U.S. Army Corps of Engineers, South Atlantic Division
Documentation of SARBO Project Assessment for Dredging and Material Placement in Fiscal Year 2023, Fiscal Year 2024, and Subsequent Fiscal Years

June 2023

1. PURPOSE AND BACKGROUND. This documents the SARBO Project Assessment that the U.S. Army Corps of Engineers (USACE) South Atlantic Division (SAD) (hereinafter the "USACE") is required to complete in accordance with the 2020 South Atlantic Regional Biological Opinion for Dredging and Material Placement Activities in the Southeast United States (2020 SARBO).[1] The "SARBO Project Assessment" is the term used by USACE for the Risk Assessment and Risk Management Process required in Section 2.9.2 of the 2020 SARBO, as explained in the "U.S. Army Corps of Engineers South Atlantic Division Overview of 2020 SARBO Risk Assessment [Referred to as the "SARBO Project Assessment"] and Risk Management Process" dated June 2023. The SARBO Project Assessment is used to inform the USACE's decisions on when and how projects are completed by both Regulatory and Civil Works for dredging and material placement projects (often referred to as operation and maintenance (O&M) projects). This documents the consolidation of relevant information that was assembled, discussed monthly with NMFS, considered, applied to FY23 dredging and material placement projects, and will be applied for FY24 assessments and future FY projects - with any substantive updates made as appropriate after approval.

This SARBO Project Assessment covers the following:

- Species information, including updates to the status of the species and relevant new information that informs where, when, and how species use an area (Section 3 and Appendix 1).
- Routes of effect considerations and updates, including a discussion of lessons learned from prior projects (Section 4); and
- Potential species interactions with equipment and other routes of effects analyzed in SARBO based on data collected from past projects and lessons learned on those projects (Section 4).

This assessment is then used to provide a recommendation for completion of projects (Section 5). This SARBO Project Assessment references key provisions and information in the 2020 SARBO and adds regional-specific details needed to evaluate the probability of encountering ESA-listed species and the probability of take of these species take based on project details and to then make recommendations that reduce the probability of take, when deemed appropriate.

The SARBO Project Assessment focuses on Endangered Species Act (ESA)-listed species under the National Marine Fisheries Service (NMFS) jurisdiction. In addition to factors discussed in this Assessment, USACE evaluates additional relevant factors (e.g., mission requirements, contract requirements, cost, and equipment availability) when determining how, where, and when maintenance dredging and material placement projects are completed in accordance with the USACE mission requirements. This SARBO Project Assessment will be updated or amended as needed when new information or lessons learned is relevant to the analysis.

2. PROJECTS COVERED UNDER THE SARBO PROJECT ASSESSMENT. Each fiscal year, USACE SAD will review a list of projects anticipated to be covered under the 2020 SARBO and provide project timing, equipment, and risk-minimization recommendations based on the analysis in this SARBO Project Assessment.

As this is the first time a formal SARBO Project Assessment was documented, many of the projects covered under the 2020 SARBO in FY23 have been initiated or completed. However, the considerations in this SARBO Project Assessment were discussed within

[1] The 2020 SARBO was issued by NMFS on 27 MAR 2020 and revised on 31 JUL 2020, both under NMFS consultation tracking number SERO-2019-03111.

SAD and with NMFS, and recommendations for each project considered information that was initially established in the RHDC 6.0 Pre-Construction Risk Assessment and updated, as fully documented in this SARBO Project Assessment. Hence, the SARBO Project Assessment Recommendations document the projects that were covered under the 2020 SARBO and the recommendations that were made based on the analysis documented in this SARBO Project Assessment. In addition, recommendations were made in the RHDC 6.0 Pre-Construction Risk Assessment for five (5) Federal navigation projects anticipated in FY23 (that is, maintenance dredging for Wilmington Harbor, Morehead City Harbor, Charleston Harbor, Savannah Harbor, and Brunswick Harbor). In FY24 and future years, the SARBO Project Assessment Recommendations will cover all projects anticipated to occur in each fiscal year.

3. SPECIES CONSIDERATIONS. Based on USACE's review of specific projects and the information provided below, no new information has been identified that warrants a re-initiation of consultation for the 2020 SARBO. USACE concludes the risk-minimization measures in the SARBO are sufficient to assure that each of the species' populations are not adversely affected and actions covered under the SARBO will not affect these species' ability to survive or recover. The 2020 SARBO provides a list of all species that may be present within the 2020 SARBO action area that extends from North Carolina to the Caribbean. USACE further analyzed this information, and Table 4 includes the probability of encountering each species by state for the states in which projects were anticipated to occur in FY23 and FY24. While USACE and BOEM track the status of all species and critical habitat analyzed in the 2020 SARBO, USACE documented additional species considerations for those species most frequently encountered. The species updates and new information considered as part of this SARBO Project Assessment is provided in Appendix 1 for sea turtles (green, Kemp's ridley, and loggerhead sea turtle), Atlantic sturgeon and North Atlantic right whale.

4. ROUTES OF EFFECTS CONSIDERATIONS. The routes of effects considered in the 2020 SARBO Section 3 were reviewed as part of the SARBO Project Assessment based on species considerations outlined in Section 3 and Appendix 1 in combination with lessons learned on prior projects in the area and take that was observed. The following sections discuss the routes of effects based on equipment type and include lessons learned on prior projects where appropriate. Effects to critical habitat units are also analyzed in the 2020 SARBO along with minimization measures included as Project Design Criteria (PDC) to ensure adverse effects to critical habitat will not occur. Therefore, no additional considerations in the SARBO Project Assessment are warranted.

A. Species Interaction with Dredging and Material Placement Equipment (2020 SARBO Section 3.1.1). These interactions include the probability of encountering equipment used on a project covered under the 2020 SARBO (entrainment or impingement[2]) and the potential for the equipment to result in effects to species or habitat from changes in water quality. These routes of effects are listed below and described in more detail for routes of effects with the probability of species encounters.

A.1. Mechanical Dredging (2020 SARBO Section 3.1.1.3). This route of effect was determined to be not likely to adversely affect (NLAA) ESA-listed species and critical habitat based on adherence to the PDCs. USACE is unaware of any information that changes the analysis completed in SARBO and therefore does not require additional consideration in the SARBO Project Assessment.

A.2. Cutterhead Dredging (2020 SARBO 3.1.1.4). This route of effect was determined to be NLAA for all areas except in specific sections of rivers identified in the Sturgeon PDCs in Appendix E of SARBO. As stated in SARBO Section 3.1.1.4.2,

[2] For this Project Assessment IAW the 2020 SARBO, entrainment occurs when a species either comes into contact with a suction type of dredge (hopper or cutterhead) or is in close enough proximity that they cannot outswim the suction velocity created by the dredge. Impingement occurs when the species is captured by the equipment (e.g., captured in a mechanical dredge) or stuck to the equipment (e.g., entrained by a hopper dredge, but stopped by grating on the draghead that prevents movement into the hopper).

