Appendix B – Supplemental Information for Vessel Transits in the Gulf of Mexico

Revolution Wind Farm and Revolution Wind Export Cable – Development and Operation

APPENDIX B
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For the National Marine Fisheries Services

U.S. Department of Interior
Bureau of Ocean Energy Management
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1.0 Introduction

This report presents supplemental analysis for the biological assessment (BA) prepared for the Revolution Wind Farm (RWF) and Revolution Wind Export Cable (RWEC) Project (Project). Specifically, this report assesses potential impacts associated with Project vessel traffic that may originate from the Gulf of Mexico to Endangered Species Act (ESA) -listed species under National Marine Fisheries Service (NMFS) jurisdiction. Only ESA-listed species that occur in the Gulf of Mexico and potential vessel traffic from Gulf of Mexico ports are assessed in this report. ESA-listed species that occur in the Project action area outside the Gulf of Mexico and all other potential impacts associated with other components of the Project, including potential vessel traffic from ports outside of the Gulf of Mexico, are addressed in the BA (Confluence Environmental Company 2022).

Overall, several existing Atlantic coast port facilities have been identified as local ports to potentially support the Project in transporting materials to the Project area. Vessels not transporting material from these local ports may travel with components and equipment directly to the Project area from non-local locations such as the Gulf of Mexico. While project contracts are not in place, the types of vessels, numbers of vessels, and numbers of vessel trips required for the construction and installation of the Project have been estimated and identified in the BA. Most vessel operations are expected to originate and return to local ports servicing the Project in the Project area.

Vessels that will not be transporting construction material from local ports may travel directly to the Project area from locations that will be determined prior to construction. For planned operations and maintenance activities, local ports are expected to be used and the use of non-local ports in the Gulf of Mexico is not anticipated. During construction, it is anticipated that a total of only 33 vessel trips could potentially occur between non-local ports in the Gulf of Mexico and the Project area. While no specific Gulf of Mexico non-local ports have been identified for construction support, the travel distance from the Project area to the Gulf of Mexico region can be estimated from broad vessel traffic patterns observable in Automatic Identification Systems data (BOEM et al., 2022). The minimum travel distance from the Project area to an observable area of traffic separation approximately 150 miles due west of Key West, Florida is approximately 1,550 miles. Travel distance from this point to Gulf of Mexico non-local ports ranges from approximately 475 miles (to the Port of Mobile, Alabama) to 850 miles (to the Port of Corpus Christi, Texas). This equates to total travel distances ranging from 1,925 to 2,400 miles.

NMFS ESA-listed species occurring in the Gulf of Mexico are presented in Table 1. For reference to the other geographic regions where these listed species may occur, Table 1 indicates if the species also occurs in other areas between port locations and the Project area that have been further analyzed in the BA. Table 2 summarizes the estimated various vessels and trips

associated with Project construction that potentially may originate from the non-local ports in the Gulf of Mexico. At this time specific vessels and Gulf of Mexico ports have not been selected for Project construction activity. Typical vessel operational knot speeds and vessel drafts for Project construction vessels are identified in Table 3.10 in the BA.

Table 1. Threatened and Endangered Species that May Occur in Vessel Transit Areas between Ports of Origin and the Project Area

Species	Scientific Name	Listing Status	Potential Occurrence Port of Origin Routes		
			Gulf of Mexico	Europe	Atlantic Coast
Sea Turtles					
Green sea turtle North Atlantic DPS	*Chelonia mydas*	Threatened	X	—	X
Hawksbill sea turtle	*Eretmochelys imbricata*	Endangered	X	—	X
Kemp's ridley sea turtle	*Lepidochelys kempii*	Endangered	X	—	X
Leatherback sea turtle	*Dermochelys coriacea*	Endangered	X	X	X
Loggerhead sea turtle Northwest Atlantic Ocean DPS	*Caretta caretta*	Threatened	X	X	X
Fish, Rays, Sharks					
Smalltooth sawfish U.S. DPS	*Pristis pectinata*	Endangered	X	—	—
Gulf sturgeon	*Acipenser oxyrinchus desotoi*	Threatened	X	—	—
Nassau grouper	*Epinephelus striatus*	Threatened	X	—	—
Giant manta ray	*Manta birostris*	Threatened	X	X	X
Oceanic whitetip shark	*Carcharhinus longimanus*	Threatened	X	X	—
Corals					
Boulder star coral	*Orbicella franksi*	Threatened	X	—	—
Elkhorn coral	*Acropora palmata*	Threatened	X	—	—
Lobed star coral	*Orbicella annularis*	Threatened	X	—	—
Mountainous star coral	*Orbicella faveolata*	Threatened	X	—	—
Pillar coral	*Dendrogyra cylindrus*	Threatened	X	—	—
Rough cactus coral	*Mycetophyllia ferox*	Threatened	X	—	—

