those that are migratory. Since the issuance of the FEIS there have been no further developments in the operational practices surrounding lighting structures for the Port, and project changes have led to a decrease of 25% for projected noise impacts from construction of the Port. Therefore, MARAD finds the mitigation measures provided in Appendix G of the FEIS as sufficient to minimize potential impacts on migratory birds and concludes that project implementation may affect, but is not likely to adversely affect migratory birds.

After carefully reviewing the submitted EIA, FEIS, and in accordance with Section 7 of the ESA, I request your concurrence with MARAD's determination that the proposed action ***may affect, but is not likely to adversely affect*** Federally-listed threatened and endangered species and designated critical habitat located within the project area. In support of this determination, I direct your attention to Section 2.4.4 (Coastal Species and Terrestrial Species), Section 3 (Impact Assessment), and Section 3.1.2.6 (Migratory Birds) of the EIA; and to Section 4.3.1 (Offshore Threatened and Endangered Species), and Section 4.12.1 (Onshore Threatened and Endangered Species) of the FEIS.

MARAD appreciates your continued assistance on this project and would appreciate receiving your response by September 1, 2023, if possible. If you have any questions about this request, please contact me at (202) 816-0498 (Vince.Mantero@dot.gov), or Michael Heard Snow, at (202) 805-0570 (m.heardsnow.ctr@dot.gov).

Sincerely,



Vince Mantero
Acting Director
Office of Deepwater Port Licensing &
Port Conveyance
Maritime Administration

Attachments:

August 10, 2016, FWS Consolation Response Letter
Port Delfin Environmental Impact Assessment with Attachments

Cc:

Doug Cotton, FERC
Jennifer Wade, DOE
Peri Ulrey, DOE
CAPT Jerry Butwid, USCG
Brent Yezefski, USCG
LCDR Jake Lobb, USCG
Mike Tucker, NMFS

The Fish and Wildlife Service (Service) has reviewed the information provided and offers the following comments in accordance with provisions of the Endangered Species Act (ESA) of 1973 (87 Stat. 884 as amended, 16 U.S.C. 1531 et seq.). Based on the justification given, we concur with your determination that the proposed action is not likely to adversely affect the federally listed and/or proposed species and their critical habitats as described herein.

We recommend that you contact the Service for additional consultation if: 1) the scope or location of the proposed project is changed significantly; 2) new information reveals that the action may affect listed species or designated critical habitat; 3) the action is modified in a manner that causes effects to listed species or designated critical habitat; or 4) a new species is listed, or critical habitat designated. Additional consultation because of any of the above conditions or for changes not covered in this consultation should occur before changes are made and or finalized.

Brigette D. Firmin
Field Supervisor
Louisiana Ecological Services Office

DATE

The logo for SWCA is positioned vertically on the left side of the page. It consists of the letters 'S', 'W', 'C', and 'A' stacked vertically in a large, light blue, serif font. The 'S' and 'W' are partially cut off at the bottom, while the 'C' and 'A' are fully visible.

Environmental Assessment for the Port Delfin LNG Project

JANUARY 27, 2023
REVISED APRIL 7, 2023

PREPARED FOR
Delfin LNG LLC

PREPARED BY
SWCA Environmental Consultants

ENVIRONMENTAL ASSESSMENT FOR THE PORT DELFIN LNG PROJECT

Prepared for

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SWCA Project No. 61109

January 27, 2023

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ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
μPa	micropascal
Applicant	Delfin LNG LLC; <i>also</i> , Delfin LNG
AQCR	Air Quality Control Region
BACT	Best Available Control Technology
BCC	Birds of Conservation Concern
BGEPA	Bald and Golden Eagle Protection Act of 1940, as amended
BMP	best management practice
BO	Biological Opinion
CAA	Clean Air Act
CFCs	chlorofluorocarbons
CFR	Code of Federal Regulations
CO	carbon monoxide
CO ₂	carbon dioxide
CO ₂ e	carbon dioxide equivalent
CWA	Clean Water Act
dB	Decibel
Delfin LNG	Delfin LNG LLC; <i>also</i> , the Applicant
DOE	U.S. Department of Energy
DOF	Delfin Onshore Facility
DP	dynamic positioning
DPLA	Deepwater Port License Application
DWP	deepwater port
EEZ	economic exclusion zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
ESA	Endangered Species Act of 1973, as amended
FEED	Front-End Engineering Design
FERC	Federal Energy Regulatory Commission
FLNGV	Floating Liquefied Natural Gas Vessel
FMP	Fishery Management Plan
FRP	Facility Response Plan
FTA	free trade agreement

GHG	greenhouse gas
GMFMC	Gulf of Mexico Fishery Management Council
GoM	Gulf of Mexico
GWP	global warming potential
HAPC	Habitat Area of Particular Concern
HAP	hazardous air pollutant
HCD	Habitat Conservation Division (National Oceanic and Atmospheric Administration National Marine Fisheries Service Southeast Region)
HHC	heavy hydrocarbon
IHA	Incidental Harassment Authorization
IPaC	Information for Planning and Consultation
LDAR	leak detection and repair
LDWF	Louisiana Department of Wildlife and Fisheries
LNG	liquefied natural gas
LNGC	liquefied natural gas carrier
MARAD	Maritime Administration
MARPOL	International Convention for the Prevention of Pollution from Ships
MBTA	Migratory Bird Treaty Act of 1918, as amended
mgd	million gallons per day
MMPA	Marine Mammal Protection Act of 1972, as amended
MSA	Magnuson-Stevens Fishery Conservation and Management Act
mt CO ₂ e/yr	metric tons of carbon dioxide equivalent per year
N ₂ O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NGA	Natural Gas Act
NNSR	non-attainment new source review
NOAA	National Oceanic and Atmospheric Administration
NOAA Fisheries	National Marine Fisheries Service
NO _x	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NSR	New Source Review
OCS	Outer Continental Shelf
P.L.	Public Law
PAH	polycyclic aromatic hydrocarbon

PCB	polychlorinated biphenyl
PM	particulate matter
Port Delfin	deepwater port terminal
Project	Port Delfin LNG Project
PSD	Prevention of Significant Deterioration
PSO	protected species observer
RMS	root-mean-squared
ROD	Record of Decision
SEL	sound exposure level
SIP	state implementation plan
SO ₂	sulfur dioxide
SPCC	Spill Prevention, Control, and Countermeasure
SPL	sound pressure level
SSY	Submerged Swivel and Yoke
TYMS	Tower Yoke Mooring System
U.S.C.	United States Code
UME	Unusual Mortality Event
USCG	U.S. Coast Guard
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UTOS	U-T Offshore System
VOCs	volatile organic compounds
WCA	water column associated
ZOI	zone of influence

1 INTRODUCTION

1.1 PROJECT DESCRIPTION AND APPLICATION HISTORY

Delfin LNG LLC (Delfin LNG; *also* the Applicant), a Louisiana limited liability company, is proposing to construct, own, and operate a deepwater port (DWP) terminal (referred herein as Port Delfin) in the Gulf of Mexico to serve the global liquefied natural gas (LNG) market. The primary purpose of the Port Delfin LNG Project (Project) is to provide a safe and reliable facility to liquefy natural gas for export to free trade agreement (FTA) and non-FTA nations. The primary purpose of this assessment is to update protected species and air quality findings as they relate to engineering refinements that have occurred in the Project design process.

The proposed DWP would be located in federal waters within the Outer Continental Shelf (OCS) West Cameron Area, West Addition Protraction Area (Gulf of Mexico), approximately 37.4 to 40.8 nautical miles (43.0 to 47.0 statute miles) off the coast of Cameron Parish, Louisiana, in water depths ranging from approximately 64 to 72 feet (Figure 1-1 in Appendix A). The Delfin Onshore Facility (DOF) consists of an approximately 11-acre site, 120,000-horsepower compressor station and associated metering and regulation facilities to be constructed and operated in Cameron Parish, Louisiana, new supply header pipelines (0.25 mile, 42-inch diameter) to be installed to connect the former U-T Offshore System (UTOS) pipeline to the new meter station, and 0.6 mile of new twin 30-inch pipelines between Transco Station 44 and the new compressor station site.

Delfin LNG filed a Deepwater Port License Application (DPLA) on May 8, 2015, and an amended application on November 19, 2015, for a license to construct, own, and operate the DWP pursuant to the Deepwater Port Act of 1974, as amended, and in accordance with U.S. Coast Guard (USCG) and Maritime Administration (MARAD) implementing regulations (docket number USCG-2015-0472). A related application was submitted to the Federal Energy Regulatory Commission (FERC) for the onshore portion of the Project. On November 28, 2016, the USCG issued the Final Environmental Impact Statement (EIS) (USCG 2016) for the DWP, concluding that the Project meets environmental standards with the inclusion of certain environmental protection measures and mitigations. A favorable Record of Decision (ROD) was received from MARAD on March 13, 2017. FERC authorized the onshore portion in its September 28, 2017, order issuing certificate. The Department of Energy (DOE) issued FTA and non-FTA natural gas export authorizations for the Project on June 1, 2017. In December of 2020, the DOE extended the FTA and non-FTA authorizations through 2050. Since issuance of the original MARAD ROD, Delfin has proceeded with further engineering development and refinement for the Project.

1.2 SCOPE OF ENVIRONMENTAL ASSESSMENT

On October 11, 2020, Delfin LNG announced the completion of its Front-End Engineering Design (FEED) for the Floating Liquefied Natural Gas Vessels (FLNGVs) for the Port Delfin LNG Project developed jointly by Delfin LNG, Samsung Heavy Industries, and Black and Veatch. Delfin LNG provided a general update and explanation to MARAD and USCG on April 11, 2022 and on May 10, 2022, participated in a virtual meeting with these agencies regarding the Project. Subsequently, on June 14, 2022, Delfin LNG provided a letter to MARAD and USCG that summarized the Project status and the engineering refinements resulting from the FEED work (Appendix B), which will be discussed in this environmental assessment. The purpose of this environmental assessment is to update potential environmental impacts of the Project resulting from the FEED engineering refinements or proposed operational changes, and to further consider the Project in view of any new or updated environmental

standards. The USCG published the Final EIS for the Port Delfin in November 2016 and concluded that the Project would not result in significant environmental impacts with inclusion of specific mitigation measures and best management practices.

The scope of this environmental assessment is to further examine potential environmental impacts of the Project based on the results of the recent FEED and summarized in the June 14, 2022 letter to MARAD and USCG. This document examines potential environmental impacts to ensure the updated engineering design and operations continue to meet environmental standards, including the need for any additional environmental protection measures or updated mitigation.

In addition, this document further evaluates species or habitats that have undergone changes in regulatory protections since the initial 2015 application filing and subsequent issuance of the Final EIS (USCG 2016). These regulatory updates include protections afforded under the following:

- Endangered Species Act of 1973, as amended (ESA) (16 United States Code [U.S.C.] 1535-1543, Public Law [P.L.] 93-205) (species listings or delistings, designation of critical habitat);
- Marine Mammal Protection Act of 1972, as amended (MMPA) (16 U.S.C. 1361);
- Magnuson-Stevens Fishery Conservation and Management Act (MSA) (including essential fish habitat [EFH] and habitat areas of particular concern [HAPCs]);
- Bald and Golden Eagle Protection Act of 1940, as amended (BGEPA) (16 U.S.C. 668-668d); and
- Migratory Bird Treaty Act of 1918, as amended (MBTA) (16 U.S.C. 703-712).

Finally, this environmental assessment will further address air emissions and greenhouse gas (GHG) impacts to air quality based on the engineering refinements, and on the requirements that are currently being applied to MARAD/USCG DWP projects under the Clean Air Act (CAA).

1.3 RULES AND REGULATIONS

1.3.1 Endangered Species Act

The ESA protects fish, wildlife, plants, and invertebrates that are federally listed as threatened and endangered species. The ESA states that threatened and endangered plant and animal species are of aesthetic, ecological, educational, historic, and scientific value to the United States, and protection of these species and their habitats is required. A federally listed endangered species is one that is in danger of extinction throughout all or a significant portion of its range. A federally listed threatened species is likely to become endangered in the foreseeable future throughout all or a significant portion of its range. Protection is also afforded under the ESA to “critical habitat,” which is defined as specific areas both within and outside the geographic area occupied by a species on which are found those physical and biological features essential to its conservation. The lead federal agencies for implementing the ESA are the U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NOAA Fisheries). NOAA Fisheries is responsible for the protection, conservation, and recovery of endangered and threatened marine and anadromous species under the ESA through responsibilities delegated by the Secretary of Commerce. The USFWS has similar authority for non-anadromous fish and all other wildlife under responsibilities delegated by the Secretary of Interior. In some cases, both agencies may have jurisdiction due to a species’ life stage requirement.

1.3.2 Marine Mammal Protection Act

The MMPA established a national policy to prevent marine mammal species and population stocks from declining beyond the point where they ceased to be significant functioning ecosystems of which they are a part. The lead federal agencies for implementing the MMPA are NOAA Fisheries and the USFWS. NOAA Fisheries is responsible for the protection of whales, dolphins, porpoises, seals, and sea lions. The USFWS is responsible for the protection of walrus, manatees, sea otters, and polar bears. The MMPA prohibits the “take” of marine mammals, with certain exceptions, in waters under U.S. jurisdiction and by U.S. citizens on the high seas. Under Section 3 of the MMPA, “take” is defined as “harass, capture, hunt, kill, or attempt to harass, capture, hunt, or kill any marine mammal.” “Harassment” is defined as “any act of pursuit, torment, or annoyance that has the potential to injure marine mammal stock in the wild; or has the potential to disturb marine mammal stock in the wild by disrupting behavioral patterns, including migration, breathing, nursing, breeding, feeding, or sheltering.” In cases where U.S. citizens are engaged in activities, other than fishing, that result in the “unavoidable” incidental take of marine mammals, the Secretary of Commerce can provide authorization for the take of a small number of marine mammals, provided that the activity would “have no more than a ‘negligible impact’ on those species or stocks, and ‘not have an ‘unmitigable adverse impact’ on the availability of the species or stock for subsistence uses”.

There are two types of authorizations for take of marine mammals: the Incidental Harassment Authorization (IHA) and a Letter of Authorization (LOA). The type of authorization needed depends on the duration of the activity. An IHA effective for up to 1 year, and the LOA is required for multi-year activities. The authorization can be issued after notice and opportunity for public comment if the Secretary of Commerce finds negligible impacts. The MMPA requires consultation with NOAA Fisheries if impacts on marine mammals are unavoidable. Delfin LNG could be required to obtain a small take authorization, as deemed necessary by NOAA Fisheries upon conclusion of agency consultation.

Based on the anticipated duration of construction activities for the Project as less than one year, Delfin would be required to obtain an IHA. As IHAs for construction remain effective for one year after issuance, applying for an IHA at this time is premature for the Project, as construction is unlikely to start within the next year. Typical IHA authorization applications should be submitted between 5 and 8 months prior to the intended project start date, however more complex projects may take longer.

1.3.3 Magnuson-Stevens Fishery Conservation and Management Act

The MSA is the primary law governing marine fisheries management in U.S. federal waters. The key objectives of the MSA are to: 1) prevent overfishing; 2) rebuild overfished stocks; 3) increase long-term economic and social benefits; and 4) ensure a safe and sustainable supply of seafood (NOAA Fisheries 2023a). The MSA extended U.S. jurisdiction to 200 nautical miles (230.2 statute miles) from shore and established eight regional fishery management councils. It is the responsibility of the councils to develop fishery management plans that comply with the MSA’s conservation and management requirements, including principles that promote sustainable fisheries management realized through national standards.

Under the MSA, the EFH Final Rule (50 Code of Federal Regulations [CFR] 600) went into effect on February 19, 2002. EFH is defined as “those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity.” EFH includes coral reefs, kelp forests, bays, wetlands, rivers, and areas of the deep ocean that are necessary for fish reproduction, growth, feeding, and shelter. EFH includes all aquatic habitat that a certain fish species requires to live and reproduce. EFH does not apply to strictly freshwater species or to enclosed freshwater habitats. EFH is identified either directly by NOAA Fisheries or by regional fishery management councils. NOAA Fisheries is responsible for

determining EFH for sharks, tuna, and other highly migratory species that cross regional boundaries. The regional fishery management councils are responsible for all other species (NOAA Fisheries 2023a).

1.3.4 Bald and Golden Eagle Protection Act

The BGEPA prohibits anyone without a permit issued by the Secretary of the Interior from “taking” bald eagles (*Haliaeetus leucocephalus*) or golden eagles (*Aquila chrysaetos*), including their parts (including feathers), nests, or eggs. The BGEPA provides criminal penalties for persons who “take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle ... [or any golden eagle], alive or dead, or any part (including feathers), nest, or egg thereof.” The BGEPA defines “take” as “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb.” Regulations further define “disturb” as “to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available: 1) injury to an eagle; 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior” (50 Code of Federal Regulations [CFR] 22.6).

1.3.5 Migratory Bird Treaty Act

The MBTA implements four international conservation treaties that the United States entered into with Canada in 1916, Mexico in 1936, Japan in 1972, and Russia in 1976. It is intended to ensure the sustainability of populations of all protected migratory bird species. The MBTA prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the USFWS. The Migratory Bird Treaty Reform Act of 2004 amended the MBTA by stating the MBTA applies only to migratory bird species that are native to the United States or its territories and that a native migratory bird species is one that is present as a result of natural biological or ecological processes. The list of migratory bird species protected by the law is primarily based on bird families and species, located under Title 50 Part 10.13, and was last updated in 2020. As of December 12, 2022, the USFWS is currently evaluating a proposal to include an additional 11 species for protection under the MBTA.

1.3.6 Clean Air Act

The U.S. Congress passed the CAA in 1963, the CAA Amendment in 1966, the CAA Extension in 1970, and CAA Amendments in 1977 and 1990. The CAA requires the U.S. Environmental Protection Agency (USEPA) to set limits on how much of a pollutant can be in the ambient air anywhere in the United States. These limits are known as the National Ambient Air Quality Standards (NAAQS). The law allows individual states to have ambient air quality standards stronger than the NAAQS, but states are not allowed to have weaker standards than the NAAQS. The main (or “criteria”) air pollutants that have NAAQS established by the CAA include ozone, sulfur dioxide (SO₂), particulate matter (PM), lead, nitrogen oxides (NO_x), and carbon monoxide (CO). The CAA includes specific limits, timelines, and procedures to reduce these criteria pollutants. The CAA also regulates what are called “hazardous air pollutants” (HAPs). SO₂ and NO_x, which contribute to acid rain, are regulated by the CAA under a comprehensive permit program for electric generating facilities. The act protects stratospheric ozone by restricting the use of chlorofluorocarbons (CFCs) and limits ambient ozone by regulating the emissions of volatile organic compounds (VOCs) and NO_x.

Under the CAA, states have to develop state implementation plans (SIPs) that explain how their state will meet the NAAQS established under the CAA. A SIP is a collection of the regulations a state will use to clean up areas that are not meeting the NAAQS and maintain those areas in compliance with the NAAQS.

The USEPA must approve each SIP and, if a SIP is not acceptable, the USEPA can take over enforcement of the CAA in that state.

One of the key programs designed to achieve compliance with the NAAQS is the New Source Review (NSR) program, a preconstruction review process for new and modified stationary sources. The NSR program has two component parts: 1) the Prevention of Significant Deterioration (PSD) program for attainment or “clean” areas, which requires new or modified sources to install state-of-the-art pollution controls to ensure that the ambient air quality will not degrade; and 2) the non-attainment new source review (NNSR) program, which is designed to ensure that any new industrial growth in an area not meeting the NAAQS will comply with stringent emission limitations (by requiring the most protective pollution controls and emission offsets), with the goal of improving air quality overall to meet the NAAQS. The NSR program requires companies to obtain a permit for new construction or major modifications that substantially increase a facility’s emissions of a criteria pollutant.

State environmental agencies also issue air permits to large stationary sources of pollution, including all sources subject to NSR permitting. The permitting process provides an operating permit for sources after they have completed construction or modification to document all emission limits, monitoring, recordkeeping, and reporting requirements for ongoing operation of the new or modified facility. The information contained in this permit and all required records are available to the permitted facility, other agencies, and the public. These permits are known as “Title V” permits because they are required by Title V of the 1990 CAA. The Title V permit is meant to contain all the requirements for the permitted source and includes semi-annual and annual certification of compliance with the permit, all of which is public information.

Section 176(c)(1) of the CAA established requirements to ensure that federal actions or actions approved by federal agencies do not adversely affect a state’s ability to achieve and maintain attainment with the NAAQS for projects located in an area not in attainment with the NAAQS for one or more criteria pollutants. No emissions from construction or operation of the proposed Project would occur in any designated nonattainment area. Therefore, no further evaluation of potential Project emissions with respect to General Conformity is required.

1.3.6.1 *Summary of Current Greenhouse Gas Requirements*

The proposed DWP terminal would be a major source for emissions of criteria pollutants and would be required to apply for and receive a PSD air permit from the USEPA. As a major PSD source, Delfin LNG must therefore apply Best Available Control Technology (BACT) to its potential GHG emissions. Delfin LNG has included a GHG BACT analysis in its draft PSD air permit application. This analysis evaluates GHG control technologies for combustion emissions of carbon dioxide (CO₂) as well as for fugitive GHG emissions (primarily methane) from facility piping components.

The proposed DWP terminal would also be subject to GHG reporting requirements under 40 CFR 98, which apply to owners and operators of certain facilities emitting greater than 25,000 metric tons per year of carbon dioxide equivalent (CO₂e) emissions. The proposed DWP would be included in the petroleum and natural gas systems category specified in 40 CFR 98, Subpart W. CO₂e emissions are calculated by multiplying total mass emissions for each individual GHG by its global warming potential (GWP) and then adding the results. For example, methane and nitrous oxide (N₂O), which, after CO₂, are the two most common GHGs emitted by a facility of this type, have GWP factors of 25 times and 298 times that of CO₂, respectively.