> To minimize this risk to sturgeon, the Sturgeon PDCs prohibit dredging in known sturgeon seasonal aggregation areas and require monitoring of cutterhead dredging outside of aggregation areas in the sections of sturgeon rivers identified as having poor water quality (identified as sections and times with the letters "B" or "C" Table 56 in the Sturgeon PDCs in Appendix E. We therefore believe that take of Atlantic and shortnose sturgeon will occur by cutterhead dredging in rivers during the times identified as "B" or "C" Table 56 in the Sturgeon PDCs in Appendix E, which is discussed further in Section 6.1.3 of this Opinion.

While take may occur when cutterhead dredging is conducted in river sections identified as "B" or "C", the probability of take is still expected to be low, and no take has been observed to date under the 2020 SARBO upland discharge/disposal area monitoring. The sections of river identified either need to be avoided and therefore will not affect sturgeon, or upland material placement locations need to be monitored for take. For proposed projects that are not located in river sections identified as "B" or "C" in the Sturgeon PDCs, adherence to all other PDCs is sufficient and the proposed project does not require additional consideration in the SARBO Project Assessment. For those dredging projects occurring within the identified river sections, upland discharge/disposal area monitoring is required. If lethal take is identified, the probability of additional take will be evaluated and considered in future projects in the area.

A.3. Government Plant Dredging/ Modified Hopper (2020 SARBO Section 3.1.1.5). USACE operated three dredges that would be considered a "modified hopper" under the 2020 SARBO. Two of those vessels (Currituck and Murden) are hopper dredges that dredge material from a specific location and transport it to a placement area. The third vessel (Merritt) is a sidecast dredge that dredges material and disposes of it immediately in the surrounding environment. In addition, Dare County, North Carolina, now owns and operates a modified hopper dredge for SAW Regulatory projects. While the 2020 SARBO does not specifically provide an effects determination for modified hopper dredging, Section 2.3.1.2 describes maintenance dredging that is covered under the Opinion, which includes dredging with modified hopper dredges that are described in Section 2.5.2.2. Section 2.5.2.2 explains that hopper dredges vary in total size and draghead size, and smaller "modified hopper dredges (such as the Currituck and Murden) "have historically not resulted in entrainment of ESA-listed species and hence have had fewer restrictions than larger, traditional hopper dredges." The SARBO explains that they have smaller dragheads and lower suction velocity than traditional hopper dredges. In addition, based on NMFS' review of these types of hopper dredges having a low probability of entrainment and no reports of take, the SARBO states in Section 2.5.2.2 that modified hopper dredging does not necessitate the need for a Protected Species Observer to monitor dredged material for the potential presence of take. Therefore, the probability of entrainment from modified hopper dredging is expected to be discountable and no future minimization measures are needed to limit entrainment.

A.4. Hopper Dredging (2020 SARBO 3.1.1.5). The probability of hopper dredging take is limited to sea turtles (loggerhead, green, and Kemp's ridley[3]) and Atlantic sturgeon based on the analysis in the 2020 SARBO and that these are the only species for which take has been reported under SARBO. In FY22, lethal take data for most projects completed under the SARBO from FY10-FY22 was independently verified by a contract company and used to update and confirm prior take by area and time. A comparison by species of hopper dredging lethal take in FY22 is provided in Figure 1 showing that take of the endangered Atlantic sturgeon was higher than for either the threatened green or loggerhead sea turtles. FY22 also resulted in a historic number of Kemp's ridley sea turtle lethal takes, which occurred again in FY23 as discussed further in

[3] While lethal take of one leatherback sea turtle occurred during dredging under the 2020 SARBO in Wilmington Harbor in FY20, this take was considered an anomaly and is not expected to reoccur. The 2020 SARBO did not provide take for this species, assuming it was not at risk from hopper dredging as no prior reports of a leatherback take by hopper dredging had been identified. USACE coordinated with NMFS after this take and concluded that reinitiation of consultation was not required due to the rarity of this event.

this section. All lethal take remained within the Incidental Take Statement provided in the 2020 SARBO.

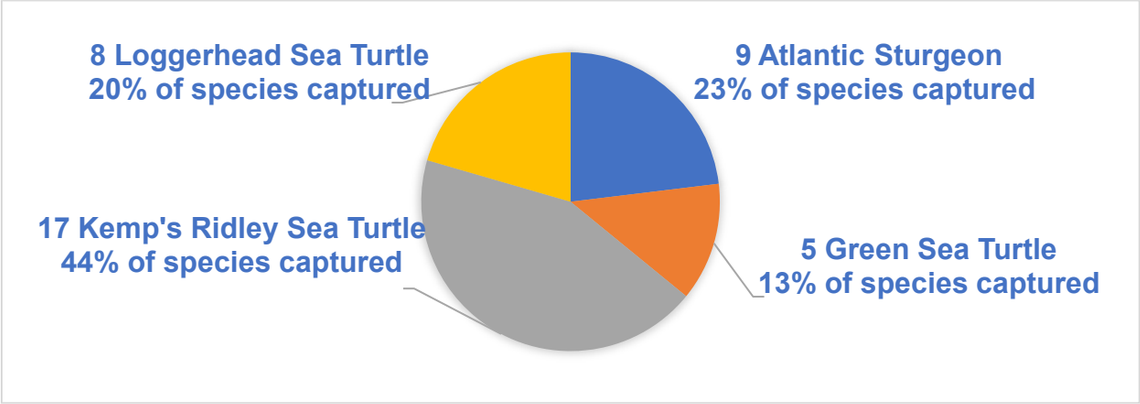

Figure 1. FY22 Hopper Dredging Take Showing Percent of Each Species

The 2020 SARBO offers flexibility in timing of dredging based on this SARBO Project Assessment process and the adaptive management process used to adjust minimization measures as deemed necessary or to stop work. Three projects (Brunswick Harbor, Charleston Harbor, and Holden Beach) were stopped early in FY22 based on the post-take risk assessment conducted by USACE. Brunswick Harbor was again stopped early in FY23. These projects were conducted during timeframes historically required and previously referred to as the seasonal dredging window, yet it resulted in numerous sea turtle hopper dredging take. A growing body of research (discussed below) indicates dredging during the timeframes still required at many projects increases the probability of lethal take of sea turtles based on their overwintering behavior and that, even if more sea turtles are present during warmer months, their behavior during these times decreases the probability of entrainment. Therefore, USACE agrees with NMFS determinations in the 2020 SARBO that limiting work to “winter” months, as was required under the 1997 SARBO, may not be the only, or even most effective, way to reduce the probability of entrainment of sea turtles in some locations. Much knowledge has been gained since the decision was made to try to minimize lethal take of sea turtles by restricting hopper dredging to “winter” months, which extended into Spring. In addition, these prior timing restrictions did not consider the best timing for other species, such as the endangered Atlantic sturgeon or critically endangered NARW, both of which are seasonally present and at increased probability of take when work occurs during the timeframes historically required under the 1997 SARBO.