Species	Scientific Name	Listing Status	Potential Occurrence Port of Origin Routes		
			Gulf of Mexico	Europe	Atlantic Coast
Staghorn coral	*Acropora cervicornis*	Threatened	X	—	—
Whales					
Blue whale	*Balaenoptera musculus*	Endangered	X	X	X
Fin whale	*Balaenoptera physalus*	Endangered	X	X	X
North Atlantic right whale	*Eubalaena glacialis*	Endangered	X	X	X
Rice's whale	*Balaenoptera ricei*	Endangered	X	—	—
Sei whale	*Balaenoptera borealis*	Endangered	X	X	X
Sperm whale	*Physeter macrocephalus*	Endangered	X	X	X
Notes: DPS=Distinct Population Segment					

Table 2. Estimated Gulf of Mexico Vessel Types and Trips Required for Offshore Construction.

Type of Vessel	Total # of Trips [a]
Service Operations Vessel #1	2
Service Operations Vessel #2	1
Heavy Transport Vessel #1	2
Heavy Transport Vessel #2	2
Heavy Transport Vessel #3	2
Heavy Transport Vessel #4	2
DP2 Platform Supply Vessel #1	2
DP2 Platform Supply Vessel #2	2
DP2 Platform Supply Vessel #3	2
Nearshore Barge	2
Support Barge	2
Primary/Lead Tug	2
Tail Tug	2
Survey Vessel	2
PLGR Vessel	2
Bunkering Vessel	2
Wind Turbine Generator Installation Vessel	2
Total Trips	**33**

[a] Total Vessel Trip counts do not account for unforeseen circumstances, such as repairs that may require the vessel to return to the Gulf of Mexico.

2.0 Species Analysis

This section provides species-specific analysis of potential impacts to ESA-listed species associated with Project vessel traffic that may originate from the Gulf of Mexico.

Overall, similar to the analysis of potential vessel transits from local ports discussed in the BA, the number of Gulf of Mexico non-local ports under consideration does not increase the number of vessel trips that are likely to occur but may affect the location and length of the transits. In addition, no upgrades or modifications at an existing Gulf of Mexico non-local port facility specific to the Project are anticipated and any upgrades or modifications would serve to support other maritime industries in general. Vessels from these Gulf of Mexico non-local port facilities would also be utilized to serve other maritime industries if they are not a component of the Project.

Finally, individual Gulf of Mexico port facilities annually service thousands of vessels and import and export millions of tons of goods and materials. The vast majority of Gulf of Mexico port facility vessel traffic consists of cargo and container ships, tankers, commercial fishing boats, passenger ships, and recreational yachts and boats. The vessel types anticipated to be associated with Project construction and operation and maintenance activities are in a vessel category that make up a small percentage of overall port vessel use.

2.1 Coral Species

The listed species of corals (Table 1) are not expected to occur within Gulf of Mexico ports or established vessel channels which are routinely dredged. Known coral reef areas and designated critical habitat of ESA-listed coral species such as the Flower Gardens Banks and the Florida Keys National Marine Sanctuaries are protected from anchoring and other potential vessel impacts and are located in deeper water that would not be impacted by potential hull and propeller impacts from vessel operations. Therefore, potential impacts to listed corals are discountable.

2.2 Blue, Sei, Fin, and North Atlantic Right Whales

Blue whale (*Balaenoptera musculus*), sei whale (*Balaenoptera borealis*), fin whale (*Balaenoptera physalus*), and North Atlantic right whale (*Eubalaena glacialis*) have been reported in the Gulf of Mexico on rare occasions. These whale species are considered extralimital in the Gulf of Mexico. Hence, they are not documented as inhabitants of the Gulf of Mexico in NMFS' stock assessment reports (Hayes et al. 2021). There is no designated critical habitat for blue, sei, and fin whale species and no designated critical habitat for North Atlantic right whales in the Gulf of Mexico.