MARAD has not issued guidance on the consideration of GHG emissions with regards to project assessments. FERC has issued an Interim Policy Statement on the “Consideration of Greenhouse Gas

Emissions in Natural Gas Infrastructure Project Reviews,” which states that Natural Gas Act (NGA) Section 3 facilities need not include upstream and downstream GHG emissions based on the following finding in *EarthReports, Inc. v. FERC*, 828 F.3d at 955 (citing *Sierra Club v. FERC*, 827 F.3d 36, 47, 59, 68 (D.C. Cir. 2016) (*Freeport*)).

“[T]he Commission’s National Environmental Policy Act (NEPA) analysis did not have to address the indirect effects of the anticipated export of natural gas ... because [DOE], not the Commission, has sole authority to license the export of any natural gas going through the Freeport facilities. In the specific circumstances where, as here, any agency “has no ability to prevent a certain effect due to” that agency’s “limited statutory authority over the relevant action [],” then that action “cannot be considered a legally relevant ‘cause’ of the effect” for NEPA purposes.”

Currently, only GHG emissions resulting from construction and operation of NGA Section 3 facilities are to be considered in FERC assessments. It is anticipated that only construction and operation GHG emissions would be considered reasonably foreseeable emissions by MARAD, which is consistent with the determination made in the 2017 ROD as well as FERC’s approach.

1.4 ENGINEERING REFINEMENTS

In preparing the FEED for the Port Delfin LNG Project, the design goal was to develop a mooring system and FLNGV design using the best available technology consistent with the concepts evaluated in the MARAD/USCG Final EIS (USCG 2016) for the Project. Accordingly, the principal design concepts used in the Project’s DPLA and Final EIS have been further developed and refined through FEED, consistent with standard engineering processes. The engineering refinements to the Port Delfin DWP terminal and FLNGVs (DWP) were developed with a goal of minimizing air emissions, water use, and other environmental impacts and providing an equal or lesser level of environmental impacts as analyzed in the Final EIS for the Project. Table 1-1 presents a summary of the updates outlined in the June 14, 2022, letter from Delfin LNG to MARAD and the USCG (Appendix B), provides the anticipated refinements from the impacts assessed in the Final EIS, and identifies the design refinements that are evaluated further in this report.

Table 1-1 Summary of Engineering Refinements for the Port Delfin DWP Terminal: 2016-2023, Port Delfin LNG Project

System Refinements	2016 Engineering Design	2023 Engineering Design	Remark	Further Evaluation Provided Below
Mooring	Tower Yoke Mooring System (TYMS) – 4-pile fixed platform (preferred alternative in the 2015 application)	Submerged Swivel and Yoke (SSY) mooring system – 3-pile fixed platform (provided as an alternative in the 2015 application)	SSY mooring system presents reduced environmental impacts, including a 25% reduction in pile driving noise over TYMS	To be evaluated under “Mooring System”
Hull	Barge-shaped hull 356 x 65 x 32 cubic meters (m ³)	Barge-shaped hull 335 x 62 x 32 m ³	Slight overall reduction in dimensions	Not warranted
Cargo Storage	Membrane containment system 8 x 26,250 m ³	Membrane containment system 8 x 22,500 m ³	Total cargo capacity reduced by approx. 15%	Not warranted
Liquefaction	Approx. 3.3 million tons per annum (mtpa) Single mixed refrigerant Integrated heavy hydrocarbon (HHC) removal HHC mixed with fuel and used onboard	Approx. 3.3 mtpa. Single mixed refrigerant Integrated HHC removal HHC mixed with fuel and used onboard	Liquefied natural gas (LNG) expander added downstream of liquefaction to supplement power generation and improve overall efficiency	Not warranted
Pre-treatment	Acid gas removal (AGR), mercury (Hg) and water (H ₂ O) removal Single train	AGR, Hg and H ₂ O removal Single train	No engineering refinement	Not warranted
Refrigerant Compression Drives	Aeroderivative gas turbines with low nitrogen oxide (NO _x) technology	Aeroderivative gas turbines with low NO _x technology	Configuration refinement from 3 gas combustion turbines to 4 smaller ones Addition of heat recovery steam generators captures waste heat from these four combustion turbines to fuel a steam turbine for power generation (See Power Generation)	To be evaluated under “Power Generation System and “Cooling System”

System Refinements	2016 Engineering Design	2023 Engineering Design	Remark	Further Evaluation Provided Below
Power Generation	Three Aeroderivative gas turbines with low NOx technology	Waste heat recovery on refrigerant compression drives combined with a steam turbine generator	<p>Power generation turbines deleted from design with the introduction of the combined cycle system for the refrigerant compression drives (New steam unit generates adequate additional power to replace these gas turbines).</p> <p>Eliminates the associated fuel consumption and greenhouse gas (GHG) emissions</p> <p>Air cooling technology added for steam turbine (see Refrigerant Compression Drives)</p>	To be evaluated under "Power Generation System" and "Cooling Water System"
Essential Generators	Dual fuel diesel generators with seawater-based cooling system	Dual fuel diesel generators with air coolers	<p>Operational use increased from use only in transit during hurricane avoidance to both hurricane avoidance and supplemental power during normal operations</p> <p>Air cooling system replaces seawater cooling system (see Utility Cooling)</p> <p>Increases in air emissions due to configuration updates</p>	To be evaluated under "Power Generation System" and "Cooling System"
Emergency Generators	3 diesel generators	2 larger diesel generators	Increases in air emissions due to configuration updates	To be evaluated under "Power Generation System"
Fire Water Pumps	2 diesel driven pumps	4 smaller diesel driven pumps	This update in configuration results in a decrease in air emissions	To be evaluated under "Power Generation System"
Process Cooling	Direct air cooling	Direct air cooling	No engineering refinement	Not warranted
Utility Cooling	Seawater based cooling system for essential generators	Air based cooling system for essential generators	Eliminates seawater intake or discharge for cooling	To be evaluated under "Cooling System"
Process Heat	Waste heat recovery on power gas turbines	Waste heat recovery on refrigerant compression drives (gas turbines)	Process heat medium further refined from hot oil to steam	Not warranted
Auxiliary Boiler	None	Dual fuel boiler	Boiler added to assist start-up and commissioning (process heat) (See Process Cooling)	Not warranted

System Refinements	2016 Engineering Design	2023 Engineering Design	Remark	Further Evaluation Provided Below
Thermal Oxidizer	Oxidizer for incinerating waste streams	Oxidizer for incinerating waste streams	No engineering refinement	Not warranted
Diesel Oil Tanks	Approx. 2,260 m ³	Approx. 6,930 m ³	Tanks are sized based on fuel consumption for the transit from shipyard to site No increase in operational diesel inventory on site (Gulf of Mexico)	Not warranted
Fresh Water Generation and Tanks	Reverse osmosis Approx. 860 m ³	Reverse osmosis Approx. 2,200 m ³	Improved efficiency	Not warranted
Ballast Water Tanks	Approx. 127,000 m ³	Approx. 121,000 m ³	Tank size has decreased but there is no refinement in the intake and discharge rates*	Not warranted
Flare	Warm (wet) Cold (dry) and low pressure (LP) pilot flame	Warm (wet) Cold (dry) and LP pilot flame	No engineering refinement	Not warranted
Inert Gas for Cargo Tanks	Inert gas generator	Nitrogen generator	Synergies with topsides nitrogen system	Not warranted
Drain Systems	Closed drains Open drains with drain pans to capture released hydrocarbons and rainwater, washwater, and other fluids for routing to oily water tank and treatment package Capacity based on collecting the first 0.5 inch of rainfall	Closed drains Open drains with drain pans to capture released hydrocarbons and rainwater, washwater, and other fluids for routing to oily water tank and treatment package Capacity based on collecting the first 0.5 inch of rainfall	No engineering refinement	Not warranted

* The Project's 2016 Final EIS (USCG 2016) contained a typographical error for the ballast water discharge rate. The Final EIS stated that the ballast water discharge rate was 2.41 million gallons per day (mgd) and the ballast water intake rate was 2.14 mgd. Both values should have been 2.14 mgd. There is no engineering refinement in ballast water intake or discharge rates in the 2022 update letter to MARAD and USCG (Appendix B).

In addition to the reduced environmental impacts, the refinements have led to an increase in the design lifetime of each FLNGV and its equipment from 20 to 25 years on site, consistent with the extended term of the natural gas export authorization through 2050, as issued by the DOE. Not all engineering refinements would result in an update in impacts on the natural environment; therefore, this report will only evaluate impacts associated with the following three systems, as summarized in Table 1-1, above: 1) mooring system; 2) power generation system; and 3) cooling system. The refinements to these three design elements are provided in Sections 1.4.1 through 1.4.3. Delfin LNG's complete explanation of design refinements, dated June 14, 2022, is provided in Appendix B.

1.4.1 Mooring System

At the feasibility stage, Delfin LNG evaluated in detail two options for the disconnectable mooring. One option was the Tower Yoke Mooring System (TYMS) that would consist of a four-pile fixed platform with a rotating swivel and disconnectable mooring assembly attached to each FLNGV. The other option was the Submerged Swivel and Yoke (SSY) Mooring System¹ consisting of a three-pile base on the seabed with a submerged rotating swivel and a yoke system connecting the mooring chains. See Subsection 2.7.2 in Section 2, "Alternatives Analysis," Volume II of the DPLA, for a description of the detailed evaluation of the TYMS and SSY mooring system that was undertaken.

The TYMS was tentatively deemed the preferred selection at the feasibility stage in 2015 due to the SSY mooring system being less mature at the time. However, as stated in Subsection 2.7.2.3 in Section 2, "Alternatives Analysis," Volume II of the DPLA, no other disconnectable mooring solutions were excluded at that stage of the project and the issue was to be investigated further during FEED. During the course of FEED in 2020, Delfin LNG determined that the SSY mooring system has now established a track record of being a safe, reliable and cost-effective mooring system for FLNGVs. Given this new track record and the operational advantages of the SSY mooring system approach, as well as the reduced environmental impacts, Delfin LNG has selected the SSY mooring system for use on the Project.

1.4.2 Power Generation System

The FEED incorporates four updates to the power generation system:

1. conversion of single-cycle system to combined-cycle system for the main power needs (refrigerant compression drives and general power);
2. additional use of the essential generators (diesel) for supplemental power;
3. configuration refinement for the emergency generators (diesel); and
4. configuration refinement for the diesel-driven fire water pumps.

The preliminary design evaluated in the Final EIS (USCG 2016) included single-cycle gas combustion turbines for both refrigerant compression (three turbines) and general power generation (one turbine). Delfin LNG's post-FEED power system design refinements for these two functions effectively results in a combined-cycle power generation system. The FEED has a total of four smaller gas combustion turbines. The combined-cycle system adds heat recovery steam generators, which collect waste heat from the four refrigerant compression gas turbines. This waste heat drives a new steam turbine to generate additional power without additional fuel, thereby eliminating the need for dedicated gas turbines for general power generation. This combined-cycle engineering design is standard technology onshore and is emerging as a

¹ Note that in Section 2, "Alternatives Analysis," Volume II of the DPLA, this system was called the "Single Anchor Loading (SAL) System with Yoke (SSY)."

new standard in the offshore industry. It reduces both fuel consumption and the associated air emissions due to power generation onboard the FLNGVs.

The preliminary design used diesel generators to provide essential power only during initial transit to the site or when disconnected from the mooring system and sailing to avoid hurricanes. The FEED would increase the use of these diesel generators to also provide supplemental power during normal operations. This update would slightly increase the air emissions from these generators. The overall emissions from power generation at the DWP would decrease due to the FEED refinements. The refined design updated the configuration for the emergency diesel generators from three emergency generators to two larger emergency generators. It also updated the configuration of the diesel-driven fire water pumps from two pumps to four smaller pumps.

The Project refinements would result in overall net air emissions decreases, including a reduction of approximately 160,000 tpy of CO₂e, which is a decrease of 15% from the preliminary project design. Emissions of NO_x would be reduced by 106 tons per year, which is a decrease of 11% from the preliminary design. Emissions of CO would be reduced by 599 tons per year, which is a 37% decrease from the preliminary design.

1.4.3 Cooling System

The cooling system design evaluated in the Final EIS (USCG 2016) included air-cooled heat exchangers for the main power plant cooling processes (refrigerant compression drives and general power generation, see Section 1.4.2). This system eliminated the intake of seawater for this main cooling system and the impacts associated with the intake and discharge of the cooling water. However, in the preliminary design, the essential generators on each FLNGV would rely on seawater withdrawal for cooling purposes when used during emergency events (e.g., during transit to avoid hurricanes) and during testing.

In the refined design resulting from the FEED, two additional systems would use air cooling: 1) the steam exhaust from the new steam turbine resulting from the combined cycle power generation system, and 2) utility cooling for the essential generators. All other process equipment and utilities would continue to be cooled by air, in line with the feasibility stage design concept.

The steam exhaust from the new combined-cycle power generation system would be condensed in an array of air-cooled condensers located on the aft deck of the vessel; this avoids any new impacts from cooling water intake and withdrawal. The essential generators, which would be used more frequently in the FEED, would now also use air cooling instead of seawater. In the FEED, a dedicated array of air fin coolers would be installed at the aft deck of the vessel for the essential generators.

In total, therefore, the engineering refinements in the FEED eliminate all seawater withdrawals and discharges for cooling purposes.

2 AFFECTED ENVIRONMENT

2.1 SURFACE WATER RESOURCES

The DWP would be located in federal waters of the Gulf of Mexico Outer Continental Shelf (OCS), approximately 37.4 to 40.8 nautical miles off the coast of Cameron Parish, Louisiana, in water depths ranging from 64 to 72 feet. This marine location is affected by large-scale physiochemical conditions originating from the Calcasieu and Mississippi river estuaries as well as the Gulf of Mexico itself.

Currents at the proposed location typically flow east to west due to the Louisiana-Texas Coastal Current as well as winds and longshore currents (USCG 2016). Water quality in the area may be affected by localized marine-based activities (oil and gas extraction, ship traffic), natural hydrocarbon seeps on the continental slope, and land-based activities through major river outflows including lowered dissolved oxygen levels in the summer due to the high nutrient loads from the Mississippi River discharge². However, water quality sampling completed for Delfin's DPLA indicated that in-situ water quality parameters (e.g., conductivity, pH, and salinity), physiochemical parameters (total suspended solids, total dissolved solids, and chemical oxygen demand), and ionic constituents (such as calcium, magnesium, and potassium) were at levels considered appropriate for typical offshore marine environments of the Gulf of Mexico (USCG 2016). Most other organic and inorganic compounds measured were not detected, and all compounds with screening criteria were below water quality criteria except phosphorus at one location (USCG 2016).

2.2 SEDIMENT AND GEOLOGICAL RESOURCES

A detailed evaluation of the underlying geology and geologic hazards in the DWP location is provided in the Final EIS (USCG 2016). This section summarizes the surface sediment composition and sediment quality at the DWP site.

Sediment cores collected at the DWP site found sediments ranging from very soft to firm gray clay, silty clay, and sandy clay. Surficial cores collected primarily for sediment chemistry exhibited a similar dark greenish gray color, and none smelled of hydrogen sulfide, a common indicator of the presence of organic activity (USCG 2016).

Similar to water quality, sediment quality in the area is affected by the source material of the sediments themselves, the overlaying marine waters, and onshore activities through river discharges. Chemical analysis of the sediment cores found naturally occurring, and possibly anthropogenically derived, inorganic compounds, including arsenic, chromium, and lead. Except for a limited number of polycyclic aromatic hydrocarbons (PAHs) and numerous detections of dioxins and furans, all other organic compounds (pesticides, polychlorinated biphenyls [PCBs], and volatiles) were not detected in sediments. Evaluation of the detected compounds indicated that contaminants at the sampling stations were low and not indicative of significant contamination and, therefore, impacts on water quality from resuspension of sediments are not expected to be adverse (USCG 2016).

2.3 AIR QUALITY RESOURCES

In this document, air quality is defined as a measurement of pollutants in ambient air. Air quality as described here may be affected by proposed Project construction, operation, and decommissioning. CO₂, SO₂, ozone, PM, and heavy metal emissions are some of the potential hazards that can negatively impact air quality. Degradation of air quality can negatively impact human health and wildlife. Also, emissions can potentially contribute to climate change.

Existing threats in and near the Project include energy industry facilities and boat traffic. Drilling platforms, drill rigs, derrick barges, and pipeline construction barges all contribute to emissions,

² The DWP is located on the periphery of "the Dead Zone," which occurs annually off the Louisiana coast during the warmer months. The Dead Zone is caused by nutrient laden water flowing out of the Mississippi River into the Gulf of Mexico resulting in eutrophication and hypoxic conditions (dissolved oxygen concentrations that cannot support living aquatic organisms, generally less than 2 milligrams per liter [mg/L]). The specific area and duration of the Dead Zone varies annually due to changes in river discharge.

negatively impacting air quality. Commercial and private vessels are also sources of emissions that may negatively impact air quality.

The location for the proposed DWP is in the Gulf of Mexico, approximately 37.4 to 40.8 nautical miles (43.0 to 47.0 statute miles) from the shoreline of southwest Louisiana. Although descriptions of regional climate do not typically include areas of open water, the nearest coastal climate can be described.

All of Louisiana can be classified as having a warm, humid climate with hot summers (Köppen-Geiger climate classification Cfa) (NOAA 2016). Historic data from Lake Charles Regional Airport, which is near the proposed DOF, indicate a mean daily temperature ranging from 83 degrees Fahrenheit (°F) in August to 51.8°F in January, with mean daily highs ranging up to 91.9°F in August and mean daily lows ranging down to 42.3°F in January. Mean annual precipitation is 57.5 inches, distributed relatively evenly throughout the year (Southern Regional Climate Center 2016).

NAAQS were developed by the USEPA to protect public health (primary standards) and public welfare (secondary standards). Primary standards are based on observable human health responses and are set at levels that provide an adequate margin of safety for sensitive segments of the population. Secondary standards are intended to protect welfare interests such as structures, vegetation, and livestock. Air dispersion modeling is used by proposed new sources to demonstrate compliance with both the primary and secondary standards. States use ambient air monitoring systems to determine whether Air Quality Control Regions (AQCRs) are meeting the NAAQS. Areas meeting the NAAQS are termed “attainment areas,” and areas not meeting the NAAQS are termed “nonattainment areas.” Areas that have insufficient data to make a determination of attainment/nonattainment are unclassified or are not designated but are treated as being attainment areas for permitting purposes. The designation of an area is made on a pollutant-specific basis. For offshore locations beyond the seaward state territorial boundary, no status has been designated with respect to the NAAQS. Therefore, the NAAQS attainment status of the nearest adjacent onshore location should be considered. Cameron Parish, Louisiana, which is the nearest onshore location to the proposed DWP, is designated as attainment for all NAAQS. In addition, the nearest onshore location in Texas, located in Jefferson County, has also been designated as attainment for all NAAQS.

2.4 BIOLOGICAL RESOURCES

The Delfin LNG engineering refinements to Project facilities prompted an updated assessment on marine and coastal species that are afforded protection under the ESA and MMPA, as well as habitats classified as EFH and HAPC by NOAA Fisheries under the MSA. This section provides an overview of species previously listed in the Final EIS (USCG 2016) and provides updated identification of marine and coastal species as currently listed by NOAA Fisheries and USFWS as well as those listed by the Louisiana Department of Wildlife and Fisheries (LDWF).

On August 10, 2016 and March 8, 2017 (respectively), the USFWS and NMFS provided comments on the impacts of the Project on threatened and endangered species and designated critical habitat under the ESA Section 7 consultation process. The USFWS and NMFS concurred with the USCG and MARAD’s determination effects on listed species and their critical habitats that the Project is not likely to adversely affect Federally-listed threatened or endangered species or designated critical habitats. The impact determinations on protected species and natural resources that have undergone changes in regulatory protections since the initial 2015 application filing and subsequent issuance of the Final EIS are discussed below in Section 3.

While many marine mammals that are protected under the MMPA (and some also protected under the ESA) have a possibility to be encountered during transit through the economic exclusion zone (EEZ) on approach to the Port Delfin DWP terminal, the engineering refinements that are the subject of this environmental assessment do not apply to the MMPA and ESA species only found during transit. As such, these species will not be subject to further discussion in this report. However, any species that has been added to the ESA list since the 2015 DPLA filing and 2016 Final EIS (USCG 2016) issuance or has an update in listing status or new designation of critical habitat and has the potential for encounter during transit will be addressed below.

2.4.1 Marine ESA and MMPA Species

This section provides an overview of the marine species that have the potential to occur at the DWP facility or during vessel transit through the EEZ upon approach to the terminal. The species summarized here are afforded protection under the ESA and the MMPA. Appendix C provides a species list prepared by NOAA Fisheries for marine species under their jurisdiction that are known to occur in waters off the coast of Louisiana, and Appendix D provides a species list, generated by the Information for Planning and Consultation (IPaC) tool for species and critical habitat under the jurisdiction of the USFWS (USFWS 2023a). Table 2-1 provides a summary of marine mammals, reptiles, and fishes and any critical habitats afforded regulatory protection within the Project areas (DWP facility or transit routes). Table 2-1 also describes updates in protection status between 2016 and 2023 under the ESA and MMPA as well as the reasoning for inclusion or exemption from further analysis based on listing status and engineering refinements.