It has been observed by USACE that the most significant number and percent of lethal hopper dredging take in FY22 occurs at the same navigation dredging projects covered under 2020 SARBO (i.e., Savannah Harbor, Brunswick Harbor, and Naval Submarine Base Kings Bay), representing 51% of all take under SARBO, 45% of all sea turtle take, and 88% of all Atlantic sturgeon take. If expanded to include other projects in the same central Georgia to north Florida area (i.e., Naval Station Mayport and Jacksonville Harbor), these projects represent 55% of all take under SARBO, 54% of all sea turtle take, and 90% of all Atlantic sturgeon take (Table 5). These projects have had timing restrictions to protect sea turtles present year-round in varying abundance although those timing restrictions coincide with the seasonally limited presence of NARW during calving season and seasonally limited presence of Atlantic sturgeon in marine and estuarine waters. Yet these timing restrictions still result in higher sea turtle take for these projects than other projects. Large numbers of sea turtles and Atlantic sturgeon have been relocated when work was limited to historic dredging timeframes indicating abundance even during historic timeframes, as discussed under the relocation trawling analysis below. USACE concludes that moving hopper dredging outside this historic timeframe may be more protective of Atlantic sturgeon, NARW, and even sea turtles based on observations in other projects that adjusted project timing and for the reasons described below.

USACE asserts the probability of sea turtle entrainment by hopper dredging is likely more related to turtle behavior than abundance in a project area. Sea turtles’ behavior can

generally be classified as foraging, resting, or transiting, and research indicates that these behaviors are influenced by time of year, sea temperature, sediment types, and foraging opportunities. Studies that capture dive patterns indicate sea turtle behavior changes in lower water temperatures during winter and early spring months as they enter an overwintering state. Figure 2 below shows loggerhead sea turtle dive durations at three locations in Greece, Gulf of California, and Cape Canaveral, Florida (within the SARBO action area)[4] where the dive times dramatically increase as sea surface temperatures decrease in December to March. This was also observed in the Gulf of Mexico when studying dive behaviors of loggerhead sea turtles,[5] for which the study concluded, "Although it has been suggested that sea turtles in some locations remain dormant (i.e., hibernate) at temperatures below 10°C, recent studies suggest an alternative; that turtles undertake long dives paired with infrequent surfacing events during winter." The study also concluded, "[I]t is possible that because turtles are ectotherms, they are simply more active in warmer waters, or they use differing water temperatures for thermoregulation." While colder temperatures are still relevant factors and can lead to cold stun events, the generally colder waters that occur during winter months also result in an overall sea turtle behavioral change that likely leaves them more vulnerable to hopper dredging lethal take. When overwintering, sea turtles tend to have long rest times on the sea floor lasting several hours with short surface intervals, which increases the likelihood that the turtle is in the same space as a draghead working on the sea floor and likely in a behavior state that is less likely to be able to quickly respond to oncoming equipment.

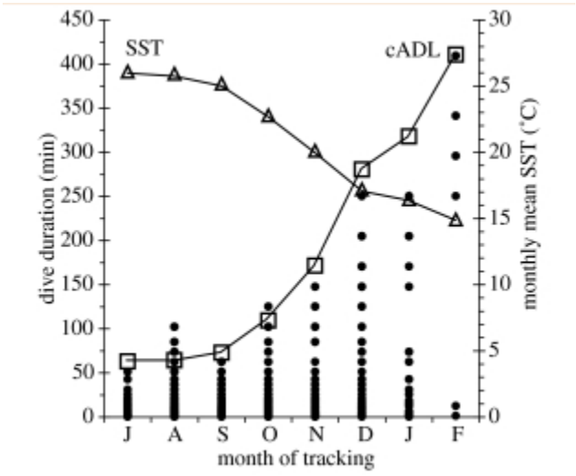

Figure 2. Dive durations (filled circles) of a loggerhead turtle recorded in different months during the tracking period. Open triangles represent the monthly average sea surface temperature (SST).

When the sea surface temperature rises, sea turtles become more active with more frequent dives and longer surface intervals indicating they spend more time in the water column where they are less likely to be entrained by a hopper dredge draghead operating at the sea floor. While turtles still rest throughout the year, those that are resting between inter-nesting periods, foraging, or while transiting, such as loggerhead sea turtles moving north of the SARBO action area after nesting, are likely better able to detect the presence of equipment in the area and avoid an interaction than turtles in an anaerobic overwintering state. During the times sea turtles are resting between inter-nesting periods, foraging, or while transiting after nesting, they are still likely to be encountered by relocation trawling nets dragged through the water column. This was observed in FY22 for the beach nourishment projects that started in January and continued throughout the remainder of the FY, which resulted in both hopper dredging entrainment and relocation trawling captures in January through mid-April. Only one sea turtle was entrained during

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[4] Hochscheid S, Bentivegna F, Hays GC. First records of dive durations for a hibernating sea turtle. Biol Lett. 2005 Mar 22;1(1):82-6. doi: 10.1098/rsbl.2004.0250. PMID: 17148134; PMCID: PMC1629053.

[5] Iverson AR, Fujisaki I, Lamont MM, Hart KM (2019) (stating that loggerhead Sea turtle (Caretta caretta) diving changes with productivity, behavioral mode, and sea surface temperature). PLoS ONE 14(8): e0220372. https://doi.org/10.1371/journal. pone.0220372.

hopper dredging after 19 April 2022, yet another 118 sea turtles were captured during relocation trawling from 20 April to 30 September 2022.