The risk of overlap of these species with potential Project vessel traffic is considered to be extremely unlikely to occur. In addition, Project mitigation measures include the implementation of NOAA vessel guidelines for marine mammal and sea turtle strike avoidance measures,

including vessel speed restrictions. These measures would effectively avoid and minimize the likelihood of vessel strike, such that the likelihood of injury or mortality to these whale species is discountable. See the BA for additional information and assessment of potential impacts to these listed whale species in the action area outside the Gulf of Mexico.

2.3 Giant Manta Ray, Oceanic Whitetip Shark, and Smalltooth Sawfish,

Vessel strikes of elasmobranch species, in general, are extremely rare. Giant manta rays (*Manta birostris*) are found in open water, feeding over reefs, or visiting shallow-water cleaning stations in certain areas. Oceanic whitetip sharks (*Carcharhinus longimanus*) tend to prefer the deeper ocean waters where there is no likelihood of vessel strike. Although oceanic whitetips have been observed in waters as shallow as 120 feet (36 meters) and along coastlines, they tend to only hunt in these waters if they are near a continental shelf where they still have access to deeper waters. There is no designated critical habitat for giant manta rays and oceanic whitetip sharks.

Smalltooth sawfish (*Pristis pectinata*) vessel encounters would be rare, and their designated critical habitat is outside the anticipated areas of vessel transit routes. Small, juvenile smalltooth sawfish are generally restricted to estuarine waters of peninsular Florida, whereas larger adults have a broader distribution and could be found in the southeastern Gulf of Mexico.

There is a very small likelihood that giant manta rays, oceanic whitetip sharks, and smalltooth sawfish would be expected to occur within the Gulf of Mexico vessel transit areas and occur at or near the surface at the same time vessels associated with the Project may be present. Additionally, only 33 estimated trips between the Gulf of Mexico non-local ports and the Project area may potentially occur over the lifetime of the Project. This low likelihood of interaction results in an unlikely occurrence of a vessel strike to one of these species. Based on the best available information on vessel strike risks associated with the Project, the risk of vessel strikes with a giant manta ray, oceanic whitetip shark, or smalltooth sawfish is extremely unlikely to occur and the potential effects from vessel strikes is considered to be discountable. See the BA for additional information and assessment of potential impacts to the giant manta ray species in the action area outside the Gulf of Mexico.

2.4 Nassau Grouper

Nassau grouper (*Epinephelus striatus*) are not likely to be at risk of vessel strikes from vessel transits through the Straits of Florida. The risk of a vessel strike resulting from the Project is also considered discountable because vessel strikes of marine fish offshore are rare events in general and not considered a threat to Nassau grouper. There is no designated critical habitat for Nassau grouper. While it is possible that the presence of vessels may result in a short-term behavioral response from this species (e.g., startle, dive), the effects are not expected to result in any injury or reduced fitness of individuals. Therefore potential effects to Nassau grouper from vessel strikes are discountable.

2.5 Gulf Sturgeon

NMFS reports there have been two definitive deaths of Gulf sturgeon (*Acipenser oxyrinchus desotoi*) from 2015-2017 due to vessel strike (Panama City FWS unpublished data as referenced in National Marine Fisheries Service 2020). Gulf sturgeon may be found in rivers, estuaries, and nearshore habitats from Texas to Florida. Any vessel trips originating from Gulf of Mexico non-local ports west of the mouth of the Mississippi River from Louisiana or Texas will not impact Gulf sturgeon since the species does not occur there. Therefore, trips originating from non-local ports east of the Mississippi River could potentially expose Gulf sturgeon to vessels. Additionally, ports and shallow navigation channels are expected to be the areas of highest risk for vessel interaction with this benthic-dwelling species. Designated critical habitat for Gulf sturgeon is located within several Gulf of Mexico river systems east of the Mississippi River and in the estuary habitat at the mouths of these systems.

A study on the similar species Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) concluded that with the assumed behavioral modification to vessel noise, mortalities are likely caused by deep-draft ocean cargo ships (Balazik et al. 2012). Potential vessel strike impacts to Atlantic sturgeon are also assessed in the BA. The number of vessels originating from the Gulf of Mexico non-local ports in support of construction of the Project is expected to be low and most trips may occur from ports west of the Mississippi where the primary ports associated with oil and gas operations are located. Therefore, it is anticipated that the low number of estimated vessel trips (a total of 33 over the lifetime of the project) and low amount of expected overlap with vessel operations with Gulf sturgeon results in a discountable chance of adverse effects occurring.