Table 2-1 Protected Marine Species Anticipated in the Vicinity of the Port Delfin Deepwater Port Terminal and Transit Routes: A 2016 and 2023 Comparison, Port Delfin LNG Project

Species Name	Protection Mechanism (GoM)	Regulatory Update (2016-2023)	Potential Occurrence (EEZ Approach)	Potential Occurrence (Proposed DWP)	Critical Habitat at DWP	Further Evaluation Provided Below
Marine Mammals						
Atlantic Spotted Dolphin (<i>Stenella frontalis</i>)	MMPA Protected	None	Likely	Likely/Common	No	Yes - potential to occur at DWP (Table 4-1)
Blainville's Beaked Whale (<i>Mesoplodon densirostris</i>)	MMPA Protected	None	Potential	Unlikely/Rare	No	Not warranted
Blue Whale (<i>Balaenoptera musculus</i>)	ESA Endangered MMPA Depleted	None	Potential	Unlikely/Rare	No	Not warranted
Bottlenose Dolphin (<i>Tursiops truncatus</i>)	MMPA Protected	None	Likely	Likely/Common	No	Yes - potential to occur at DWP (Table 4-1)
Clymene Dolphin (<i>Stenella clymene</i>)	MMPA Protected	None	Potential	Unlikely/Rare	No	Not warranted
Cuvier's Beaked Whale (<i>Ziphius cavirostris</i>)	MMPA Protected	None	Likely	Unlikely/Rare	No	Not warranted
Dwarf Sperm Whale (<i>Kogia simus</i>)	MMPA Protected	None	Potential	Unlikely/Rare	No	Not warranted
False Killer Whale (<i>Pseudorca crassidens</i>)	MMPA Protected	None	Unlikely/Rare	Unlikely/Rare	No	Not warranted
Fin Whale (<i>Balaenoptera physalus</i>)	ESA Endangered MMPA Depleted	None	Potential	Unlikely/Rare	No	Not warranted
Fraser's Dolphin (<i>Lagenodelphis hosei</i>)	MMPA Protected	None	Potential	Unlikely/Rare	No	Not warranted
Gervais' Beaked Whale (<i>Mesoplodon europaeu</i>)	MMPA Protected	None	Potential	Unlikely/Rare	No	Not warranted
Humpback Whale (<i>Megaptera novaeangliae</i>)	MMPA Depleted	Providing correction: the humpback whale is not at risk under the ESA in the GoM or Northwest Atlantic	Potential	Unlikely/Rare	No	Not warranted
Killer Whale (<i>Orcinus orca</i>)	MMPA Protected	None	Likely	Unlikely/Rare	No	Not warranted
Melon-headed Whale (<i>Peponocephala electra</i>)	MMPA Protected	None	Unlikely/Rare	Unlikely/Rare	No	Not warranted
Minke Whale	MMPA Protected	None	Potential	Unlikely/Rare	No	Not warranted

Species Name	Protection Mechanism (GoM)	Regulatory Update (2016-2023)	Potential Occurrence (EEZ Approach)	Potential Occurrence (Proposed DWP)	Critical Habitat at DWP	Further Evaluation Provided Below
<i>(Balaenoptera acutorostrata)</i>						
Northern Right Whale <i>(Eubalaena glacialis)</i>	ESA Endangered MMPA Depleted	None	Unlikely/Rare	Unlikely/Rare	No	Not warranted
Pantropical Spotted Dolphin <i>(Stenella attenuate)</i>	MMPA Protected	None	Likely	Unlikely/Rare	No	Not warranted
Pygmy Killer Whale <i>(Feresa attenuate)</i>	MMPA Protected	None	Potential	Unlikely/Rare	No	Not warranted
Pygmy Sperm Whale <i>(Kogia breviceps)</i>	MMPA Protected	None	Potential	Unlikely/Rare	No	Not warranted
Rice's Whale (fka Bryde's Whale) <i>(Balaenoptera ricei)</i>	ESA Endangered MMPA Depleted	GoM stock of Bryde's whale determined to be genetically different from the Atlantic stock; Species renamed. Listed as endangered under the ESA in 2019	Likely	Unlikely/Rare	No	Yes - due to renaming and updated ESA listing status (Table 4-1)
Risso's Dolphin <i>(Grampus griseus)</i>	MMPA Protected	None	Likely	Unlikely/Rare	No	Not warranted
Rough-toothed Dolphin <i>(Steno bredanensis)</i>	MMPA Protected	None	Potential	Unlikely/Rare	No	Not warranted
Sei Whale <i>(Balaenoptera borealis)</i>	ESA Endangered MMPA Depleted	None	Potential	Unlikely/Rare	No	Not warranted
Short-finned Pilot Whale <i>(Globicephala macrorhynchus)</i>	MMPA Protected	None	Likely	Unlikely/Rare	No	Not warranted
Sowerby's Beaked Whale <i>(Mesoplodon bidens)</i>	MMPA Protected	None	Potential	Unlikely/Rare	No	Not warranted
Sperm Whale <i>(Physeter microcephalus)</i>	ESA Endangered MMPA Depleted	None	Likely	Unlikely/Rare	No	Not warranted
Spinner Dolphin <i>(Stenella longirostris)</i>	MMPA Protected	None	Likely	Unlikely/Rare	No	Not warranted
Striped Dolphin <i>(Stenella coeruleoalba)</i>	MMPA Protected	None	Likely	Unlikely/Rare	No	Not warranted
West Indian Manatee <i>(Trichechus manatus)</i>	MMPA Protected, ESA Threatened	Updated ESA listing in 2017	Unlikely/Rare	Unlikely/Rare	No	Yes - Updated ESA listing status (Table 4-1)

Species Name	Protection Mechanism (GoM)	Regulatory Update (2016-2023)	Potential Occurrence (EEZ Approach)	Potential Occurrence (Proposed DWP)	Critical Habitat at DWP	Further Evaluation Provided Below
Marine Reptiles						
Green Turtle (<i>Chelonia mydas</i>)	ESA Threatened (North Atlantic DPS)	None	Likely	Likely	No	Yes - potential to occur at DWP (Table 4-1)
Hawksbill Turtle (<i>Eretmochelys imbricata</i>)	ESA Endangered	None	Likely	Likely	No	Yes - potential to occur at DWP (Table 4-1)
Kemp's Ridley Turtle (<i>Lepidochelys kempii</i>)	ESA Endangered (Northwest Atlantic DPS)	None	Likely	Likely	No	Yes - potential to occur at DWP (Table 4-1)
Leatherback Turtle (<i>Dermochelys coriacea</i>)	ESA Endangered	None	Likely	Likely	No	Yes - potential to occur at DWP (Table 4-1)
Loggerhead Turtle (<i>Caretta caretta</i>)	ESA Threatened (GoM)	None	Likely	Likely	yes - Sargassum (hatchlings)	Yes - potential to occur at DWP (Table 4-1)
Marine Fish						
Giant Manta Ray (<i>Manta birostris</i>)	ESA Threatened	Newly listed under ESA in 2018	Likely	Potential	No	Yes - due to new ESA listing status (Table 4-1)
Gulf Sturgeon (<i>Acipenser oxyrinchus</i>)	ESA Threatened	None	Unlikely	Unlikely	No	Not warranted
Oceanic Whitetip Shark (<i>Carcharhinus longimanus</i>)	ESA Threatened	Newly listed under ESA in 2018	Likely	Unlikely	No	Yes - due to new ESA listing status
Smalltooth Sawfish (<i>Pristis pectinate</i>)	ESA Endangered	None	Unlikely	Unlikely	No	Not warranted

DPS = Distinct Population Segment

DWP = deepwater port

EEZ = economic exclusion zone

ESA = Endangered Species Act of 1973, as amended

GoM = Gulf of Mexico

MMPA = Marine Mammal Protection Act of 1975, as amended

N/A = Not applicable

Species considered “Unlikely/Rare” are excluded from further analysis due to their likelihood of being impacted by the construction, operation, or decommissioning of the proposed Project.

Species that are further described below due to updated listing status or updated due to an increase in scientific information since the Final EIS (USCG 2016), as well as updated impacts at the DWP include Rice’s whale (*Balaenoptera ricei*), West Indian manatee (*Trichechus manatus*), oceanic whitetip shark (*Carcharhinus longimanus*), and giant manta ray (*Manta birostris*).

Species that are further discussed as part of the updates to impacts at the DWP include bottlenose dolphin (*Tursiops truncatus*), Atlantic spotted dolphin (*Stenella frontalis*), and each of the five marine turtles – green turtle (*Chelonia mydas*), Kemp’s ridley turtle (*Lepidochelys kempii*), leatherback turtle (*Dermochelys coriacea*), loggerhead turtle (*Caretta caretta*), and hawksbill turtle (*Eretmochelys imbricata*).

2.4.1.1 *Rice’s Whale*

Rice’s whale was listed as a federally endangered species on April 15, 2019, and the rule became effective on May 15, 2019, after the issuance of the Project’s Final EIS (USCG 2016). Rice’s whale is a species of baleen whale that inhabits the northeastern Gulf of Mexico along the continental shelf break between 328 and about 1,300 feet in depth. Limited data suggests the species spends most of its time within about 50 feet of the surface overlaying these deeper waters. The species was formerly believed to have been a subspecies of the Bryde’s whale (*Balaenoptera edeni*), but genetic and skeletal studies found the Rice’s whale to be a distinct species in 2021 (NOAA Fisheries 2023b). Upon the reclassification of the whale to a new species in 2021, NOAA Fisheries revised the common and scientific name of the species to reflect the new scientifically accepted taxonomy and nomenclature.

Rice’s whales are uniformly dark gray on top with a pale to pink belly. The species has three prominent ridges in front of their blowhole, with pointed pectoral fins, a broad fluke, and a pointed and strongly hooked dorsal fin (NOAA Fisheries 2023b). While the species is endemic to the Gulf of Mexico, Rice’s whale’s Core Distribution Area is limited to the northeastern Gulf of Mexico, east of Louisiana and the Mississippi River delta (Figure 2-1 in Appendix A). Occurrence outside of the species’ Core Distribution Area is considered rare based on passive acoustic monitoring data (Soldevilla et al. 2022). The primary threats to Rice’s whale include vessel strikes, underwater noise, and pollution as a result of increased vessel traffic from commercial shipping and offshore energy exploration and development (NOAA Fisheries 2023b).

2.4.1.2 *West Indian Manatee*

The West Indian manatee is a federally threatened species under the ESA and is afforded additional protection by the MMPA. The West Indian manatee was reclassified as a federally threatened species in 2017, after the issuance of the Project’s Final EIS (USCG 2016), downlisting the species from its previous endangered status. Since this reclassification, the West Indian manatee has experienced a significant mortality event in Florida between 2020 and 2022. This die-off has been categorized as an Unusual Mortality Event (UME), defined under the MMPA as “a stranding that is unexpected; involves a significant die-off of any marine mammal population; and demands immediate response.” This UME and the consideration for reevaluation of the species listing status has prompted informal discussions with the USFWS and requirements for the species when evaluating potential project impacts in Gulf Coast regions that have previously not been required to discuss. The updated ESA listing, recent informal USFWS precedent, and the engineering refinements of the DWP triggered a re-examination of habitats that are proposed to be crossed during the Project’s onshore and offshore construction activities.

West Indian manatees are typically grey in color and the muzzle is heavily whiskered and coarse, with single hairs sparsely distributed throughout the body. Manatees are found in warm coastal waters of no less than 68°F, and mostly in rivers and estuaries but sometimes in saltwater (USFWS 2023b). During the summer, manatees expand their range and, on rare occasions, are seen as far north as Massachusetts on the Atlantic Coast and as far west as Texas on the Gulf Coast. While the reason for manatees to travel beyond the established range is unknown; however, it is theorized that increasing surface water temperatures in the northern Gulf of Mexico and an increase in population size in Florida leading to habitat competition have contributed to the increase in distances manatees will travel to forage. Currently, Florida is the only known area to have (natural) warm-water refuges to support manatee populations year-round and, as such, manatees are thought to migrate back to Florida during the winter months. The locations of manatee sightings in Louisiana have been consistent with the habitat types in Florida, broadly, with manatees utilizing nearshore coastal waters, particularly having submerged aquatic vegetation present, but most frequently reported in brackish and freshwater rivers and embayments. Minimal data or analyses of sightings data exist for areas of Louisiana; however, there have been recent reports of manatee sightings along the coast and brackish tributaries of Louisiana, including one in Lake Pontchartrain in September 2022 and another in the Amite River in Ascension Parish in September 2020. Manatees occurring west of Florida and to the north of Mexico generally are considered to be strays originating from populations in either Florida or Mexico (Fertl et al. 2005). Due to the West Indian manatee's rarity in the western Gulf of Mexico, it is not expected to occur near the DOF. Additionally, the West Indian manatee is not expected to occur near the DWP, as manatees are most commonly found travelling in waters 9 to 15 feet deep, with waters over 18 feet generally avoided (Rathburn 1990).

2.4.1.3 *Oceanic Whitetip Shark*

The oceanic whitetip shark was listed as federally threatened by NOAA Fisheries under the ESA on January 30, 2018, after the issuance of the Project's Final EIS (USCG 2016). The final rule went into effect on March 1, 2018. Critical habitat has not been designated for the species. Oceanic whitetip sharks are large-bodied with a stocky build and characteristic mottled markings on the tips of their dorsal, pectoral, and tail fins. The oceanic whitetip shark can be found in tropical to subtropical oceans worldwide. The shark species typically occurs offshore over the OCS and around oceanic islands, generally in the surface waters (0 to 498 feet) over depths greater than 600 feet. Oceanic whitetip sharks are opportunistic feeders and are known to primarily feed on bony fish and cephalopods but have been known to also feed on sharks and rays, sea birds, marine mammals, and even garbage (NOAA Fisheries 2023b). Oceanic whitetip shark populations have significantly declined worldwide due to commonly being caught as bycatch in commercial fisheries combined with the demand for its fins, including an 88 percent decline in the Gulf of Mexico and 80 to 95 percent in the Pacific and Atlantic Oceans (NOAA Fisheries 2023b). The species is vulnerable to extinction due to the age at which they reach maturity, ranging between 6 and 9 years, and their low to moderate productivity, having 1 to 14 pups every other year (NOAA Fisheries 2023b).

2.4.1.4 *Giant Manta Ray*

The giant manta ray was listed as federally threatened by NOAA Fisheries under the ESA on January 21, 2018, after the issuance of the Project's Final EIS (USCG 2016). The final rule went into effect on February 21, 2018. Critical habitat has not been designated for the species. The giant manta ray is the world's largest ray, with a wingspan of up to 29 feet. It is recognized by its large diamond-shaped body with elongated wing-like pectoral fins, ventrally placed gill slits, laterally placed eyes, and wide terminal mouth. In front of the mouth it has two structures called cephalic lobes that extend and help to introduce water into the mouth for feeding activities. Giant manta rays have two distinct color types: chevron

(mostly black back dorsal side and white ventral side) and black (almost completely black on both ventral and dorsal sides). The giant manta ray can be found in all ocean basins (NOAA Fisheries 2022).

The giant manta ray is a seasonal visitor along productive coastlines with regular upwelling, in oceanic island groups, and at offshore pinnacles and seamounts. The timing of these visits varies by region and seems to correspond with the movement of zooplankton, current circulation and tidal patterns, seasonal upwelling, seawater temperature, and possibly mating behavior. They have also been observed in estuarine waters near oceanic inlets (Adams and Amesbury 1998; Medeiros et al. 2015). Giant manta rays primarily feed on planktonic organisms such as euphausiids, copepods, mysids, decapod larvae, and shrimp, but some studies have noted their consumption of small and moderately sized fishes (Miller and Klimovich 2017). While it was previously assumed, based on field observations, that giant manta rays feed predominantly during the day on surface zooplankton, results from recent studies (Burgess et al. 2016; Couturier et al. 2013) indicate that these feeding events are not an important source of the dietary intake.

While little is known about giant manta ray aggregation sites, the Flower Garden Banks National Marine Sanctuary and the surrounding region might represent the first documented nursery habitat for the giant manta ray (Stewart et al. 2018). The Flower Garden Banks National Marine Sanctuary may be an optimal nursery ground because of its location near the edge of the continental shelf and proximity to abundant pelagic food resources. In addition, small juveniles are frequently observed along a portion of Florida's east coast, indicating that this area may also function as a nursery ground for juvenile giant manta rays.

The species is known to be in decline due to overfishing and bycatch, as well as harvest for international trade. Other threats known to impact the species include marine debris/pollution, vessel strikes, entanglement, and recreational fishing interactions. These threats to the species, along with the lowest fecundity of all elasmobranchs, typically giving birth to only one pup every two to three years, puts the species in danger for extinction (NOAA Fisheries 2022).

2.4.1.5 *Bottlenose Dolphin*

The bottlenose dolphin is found in oceanic waters worldwide, ranging from latitudes of 45°N to 45°S, and is divided into different stocks in the Gulf of Mexico for management purposes (Waring et al. 2010). There are coastal populations that migrate into bays, estuaries, and river mouths, as well as offshore populations that inhabit pelagic waters along the continental shelf (NOAA Fisheries 2022c). The coastal stocks are generally found throughout shallower nearshore waters out to 66 feet, or around 56 miles from shore in the northern Gulf of Mexico (Waring et al. 2010). The species is not listed under the ESA but is afforded protection by the MMPA (16 U.S.C. 1361 et seq.).

2.4.1.6 *Atlantic Spotted Dolphin*

The Atlantic spotted dolphin is found in warm temperate and tropical waters of the Gulf of Mexico and Atlantic Ocean. In U.S. waters, the species is divided into three stocks: Northern Gulf of Mexico stock, Puerto Rico and U.S. Virgin Islands stock, and Western North Atlantic stock. It is believed that the Northern Gulf of Mexico stock has approximately 37,000 dolphins (NOAA Fisheries 2022c). The species typically lives in coastal or continental shelf waters that range from 65 to 820 feet deep but can be found in deeper oceanic waters in the northern portion of its range (NOAA Fisheries 2022c). Atlantic spotted dolphins are not listed under the ESA but are afforded protection by the MMPA.

2.4.1.7 Marine Turtles

Five of the seven sea turtle species found in the world can be found in the Gulf of Mexico: green, hawksbill, Kemp's ridley, leatherback, and loggerhead (Table 2-2). All species are listed as either threatened or endangered under the ESA and are under the joint jurisdiction of NOAA Fisheries and the USFWS. The USFWS has jurisdiction over the nesting beaches, while NOAA Fisheries is responsible for the species in the marine environment. All species of sea turtles nest on coastal beaches and, as such, no suitable nesting habitat can be found near the DOF. However, once hatched, sea turtles have the potential to occur in the vicinity of the DWP during some stage of their life cycle. There are five developmental stages in a sea turtle's life cycle: egg, hatchling, juvenile, sub-adult, and adult.

Table 2-2 Marine Turtles with the Potential to Occur within the Vicinity of the Port Delfin Deepwater Port Terminal, Port Delfin LNG Project

Species Name	Designated Critical Habitat	Potential to Occur in Project Area
Green Sea Turtle (<i>Chelonia mydas</i>)	N/A	Hatchling, juvenile, sub-adult, adult
Hawksbill Sea Turtle (<i>Eretmochelys imbricata</i>)	N/A	Hatchling, juvenile, sub-adult, adult
Kemp's Ridley Sea Turtle (<i>Lepidochelys kempi</i>)	N/A	Hatchling, juvenile, sub-adult, adult
Leatherback Sea Turtle (<i>Dermochelys coriacea</i>)	N/A	Hatchling, juvenile, sub-adult, adult
Loggerhead Sea Turtle (<i>Caretta caretta</i>)	Sargassum critical habitat (drift algae)	Hatchling, juvenile, sub-adult, adult

Source: NOAA Fisheries (2022c).

2.4.2 Essential Fish Habitat

The Project is located within the northwestern Gulf of Mexico (west of the Mississippi River Delta), which is under the jurisdiction of the Gulf of Mexico Fishery Management Council (GMFMC) and the NOAA Fisheries Southeast Region's Habitat Conservation Division (HCD). The GMFMC divided the Gulf of Mexico into five Eco-Regions. The Project area falls within Eco-Region 4, which extends from the Mississippi Delta to Freeport, Texas (NOAA Fisheries and GMFMC 2016). Gulf of Mexico Fishery Management Plans (FMPs) provide the basis for management of fishery resources in the Gulf of Mexico's EEZ, regulating the amount of fish that are harvested in order to maintain the best interest of the people of the United States. The GMFMC has created FMPs for federally managed fisheries in which EFH for each species or complex is defined (NOAA Fisheries and GMFMC 2016), and the following are found within the vicinity of the DWP:

- Red Drum FMP
- Reef Fish FMP
- Shrimp FMP
- Coastal Migratory Pelagic FMP
- Atlantic Highly Migratory Species FMP

The NOAA Fisheries HCD and GMFMC evaluate the occurrence of various life stages (egg, larvae, juvenile, adult, and spawning adult) of each managed species within the EHF. The habitat zones are

divided into three categories: 1) estuarine, which is located inside barrier islands and estuaries; 2) nearshore, which is located in waters 60 feet or less in depth; and 3) offshore, which is located in waters 60 feet or greater in depth (NOAA Fisheries and GMFMC 2016). The Project is situated between the nearshore and offshore environments and, as there has been no refinement in location of the DWP between the 2016 Final EIS (USCG 2016) and the 2022 update, the applicable EFH habitat types for evaluation are the benthic softbottom and water column associated (WCA) life stages, including those utilizing drift algae (*Sargassum*).

In December 2016, NOAA Fisheries and the GMFMC published the *Final Report: 5-Year Review of Essential Fish Habitat Requirements*, which refined the previous habitat association tables, conducting an exhaustive literature review to fill data gaps and updated out-of-date information. This allowed for the creation of species profiles which provided known habitat requirements for each managed species by life stage. While the species potential for occurrence within the DWP has not changed, there is now more comprehensive information on what life stage is anticipated to be present at the DWP depending on the habitat zone (estuarine, nearshore, offshore), and the habitat type.

Table 2-3 provides a summary of the species and corresponding life stages within each of the FMPs that: 1) have the potential to occur within the vicinity of the DWP; and 2) meet the criteria of occupying the appropriate EFH (WCA, soft bottom, sand/shell). These species have also been documented to occur within the Eco-Region and occur within the water depths of the DWP (64 to 72 feet). These habitat associations were derived from the 2016 *Final Report: 5-Year Review of Essential Fish Habitat Requirements* (NOAA Fisheries and GMFMC 2016).