Hopper dredging for the Holden Beach project in FY22 resulted in four sea turtle lethal takes (three Kemp's ridley and one loggerhead) in March and April while other similar beach projects in North Carolina in FY22 (Buxton, Avon, Nags Head, Kill Devil Hills, and Southern Shores shown in Figure 3) using hopper dredging later in the year were completed with only 1 take (green at Kill Devil Hills). Hopper dredging resumed at Duck and Southern Shores in April and May or FY23, again completed outside the historic dredging timeframe without lethal take (Figure 4). Similarly, dredging in Wilmington Harbor in March in FY22 resulted in two lethal sea turtle takes and work that resumed in May in FY22 did not result in lethal take. Figure 3 shows all hopper dredging lethal take observed and relocation trawling captures for projects covered under SARBO in FY22. The relocation trawling records confirm that sea turtles, including Kemp's ridley sea turtles captured in record numbers in FY22 earlier in the year, remained in the areas where hopper dredging was occurring without lethal take. The continued captures are not surprising since the waters off the outer banks of North Carolina where the beach projects occurred in FY22 are known to have high densities of sea turtles and are designated critical habitat for loggerhead sea turtles (79 FR 39855) for nesting beaches (nearshore reproductive habitat), for breeding areas, and as a constricted migratory pathway for loggerhead sea turtles migrating to northern foraging grounds in summer months and back in the fall to overwintering sites south of Cape Hatteras.

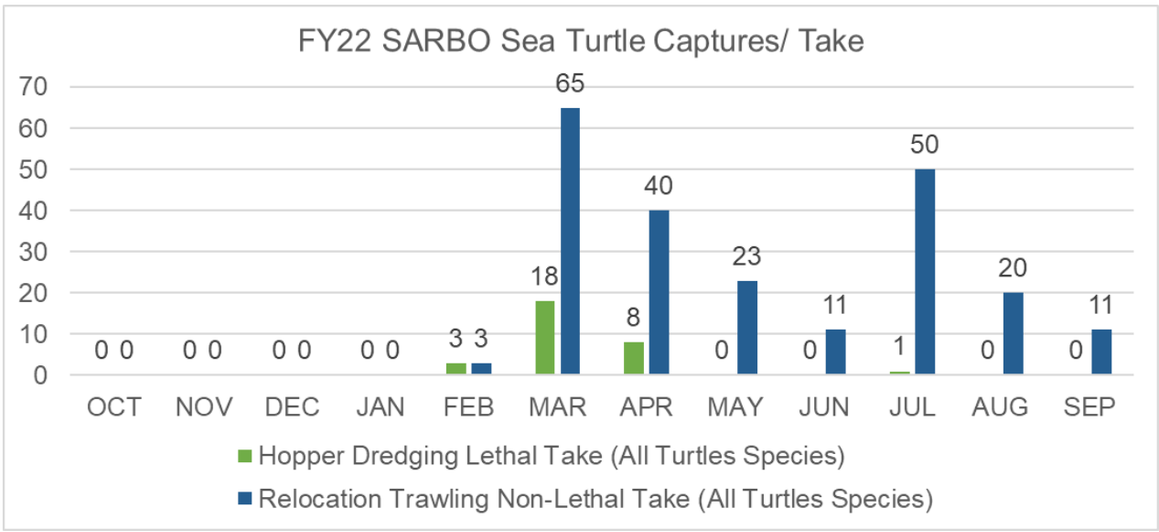

Figure 3. Sea Turtles Captured during Hopper Dredging and Relocation Trawling under 2020 SARBO in FY22

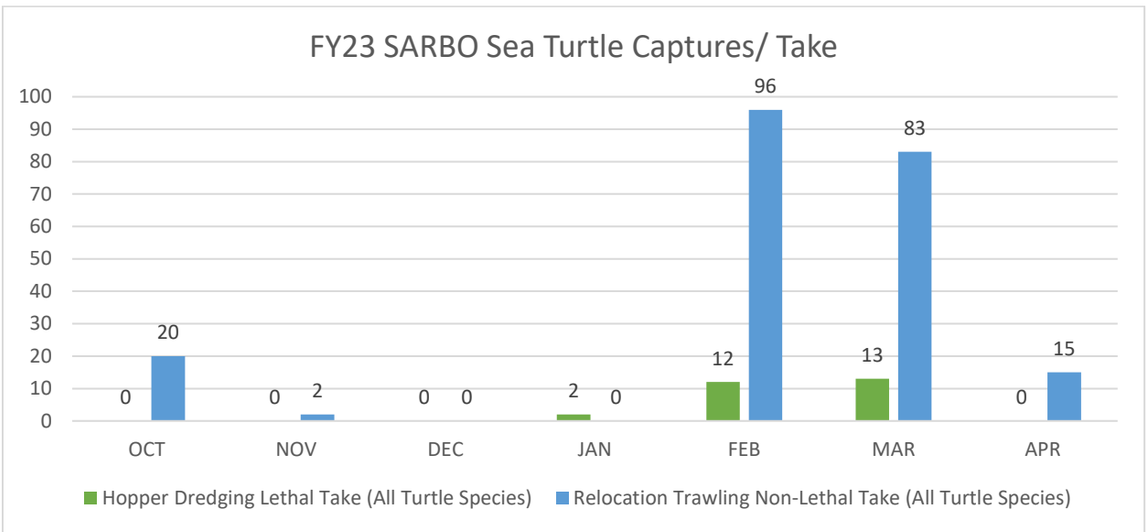

Figure 4. Sea Turtles Captured during Hopper Dredging and Relocation Trawling under 2020 SARBO in FY23 (1 OCT 2022 to 8 MAY 2023)

The presented data aligns with some sea turtle experts' beliefs that summer hopper dredging may have the lowest probability of sea turtle entrainment, even if abundance is high in the area. This has also been observed at other projects where colder timeframes resulted in higher turtle take by hopper dredging than warmer timeframes for the same projects or where hopper dredging occurred in area with a high density of turtles yet minimal to no take occurred. Florida (south of Titusville) has not had seasonal restrictions to protect sea turtles that limit dredging to colder timeframes, and the area has designated critical habitat for loggerhead breeding areas in the waters off the central east coast and the highest nesting concentration. As reported in the RHDC 5.0 Pre-Construction Risk Assessment, hopper dredging take data for FY13 – FY20 showed that even though the east coast of Florida has a high density of turtles, only 14% of all sea turtle takes occurred on the east coast of Florida south of Kings Bay.

The three figures below show the projects completed in FY21(Figure 5), FY22 (Figure 6), and FY23 to date (Figure 7) under the 2020 SARBO and the quantity of lethal take that reported for each. The lines show the timeframe in which work occurred followed by text listing observed lethal take and the total number of days that dredging occurred (referred to as dredge days). Dredge days count all days that a dredge was working, including if more than one dredge was working (e.g., two hopper dredges working for 20 calendar days = 40 dredge days). This information is used for the SARBO Project Assessment of the same projects in future years and for projects in surrounding areas.