2.6 Sea Turtles

In general, all species of sea turtles are susceptible to vessel strike, but this susceptibility is likely dependent upon a number of factors including geographic area, water depth, species surface patterns, and number of vessel trips. For example, hawksbill sea turtles (*Eretmochelys imbricata*) could be present in vessel transit area originating or returning to ports in the Gulf of Mexico, but despite their potential presence, their densities are expected to be rare around port areas in the Gulf of Mexico and in the deeper water transit routes expected to be taken by vessels, compared to other sea turtle species. Loggerhead sea turtle (*Caretta caretta*) designated critical habitat is located within potential vessel transit routes for the Project. Designated critical habitat for green (*Chelonia mydas*), hawksbill, and leatherback (*Dermochelys coriacea*) sea turtles are outside the potential areas of vessel transit routes and there is no designated critical habitat for Kemp's ridley sea turtle (*Lepidochelys kempii*).

Considering only 33 estimated construction trips between the Gulf of Mexico and the Project area may potentially occur over the lifetime of the project, the likelihood of encountering and striking a sea turtle in the Gulf of Mexico is extremely low based on the low level of vessel activity expected relative to the overall vessel transit. This low likelihood of interaction results in an unlikely occurrence of a vessel strike to any species of sea turtle. In addition, Project

mitigation measures include the implementation of NOAA vessel guidelines for marine mammal and sea turtle strike avoidance measures, including vessel speed restrictions. These measures would effectively avoid and minimize the likelihood of vessel strike. Based on the best available information, the risk of vessel strikes with sea turtles in the Gulf of Mexico is extremely unlikely to occur and will be discountable. See the BA for additional information and assessment of potential impacts to the sea turtle species in the action area outside the Gulf of Mexico.

2.7 Sperm and Rice's Whales

Vessel strikes are a well-documented threat to large whales worldwide. The probability of a vessel strike increases significantly as speeds increase above 10 knots (Conn and Silber 2013; Kite-Powell et al. 2007; Laist et al. 2001; Vanderlaan and Taggart 2007). For sperm whales (*Physeter macrocephalus*), there are no known recent strikes in the Gulf of Mexico but historically there is one possible lethal strike, which occurred in 1990, and there is the possibility of at least one non-lethal vessel strike of a sperm whale based on photographs taken by a protected species observer (National Marine Fisheries Service 2020). In addition, the U.S. Navy USS BUCKLEY reported striking a whale in the Gulf of Mexico (report to NMFS on June 25, 2001). Sperm whales and Rice's whales (*Balaenoptera ricei*) could potentially occur in the vessel transit route between Gulf of Mexico non-local ports on the way toward the Straits of Florida and to the Project area or on a return trip in vessels that do not remain in the Project area. Sperm whale occurrence is more diverse throughout deep waters of the Gulf of Mexico and may overlap with vessel transit areas. Rice's whale distribution is much smaller and limited to the eastern area of the Gulf of Mexico in depths between about 330 feet (100 meters) and about 1,310 feet (400 meters). Most vessels would likely originate from ports west of the mouth of the Mississippi River and would not overlap with Rice's whales. There is no designated critical habitat for sperm or Rice's whales.

The 33 total potential construction trips between the Gulf of Mexico and the Project area over the lifetime of the Project are very low as compared to total regional vessel trips. Project mitigation measures include the implementation of NOAA vessel guidelines for marine mammal and sea turtle strike avoidance measures, including vessel speed restrictions. These measures would effectively avoid and minimize the likelihood of encountering and striking whales, such that the likelihood of sperm or Rice's whale injury or mortality is discountable. See the BA for additional information and assessment of potential impacts to the sperm whale species in the action area outside the Gulf of Mexico.

3.0 Conclusion

In conclusion, the overall number of vessel trips between the Gulf of Mexico and the Project area is expected to be very low over the lifetime of the Project (33 total construction trips estimated). In addition, the vessel types anticipated to be associated with Project construction and operation and maintenance activities are in a vessel category and frequency that make up a small

percentage of overall port vessel transit activity. There are no or very limited reports of vessel strikes to listed species from total baseline vessel activities. Considering the number of vessel trips associated with the Project, species occurrences, and species-specific risk factors, the potential for vessel strikes on listed species in the Gulf of Mexico is insignificant (locally) or discountable (from outside the region).

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