Table 2-3 Managed Species with the Potential to Occur within the Vicinity of the Port Delfin Deepwater Port Terminal, Port Delfin LNG Project

Fishery Management Plan	Species Name	Life Stage	Habitat Requirement in DWP Area
Red Drum	Red Drum (<i>Sciaenops ocellatus</i>)	Late juvenile, adult	Sand and shell
Reef Fish	Almaco Jack (<i>Seriola rivoliana</i>)	Juvenile	Drift algae
Reef Fish	Dog Snapper (<i>Lutjanus jocu</i>)	Eggs, larvae	WCA
Reef Fish	Dwarf Sand Perch (<i>Diplectrum bivittatum</i>)	Eggs, larvae Juveniles, adults	WCA Soft bottom
Reef Fish	Gray (mangrove) Snapper (<i>Lutjanus griseus</i>)	Adults	Soft bottom
Reef Fish	Gray Triggerfish (<i>Balistes capricious</i>)	Larvae, juvenile Adult	WCA, drift algae Sand and shell
Reef Fish	Greater Amberjack (<i>Seriola dumerili</i>)	Juvenile Egg, larvae, adult	Drift algae WCA
Reef Fish	Lane Snapper (<i>Lutjanus synagris</i>)	Eggs Juvenile	WCA Soft bottom
Reef Fish	Mahogany Snapper (<i>Lutjanus mahogoni</i>)	Eggs, larvae Juveniles, adults	WCA Sand and shell
Reef Fish	Nassau Grouper (<i>Epinephelus striatus</i>)	Larvae Adults	WCA Sand and shell
Reef Fish	Red Grouper (<i>Epinephelus morio</i>)	Eggs	WCA

Fishery Management Plan	Species Name	Life Stage	Habitat Requirement in DWP Area
Reef Fish	Red Hind (<i>Epinephelus guttatus</i>)	Eggs, larvae Adults	WCA Sand and shell
Reef Fish	Red Snapper (<i>Lutjanus campechanus</i>)	Eggs, larvae Juveniles, adults	WCA Softbottom, sand and shell
Reef Fish	Yellowedge Grouper (<i>Epinephelus flavolimbatus</i>)	Early juvenile	WCA
CMP	Cobia (<i>Rachycentron canadum</i>)	All life stages	WCA
CMP	King Mackerel (<i>Scomberomorus cavalla</i>)	Juvenile, adults	WCA
CMP	Mahi mahi (<i>Coryphaena hippurus</i>)	Egg, larvae	WCA
Shrimp	Brown Shrimp (<i>Penaeus aztecus</i>)	Eggs, larvae Late juvenile, adult	WCA Soft bottom, sand and shell
Shrimp	White Shrimp (<i>Penaeus setiferus</i>)	Eggs, larvae, adult	WCA, softbottom
Stone Crab	Stone Crab (<i>Menippe adina</i>)	Eggs Larvae	Soft bottom WCA

DWP = deepwater port

WCA = water column associated

2.4.3 Habitat Areas of Particular Concern

HAPCs are subsets of EFH that are rare, particularly susceptible to human-induced degradation, especially ecologically important, or located in an environmentally stressed area. These HAPCs are not always afforded regulatory protection under the MSA, but potential adverse impacts are more scrutinized during an EFH consultation project and may be subject to more stringent conservation recommendations (NOAA Fisheries and GMFMC 2016). In the past few years, NOAA Fisheries has conducted various public workshops and prepared multiple EISs to support re-evaluation of certain areas for HAPC consideration. In a January 19, 2021, final ruling, which took effect on March 21, 2021 (15 CFR 922, Docket No. 210107-0004), NOAA implemented the expansion of the Flower Garden Banks National Marine Sanctuary, which previously included the West and East Flower Garden Banks and Stetson Bank, to provide protections to an additional 14 reefs and banks in the northwestern Gulf of Mexico, thereby expanding the sanctuary from 56 square miles to a total of 160 square miles. After the expansion of the Flower Garden Banks National Marine Sanctuary, the Jakkula Bank remains the only bank with HAPC status in the Northwest Gulf of Mexico.

Additionally, NOAA Fisheries prepared Amendment 9 to the FMP for Coral and Coral Reefs: Coral Habitat Areas Considered for Habitat Area of Particular Concern Designation in the Gulf of Mexico. This Amendment evaluated new areas for HAPC status as well as site-specific fishing regulations for gear type and anchoring (NOAA Fisheries and GMFMC 2016). Amendment 9 was accepted and published on October 16, 2020 and went into effect on November 16, 2022 (85 FR 65740). In the northwestern Gulf of Mexico, the following reefs are now categorized as HACPs: 1) AT-047; 2) AT-357; 3) Green Canyon 852, located along the banks of the OCS, further offshore of the Flower Garden Banks National Marine Sanctuary.

Though the various amendments to the HACP for coral reefs and expansion of the Flower Garden Banks National Marine Sanctuary, the DWP remains outside the boundaries and will not impact these protected areas. Furthermore, on March 8, 2017, the NMFS concurred with 2016 Final EIS, stating that implementation of the Project will not result in any substantial adverse effect to EFH or Federally managed fishery species (USCG 2016).

2.4.4 Coastal Species and Terrestrial Species

Consultation with the USFWS was completed on August 10, 2016 and the Project received a concurrence letter stating that the proposed Port is not likely to adversely affect Federally-listed threatened or endangered species or designated critical habitat under USFWS jurisdiction (USCG 2016).

Following Delfin engineering requirements, an updated review was completed utilizing the USFWS IPaC (USFWS 2023a) database and an informal consultation with the LDWF to determine the federal and state listed species that have the potential to occur within the DOF (Appendix D). Species that were previously listed in the Project's Final EIS (USCG 2016) are addressed in this section, as well as species with updated protection under the ESA and Louisiana state regulations that have the potential to occur in the DOF. Species considered "Unlikely/Rare" are excluded from further analysis due to the improbability of these species being impacted by the construction and operation of the DOF. Species that are further described below include those with an updated listing status or those species for which there has been an increase in scientific information since submittal of the Project's Final EIS (USCE 2016).

Table 2-4 Protected Coastal Species and Migratory Birds with Potential to Occur at the Port Delfin LNG Project's Onshore Facilities

Species Name	Project Site within Nesting Range?	Nesting Season	Protection Mechanism	Regulatory Update (2016-2023)	Potential Occurrence (Proposed DOF)	Critical Habitat or Nesting Habitat at DOF	Further Evaluation Provided Below
Coastal Birds							
American Golden-plover (<i>Pluvialis dominica</i>)	No	--	MBTA	Updated MBTA species list in 2022	Unlikely/Rare	No	Not warranted
Bald Eagle (<i>Haliaeetus leucocephalus</i>)	Yes	September to July	MBTA	Updated MBTA species list in 2022	Unlikely/Rare	No	Not warranted
Black Skimmer (<i>Rynchops niger</i>)	Yes	May to September	MBTA	Updated MBTA species list in 2022	Unlikely/Rare	No	Not warranted
Chimney Swift (<i>Chaetura pelagica</i>)		March to August	MBTA	Updated MBTA species list in 2022	Unlikely/Rare	No	Not warranted
Dickcissel (<i>Spiza americana</i>)	Yes	May to August	MBTA	Updated MBTA species list in 2022	Unlikely/Rare	No	Not warranted
Eastern Black Rail (<i>Lateralus jamaicensis</i> spp. <i>jamaicensis</i>)	Yes	April to August	ESA threatened species, MBTA	Newly listed under ESA in 2020	Unlikely/Rare	No	Yes - updated ESA listing status (Table 4-1)
Gull-billed Tern (<i>Gelochelidon nilotica</i>)	Yes	May to July	MBTA	Updated MBTA species list in 2022	Unlikely/Rare	No	Not warranted
King Rail (<i>Rallus elegans</i>)	Yes	May to September	MBTA	Updated MBTA species list in 2022	Unlikely/Rare	No	Not warranted
Lesser Yellowlegs (<i>Tringa flavipes</i>)	No	--	MBTA	Updated MBTA species list in 2022	Unlikely/Rare	No	Not warranted
Long-billed Curlew (<i>Numenius americanus</i>)	No	-	MBTA	Updated MBTA species list in 2022	Unlikely/Rare	No	Not warranted
Marbled Godwit (<i>Limosa fedoa</i>)	No	-	MBTA	Updated MBTA species list in 2022	Unlikely/Rare	No	Not warranted
Painted Bunting (<i>Passerina ciris</i>)	Yes	April to August	MBTA	Updated MBTA species list in 2022	Unlikely/Rare	No	Not warranted
Piping Plover (<i>Charadrius melodus</i>)	No	--	ESA threatened species, MBTA	None	Unlikely/Rare	No	Not warranted
Prothonotary Warbler (<i>Protonotaria citrea</i>)	Yes	April to July	MBTA	Updated MBTA species list in 2022	Unlikely/Rare	No	Not warranted
Redish Egret (<i>Egretta rufescens</i>)	Yes	March to September	MBTA	Updated MBTA species list in 2022	Unlikely/Rare	No	Not warranted

Red Knot (<i>Calidris canutus rufa</i>)	No	--	ESA threatened species, MBTA	Yes - new proposed critical habitat in 2021	Unlikely/Rare	No	Not warranted
Ruddy Turnstone (<i>Arenaria interpres morinella</i>)	No	--	MBTA	Updated MBTA species list in 2022	Unlikely/Rare	No	Not warranted
Sandwich Tern (<i>Thalasseus sandvicensis</i>)	Yes	April to August	MBTA	Updated MBTA species list in 2022	Unlikely/Rare	No	Not warranted
Short-billed Dowitcher (<i>Limnodromus griseus</i>)	No	-	MBTA	Updated MBTA species list in 2022	Unlikely/Rare	No	Not warranted
Swallow-tailed Kite (<i>Elanoides forficatus</i>)	Yes	March to June	MBTA	Updated MBTA species list in 2022	Unlikely/Rare	No	Not warranted
Whooping Crane (<i>Grus americana</i>)	No	April to May	MBTA	Non-essential, experimental population (South Louisiana)	Unlikely/Rare	No	Not warranted
Willet (<i>Tringa semipalmata</i>)	Yes	April to August	MBTA	Updated MBTA species list in 2022	Unlikely/Rare	No	Not warranted
Wilson's Plover (<i>Charadrius wilsonia</i>)	Yes	April to August	MBTA	Updated MBTA species list in 2022	Unlikely/Rare	No	Not warranted
Insects							
Monarch Butterfly (<i>Danaus plexippus</i>)	No	--	ESA candidate species	Candidate species designated under ESA in 2020	Likely/Common	No	Yes - updated ESA listing status (Table 4-1)
Terrestrial Reptiles							
Alligator Snapping Turtle (<i>Macrochelys temminckii</i>)	--	--	ESA proposed threatened species	Candidate species designated under ESA in 2022	Unlikely/Rare	No	Yes - updated ESA listing status (Table 4-1)

-- = Does not nest in vicinity of DOF

DOF = Delfin Onshore Facility

ESA = Endangered Species Act of 1973, as amended

MBTA = Migratory Bird Treaty Act of 1918, as amended

N/A = Not applicable

2.4.4.1 Eastern Black Rail

The eastern black rail (*Laterallus jamaicensis* spp. *jamaicensis*) was listed as a federally threatened species at the end of October 2020, after the issuance of the Project's Final EIS (USCG 2016), and the final rule became effective on November 9, 2020. This listing triggered a re-examination of habitats that were proposed to be impacted during the Project's onshore construction activities. The eastern black rail is gray-black in coloration, with white speckled upperparts, and has a greyish crown, a chestnut-colored nape of the neck, and a short tail (USFWS 2023c). The species is found in higher elevation wetland zones with some shrubby vegetation, and impounded and unimpounded intermediate marshes, which are marshes that are closer to high elevation areas, also provide habitat for the subspecies. Inland coastal prairies and associated wetlands may also provide habitat for the eastern black rail (USFWS 2023c).

Louisiana is not currently known to support a breeding eastern black rail population. There are no confirmed breeding records, and historic observations during the breeding season are rare (Watts 2016). Western Louisiana supports the eastern extent of the coastal wetlands and prairie that black rails are known from in Texas. Most historic and recent records of eastern black rails are from the Broussard Beach area of Cameron Parish, located approximately 18 miles from the DOF. The breeding population estimate is set to range from zero to 10 breeding pairs due to the unlikelihood of occurrence (Watts 2016). Due to the rarity of eastern black rails in Louisiana, it is unlikely they would occur near the DOF. The onshore facilities utilized by Delfin LNG are dominated by previously disturbed areas and pre-existing facilities. The eastern black rail is not anticipated to occur at the DWP as it is a coastal species and the DWP is 37.4 to 40.8 nautical miles offshore.

2.4.4.2 Monarch Butterfly

The monarch butterfly (*Danaus plexippus*) was designated as a candidate species for ESA listing on December 15, 2020, after the issuance of the Project's Final EIS. This listing triggered a re-examination of habitats that were proposed to be impacted during the Project's onshore construction activities. Monarch butterflies are easily identified by their bright orange wings that feature black veining and black borders contrasted by white spots. In North America, the eastern populations overwinter in the mature oyamel fir forests in the mountains of central Mexico. In March, they make one of the most phenomenal cross-country journeys, traveling over 2,000 miles to the northern United States and Canada (USFWS 2023d). Monarchs travel only during the day and require roost sites at night. Pine, fir, and cedar trees are often chosen for roosting. During the breeding season, monarchs are typically found in open grassy areas, laying their eggs exclusively on the milkweed plant (USFWS 2023d). Milkweed plants can be found in a wide range of habitats including, but not limited to, prairies, fields, open woodlands, and roadsides (Xerces Society 2021a). Throughout all stages of the year, monarch butterflies rely on a diversity of nectar-rich plants for energy (Xerces Society 2021b).

Milkweed is often found in fields, wet areas, open areas, and urban areas. The DOF contains open areas that could contain milkweed that would attract monarch butterflies. As a result, the monarch butterfly is likely to occur on a seasonal basis along its migration route. However, the species is not expected to overwinter in the DOF and is not federally listed as threatened or endangered.

2.4.4.3 Alligator Snapping Turtle

The alligator snapping turtle (*Macrochelys temminckii*) was listed as a proposed federally threatened species on November 18, 2021, after the issuance of the Project's Final EIS (USCG 2016). This listing triggered a re-examination of habitats that were proposed to be impacted during the Project's onshore construction activities. The proposed listing of the alligator snapping turtle is due to decades of

overharvesting for domestic and international meat consumption, impacts from nest predation, recreational and illegal harvest and collection, and fishing activities (USFWS 2021). This listing triggered a re-examination of habitats that are proposed to be impacted during the Project's onshore construction activities.

The alligator snapping turtle has a dark brown carapace with three peaked heels and an upper jaw with a strongly hooked beak (LDWF 2022). Alligator snapping turtles are found in freshwater lakes and bayous and are known to occur throughout Louisiana, but less commonly in marshes (LDWF 2022). The DOF is previously disturbed and currently being actively used for both commercial and other industrial operations and does not contain suitable habitat for the species. However, north of the DOF is the Old North Bayou, which may provide suitable habitat for the alligator snapping turtle. Due to the proximity of suitable habitats north of the DOF, it is unlikely the alligator snapping turtle would inhabit the disturbed areas within the DOF. Therefore, it would be unlikely to rare for this species to occur in the proposed DOF. Additionally, no critical habitat is currently designated for this species.

2.4.5 Migratory Birds

Since the issuance of the Project's Final EIS (USCG 2016), the USFWS has updated its list of Birds of Conservation Concern (BCC) and list of migratory birds. In a recent rule proposed by the USFWS on December 12, 2022, the USFWS revised the list of birds protected by the MBTA, both adding and also removing species. Reasons for the updates to the list include adding species based on new taxonomy and new evidence of natural occurrence in the United States or U.S. territories, removing species no longer known to occur within the United States or U.S. territories, and changing names to conform to accepted use. This recent rule refinement and others regarding MBTA birds following the issuance of the Project's Final EIS triggered a re-examination of migratory birds that could occur at the proposed DOF and DWP, as shown in Table 2-4, above.

3 IMPACT ASSESSMENT

The engineering refinements to the DWP facility would impact the natural environment in variety of ways, across various resource groups. These refinements from the original design were implemented to reduce the overall impacts on the environment. Table 3-1 provides the refinement category, the Project location, Project phase, and the impact categories that will be discussed for the impacted resource groups, including individual species that have the potential to occur at the DWP. Table 3-2 summarizes the protected species and habitats, and the anticipated effects determination based on engineering refinements, and anticipated differences between agency determinations in 2016 and anticipated determinations based on the engineering refinements. Discussions below include a summary of impacts to the environmental resources, as well as protected species and habitats that have the potential to occur at the DWP or have had changes in regulatory protections since 2016.

Table 3-1 Summary of Engineering Refinements and Impact Types at the Deepwater Port Facility, Port Delfin LNG Project

Refinement Category	Project Phase	Impact Category	Impact Refinement	Impacted Resource Group
Mooring System	Construction, Decommissioning	Pile driving: water quality (turbidity)	Reduction in the duration of localized, temporary turbidity by 25% due to reduction in number of piles to be driven	Water resources, geologic/benthic, bottlenose dolphin (<i>Tursiops truncatus</i>), Atlantic spotted dolphin (<i>Stenella frontalis</i>), marine turtles, giant manta ray (<i>Manta birostris</i>), EFH
Mooring System	Construction, Decommissioning	Pile driving: pile driving noise (and extraction)	Reduction in the duration of localized, temporary acoustic disturbance (air and underwater) by 25% due to reduction in number of piles to be driven	Bottlenose dolphin, Atlantic spotted dolphin, marine turtles, giant manta ray, EFH, migratory birds
Mooring System	Construction, Decommissioning	Footprint: benthic disturbance	Configuration of piles anticipated to occupy the same footprint; therefore, no further development in area of bottom disturbance during pile installation or removal	EFH (Soft bottom and sand/shell habitat associated species)
Mooring System	Construction, Decommissioning	GHG emissions	Reduction in GHG emissions and fuel consumption by the construction equipment due to the decrease in pile driving duration	Air quality
Mooring System	Construction, Decommissioning	Marine debris and pollution	Reduction in potential for localized debris and pollution due to construction activities	Bottlenose dolphin, Atlantic spotted dolphin, marine turtles, giant manta ray, EFH, migratory birds
Mooring System	Operation	Footprint: habitat creation	Configuration of piles anticipated to occupy the same footprint; therefore, no further development in area of localized habitat creation	EFH (Soft bottom and sand/shell habitat associated species)
Power Generation System	Operation	GHG emissions	Reduction in the amount of GHG emission due to reconfiguration of generators and reduction in fuel consumption	Air quality
Cooling System	Operation	Cooling: Water intake	Reduction (elimination) in amount of cooling water intake by 0.001 mgd due to increased use of air cooling	Water resources, EFH (WCA species life stages)

EFH = essential fish habitat

GHG = greenhouse gas

mgd = million gallons per day

WCA = water column associated

Table 3-2 Summary of Protect Species and Habitats: A 2016 and 2023 Comparison, Port Delfin LNG Project

Species Name	General Project Occurrence	Regulatory Update or Reason for Discussion	Regulatory Agency	2016 Effects Determination	2023 Anticipated Determination
Marine Mammals: Atlantic Spotted Dolphin (<i>Stenella frontalis</i>); Bottlenose Dolphin (<i>Tursiops truncatus</i>)	DWP facilities, and offshore transit routes	Effects due to engineering refinements; MMPA protections	MMPA through NMFS	NLAA	MANLAA
Rice's Whale (<i>Balaenoptera ricei</i>)	Offshore transit routes	New ESA listing due to subspecies renaming	ESA and MMPA through NMFS	NMFS (as <i>Bryde's Whale</i>): NLAA	MANLAA
West Indian Manatee (<i>Trichechus manatus</i>)	Nearshore coastal environment near construction vessel routes	ESA listing update, and precedent for evaluation in Texas coastal project	ESA through USFWS MMPA through NMFS	Not evaluated	MANLAA
Giant Manta Ray (<i>Manta birostris</i>)	DWP facilities, and offshore transit routes	New ESA listing	ESA through NMFS	Not evaluated	MANLAA
Oceanic Whitetip Shark (<i>Carcharhinus longimanus</i>)	Offshore transit routes	New ESA listing	ESA through NMFS	Not evaluated	MANLAA
Marine Turtles: Green Turtle (<i>Chelonia mydas</i>) Hawksbill Turtle (<i>Eretmochelys imbricata</i>) Kemp's Ridley Turtle (<i>Lepidochelys kempii</i>) Leatherback Turtle (<i>Dermochelys coriacea</i>) Loggerhead Turtle (<i>Caretta caretta</i>)	DWP facilities, and offshore transit routes	Effects due to engineering refinements	ESA through USFWS (nesting) ESA through NMFS (swimming)	USFWS: NLAA NMFS: NLAA	MANLAA
Eastern Black Rail (<i>Lateralus jamaicensis</i> spp. <i>jamaicensis</i>)	DOF	New ESA listing	ESA through USFWS	Not evaluated	MANLAA

Species Name	General Project Occurrence	Regulatory Update or Reason for Discussion	Regulatory Agency	2016 Effects Determination	2023 Anticipated Determination
Monarch Butterfly (<i>Danaus plexippus</i>)	DOF	Candidate species for ESA designation	ESA through USFWS	Not evaluated	MANLAA
Alligator Snapping Turtle (<i>Macrochelys temminckii</i>)	DOF	New ESA proposed listing	ESA through USFWS	Not evaluated	MANLAA
Migratory Birds	DOF, DWP facilities, offshore transit routes	Effects due to engineering refinements	MBTA through USFWS	Project implementation will not result in a substantial adverse effect to Migratory Birds	Project implementation will not result in a substantial adverse effect to Migratory Birds
Critical Habitat: Rice's Whale	Offshore transit routes	Proposed Critical Habitat under ESA	ESA through NMFS	Not evaluated	MNLAA
Critical Habitat: Loggerhead Turtle	DWP facilities, and offshore transit routes	Effects due to engineering refinements	ESA through NMFS	NLAA	MANLAA
Essential Fish Habitat	DWP facilities, and offshore transit routes	Effects due to engineering refinements	MSA through NMFS	Project implementation will not result in a substantial adverse effect to EFH	Project implementation will not result in a substantial adverse effect to EFH

DOF = Delfin Onshore Facility

DWP = Deepwater Port

EFH = Essential Fish Habitat

ESA = Endangered Species Act of 1973, as amended

MBTA = Migratory Bird Treaty Act of 1918, as amended

MANLAA = May Affect Not Likely to Adversely Affect

NLAA = Not Likely to Adversely Affect

NMFS = National Marine Fisheries Service

USFWS = United States Fish and Wildlife Service

3.1 MOORING SYSTEM

As indicated in the June 14, 2022 letter (Appendix B), the implementation of the SSY mooring system over the TYMS ultimately would result in the reduction in the number of piles required for each of the four SSY mooring systems. The SSY mooring system would require the installation of 12 (96-inch) steel piles instead of 16 piles. The duration of the construction timeframe would decrease by 25 percent; therefore, the duration of pile driving noise, both above the water surface and underwater, as well as the duration of the localized, temporary increase in turbidity would decrease by 25 percent. Additionally, the reduction in construction time would reduce GHG emissions by approximately 25 percent due to shorter run-time of construction equipment. Finally, this reduction in overall construction timeframe would decrease the potential for impacts due to marine debris ingestion. With less construction materials in the water, there is less chance of marine animals ingesting marine debris.