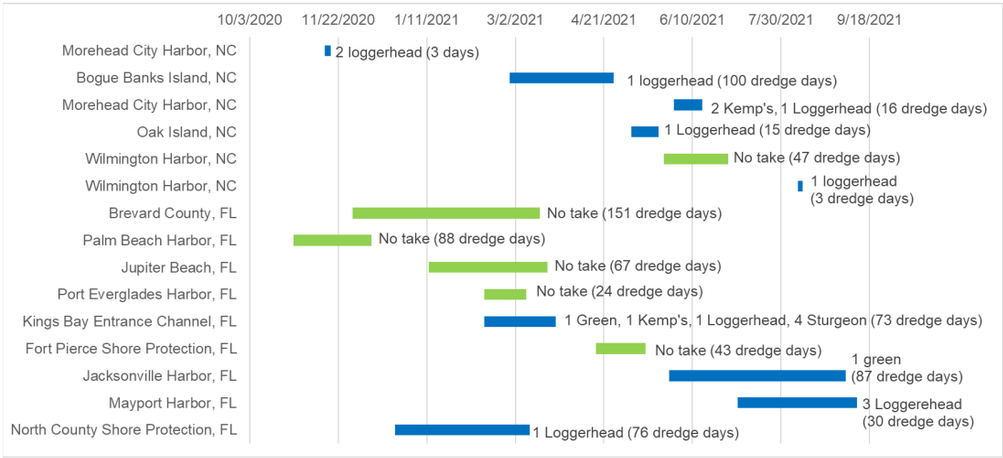

Figure 5. Projects Completed in FY21 under 2020 SARBO. Green lines indicate projects with no take, and blue lines are projects with observed hopper dredging take.

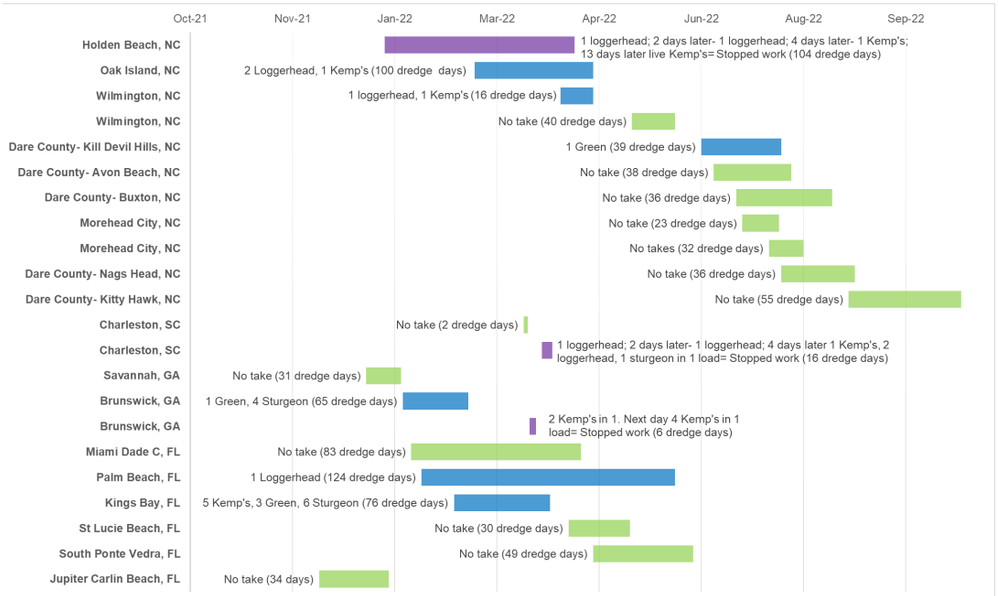

Figure 6. Projects Completed in FY22 under 2020 SARBO. Green lines indicate projects with no take, blue lines are projects with observed hopper dredging take, and purple lines are projects that had take and stopped work early.

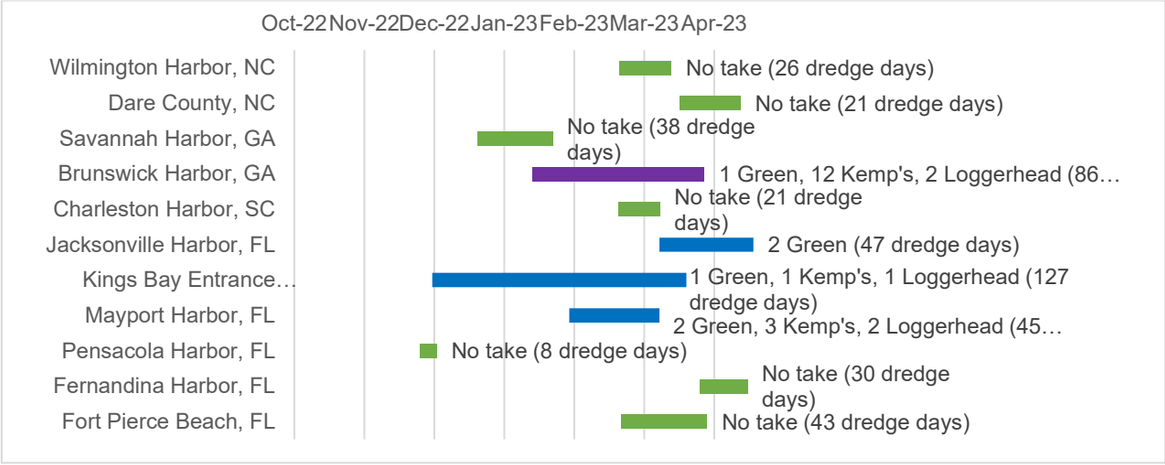

Figure 7. Projects Completed in FY23 from 1 OCT 2022 to 8 MAY 2023 under 2020 SARBO. Green lines indicate projects with no take, blue lines are projects with observed hopper dredging take, and purple lines are projects that had take and stopped work early.

For sea turtles, the probability of encounter by species and area can vary. Loggerhead sea turtles are typically the most frequently encountered in the SARBO action area and the highest allowed take under the 2020 SARBO Incidental Take Statement (107 loggerheads per three-year period, which is approximately 35 per year). Of the 290 reported sea turtle lethal takes under the 1997 SARBO with the species identified,[6] loggerhead sea turtles accounted for 63% of all take (183 reported), followed by an almost even number of green and Kemp's ridley sea turtles with 18% green (53 reported) and 19% Kemp's ridley (54 reported), as shown in Figure 8.