The configuration of the pile support structures is anticipated to impact the same 75- x 75-square-foot benthic footprint during construction. No further developments of benthic disturbance in the soft bottom and sand shell habitats are anticipated. The pile configuration and the shading of the FLNGV is anticipated to create the same amount of habitat as the original TYMS design for the duration of the Project. During decommissioning of the Project, impacts due to removal of the structures would not be refined from the impacts discussed in the Project's Final EIS (USCG 2016).

3.1.1 Natural Environment

3.1.1.1 *Water Resources*

As stated in the Project's Final EIS (USCG 2016), potential impacts on water quality during construction of the TYMS would include modification of aquatic habitat by the conversion of soft bottom to hard bottom structures, increased sedimentation (i.e., accumulation and redistribution of sediment on waterbody bottom) and turbidity (a measure of water clarity) from piling installation activities, increased water discharges from associated tending vessels, suspension of sediments during pipeline installation, and the potential introduction of fuels and lubricants via accidental spills or releases by construction equipment and tending vessels. All of these adverse water quality impacts were identified as short-term, direct, and minor.

The refined design of the mooring system to the SSY would result in similar types of impacts but at a lesser magnitude. Because the SSY mooring system would require only three piles instead of the four piles required for the TYMS, there would be approximately 25 percent less seabed disturbance (turbidity) and construction time during the installation of the mooring system. Seabed disturbance and construction time would also be proportionally reduced during decommissioning when the mooring structures would be removed and the piles are cut 15 feet below the mudline.

3.1.1.2 *Sediment and Geological Resources*

Due to the siting, the Project's Final EIS (USCG 2016) stated that construction, operation, and decommissioning of the proposed Project would not be expected to impact any mineral or paleontological resources, increase the risk associated with any geological hazards (landslides, seismicity, and liquefaction), or alter sediment composition or structure to a major degree. However, construction and decommissioning of the TYMS mooring system would disturb the seafloor sediments and permanently alter approximately 0.15 acre of the seafloor due to the engineering refinement of soft bottom sediment to hard structures that would support a different aquatic community. The Project's Final EIS determined that

the area used for the mooring piles and anchors would be relatively small. Impacts from resuspension of bottom sediments would be short-term and negligible. Scour and the resulting localized turbidity were identified as potential operational impacts; however, due to the site conditions, impacts would be minor, short-term, and localized.

Use of the SSY mooring system instead of the TYMS would decrease construction and decommissioning impacts on sediments. The reduction from four to three pilings for each mooring would reduce the permanent conversion in bottom habitat and sediment by approximately 25 percent. During operation, the mooring chains would remain above the seabed while the FLNGV was moored; no scour would occur from these chains. The chains would be dropped and picked up from the seabed on an infrequent basis when the FLNGV is disconnected to avoid hurricanes; seabed impacts from this activity would be negligible due to the small area impacted, minimal disturbance, and infrequent occurrence.

3.1.1.3 *Air Quality*

As a result of the new FEED design, GHG emissions from the vessel traffic and associated equipment during the construction phase of the Project would be reduced due to the shortened duration of construction for 12 pilings in the new FEED design compared to the 16 pilings originally proposed. During the construction phase, Delfin LNG would minimize fugitive emissions through proper piping design, good work practices, and the implementation of a leak detection and repair (LDAR) program (Best Management Practice [BMP]-34).

3.1.2 Protected Species and Habitats

3.1.2.1 *Atlantic Spotted Dolphin*

Potential risk to the Atlantic spotted dolphin exists as a result of planned pile driving activities for the construction of the DWP. Since the DWP application submittal, engineering refinements have occurred that would result in a 25 percent reduction in the duration of pile driving noise due to the reduction in the number of piles required for the construction of the SSY mooring system. Furthermore, the reduction in the number of piles required would lead to a reduction in the duration of sediment suspension related to pile driving construction by 25 percent. The use of the existing mitigation measures and BMPs provided in the Final EIS (USCG 2016) are still valid to reduce the adverse effects of the construction activities proposed for the DWP. Delfin would follow the mitigation measures and BMPs provided in Appendix G of the Final EIS, to minimize potential impacts on the Atlantic spotted dolphin during the construction of the DWP. The Project would have a “negligible impact” on the Atlantic spotted dolphin.

3.1.2.2 *Bottlenose Dolphin*

Potential risks to the bottlenose dolphin exist as a result of planned pile driving activities for the construction of the DWP. Since the DWP’s application submittal, engineering refinements have occurred that would result in a 25 percent reduction in the duration of pile driving noise due to the reduction in the number of piles required for the construction of the SSY mooring system. Furthermore, the reduction in the number of piles required would lead to a 25 percent reduction in the duration of sediment suspension related to pile driving construction. The use of the existing mitigation measures and BMPs provided in the Project’s Final EIS (USCG 2016) are still valid to reduce the adverse effects of the construction activities proposed for the DWP. Delfin LNG would follow the mitigation measures and BMPs provided in Appendix G of the Final EIS to minimize potential impacts on the bottlenose dolphin during the construction of the DWP. As a result, the Project would have a “negligible impact” on the bottlenose dolphin.

3.1.2.3 *Giant Manta Ray*

The giant manta ray has been recently listed as an ESA species and has the potential to occur in the vicinity of the DWP; therefore, the impact evaluation below evaluates all routes of impact on the giant manta ray, not only those that have been adjusted due to engineering refinements. Potential risks to the giant manta ray from the construction and operation of the DWP include marine pile driving noise and the resulting turbidity (habitat avoidance), vessel strikes from construction vessels and from LNG carriers (LNGCs) utilizing the DWP, and marine debris/pollution. NOAA Fisheries has recently published a Biological Opinion (BO) to SPOT Terminal Services LLC and GulfLink LLC for DWP construction in similar locations in the northwest Gulf of Mexico, providing precedent for determinations on the various routes of effect specific to this type of project. NOAA Fisheries consultation guidance indicates that projects should consider the following details in the BMPs: visual surveys prior to the start of activities, shutdown procedures if the species is observed, vessel speed restrictions, and pollution/spill safety requirements.

PILE DRIVING NOISE

Noise from construction activities, including pile driving, can physically injure fish and elasmobranchs, such as the giant manta ray, and alter their behavior. Noise injuries can occur from single noise events that exceed the threshold for direct physical injury and from prolonged exposure exceeding daily cumulative exposure thresholds. Behavioral changes can affect migration patterns, feeding, resting, and reproduction. Noise impacts on elasmobranchs is not yet well understood. As the giant manta ray, a marine fish, was not yet an ESA-listed species when the Project's Final EIS (USCG 2016) was prepared, and because no other federally listed marine fishes were known to occur at the DPW location, the Project's Final EIS did not evaluate the zone of influence and impact radius for noise on marine fishes. The consultation guidance document for the giant manta ray (NOAA Fisheries 2022) indicates that, generally, pile driving noise is not likely to adversely affect the giant manta ray if it is below the injury threshold level for fish >2 grams. The Project's DPLA (2015) provided a discussion of the anticipated sound source levels using the most applicable source level information available: 96-inch-diameter steel piles in water depths of 39 to 49 feet, using a hydraulic impact hammer. This reference pile driving project generated an unattenuated peak average sound pressure root-mean-squared (RMS) metric, a peak sound pressure level (SPL), and a sound exposure level (SEL) of 220, 205, and 194 decibels (dB) relative to 1 micropascal (μPa) root mean squared (dB re $1\mu\text{Pa}$ RMS), respectively, at a distance of 33 feet from the source.

Based on Project-specific design criteria in the DPLA material, pile driving is predicted to produce peak sounds above the SPL (206 dB re $1\mu\text{Pa}^2/\text{sec}$) threshold from approximately 33 to 72 feet (considering mean and standard deviation) and above the lesser cumulative SEL (183 dB) from 4,593 to 7,874 feet from the source for fish >2 grams (Figure 3-1 in Appendix A), and disturbance levels resulting in behavioral effects (>150 dB re $1\mu\text{Pa}$ RMS) within distances from 3.7 miles up to 11.2 miles from the pile-driving noise source. The application notes that it is highly likely that this estimate represents the most conservative and worst-case scenario and that the actual threshold distances may be much less than the model suggests.

In order to allow for the giant manta ray and other mobile marine species to vacate the area during pile driving activities, the Project would employ ramp-up procedures at the beginning of each day or after a period where pile driving activities have ceased for more than one hour. The ramp-up procedure for impact hammers involves initially starting with three soft strikes at 40 percent energy, followed by a 1-minute waiting period, followed by two subsequent three-strike sets. This would allow for mobile animals within the vicinity of the Project activities to vacate the area before the impact hammer is operating at 100 percent energy. Furthermore, the Project would utilize protected species observers

(PSOs) during construction activities to ensure protected marine species are not in the vicinity of the Project prior to ramp-up. This specific BMP is outlined in BMP-14, BMP-42, and BMP-43, below.

Using the BMPs proposed in the Project's Final EIS for the reduction in construction noise (USCG 2016), impacts on the giant manta ray due to pile driving noise would be temporary and minor, as the species would temporarily vacate the area. The giant manta ray may be affected in their movement across the continental shelf in the vicinity of the Project due to their avoidance of construction activities and related noise. It is anticipated that the temporary effects to habitat access would be unmeasurable and, therefore, insignificant, given the Project is not located in the immediate vicinity of a productive inlet for feeding and due to the availability of surrounding suitable open water routes of travel. Therefore, potential impacts from pile driving "may affect but are not likely to adversely affect" the giant manta ray.

TURBIDITY

It is anticipated that there would be an increase in turbidity levels associated with construction of the SSY mooring system. Turbidity levels would gradually decrease with distance and time as sediments settle out of the water column. The giant manta ray may be temporarily unable to use the DWP area for forage due to avoidance of construction activities and the related turbidity and noise resulting from these activities. However, it is anticipated that any potential effects would be insignificant considering the Project would be located in open water surrounded by large expanses of similar, nearby habitats that would allow the giant manta ray to continue to forage and conduct other essential behaviors in the surrounding area. Therefore, potential impacts from turbidity "may affect but are not likely to adversely affect" the giant manta ray.

VESSEL STRIKE

The increased vessel traffic in the Gulf of Mexico due to LNGCs transiting to and from the proposed DWP could pose an increased risk of accidental vessel strikes. However, due to the anticipated occurrence and mobility of the species and the vessel transit routes and mitigation measures, it is not likely that the anticipated increase in vessel traffic to and from the DWP would result in an increase in vessel strikes. LNGCs are expected to use the well-established shipping lanes in the Gulf of Mexico that are situated in deeper open waters, and these vessels are generally slower moving and generate more noise, making them more readily detectable by the mobile species in the area, thereby allowing for natural avoidance. Additionally, to further reduce the potential for vessel strikes, all LNGCs and support vessel captains associated with the Project would be provided with, and requested to comply with, the NOAA Fisheries Vessel Strike Avoidance Measures (revised February 2021), which include collision avoidance measures, as outlined in BMP-17, below. Due to the expected low concentration of giant manta rays in the open and unproductive waters where high-speed vessel traffic would occur, it is unlikely that vessels outside of nearshore inlets and passes would encounter this species. Therefore, potential impacts from vessel strikes "may affect but are not likely to adversely affect" the giant manta ray.

MARINE POLLUTION

Giant manta rays are filter feeders and, as such, are subject to hazards associated with microplastic and other pollutants due to ingestion. Delfin LNG would comply with federal regulations to control the discharge of operational waste, such as bilge and ballast water, trash and debris, and sanitary and domestic waste, that could be generated from all vessels associated with the proposed Project, particularly by obtaining the appropriate National Pollutant Discharge Elimination System (NPDES) permits for the continuous and intermittent discharge, as regulated by the USEPA under the Clean Water Act (CWA). Furthermore, all LNGCs making port calls at the DWP would be required to use approved equipment and follow and maintain records for ballast water and operational discharges that are compliant with

International Convention for the Prevention of Pollution from Ships (MARPOL) and USCG standards. Marine pollution reduction BMPs, as provided in the application materials and the Project's Final EIS (USCG 2016) are defined below as BMP-12 and BMP-15.

Additionally, and while rare, pollution due to a release of the LNG product has the potential to impact the giant manta ray and has been identified by the NOAA Fisheries in the SPOT and GulfLink BO as the most impactful route of effect to the giant manta ray for a DWP project. Giant manta rays that are exposed to natural gas spills are anticipated to experience fitness reduction, possibly leading to mortality. As there are no abundance estimates within the Gulf of Mexico outside those known to occur at the Flower Garden Banks National Marine Sanctuary, there is no current analysis of effect for the species, making mortalities associated with large or small-scale spills unquantifiable. It should be noted that the SPOT and GulfLink DWP projects relate to crude oil and not LNG. Due to the highly evaporative nature of LNG, a worst-case scenario for an impact radius due to an offshore spill of LNG is significantly lower than crude oil. The Project's Final EIS (USCG 2016) presents the results of a risk-based analysis approach to assess and quantify potential hazards and consequences of an LNG spill from an LNGC. The report identifies the worst-case LNGC breach scenario within approximately 1.4 miles of a spill, with minor damage reaching as far as 4.1 mile. Project-specific BMPs that would reduce or eliminate impacts on the giant manta ray, as outlined in the Project's Final EIS, have already been proposed and include the development of a Spill Prevention, Control, and Countermeasure (SPCC) Plan and a Facility Response Plan (FRP) outlined in BMP-4 and BMP-5. Therefore, potential impacts from "marine debris may affect but are not likely to adversely affect" the giant manta ray.

Mitigation Measures

Below are the BMPs that have been proposed by Delfin LNG and identified in the Project's Final EIS (USCG 2016); these BMPs will minimize Project impacts on marine species, including the giant manta ray:

BMP-4: Prior to construction and operation, Delfin LNG will prepare and submit for approval a construction and operation SPCC Plan and FRP detailing emergency procedures for addressing accidental releases and spills during construction and releases.

BMP-5: All construction vessels will operate in accordance with their respective SPCC plans. All vessels will have spill containment kits and spill response plans for use in the event of a release. Typically, a spill response kit for a vessel other than an oil carrier must be capable of cleaning up an on-deck spill of a half-barrel or less.

BMP-11: A turbidity/suspended sediment monitoring program may be implemented to provide data on ambient bed load contribution to the water column during piling installation. This program will be analogous with what is required for offshore oil and gas exploration and production in the Gulf of Mexico.

BMP-12: Delfin LNG will acquire the appropriate individual or Project-based NPDES permits for the continuous and intermittent discharges for the various on-board service systems. The NPDES permit will be administered by the USEPA for federal waters and will require periodic monitoring for compliance under the CWA.

BMP-13: LNGCs calling on the proposed DWP will be required to use approved equipment and follow and maintain records for ballast water and operational discharges (e.g., bilge, sanitary discharges) that are compliant with MARPOL and USCG standards. LNGCs operating fully within federal waters will be

required to operate under a Vessel General Permit. Inspections will require review of onboard records for assessing compliance.

BMP-14: Delfin LNG will institute impact minimization and mitigation measures throughout the course of the proposed Project. Delfin LNG will implement mitigation measures such as, but not limited to, use of lowest noise-producing impact hammer available, use of a cofferdam system (including the introduction of bubbles within the annulus between the pile and the cofferdam) to reduce the transmission of marine noise, use of the pile-driving, soft-start, ramp-up procedures preceded by clearing the surrounding waters by a PSO, and call for a suspension of pile driving by the PSO should a protected species be observed in proximity to the active pile driving operation. Prior to operating at full capacity, Delfin LNG will implement a soft start with several initial hammer strikes at less than full capacity (i.e., approximately 40 to 60 percent energy levels) with no less than a 1-minute interval between each strike. PSOs will be present to conduct surveys before, during, and after all pile-driving activities to monitor for marine species within designated zones of influence (ZOIs).

BMP-17: Delfin LNG will institute the procedures described in the NOAA Fisheries Southeast Region (2008, revised 2011) guidelines for Vessel Strike Avoidance Measures and Reporting for Mariners, which call for vessels to maintain a vigilant watch for marine mammals and sea turtles to avoid striking protected species. Delfin LNG will adhere to the reporting procedures related to injured or dead protected species described in these guidelines.

BMP-18: To prevent or mitigate potential noise impacts on marine mammals and sea turtle species, Delfin LNG will maintain minimal safe operating power at all times for vessels with dynamic positioning (DP) thrusters. Each of Delfin's FLNGVs will not engage thrusters if it is not required to do so. Additionally, if a marine mammal or sea turtle is detected within 1,640 feet of a DP vessel, the responsible crew member will alert the vessel operators to minimize thruster power down to the absolute lowest safe operating levels. Other vessels in the immediate vicinity of the vessel that had an animal detected within 1,640 feet will also be instructed to reduce to slow speed and minimum safe operating power consistent with the activities being performed.

BMP-42: All Project-related activities will comply with federal regulations to control noise generated from vessels associated with the proposed Project.

BMP-43: During construction, Delfin LNG will implement various procedure measures, including soft starts. Prior to operating at full capacity, Delfin LNG will implement a soft start with several initial hammer strikes at less than full capacity (i.e., approximately 40 to 60 percent energy levels) with no less than a 1-minute interval between each strike.

BMP-44: Delfin LNG will ensure that all equipment has sound control devices no less effective than those provided by the manufacturer.

3.1.2.4 *Marine Turtles*

Five species of sea turtles have the potential to occur at the DWP in various age classes: green sea turtle, hawksbill sea turtle, Kemp's ridley sea turtle, leatherback sea turtle, and loggerhead sea turtle. Noise impacts on ESA-listed sea turtles results from the noise generated during construction of the DWP. The engineering refinements proposed at the DWP would reduce the potential impacts on sea turtles as duration of pile driving noise would decrease by 25 percent, as only 12 piles would be required for the SSY mooring system rather than the 16 piles required for the TYMS. Furthermore, the reduction in the number of piles required would lead to a 25 percent reduction in the duration of sediment suspension related to pile driving construction. With the noise mitigation strategy presented in the Final EIS (USCG

2016), impacts from the construction of the SSY mooring system are not likely to adversely affect sea turtles. The impacts of operational functions of the DWP following the engineering refinements are the same as assessed in the Final EIS and the Project “may affect but is not likely to affect” marine sea turtles. Engineering refinements would have no change in impacts to loggerhead turtle critical habitat, consistent with the findings in the FEIS and NMFS consultation; therefore, the project “may affect but is not likely to adversely affect” critical habitat.

3.1.2.5 *Essential Fish Habitat*

The refined design of the mooring system to SSY would further alter the area of benthic disturbance and conversion, and impacts on EFH species with soft bottom habitat association, and the duration of the temporary increase in turbidity affecting WCA EFH. Because the SSY mooring system would require only three piles instead of the four piles required for the TYMS, there would be approximately 25 percent less benthic disturbance (turbidity) and construction time during the installation of the SSY mooring system. Seabed disturbance and construction time would also be proportionally reduced during decommissioning when the mooring structures would be removed. This provides a reduction of approximately 25 percent in soft bottom EFH disturbance and a 25 percent reduction in the duration of turbidity impacts on WCA EFH from those identified in the Final EIS (USCG 2016). Therefore, project implementation will not result in a substantial adverse effect to EFH.

3.1.2.6 *Migratory Birds*

Due to the engineering refinements developed from the 2020 FEED Study, noise and marine debris impacts on migratory birds require additional analysis. The Final EIS (USCG 2016) determined that construction of the DWP would cause minor short-term impacts on the area’s coastal and migratory birds as a result of increased vessel traffic, noise, marine debris, and lighting. However, the Final EIS concluded that all impacts analyzed in the Final EIS may affect, but are not likely to adversely affect, ESA-listed birds, including those that are migratory. There are no further developments in the operational practices or mechanisms in which the DWP would use its lighting structures. Therefore, the impact assessment in the Final EIS is valid, and Project implementation will not result in a substantial adverse effect to migratory birds.

Noise

The environmental impacts assessed in the Final EIS (USCG 2016) prior to the development of the SSY mooring system and FLNGV design refinements remain the same and are valid. The transition from a TYMS to an SSY mooring system reduces the chance of potential impacts on migratory birds. The noise produced during construction of the SSY mooring system would reduce the impact initially analyzed in the Final EIS. The decision to construct an SSY mooring system instead of the TYMS would result in a 25 percent reduction of pile driving noise during construction. Additionally, as stated in the Final EIS, bird use at the DWP would be intermittent and not common, and offshore birds are very mobile and have other habitat in the area; therefore, noise would have no effect on migratory birds.

Marine Debris

Marine debris could be lost from any vessel involved in construction of the proposed Project. Implementation of the SSY mooring system reduces the construction time and construction materials, which also reduces the chance of entanglement in and ingestion of marine debris by migratory birds.

DOF Occurrence

Migratory birds are a unique group to the Project in that they have the potential to occur at both the DOF and offshore DWP areas. The use of the existing mitigation measures and BMPs provided in the Final EIS (USCG 2016) are still valid to reduce the adverse effects of the construction activities proposed for the DWP. Mitigation measures provided in Appendix G of the Final EIS are anticipated to minimize potential impacts on migratory birds during construction of the DOF and DWP; therefore, construction of the DOF and DWP will not result in a substantial adverse effect to migratory birds.

3.2 POWER GENERATION SYSTEM

3.2.1 Natural Environment

3.2.1.1 *Air Quality*

With respect to GHG emissions, Delfin LNG's refined engineering has achieved substantial reductions based on incorporating waste heat recovery from the refrigerant compression gas turbine drives in combination with steam turbine power generation. This measure eliminates the gas turbines that would have been used for power generation and reduces the GHG emissions from power generation onboard the vessels, which reduces fuel gas usage. Potential air emissions from the reconfigured essential generators and emergency/fire water engines would increase due to capacity increases; however, in combination with the refinements to the power generation and refrigeration systems, there would be a net decrease of operating air emissions of around 160,000 tpy of CO₂e for the Project, which represents an overall reduction of approximately 15 percent. Emissions of NO_x and CO would be reduced in the refined design by 11 percent and 37 percent, respectively.

3.3 COOLING SYSTEM

3.3.1 Natural Environment

3.3.1.1 *Water Resources*

The refined FEED eliminates all withdrawals and discharges of cooling water. This is a reduction of 0.001 million gallons per day (mgd) of seawater that would have been used for essential generator testing with the initial design. This engineering refinement eliminates any impacts on water quality due to thermal impacts.

3.3.2 Protected Species and Habitat

3.3.2.1 *Essential Fish Habitat*

The reduction in the required volume for ballast water and the further development in the system cooling from seawater cooled to air cooled allows for an overall reduction in seawater intake. This provides a reduction in the entrainment of ichthyoplankton for WCA species in the vicinity of the DWP. As such, the engineering refinements would have an overall decrease in the impacts on WCA EFH from those identified in the Final EIS (USCG 2016). Project implementation will not result in a substantial adverse effect to EFH.

3.4 REGULATORY CHANGES ON NEW SPECIES AND HABITATS

Activities associated with the construction and operation at the DOF that have the potential to impact ESA listed species include ground disturbance, vegetation clearing, staging activities, filling of wetlands, stormwater runoff, construction noise, compressor station noise, and accidental fuel spills. These impacts were evaluated in the Final EIS (USCG 2016) and remain valid, as the 2020 FEED Study did not develop engineering refinements at the DOF. The engineering refinements developed only pertain to the DWP and the FLNGVs. Following the issuance of the Final EIS, multiple regulatory changes and updates have occurred for ESA listed species and other federally protected species that may occur at the DOF and the vessel transit routes away from the vicinity of the DWP. The species that warranted further evaluation due to the update in regulatory protections in the DOF and vessel routes are summarized in Table 3-3 and discussed in the sections below.

Table 3-3 Summary of Species Evaluated due to an Update in Regulatory Protections, Port Delfin LNG Project

Species Name	General Project Occurrence	Regulatory Update or Reason for Discussion
Rice's Whale (<i>Balaenoptera ricei</i>)	Offshore transit routes	New ESA listing due to subspecies renaming and proposed critical habitat.
West Indian Manatee (<i>Trichechus manatus</i>)	Nearshore coastal environment near construction vessel routes	ESA listing update, and precedent for evaluation in Texas coastal project
Oceanic Whitetip Shark (<i>Carcharhinus longimanus</i>)	Offshore transit routes	New ESA listing
Eastern Black Rail (<i>Lateralus jamaicensis</i> spp. <i>jamaicensis</i>)	DOF	New ESA listing
Monarch Butterfly (<i>Danaus plexippus</i>)	DOF	Candidate species for ESA designation
Alligator Snapping Turtle (<i>Macrochelys temminckii</i>)	DOF	Proposed threatened

DOF = Delfin Onshore Facility

ESA = Endangered Species Act of 1973, as amended

MBTA = Migratory Bird Treaty Act of 1918, as amended

3.4.1 Rice's Whale

As the Project is located outside of the core distribution area for the Rice's whale, it is unlikely that the species will be impacted by the construction, operation, or decommissioning of the DWP facility. However, due to their distribution along the edge of the OCS, there exists the potential for an encounter during vessel transit to and from the DWP. As the proposed transit routes are outside of the Core Distribution Area, vessel encounters are anticipated to be relatively low. However, there is proposed critical habitat for the Rice's whale, described as one continuous marine area within the Gulf of Mexico from the Texas-Mexico border in the west to the Florida Keys in the east between the 100 m to 400 m isobaths. With the adherence to the below BMPs, it is anticipated that the project "may affect but will not adversely affect" Rice's whale critical habitat. The draft rule could go into effect as early as July 2023.

Mitigation Measures:

The BMPs that have been proposed by Delfin LNG and identified in the Project's Final EIS (USCG 2016) will minimize Project impacts on marine mammals and are valid BMPs for Rice's whale. However, there is one update that would apply for all marine mammals. Following the issuance of the Final EIS in

2016, NOAA fisheries has updated their Vessel Strike Avoidance Measures. BMP-17 in the Final EIS documents the previous measures, prior to the 2021 update. Under the new protocol, all LNG vessels associated with the Project would be required to comply with the NOAA Fisheries *Vessel Strike Avoidance Measures* (NOAA Fisheries 2021). LNG vessels would comply with the following measures:

1. Operate at the minimum safe speed when transiting and maintain a vigilant watch for protected species to avoid striking them. Even with a vigilant watch, most marine protected species are extremely difficult to see from a boat or ship, and you cannot rely on detecting them visually and then taking evasive action. The most effective way to avoid vessel strikes is to travel at a slow, safe speed. Whenever possible, assign a designated individual to observe for protected species and limit vessel operation to only daylight hours.
2. Follow deep-water routes (e.g., marked channels) whenever possible.
3. Operate at “Idle/No Wake” speeds in the following circumstances:
 - a. while in any Project construction areas;
 - b. while in water depths where the draft of the vessel provides less than 4 feet of clearance from the bottom; or
 - c. in all depths after a protected species has been observed in and has recently departed the area.
4. When a protected species is sighted, attempt to maintain a distance of 150 feet or greater between the animal and the vessel. Reduce speed and avoid abrupt changes in direction until the animal(s) has left the area.
5. When dolphins are bow- or wake-riding, maintain course and speed as long as it is safe to do so or until the animal(s) leave the vicinity of the vessel.
6. If a whale is sighted in the vessel’s path or within 300 feet from the vessel, reduce speed and shift the engine to neutral. Do not engage the engines until the animals are clear of the area.
7. If a whale is sighted farther than 300 feet from the vessel, maintain a distance of 300 feet or greater between the whale and the vessel and reduce speed to 10 knots or less.

Through implementation of the above *Vessel Strike Avoidance Measures* (NOAA Fisheries 2021) by all LNG vessels, it is anticipated that Project-related vessel strikes with the Rice’s while are unlikely to occur and impacts are anticipated to be discountable.

3.4.2 West Indian Manatee

The West Indian manatee has the potential for crossing coastal waters in the vicinity of construction and decommissioning vessels en route to the DWP facility. While manatees are not common in coastal Louisiana waters, increasing occurrence of transient individuals along the northern Gulf of Mexico and the UME in Florida between 2020 and 2022 has prompted evaluation of the species for some coastal projects. The West Indian manatee, while classified as a marine mammal, is under the jurisdiction of the USFWS, and not NOAA Fisheries. Evaluation and the effects determination would be provided by the USFWS. General BMPs for marine mammals are addressed in the Final EIS, specifically BMP 17-19. However, USFWS has developed additional standard mitigation measures for the project specific activities that may affect manatees. The USACE Nationwide Permits 8 and 12 authorization issued for the Project on September 20, 2022 also reiterated the applicability of the standard mitigation measures for manatees.

Mitigation Measures:

Due to the recent precedent for evaluation of the West Indian manatee for a coastal construction project in Texas, it is recommended that Delfin LNG plan to adopt USFWS *Standard Manatee Conditions for In-Water Activities* to mitigate impacts during construction of the DOF and DWP, including:

1. All work, equipment, and vessel operation should cease if a manatee is spotted within a 50-foot radius (buffer zone) of the active work area. Once the manatee has left the buffer zone on its own accord (manatees must not be herded or harassed into leaving), or after 30 minutes have passed without additional sightings of manatee(s) in the buffer zone, in-water work can resume under careful observation for manatee(s).
2. If a manatee(s) is sighted in or near the Project area, all vessels associated with the Project should operate at “no wake/idle” speeds within the construction area and at all times while in waters where the draft of the vessel provides less than a 4-foot clearance from the bottom. Vessels should follow routes of deep water whenever possible.
3. If used, siltation or turbidity barriers should be properly secured, made of material in which manatees cannot become entangled, and be monitored to avoid manatee entrapment or impeding their movement.
4. Temporary signs concerning manatees should be posted prior to and during all in-water Project activities and removed upon completion. Each vessel involved in construction activities should display at the vessel control station or in a prominent location, visible to all employees operating the vessel, a temporary sign at least 8½ x 11 inches reading language similar to the following: “CAUTION BOATERS: MANATEE AREA / IDLE SPEED IS REQUIRED IN CONSTRUCTION AREA AND WHERE THERE IS LESS THAN 4 FOOT BOTTOM CLEARANCE WHEN MANATEE IS PRESENT.” A second temporary sign measuring 8½ x 11 inches should be posted at a location prominently visible to all personnel engaged in water-related activities and should read language similar to the following: “CAUTION: MANATEE AREA / EQUIPMENT MUST BE SHUTDOWN IMMEDIATELY IF A MANATEE COMES WITHIN 50 FEET OF OPERATION.”
5. Collisions with, injury to, or sightings of manatees should be immediately reported to the Service’s Louisiana Ecological Services Office (337-291-3100) and the LDWF Natural Heritage Program (225-765-2821). Please provide: the nature of the call (i.e., report of an incident, manatee sighting, etc.); time of incident/sighting; and the approximate location, including the latitude and longitude coordinates, if possible.

Due to the west Indian manatee’s rarity and unlikely occurrence in the western Gulf of Mexico, and compliance with the above *Standard Manatee Conditions for In-Water Activities*, vessel impacts with the West Indian manatee are not likely to occur and impacts are anticipated to be discountable.

Additionally, due to the nature of LNG, product spills are anticipated to be short-term and minor in the immediate vicinity of the DWP. As stated in the Final EIS (USCG 2016): “If an LNG spill were to occur, potential impacts would include exposure to low temperature LNG at the water surface, possibly resulting in rapidly dropping water temperatures near the surface. These impacts would likely occur in the immediate vicinity of the spill location; the time frame of the impact is limited. Since LNG would boil off as natural gas at the surface, depth and pressure required for gas to dissolve in surface waters would not be sufficient and gas vapors would disperse. In addition, the time frame for these impacts would be limited, and adverse toxic impacts would be expected to be minor after the LNG boiled off and the vapors dispersed.” Construction, operation, and decommissioning of the DWP are not anticipated to impact the

West Indian manatee. Therefore, potential impacts from the Project are “may affect but are not likely to adversely affect” West Indian manatee.

3.4.3 Oceanic Whitetip Shark

As the DWP is located in water depths ranging from approximately 64 to 72 feet, the oceanic whitetip shark is not anticipated to occur in the vicinity of the DWP. The known range of the oceanic whitetip shark is typically in surface waters above depths greater than 600 feet; therefore, due to the distance from the DWP to the continental shelf, construction activities producing acoustic and water quality disturbances are not anticipated to impact the species. Furthermore, due to the nature of LNG, product spills are anticipated to be short-term and minor in the immediate vicinity of the DWP. As stated in the Final EIS (USCG 2016): “If an LNG spill were to occur, potential impacts would include exposure to low temperature LNG at the water surface, possibly resulting in rapidly dropping water temperatures near the surface. These impacts would likely occur in the immediate vicinity of the spill location; the time frame of the impact is limited. Since LNG would boil off as natural gas at the surface, depth and pressure required for gas to dissolve in surface waters would not be sufficient and gas vapors would disperse. In addition, the time frame for these impacts would be limited, and adverse toxic impacts would be expected to be minor after the LNG boiled off and the vapors dispersed.” Construction, operation, and decommissioning of the DWP are not anticipated to impact the oceanic whitetip shark.

While not known to occur in waters surrounding the DWP, the species has the potential to occur in the surface waters over deeper pelagic waters of the EEZ. There exists the potential for an encounter during vessel transit to and from the DWP; however, vessel strikes are not a known cause mortality. It is anticipated that Project-related vessel strikes with the oceanic whitetip shark are unlikely to occur, and impacts are anticipated to be discountable. Therefore, potential impacts from the Project “may affect but are not likely to adversely affect” the oceanic whitetip shark.

3.4.4 Eastern Black Rail

No engineering refinements are proposed for the DOF; therefore, the mitigation measures and BMPs presented in the Final EIS (USCG 2016) are still valid to reduce the adverse effects of the onshore construction activities proposed for the DOF. Delfin LNG would follow the mitigation measures and BMPs provided in Appendix G of the Final EIS to minimize potential impacts on the eastern black rail during construction of the DOF. The Project “may affect but is not likely to adversely affect” the eastern black rail. Additionally, informal consultation with the USFWS is anticipated to develop survey protocols, methods, and BMPs that will avoid and minimize disturbance of the newly listed species during construction of the DOF.

3.4.5 Monarch Butterfly

No engineering refinements are proposed for the DOF; therefore, the mitigation measures and BMPs presented in the Final EIS (USCG 2016) are still valid to reduce the adverse effects of the onshore construction activities proposed for the DOF. Mitigation measures provided in Appendix G of the Final EIS are anticipated to minimize potential impacts on the monarch butterfly during construction of the DOF. The Project “may affect but is not likely to adversely affect” the monarch butterfly although candidate species receive no statutory protection under the ESA.

3.4.6 Alligator Snapping Turtle

The DOF lacks the required habitats for the alligator snapping turtle, which is absent from the IPaC list. Informal consultation was undertaken with LDWF to analyze the known occurrences of alligator snapping turtles within the DOF and a 2-mile buffer. LDWF provided a response dated December 9, 2022 that did not identify any known occurrences of alligator snapping turtles within the DOF and the 2-mile buffer (Appendix D).

No engineering refinements are proposed for the DOF; therefore, the mitigation measures and BMPs presented in the Final EIS (USCG 2016) are still valid to reduce the adverse effects of the onshore construction activities proposed for the DOF. Mitigation measures provided in Appendix G of the Final EIS are anticipated to minimize potential impacts on the alligator snapping turtle during construction of the DOF. The Project is “may affect but is not likely to adversely affect” the alligator snapping turtle.

4 SUMMARY

In preparing the FEED for the Project, the design goal was to develop a mooring system and FLNGV design using the best available technology consistent with the concepts evaluated in the Final EIS (USCG 2016) for the Project. The engineering refinements to the DWP and FLNGVs were developed with a goal of minimizing air emissions, water use, and other environmental impacts and providing an equal or lesser level of environmental impacts as analyzed in the 2016 Final EIS for the Project. These refinements triggered an updated evaluation of the potential impacts from construction, operation, and decommissioning of both the onshore and offshore portions of the Project. It was determined that the refined Project design would reduce the impacts on air quality, sediment and geologic resources, water quality resources, and ESA, MMPA, and MSA listed species, including their habitats. A summary of anticipated effect determinations for protected species and their habitats is provided as Table 4-1.

The USCG published the Final EIS for the Port Delfin in November 2016 and concluded that the Project would not result in significant environmental impacts with inclusion of specific mitigation measures and best management practices. Based on the review of the engineering refinements, updated environmental regulations, and current literature, this environmental assessment concludes that there are no significant new circumstances or substantial changes to the level of impact on environmental resources or protected species.

Table 4-1 Summary of Anticipated Effect Determinations, Port Delfin LNG Project

Species Name	Regulatory Agency	2023 Anticipated Determination
Marine Mammals: Atlantic Spotted Dolphin (<i>Stenella frontalis</i>); Bottlenose Dolphin (<i>Tursiops truncatus</i>)	MMPA through NMFS	MANLAA
Rice's Whale (<i>Balaenoptera ricei</i>)	ESA and MMPA through NMFS	MANLAA
West Indian Manatee (<i>Trichechus manatus</i>)	ESA through USFWS MMPA through NMFS	MANLAA
Giant Manta Ray (<i>Manta birostris</i>)	ESA through NMFS	MANLAA
Oceanic Whitetip Shark (<i>Carcharhinus longimanus</i>)	ESA through NMFS	MANLAA
Marine Turtles: Green Turtle (<i>Chelonia mydas</i>) Hawksbill Turtle (<i>Eretmochelys imbricata</i>) Kemp's Ridley Turtle (<i>Lepidochelys kempii</i>) Leatherback Turtle (<i>Dermochelys coriacea</i>) Loggerhead Turtle (<i>Caretta caretta</i>)	ESA through USFWS (nesting) ESA through NMFS (swimming)	MANLAA
Eastern Black Rail (<i>Lateralus jamaicensis</i> spp. <i>jamaicensis</i>)	ESA through USFWS	MANLAA
Monarch Butterfly (<i>Danaus plexippus</i>)	ESA through USFWS	MANLAA
Alligator Snapping Turtle (<i>Macrochelys temminckii</i>)	ESA through USFWS	MANLAA
Migratory Birds	MBTA through USFWS	Project implementation will not result in a substantial adverse effect to Migratory Birds
Critical Habitat: Loggerhead Turtle	ESA through NMFS	NLAA
Critical Habitat: Rice's Whale (proposed)	ESA through NMFS	MANLAA
Essential Fish Habitat	MSA through NMFS	Project implementation will not result in a substantial adverse effect to EFH

EFH = Essential Fish Habitat

ESA = Endangered Species Act of 1973, as amended

MBTA = Migratory Bird Treaty Act of 1918, as amended

MANLAA = May Affect Not Likely to Adversely Affect

NMFS = National Marine Fisheries Service

USFWS = United States Fish and Wildlife Service

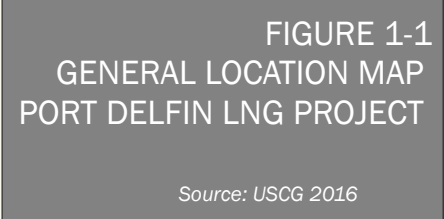
5 REFERENCES CITED/LITERATURE CITED

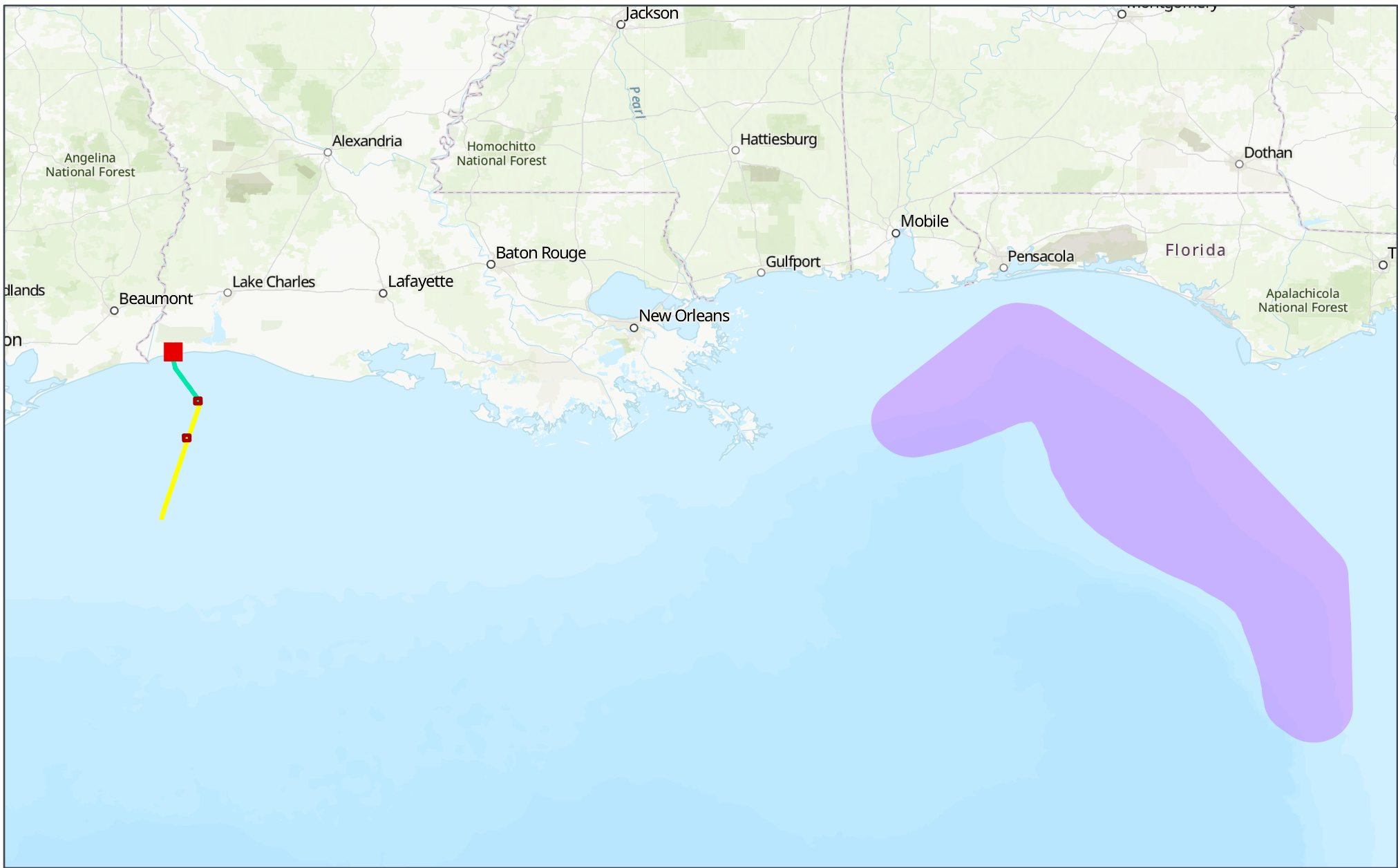
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APPENDIX A