The 2020 SARBO Incidental Take Statement provided species take limits in three consecutive year timeframes to account for variability, as was evident by the unprecedented number of Kemp's ridley sea turtle takes that occurred under the 2020 SARBO in FY22. In FY22, a total of 18 Kemp's ridley sea turtles were entrained during hopper dredging (17 lethal take and 1 rehabilitated and released alive [not counted as lethal take]). Figure 8 compares the percent of Kemp's ridley sea turtle captures on all 2020 SARBO projects in FY22 to those reported under the 1997 SARBO from 1997-2018. Table 36 in the 2020 SARBO reported that the average hopper dredging lethal take of Kemp's ridley sea turtles under the 1997 SARBO was three per year with a maximum observed take of eight in a single year. The 18 observed lethal take in FY22 is within the allowed take limits for this species because the Incidental Take Statement for Kemp's ridley sea turtles under the 2020 SARBO is 58 observed lethal takes per three consecutive year period (average of 19 per year).

While all work in FY23 is not yet complete, work completed to date resulted in the highest number of Kemp's ridley lethal take from hopper dredging in a single FY. To date 16 Kemp's ridley lethal takes from hopper dredging have occurred with 12 reported at Brunswick Harbor, one at Kings Bay, and three at Mayport. This is believed to have been related to the higher-than-average number of Kemp's ridley in the area in FY22 and occurring again in FY23. In Brunswick Harbor, the amount of work required to be completed in FY23 was also higher than normal due to hopper dredging not occurring in this area in FY21 and hopper dredging stopped early in FY22. Despite numerous efforts to minimize hopper dredging entrainment in Brunswick Harbor again in FY23, including operating two relocation trawls and shifting areas worked to avoid potential concentrations of turtles, the Corps did not have the option to shift Brunswick Harbor project timing to times believed to be lower risk to turtles because of environmental compliance restrictions and navigation impediments that needed to be removed. Once the navigation restriction was addressed, dredging in Brunswick Harbor in FY23 was again stopped early before all work was complete. Despite the unprecedentedly high number of

[6] 2020 SARBO Table 36 provides total hopper dredging takes from 1997-2018 by species covered under the 1997 SARBO (290 turtles identified by species+ 39 Atlantic sturgeon = 329 total identified takes. Five unknown turtle species and three unknown sturgeon were also reported.

Kemp's ridley takes in FY22 and again in FY23 in Brunswick Harbor, work completed in both fiscal years, individually and combined with all other dredging covered under the 2020 SARBO, remained within the incidental take limit of the 2020 SARBO. The incidental take limit in the 2020 SARBO is set by NMFS at levels that will were determined would not reduce the likelihood of the species population's ability to survive or recover.

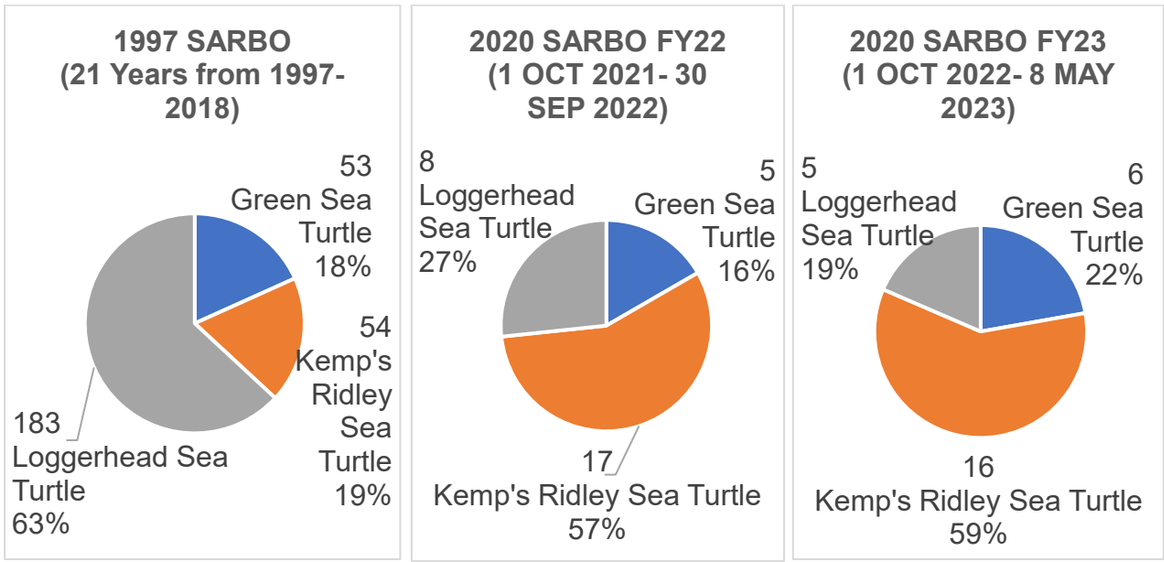

Figure 8. Percent of Sea Turtle Take by Species from Hopper Dredging under 1997 SARBO vs 2020 SARBO in FY22

As an example of the variability in species take per year, the hopper dredging lethal take observed in Brunswick Harbor is shown in Figure 9, highlighting a spike in Kemp's ridley sea turtles observed take in both 2012 and 2022 (10 years apart). According to NMFS, this species seems to appear in higher numbers in certain areas by year. For example, there is an increase in captures at fishing piers in the Northern Gulf for a few consecutive years and then a return to normal numbers. USACE will continue to monitor all take, especially Kemp's ridley sea turtles, over the next few years to ensure the take limit is not exceeded.

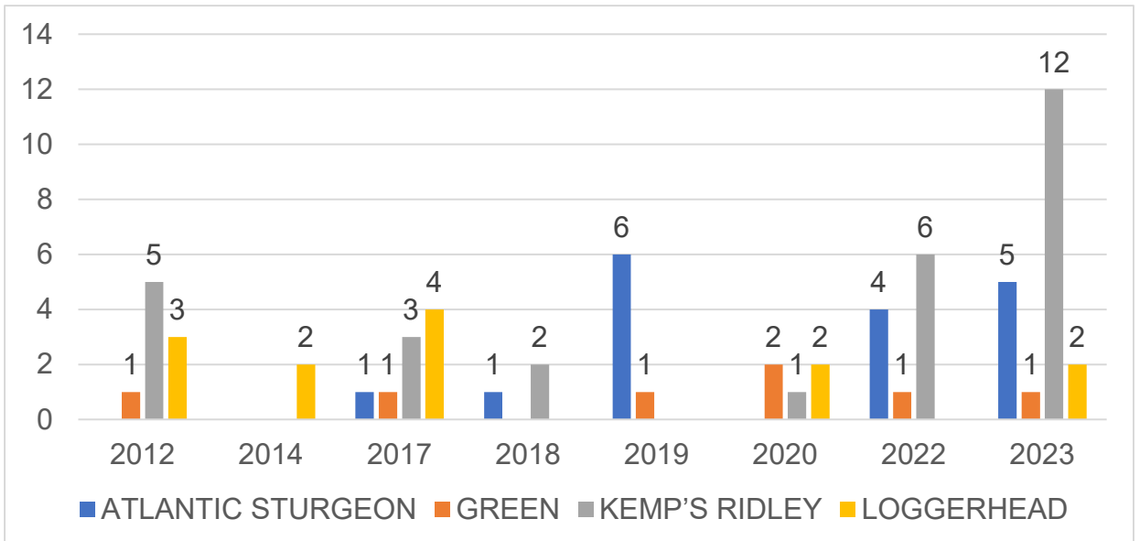

Figure 9. Brunswick Harbor Dredging Take (2010-2023)