Figures





PORT DELFIN LNG DEEPWATER PORT

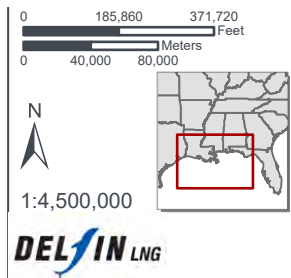
Figure 2-1.
Rice's Whale's Core
Distribution Area

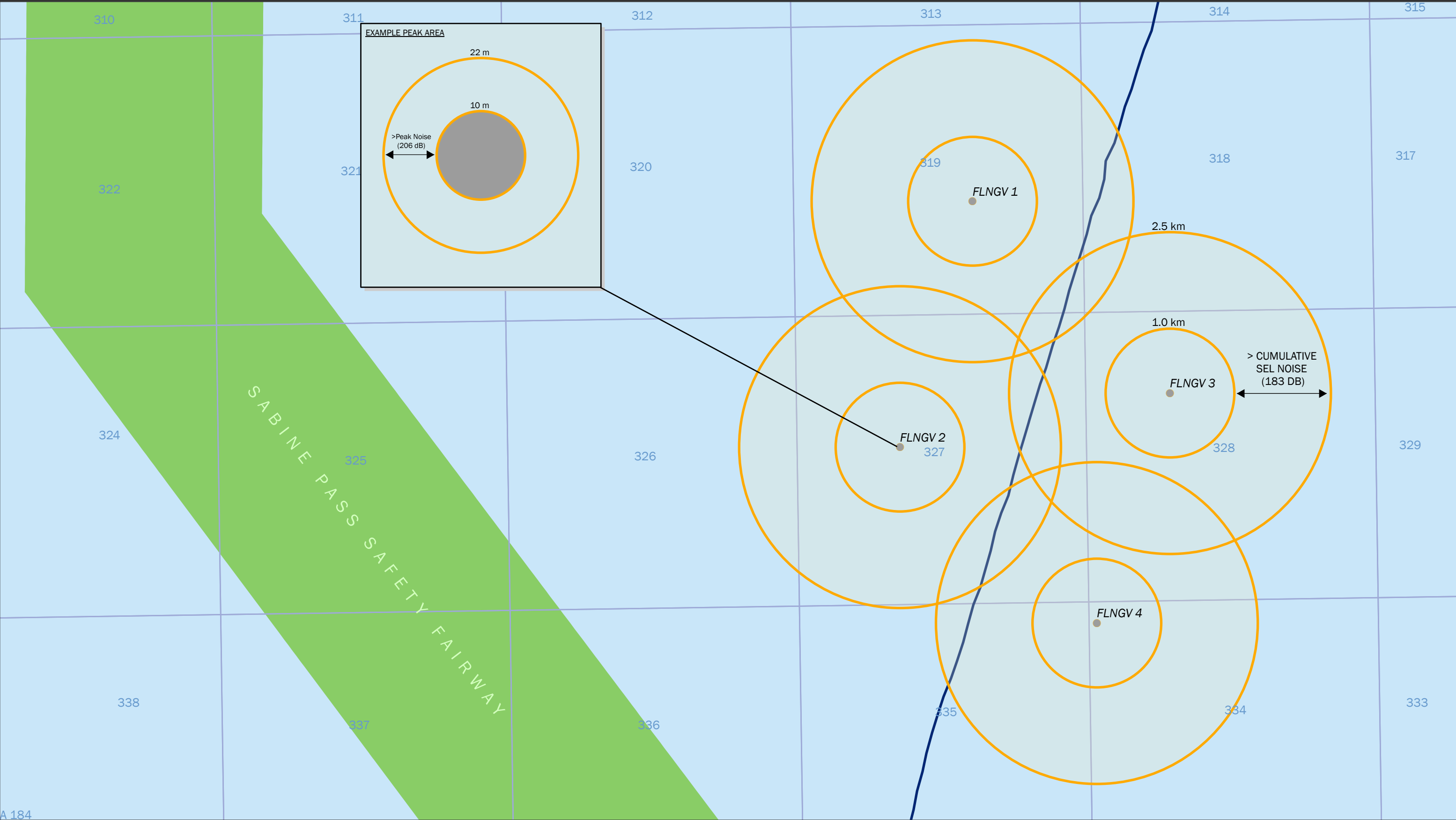
- Delfin Onshore Facility
- ▭ West Cameron Block 167 and 327
- U-T OFFSHORE SYSTEMS, LLC
- HIGH ISLAND OFFSHORE, LLC
- ▭ Rice's Whale Core Distribution Area

Credits: NOAA.gov

Base Map: Esri ArcGIS Online,
accessed December 2022
Updated: 12/20/2022
Project No. 61109

Layout: Figure 2 - Rice's Whale's Core
Distribution Area
Aprx:
61109_portDelfinLngDeepwaterPort





A 184

FIGURE 3-1
PILE DRIVING NOISE THRESHOLDS
PORT DELFIN LNG PROJECT

Source: USCG 2016

APPENDIX B

Correspondence with MARAD General Update and Explanation of Refinements



25 W. Cedar Street, Suite 215
Pensacola, FL 32502
United States of America

June 14, 2022

Ms. Yvette M. Fields, Director
Office of Deepwater Port Licensing and Port Conveyance
U.S. Maritime Administration
1200 New Jersey Avenue SE, W21-310 (MAR-530)
Washington, DC 20590
Via E-mail to Yvette.Fields@dot.gov

Captain Jerry Butwid
Chief, Office of Operating and Environmental Standards (CG-OES)
U.S. Coast Guard Headquarters
2703 Martin Luther King Jr. Ave. SE STOP 7509
Washington, D.C. 20593-7509
Via E-Mail to Jerry.F.Butwid@uscg.mil

Subject: Delfin LNG LLC Deepwater Port Project, USCG-2015-0472
General Update and Explanation of Design Refinements

Dear Ms. Fields and Captain Butwid:

On April 11, 2022, Delfin LNG LLC (Delfin) provided the U.S. Maritime Administration (MARAD) and U.S. Coast Guard (USCG) a written summary of the current status of the Delfin LNG Deepwater Port project. Subsequently, on May 10, 2022, we participated in a virtual meeting with MARAD and USCG that included a PowerPoint presentation and general discussion of the status of our project. During that meeting, MARAD suggested we provide a letter to the agencies summarizing our project status including the results of our Front End Engineering Design (FEED) work.

The purpose of this letter is to provide the agencies with a project update and additional information concerning the project engineering refinement. While Delfin received a favorable Record of Decision (ROD) from MARAD on March 13, 2017, we are now prepared to move forward with the actions needed for MARAD to issue the Deepwater Port license to the project. We look forward to working with the agencies to this end in the coming months.



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This letter focuses on aspects of the Deepwater Port related to design and environmental impacts. Delfin has also developed and grown the company, its organization and corporate matters. Therefore, Delfin is in the process of preparing an update of financing-related information to satisfy the related conditions in the ROD for the issuance of the Delfin Deepwater Port License. We also intend to proceed in the coming months with USCG-led efforts related to navigational safety zones and the port operations manual, as well as needed actions with other agencies.

On October 11, 2020, Delfin LNG announced the completion of its Front End Engineering Design (FEED) for the Floating Liquefied Natural Gas Vessels (FLNGVs) for the Delfin LNG project developed jointly by Delfin, Samsung Heavy Industries, and Black and Veatch. In preparing the FEED for the Delfin Deepwater Port project, our design goal was to develop a mooring system and FLNGV design using the best available technology consistent with the concepts evaluated in the MARAD/USCG Final Environmental Impact Statement (FEIS) for the Port Delfin LNG Project Deepwater Port (November 28, 2016). Accordingly, the principal design concepts used in the Delfin Deepwater Port license application and FEIS have been further developed and refined through FEED consistent with standard engineering processes.

The engineering refinements to the Delfin LNG FLNGVs were developed with a goal of minimizing air emissions, water use and other environmental impacts and providing an equal or lesser level of environmental impacts as analyzed in the 2016 FEIS for the Delfin LNG project. The information presented below reflects the results of our engineering refinement process and demonstrates that Delfin has succeeded in maturing our proposed Deepwater Port project consistent with the FEIS. The information below demonstrates that overall project emissions have been reduced below that analyzed in the FEIS. Construction impacts and seabed disturbance are within the parameters of that examined in the FEIS, while pile driving noise has been reduced by 25% with a reduction in mooring system pilings from four to three now proposed with use of the Submerged Swivel and Yoke (SSY) system. The purpose of this document is to provide a description of the refinement of key elements of the design through the FEED process.

SYSTEM COMPARISON TABLE

The following table outlines the main refinements to the design in FEED compared to that considered in the FEIS on a system by system basis.

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System	2016	2022	Remark
Mooring	Tower Yoke Mooring System (TYMS)	Submerged Swivel and Yoke (SSY)	SSY evaluation presented in Alternatives Analysis in the DWPLA. TYMS presented as a tentative selection at feasibility stage.
Hull	Barge shaped hull 356 x 65 x 32	Barge shaped hull 335 x 62 x 32	
Cargo Storage	Membrane containment system. 8 x 26,250 m ³	Membrane containment system. 8 x 22,500 m ³	Total cargo capacity reduced by approx. 15%.
Liquefaction	Approx. 3.3 mtpa. Single Mixed Refrigerant. Integrated HHC removal. HHC mixed with fuel and used onboard	Approx. 3.3 mtpa. Single Mixed Refrigerant. Integrated HHC removal. HHC mixed with fuel and used onboard	LNG expander added downstream of liquefaction to supplement power generation and improve overall efficiency
Pre-treatment	AGR, Hg and H ₂ O removal. Single train.	AGR, Hg and H ₂ O removal. Single train.	
Refrigerant Compression Drives	Aeroderivative gas turbines with low NO _x technology	Aeroderivative gas turbines with low NO _x technology	
Power Generation	Aeroderivative gas turbines with low NO _x technology	Waste heat recovery on refrigerant compression drives combined with a steam turbine generator	Cogeneration of power added to improve efficiency and lower Greenhouse Gas (“GHG”) emissions
Essential Generators	Dual Fuel Diesel Generators	Dual Fuel Diesel Generators	
Process Cooling	Direct Air Cooling	Direct Air Cooling	
Utility Cooling	Seawater based cooling system for essential generators	Air cooled	
Process Heat	Waste heat recovery on power gas turbines	Waste heat recovery on refrigerant compression drives (gas turbines)	Process heat medium changed from hot oil to steam

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Auxiliary Boiler	None	Dual fuel boiler	Boiler added to assist start-up and commissioning (process heat)
Thermal Oxidizer	Oxidizer for incinerating waste streams	Oxidizer for incinerating waste streams	
Diesel Oil Tanks	Approx. 2,260 m3	Approx. 6,930 m3	Tanks are sized based on fuel consumption for the transit from shipyard to site. No increase in operational diesel inventory on site (GoM).
Fresh Water Generation and Tanks	Reverse Osmosis Approx. 860 m3	Reverse Osmosis Approx. 2,200 m3	
Ballast Water Tanks	Approx. 127,000 m3	Approx. 121,000 m3	
Flare	Warm (wet) Cold (dry) and LP Pilot flame	Warm (wet) Cold (dry) and LP Pilot flame	
Inert Gas for Cargo Tanks	Inert Gas Generator	Nitrogen Generator	Synergies with topsides N2 system
Drain Systems	Closed drains Open drains with drain pans to capture released hydrocarbons and rainwater, washwater and other fluids for routing to oily water tank and treatment package. Capacity based on collecting the first ½ inch of rainfall.	Closed drains Open drains with drain pans to capture released hydrocarbons and rainwater, washwater and other fluids for routing to oily water tank and treatment package. Capacity based on collecting the first ½ inch of rainfall.	

In addition an increase in the design lifetime of the FLNGV and its equipment from 20 to 25 years on site is implemented consistent with the extended term of the natural gas export authorization through 2050 issued by DOE in December of 2020.

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MOORING SYSTEM SELECTION

At the feasibility stage, Delfin evaluated in detail two options for the disconnectable mooring. One option was the Tower Yoke Mooring System (TYMS) that would consist of a four-pile fixed platform with a rotating swivel and disconnectable mooring assembly attached to each FLNGV. The other option was the Submerged Swivel and Yoke (SSY) Mooring System consisting of a three-pile base on the seabed with a submerged rotating swivel and a yoke system connecting the mooring chains. See Chapter 2.7.2 in Section 2 Alternatives Analysis of Vol. II of the DWP License Application for a description of the detailed evaluation of the TYMS and SSY systems that was undertaken. The two options are depicted below:



Figure 1 Tower Yoke Mooring System

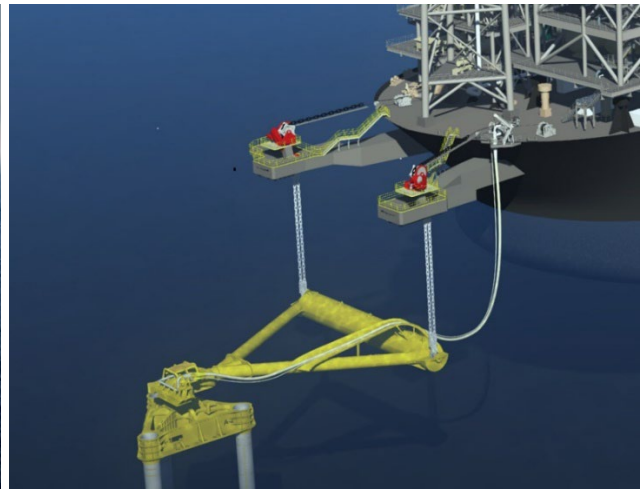


Figure 2 Submerged Swivel Yoke Mooring System

The TYMS was tentatively deemed the preferred selection at the feasibility stage in 2015 due to the SSY system being less mature at the time. However, as stated in Chapter 2.7.2.3 of the Alternatives Analysis report, no other disconnectable mooring solutions were excluded at that stage of the project and the issue was to be investigated further during FEED.

During the course of FEED in 2020, Delfin determined that the SSY mooring system has now established a track record of being a safe, reliable and cost effective mooring system for FLNGVs. Given this new track record and the operational advantages of the SSY approach, as well as the reduced environmental impacts, Delfin has selected the SSY mooring system for use on the project.

The SSY mooring system is currently deployed for the following operational LNG projects:

- Hilli Episeyo, FLNG vessel in operation offshore Cameroon
- Golar Nanook, FSRU vessel in operation offshore Brazil

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Figure 3 SSY mooring system on FLNG offshore Cameroon



Figure 4 SSY mooring system on FSRU offshore Brazil

The SSY system has operational advantages over the TYMS, including an expected quicker reconnect time after any necessary hurricane evasion. The submerged design also provides more protection for the abandoned equipment in the event of a hurricane, and thus reduces risk of damage to the mooring or gas transfer system. Another advantage of the SSY over TYMS is the reduced seabed disturbance, construction time and noise from having to drive three piles instead of four during the installation of the system. The FLNGV will be able to remain connected to the SSY system in all winter storm conditions as well as the conditions experienced and expected at the Delfin DWP site during the majority of the named tropical storms in the area.

The four previously proposed TYMS units would be replaced by four SSY units at the same locations. On an environmental impact basis, Delfin expects the construction, operation and decommissioning of the SSY units will be less than that of the TYMS units. In particular, Delfin notes the following:

- The SSY units only require installing three rather than four 96" diameter piles proposed as part of the TYMS units. This results in 25% less pile driving noise.
- The SSY units can be installed within the same 75 X 75 foot seabed footprint as the original TYMS units resulting in no additional seabed disturbance.
- The SSY units will be disconnectable and allow FLNGV departure and storm evasion on a similar or shorter time line to that of the TYMS units.
- The SSY units are expected to allow for quicker reconnect and start-up after storm evasion and thereby improve the facility uptime.

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POWER GENERATION SYSTEM

Incorporating waste heat recovery from the refrigerant compression gas turbine drives in combination with steam turbine power generation has been included in Delfin's post-FEED design refinements and effectively results in a combined-cycle power generation system. This measure reduces the GHG emissions from power generation onboard the FLNGVs and saves fuel. While simple-cycle power generation historically has been the main arrangement on many offshore floating assets, a change to combined-cycle to reduce emissions and save fuel costs is emerging as a new standard in the offshore industry.

In alignment with Delfin's project objectives to minimize the impact on the environment, the combined-cycle power generation system uses air cooling for the steam condensation. The steam exhaust from the Steam Turbine Generator (STG) is condensed in an array of Air Cooled Condensers (ACC) located on the aft deck of the vessel.

The electrical power generated using the waste heat from the refrigerant compression drives is approximately 30 megawatts (MW) in normal operation and eliminates the need for the dedicated gas turbine power generation that was included in the design at the feasibility stage of engineering. The reduction in GHG emissions by implementing combined-cycle power generation is in the order of 100,000 CO₂ equivalent tons per year per FLNG vessel, as detailed further below. The refined design of the power generation system of Delfin's FLNGVs is illustrated below.



Figure 5 ACC and HRSG Location on the FLNGV

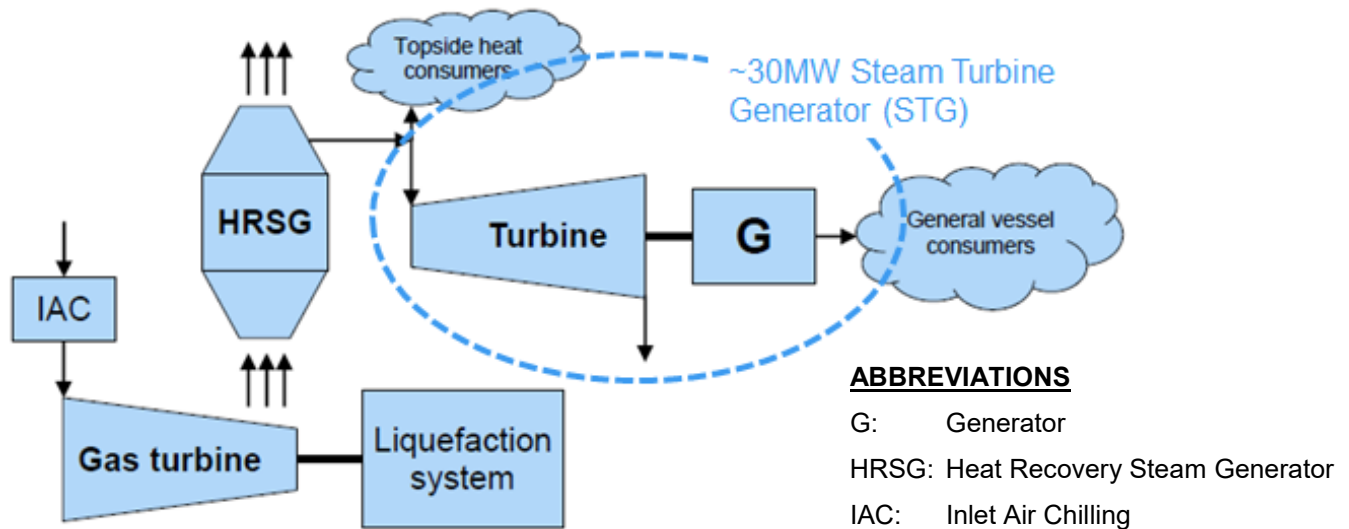


Figure 6 Schematic of the combined-cycle power generation

COOLING SYSTEM

The feasibility stage design included sea water cooled essential generators. The essential generators were primarily intended for use when the vessel is in transit to site or when sailing during hurricane avoidance events. During testing of the essential generators when connected to the mooring and performing normal liquefaction operation, the generators would be cooled by means of sea water.

In the refined design resulting from FEED, the essential generators are also used to supply supplemental power during normal liquefaction and offloading operations. For the sake of eliminating the use of sea water to cool the essential generators, a dedicated array of air fin coolers is installed at the aft deck (in front of accommodation, starboard side) of the vessel.

All other process equipment and utilities are cooled by air, in line with the feasibility stage design concept.

AIR EMISSIONS

The projected air emissions from the FLNGV equipment are listed in the following table. The projections reflect the maximum emissions when all the machinery is being operated at 100% of its respective capacity or throughput. As such, the projections take into account equipment uptime, varying ambient conditions, and various operational scenarios.

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Taking into account the refined engineering and operational scenarios, the overall emissions will decrease on an aggregate annual average basis compared with those evaluated in the 2016 Environmental Impact Statement. Additional details will be submitted as part of the air permit application process

With respect to GHG emissions (CO₂ equivalent), Delfin's refined engineering has achieved substantial reductions based on incorporating waste heat recovery from the refrigerant compression gas turbine drives in combination with steam turbine power generation. This measure reduces the GHG emissions from power generation onboard the facility and saves fuel gas usage.

Other air emissions components (NO_x, CO) have likewise been incrementally reduced with the refined design. All of the refinements proposed as part of the additional engineering have been based on keeping project environmental impacts within the parameters of those evaluated in the Environmental Impact Statement.

Source	2016	2022	Remark
Refrigeration drives (gas turbines)	3 x 54,989 lb CO ₂ e/hr 3 x 43.2 lb NO _x /hr 3 x 26.3 lb CO/hr	4 x 42,704 lb CO ₂ e/hr 4 x 33.5 lb NO _x /hr 4 x 20.4 lb CO/hr	Configuration refinement from 3 off gas turbines to 4 off smaller ones
Power generation (gas turbines)	3 x 31,031 lb CO ₂ e/hr 3 x 24.4 lb NO _x /hr 3 x 14.9 lb CO/hr	N/A	Power generation gas turbine deleted from design upon introducing combined cycle power generation
Essential generators (Dual fuel engines)	3 x 9,982 lb CO ₂ e/hr 3 x 80.4 lb NO _x /hr 3 x 50.2 lb CO/hr	3 x 13,146 lb CO ₂ e/hr 3 x 88.5 lb NO _x /hr 3 x 55.3 lb CO/hr	2016: essential gens only in operation for hurricane avoidance 2022: in operation for hurricane avoidance and single engine part time during normal operation
Emergency generator (diesel engine)	3 x 1,843 lb CO ₂ e/hr 3 x 14.8 lb NO _x /hr	2 x 3,845 lb CO ₂ e/hr 2 x 30.9 lb NO _x /hr	Configuration refinement from 3 off diesel

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	3 x 9.26 lb CO/hr	2 x 19.3 lb CO/hr	generators to 2 off larger ones
Fire water pump	2 x 3,072 lb CO ₂ e/hr	4 x 1,225 lb CO ₂ e/hr	Configuration refinement from 2 off diesel driven pumps to 4 off smaller ones
	2 x 24.7 lb NO _x /hr	4 x 9.9 lb NO _x /hr	
	2 x 15.4 lb CO/hr	4 x 6.2 lb CO/hr	

FLNGV OPERATIONAL WITHDRAWALS

The estimated average daily water intake requirement for FLNGV connected at site are listed in the following table. Overall the total average water intake is expected to be the same or lower than assumed for the Final Environmental Impact Statement issued in 2016.

Service	2016	2022	Remark
Desalination System	1.0 mgd	1.0 mgd	Assumed 35% recovery rate
Ballast System	2.1 mgd	2.1 mgd	Same production rate and number of LNGC loadings
Cooling Water for Essential Generator (testing at site)	0.001 mgd	N/A	Refined design uses air cooling for all systems
Fire Water Pump Testing	0.03 mgd	0.03 mgd	
IGG Scrubber Water	0.001 mgd	N/A	Refined design uses N ₂ for tank inerting
Water Curtain	0.1 mgd	0.1 mgd	

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FLNGV OPERATIONAL DISCHARGES

The estimated average daily operational discharges per FLNGV are listed in the following table.

Source	2016	2022	Remark
Ballast water	2.4 mgd	2.1 mgd	
Machinery rooms bilge water	0.007 mgd	0.007 mgd	
Sewage treatment discharge	0.003 mgd	0.003 mgd	
Slop tank discharge	0.007 mgd	0.007 mgd	
Essential generator cooler discharge	0.001 mgd	N/A	Refined design uses air cooling for all systems
IGG scrubber discharge	0.0006 mgd	N/A	Refined design uses N2 for tank inerting
RO reject water discharge	0.64 mgd	0.64 mgd	
Fire water test	0.03 mgd	0.03 mgd	
Water curtain	0.09 mgd	0.09 mgd	

We hope this update provides you with sufficient detail regarding the current status of the Port Delfin Project and its refined design. Please feel free to contact the undersigned or our counsel, Patrick Nevins of Latham & Watkins at (202) 637-3363 or Patrick.Nevins@LW, if you have any questions or require additional information.

Respectfully submitted,



William H. Daughdrill
HSE Director
Delfin Midstream Inc.
w.daughdrill@delfinlng.com

Cc:

Dr. Linden J. Houston Via E-mail to Linden.Houston@dot.gov

LCDR Matthew Meacham Via E-mail to Matthew.K.Meacham@uscg.mil

Ms. Melissa Perera Via E-mail to Melissa.E.Perera@uscg.mil

APPENDIX C

NOAA Fisheries ESA Species off the Coast of Louisiana



Threatened and Endangered Species List Louisiana

Threatened and Endangered Species and Critical Habitats Under NOAA Fisheries Jurisdiction

Species	Listing Status	Recovery Plan	Critical Habitat
Green sea turtle	Threatened - North and South Atlantic Distinct Population Segment (81 FR 20057 ; April 6, 2016)	October 1991	63 FR 46693 ; September 2, 1998
Kemp's ridley sea turtle	Endangered (35 FR 18319 ; December 2, 1970)	September 2011	None
Leatherback sea turtle	Endangered (35 FR 8491 ; June 2, 1970)	April 1992	44 FR 17710 ; March 23, 1979
Loggerhead sea turtle	Threatened - Northwest Atlantic Ocean Distinct Population Segment (76 FR 58868 ; September 22, 2011)	December 2008	79 FR 39856 ; July 10, 2014
Hawksbill sea turtle	Endangered (35 FR 8491 ; June 2, 1970)	December 1993	63 FR 46693 ; September 2, 1998
Gulf sturgeon	Threatened (56 FR 49653 ; September 30, 1991)	September 1995	68 FR 13370 ; March 19, 2003
Oceanic whitetip shark	Threatened (83 FR 4153 ; January 30, 2018)	2018 Recovery Outline	None

Species	Listing Status	Recovery Plan	Critical Habitat
Giant manta ray	Threatened (83 FR 2916; January 22, 2018)	December 2019 Recovery Outline	None
Sperm whale	Endangered (35 FR 18319; December 2, 1970)	December 2010	None
Rice's whale	Endangered (84 FR 15446, April 15, 2019); Name Change (86 FR 47022; August 23, 2021)	September 2020 Recovery Outline	None

Last updated by [Southeast Regional Office](#) on July 21, 2022

APPENDIX D

USFWS Information for Planning and Consultation and LDWF Element Occurrence Results



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Louisiana Ecological Services Field Office
200 Dulles Drive
Lafayette, LA 70506
Phone: (337) 291-3100 Fax: (337) 291-3139



In Reply Refer To:
Project Code: 2023-0021087
Project Name: Delfin DWP

December 02, 2022

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, and candidate species, as well as designated and proposed critical habitat that may occur within the boundary of your proposed project and may be affected by your proposed project. The Fish and Wildlife Service (Service) is providing this list under section 7 (c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). Changes in this species list may occur due to new information from updated surveys, changes in species habitat, new listed species and other factors. Because of these possible changes, feel free to contact our office (337-291-3109) for more information or assistance regarding impacts to federally listed species. The Service recommends visiting the ECOS-IPaC site or the Louisiana Ecological Services Field Office website (<https://www.fws.gov/southeast/lafayette>) at regular intervals during project planning and implementation for updated species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the habitats upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of Federal trust resources and to determine whether projects may affect Federally listed species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2) (c)).

Bald eagles have recovered and were removed from the List of Endangered and Threatened Species as of August 8, 2007. Although no longer listed, please be aware that bald eagles are protected under the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668 et seq.).

The Service developed the National Bald Eagle Management (NBEM) Guidelines to provide landowners, land managers, and others with information and recommendations to minimize potential project impacts to bald eagles, particularly where such impacts may constitute “disturbance”, which is prohibited by the BGEPA. A copy of the NBEM Guidelines is available at: <https://www.fws.gov/migratorybirds/pdf/management/nationalbaldeaglenanagementguidelines.pdf>

Those guidelines recommend: (1) maintaining a specified distance between the activity and the nest (buffer area); (2) maintaining natural areas (preferably forested) between the activity and nest trees (landscape buffers); and (3) avoiding certain activities during the breeding season. Onsite personnel should be informed of the possible presence of nesting bald eagles within the project boundary, and should identify, avoid, and immediately report any such nests to this office. If a bald eagle nest occurs or is discovered within or adjacent to the proposed project area, then an evaluation must be performed to determine whether the project is likely to disturb nesting bald eagles. That evaluation may be conducted on-line at: <https://www.fws.gov/southeast/our-services/eagle-technical-assistance/>. Following completion of the evaluation, that website will provide a determination of whether additional consultation is necessary. The Division of Migratory Birds for the Southeast Region of the Service (phone: 404/679-7051, e-mail: SEmigratorybirds@fws.gov) has the lead role in conducting any necessary consultation.

Activities that involve State-designated scenic streams and/or wetlands are regulated by the Louisiana Department of Wildlife and Fisheries and the U.S. Army Corps of Engineers, respectively. We, therefore, recommend that you contact those agencies to determine their interest in proposed projects in these areas.

Activities that would be located within a National Wildlife Refuge are regulated by the refuge staff. We, therefore, recommend that you contact them to determine their interest in proposed projects in these areas.

Additional information on Federal trust species in Louisiana can be obtained from the Louisiana Ecological Services website at: <https://www.fws.gov/southeast/lafayette>

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
 - USFWS National Wildlife Refuges and Fish Hatcheries
-

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Louisiana Ecological Services Field Office

200 Dulles Drive

Lafayette, LA 70506

(337) 291-3100

Project Summary

Project Code: 2023-0021087

Project Name: Delfin DWP

Project Type: Natural Gas Distribution

Project Description: Onshore facilities for a offshore port

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@29.76570105,-93.64099197972187,14z>



Counties: Cameron County, Louisiana

Endangered Species Act Species

There is a total of 2 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Birds

NAME	STATUS
Eastern Black Rail <i>Laterallus jamaicensis ssp. jamaicensis</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10477	Threatened

Insects

NAME	STATUS
Monarch Butterfly <i>Danaus plexippus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

IPaC User Contact Information

Agency: SWCA

Name: Sean Peacock

Address: 13 Palafox Place

City: Pensacola

State: FL

Zip: 32502

Email: sean.peacock@swca.com

Phone: 9122207387

JOHN BEL EDWARDS
GOVERNOR



JACK MONToucET
SECRETARY

PO BOX 98000 | BATON ROUGE LA | 70898

Date December 9, 2022
Name Sean Peacock
Company SWCA
Street Address 9 Scotland Place NW
City, State Zip Atlanta, GA 30318
Project Cameron gas
Project ID
Invoice Number 22120916DDA

Personnel of the Louisiana Wildlife Diversity Program (WDP) have reviewed the preliminary data for the captioned project. The attached files contain two ESRI shapefiles of the WDP data. The file named 2022_WDP_DDA_SWCA_Cameron_gas_points_final contains point data of all Element Occurrence records located within the client-supplied project footprint plus a 2-mile buffer in the Johnson's Bayou, Peveto Beach, and Smith Bayou USGS 7.5' quadrangles located in Cameron Parish, Louisiana. These Element Occurrences do not reflect the local extent of the occurrence, and the accuracy of the location information may be limited.

The 2022_WDP_DDA_SWCA_Cameron_gas_polygons_final layer contains defined polygons of at-risk animal and plant species and natural communities that occur within the client-supplied project footprint plus a 2-mile buffer in the Johnson's Bayou, Peveto Beach, and Smith Bayou USGS 7.5' quadrangles located in Cameron Parish, Louisiana. These polygons were created by the WDP using DOQQ aerial photography and topographic maps. As with the point data, these Element Occurrence polygons do not reflect the local extent of the occurrence, and the accuracy of the location information may be limited.

Please refer to the WDP Data Utilization Agreement for restrictions regarding the use of these data. All users of these data shall read and abide by the Data Utilization Agreement and familiarize themselves with the metadata provided. Metadata regarding the field descriptions and ranking codes used in the database are enclosed. Please refer to the precision data field in the attributes table which defines the precision to which the Element Occurrence, as described, may be located on a topographic map.

No State or federal wildlife management area or refuge occurs in the project footprint or 2-mile buffer.

No State-designated Scenic Stream or Natural Area occurs in the project footprint or 2-mile buffer.

The database indicates the following at-risk elements in the project footprint or 2-mile buffer:

Natural Communities

Coastal Dune Grassland. This natural community is globally imperiled (G2G3) and critically imperiled (S1) in Louisiana. Coastal Dune Grassland develops on beach dunes and relatively elevated backshore areas above intertidal beach. Louisiana's dunes are typically poorly developed due to the high frequency of overwash from tropical cyclones. This habitat is used by several at-risk species including glass lizards (*Ophisaurus* spp.), White-tailed Kite (*Elanus leucurus*), Crested Caracara (*Caracara plancus*), and several others. Do not traverse dunes or dune vegetation with vehicles.

Coastal Live Oak-Hackberry Forest. This community is considered critically imperiled (S1) in Louisiana. In southeast Louisiana, this forest type can form on ridges of stranded deltaic sediments deposited by the (formerly) constantly shifting Mississippi River. These ridges are composed primarily of sand and shell and are approximately 4 to 5 feet above sea level. This community, also known as a chenier, especially in southwest Louisiana, is an important storm barrier, limits salt water intrusion, and acts as a critical staging and stopover site for Neotropical migratory birds. We advise you to take the necessary measures to avoid any impacts to this ecological community.

Please contact Brian Early at 225-765-3992 for more information on natural communities.

Plants

Narrowleaved Puccoon (*Lithospermum incisum*; S1)
Sand Rose-gentian (*Sabatia arenicola*; S1)
Woolly Honeysweet (*Tidestromia lanuginosa*; S1)
Punctate Cupgrass (*Eriochloa punctata*; S2)
Wedgeleaf Prairie-clover (*Dalea emarginata*; S2)
Mexican Hat (*Ratibida peduncularis*; S2S3)
Roundleaf Scurfpea (*Pediomelum rhombifolium*; S2S3)
Gregg's Amaranth (*Amaranthus greggii*; S3)

For more information on these plant species, please contact Chris Doffitt at 318-487-5325.

Animals

Celia's Roadside-Skipper (*Amblyscirtes celia*). The status of this small, brown butterfly species is uncertain in Louisiana, but the species is likely rare to imperiled here. In Louisiana, Celia's Roadside Skipper has only been recorded in Cameron Parish; elsewhere (i.e., Texas), the species is found in open woodlands, especially where Paspalum grass species occur [the host plant(s) for its caterpillars].

Obscure Skipper (*Panoquina panoquinoides*). This small brown butterfly is considered critically imperiled (S1) in Louisiana due to rarity. This species utilizes open grasslands such as salt marshes and open fields as well as dunes. Prevent damage to salt marsh and dunes.

Eastern Pygmy Blue (*Brephidium pseudofea*) and Western Pygmy Blue (*B. exilis*). Both species are considered imperiled to critically imperiled (S1S2) in Louisiana. These tiniest of North American butterflies are mostly copper in color and are associated with coastal habitats, with the Western Pygmy Blue detected only in Cameron Parish. Both blues utilize the plants of coastal marsh or associated tidal flats as host plants; disturbance and destruction of brackish and salt marshes and tidal flats should be minimized to prevent loss of either species.

Western Slender Glass Lizard (*Ophisaurus attenuatus attenuatus*). This species of legless lizard is considered vulnerable (S3) in Louisiana. Primary threats to the species include loss of habitat, overuse of insecticides, which reduces prey availability, and vehicular strikes. Please contact Keri Lejeune at 337-735-8676 for more information.

Snowy Plover (*Charadrius nivosus*). This species is considered imperiled to critically imperiled (S1B, S2N) in Louisiana. This species may be found year round in Louisiana, but is more abundant outside the summer months. However, the Snowy Plover, a solitary nesting species, has been documented nesting in Louisiana, and any projects on Louisiana beaches occurring from early April to August should consider possible impacts to nesters. Like other beach birds, threats to the Snowy Plover include habitat loss/degradation due to coastal development, beach stabilization and re-nourishment, sediment diversion, disturbance by humans, environmental contaminants, and problematic native and nonnative species of plants and animals. We recommend that you take the necessary precautions to protect the breeding and wintering habitat of this species.

Wilson's Plover (*Charadrius wilsonia*). This shorebird species is imperiled to critically imperiled (S2B, S1N) in Louisiana. It may be found year round in Louisiana, but is more abundant during spring and summer. The Wilson's Plover, a solitary nester, breeds along the Gulf coast from early April to August and may be found on beaches, sand flats, and freshly dredged-material. Threats to the Wilson's Plover include habitat loss/degradation due to coastal development, beach stabilization and re-nourishment, sediment diversion, disturbance by humans, environmental contaminants, and problematic native and nonnative species of plants and animals. We recommend that you take the necessary precautions to protect the breeding and nonbreeding habitat of this species.

Piping Plover (*Charadrius melodus*) and Piping Plover Critical Habitat. This shorebird species is federally listed as THREATENED in Louisiana, and its federally designated Critical Habitat occurs along the Louisiana coast. The Piping Plover spends the nonbreeding season in Louisiana, where it arrives in late July and may be present for 8 to 10 months of the year. The Piping Plover feeds on intertidal beaches, mudflats, and sand flats with little or no emergent vegetation; it also requires unvegetated or sparsely vegetated areas for roosting. Primary threats to the Piping Plover in Louisiana include habitat loss/degradation due to coastal development, beach stabilization and re-nourishment, sediment diversion, disturbance by humans, and environmental contaminants. We recommend that you take the necessary precautions to protect the nonbreeding habitat of this species. For more information on Piping Plover Critical Habitat, visit the UFWS website: <http://endangered.fws.gov>. Contact Brigitte Firmin with the United States Fish & Wildlife Service at 337-291-3132 to coordinate activity.

Waterbird Nesting Colony. Please be aware that entry into or disturbance of active breeding colonies is prohibited by the Louisiana Department of Wildlife and Fisheries (LDWF). In addition, LDWF prohibits work within a certain radius of an active nesting colony.

Nesting colonies can move from year to year, and no current information is available on the status of these colonies. If work for the proposed project will commence during the nesting season, conduct a field visit to the worksite to look for evidence of nesting colonies. This field visit should take place no more than two weeks before the project begins. If no nesting colonies are found within 1000 feet (2000 feet for Brown Pelicans) of the proposed project, no further consultation with LDWF will be necessary. If active nesting colonies are found within the previously stated distances of the proposed project, further consultation with LDWF will be required. In addition, colonies should be surveyed by a qualified biologist to document species present and the extent of colonies. Provide LDWF with a survey report which is to include the following information:

1. qualifications of survey personnel;
2. survey methodology including dates, site characteristics, and size of survey area;
3. species of birds present, activity, estimates of number of nests present, and general vegetation type including digital photographs representing the site; and
4. topographic maps and ArcGIS shapefiles projected in UTM NAD83 Zone 15 to illustrate the location and extent of the colony.

Please mail survey reports on CD to:

Wildlife Diversity Program
La. Dept. of Wildlife & Fisheries
P.O. Box 98000
Baton Rouge, LA 70898-9000

To minimize disturbance to colonial nesting birds, the following restrictions on activity should be observed:

- For colonies containing nesting wading birds (e.g., herons, egrets, night-herons, ibis, Roseate Spoonbills) or Anhingas or cormorants, all project activity occurring within 1000 feet of an active nesting colony should be restricted to the non-nesting period (i.e., September 1 through February 15).
- For colonies containing nesting gulls, terns, or Black Skimmers, all project activity occurring within 650 feet (2000 feet for Brown Pelicans) of an active nesting colony should be restricted to the non-nesting period (i.e., September 16 through April 1).

If you have any questions or need additional information on birds, please contact Rob Dobbs at 337-735-8675.

Fact sheets for Element Occurrences may be found on our website at: https://www.wlf.louisiana.gov/resources/search?q_resources=fact+sheets. The above web address will direct you to fact sheets that were created for all plant and animal species and natural communities with a G1-G2 global rank and all plant and animal species and natural communities located in Louisiana's Coastal Zone.

The WDP compiles data on rare, threatened, endangered, or otherwise significant plant and animal species and aggregations, plant communities, and other natural features throughout the state of Louisiana. Reports summarize the existing information known at the time of the request regarding the location in question. The quantity and quality of data collected by the WDP are dependent on the research and observations of many individuals. In most cases, this information is not the result of comprehensive or site-specific field surveys; many natural areas in Louisiana have not been surveyed. This report does not address the occurrence of wetlands at the site in question. Reports should not be considered final statements on the biological elements

or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. WDP requires that this office be acknowledged in all reports as the source of all data provided here.

If at any time WDP tracked species are encountered within the project area, please contact Michael Seymour, WDP Data Manager, at 225-763-3554 or mseymour@wlf.la.gov. If you have any questions, or need additional information, please call Carolyn Michon, Assistant Data Manager at 337-735-8734.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Nicole Lorenz', followed by a long horizontal flourish.

for Nicole Lorenz, Biologist Program Manager
Wildlife Diversity Program

Enclosed:

ESRI Shapefiles, Signed Copy of the Data Agreement, Metadata, Explanation of Rankings, and Fact Sheets

JOHN BEL EDWARDS
GOVERNOR



JACK MONToucET
SECRETARY

PO BOX 98000 | BATON ROUGE LA | 70898

INVOICE

RETAIN THIS COPY FOR YOUR RECORDS

Date	December 9, 2022
Invoice Number	22120916DDA
Project	Cameron gas
Name	Sean Peacock
Company	SWCA
Street Address	9 Scotland Place NW
City, State, Zip	Atlanta, GA 30318
Number of Quads Reviewed	3
Total Due	\$120.00

Payment should be made to "Louisiana Department of Wildlife & Fisheries" within 30 days of the date of this invoice. Please include the invoice number on your check and return a copy of this invoice with your remittance to the following address:

Louisiana Department of Wildlife & Fisheries
Attn: Jennifer Riddle
P.O. Box 80399
Baton Rouge, LA 70898-0399

Should you have any questions regarding this invoice, for review of the Wildlife Diversity database for information on known sensitive elements at a charge of \$40.00 per quad reviewed, please contact WDP at (337) 735-8734.

JOHN BEL EDWARDS
GOVERNOR



JACK MONToucET
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PO BOX 98000 | BATON ROUGE LA | 70898

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