USACE will continue to evaluate the probability of sea turtle and sturgeon take by hopper dredging based on an evolving understanding these species use project areas by time of year and in response to factors such as cold snaps, hurricanes, and prevalence of foraging resources. Understanding species abundance and how the species is using and moving within the area aids in understanding the probability of take by hopper dredging. However, no amount of planning can predict every condition encountered, and dredging in certain areas has been seasonally restricted resulting in a limited understanding of the probability of encounters. Therefore, USACE will continue to adaptively manage projects

to ensure lethal take of sea turtles at an individual project or cumulatively for all projects covered under the 2020 SARBO does not exceed the SARBO 2020 Incidental Take Statement.

USACE, including its U.S. Army Engineer Research and Development Center (ERDC), has partnered with industry and environmental agencies to find ways to reduce the probability of take during hopper dredge operations. Some successful changes to USACE operations include adding draghead deflector shields that create a sand wave to move turtles away from the draghead, requiring that draghead pumps are disengaged when not actively dredging, and switching to bed-leveling during the clean-up phase when hills and valleys left by hopper dredging make it harder to keep dragheads embedded. In addition, USACE closely monitors dredging using Dredging Quality Management, which is a USACE-Dredging Industry partnership for automated monitoring of dredge activities to provide quality near-real-time data such as monitoring the draghead depths, the velocity of material entering the dragheads, when pumps are engaged and disengaged, and related dredging information to ensure that the 2020 SARBO PDCs are being followed. In addition, closed net relocation trawling, now covered under the 2020 SARBO, is used to relocate sea turtles and sturgeon away from areas where hopper dredging is occurring to reduce the probability of entrainment during hopper dredging.

A.5. Bed-leveling and Agitation Dredging (2020 SARBO Section 3.1.1.6). The 2020 SARBO analyzed the use of bed-leveling and agitation dredging and determined this route of effect to be NLAA based on adherence to the PDCs. No new information is available that changes the NMFS analysis of agitation dredging, and USACE has not determined that bed-leveling techniques are resulting in effects not considered in the 2020 SARBO. For bed-leveling, USACE reviews all proposed designs provided pre-construction and, in a few instances, has determined that they did not meet the requirements to protect species as generally outlined in the 2020 SARBO and, therefore, were not approved for use unless modified per USACE recommendations. Bed-leveling does not require additional consideration in the SARBO Project Assessment.

B. Capture and Relocation from Relocation and Abundance Trawling (2020 SARBO Section 3.1.3). The 2020 SARBO concluded that sea turtles (green, Kemp's ridley, leatherback, and loggerhead), sturgeon (Atlantic and shortnose), giant manta ray, and smalltooth sawfish may be captured by relocation trawling, provided minimization measures as part of the PDCs, and provided a take limit for species captured during trawling. The probability of entrainment of ESA-listed species is highest for sea turtles and Atlantic sturgeon, and it typically results in non-lethal take. Sea turtles and Atlantic sturgeon are the only species that have been captured during trawling under the 2020 SARBO. Species captured during relocation trawling in FY22 are provided in Table 1 and relocation to date for FY23 is provided in Table 2. To date, abundance trawling has not been used under the 2020 SARBO. Take limits for these species are provided in the 2020 SARBO for trawling, which USACE SAD manages to ensure the take limits are not exceeded.

Table 1. FY22 Relocation Trawling Non-Lethal Captures (1 OCT 2021- 30 SEP 2022)

Project Name[7]	Green Sea Turtle	Kemp's Ridley Sea Turtle	Leatherback Sea Turtle	Loggerhead Sea Turtle	Total Sea Turtles	Atlantic Sturgeon
Navigation Channel Dredging						
Wilmington Harbor, NC	2	2	1	23	28	2
Morehead City, NC		6		13	19	
Charleston Harbor, SC		4		1	5	
Brunswick Harbor, GA		9		3	12	
Kings Bay, FL	1	33		7	41	6
Dredging for Beach Nourishment						
Oak Island Beach, NC		18	1	9	28	27
Holden Beach, NC		10		7	17	10
Kill Devil Hills, NC				8	8	
Avon Beach, NC		7		18	25	
Nags Head Beach, NC		2		4	6	
Buxton Beach, NC		14		8	22	
Kitty Hawk Beach, NC			1	11	20	
Grand Total	**3**	**105**	**3**	**112**	223	**45**

Table 2. FY23 Relocation Trawling Non-Lethal Captures (1 OCT 2022- 8 MAY 2023)

Project Name[8]	Green Sea Turtle	Kemp's Ridley Sea Turtle	Leatherback Sea Turtle	Loggerhead Sea Turtle	Total Sea Turtles	Atlantic Sturgeon
Navigation Channel Dredging						
Kings Bay, FL	2	22		9	33	20
Brunswick Harbor, GA	1	49		13	63	41
Mayport, FL	1	11		9	21	1
Dredging for Beach Nourishment						
Kitty Hawk, NC		2	1	9	12	
Southern Shores, NC		5		5	10	
Duck , NC				21	0	
Grand Total	**4**	**89**	**1**	**66**	**160**	**62**

Relocation trawling was originally intended to relocate sea turtles out of a project area when the probability of lethal take was high or when multiple takes had occurred. This system of scooping up air breathing turtles and moving them to a new location has been used as a risk-minimization measure on many projects for over 30 years. In recent years, relocation trawling has also been used to move fish (not air breathing) to new locations. As discussed above, Atlantic sturgeon are present in these project areas during specific times of year, increasing the probability of encounter during trawling. As stated in the RHDC 5.0 Pre-Construction Risk Assessment, relocation trawling during historic "winter" months has resulted in the relocation of high numbers of Atlantic sturgeon in some areas, including 79 Atlantic sturgeon relocations in Brunswick Harbor between 18 January to 18 March 2018. In Savannah Harbor, 41 Atlantic sturgeon were relocated between 30 November 2017 to 1 April 2018. While minimal mortality was associated with these relocation efforts, it is stressful to the sturgeon and may result in decreased ability to weather other stresses. As discussed for hopper dredging, Atlantic sturgeon are seasonally present in the RHDC project areas and seem to be concentrated when they stage before entering spawning rivers in the spring. At this time, relocation trawling is still deemed an appropriate risk-minimization measure that can be implemented to reduce the probability of hopper dredging entrainment for Atlantic sturgeon. A breakdown of species

[7] North Carolina (NC), South Carolina (SC), Georgia (GA), and Florida (FL)
[8] North Carolina (NC), South Carolina (SC), Georgia (GA), and Florida (FL)

relocated at projects covered under the 2020 SARBO in FY22 is provided in Figure 10. Figure 11 provides the time of year when sturgeon were captured and the size (total length) of the sturgeon captured. Based on information provided by NMFS, sturgeon that are 30-150 cm total length are considered juveniles and those 150 cm and greater are adults. In FY22, 73% of the fish relocated were juveniles.

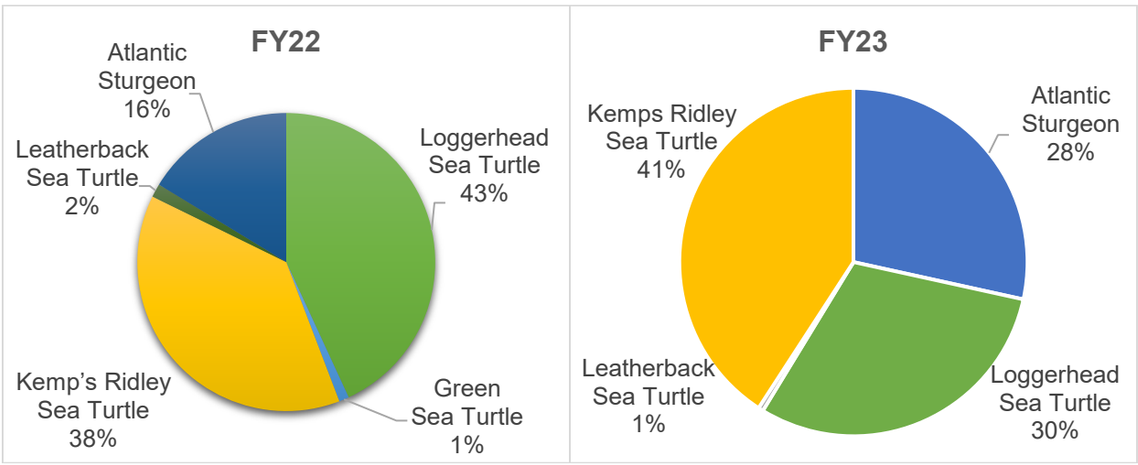

Figure 10. FY22 and FY23 Relocation Trawling Captures by Species (All SARBO Projects FY22 and FY23 from 1 OCT 2022- 8 MAY 2023)

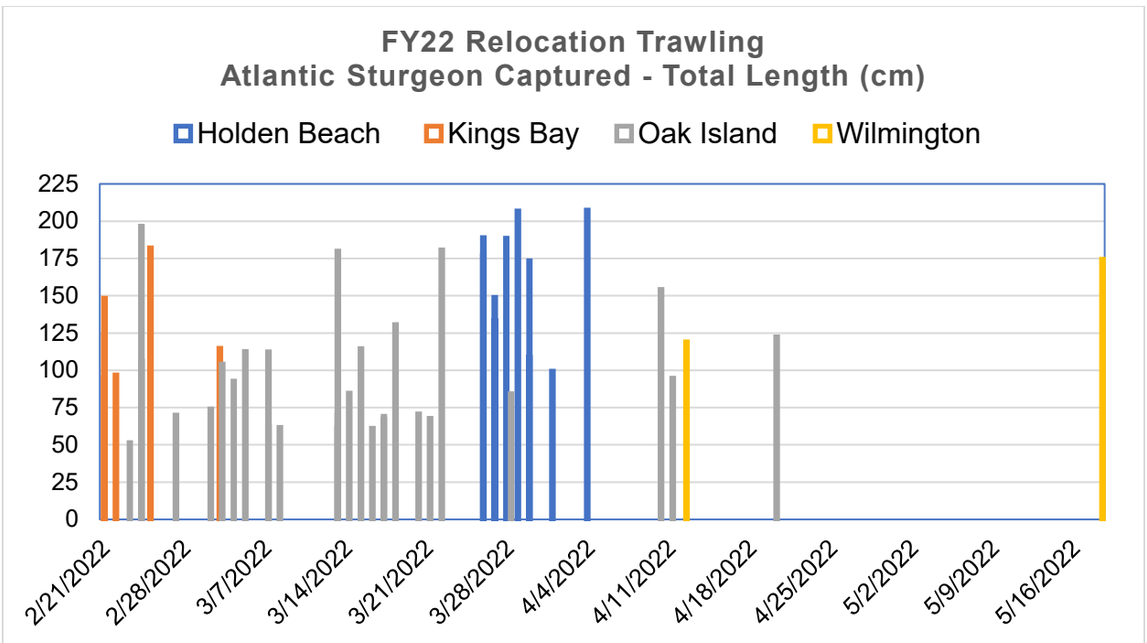

Figure 11. FY22 Relocation Trawling Captures of Atlantic Sturgeon by Date of Capture and Total Length (cm)

C. <u>Monitoring for and Handling of ESA-Listed Species During Hopper Dredging and Trawling (2020 SARBO Section 2.7)</u>. Protected Species Observers are required on all hopper dredges and relocation trawlers to monitor for take. This route of effect was evaluated in the 2020 SARBO and is limited based on adherence to the PDCs. USACE is unaware of any information that changes the analysis completed in SARBO and therefore does not require additional analysis in the SARBO Project Assessment.

USACE is working on improvements to the digital reporting program that tracks take (i.e., the Operations and Dredging Endangered Species System - ODESS), including improved tracking of bycatch to better understand effects to all species, which includes those of concern to other agencies. Historically, relocation trawling observations have been provided on handwritten data sheets. Any captured non-ESA-listed species are recorded as bycatch. In FY22, USACE increased digital tracking of bycatch on most projects conducted under the 2020 SARBO. USACE also has been partnering with contractors and Federal agencies to digitize historic records, verify historic hopper dredging take records, and test new applications to digitally report trawling capture data. This data will be available to use in risk-based decisions and publicly displayed on ODESS once

compiled, checked for accuracy, and evaluated by USACE with partners working to evaluate the data.

D. Entanglement (2020 SARBO Section 3.1.2). This route of effect was determined to be NLAA based on adherence to the PDCs. USACE is unaware of any information that changes the analysis completed in SARBO and therefore does not require additional consideration in the SARBO Project Assessment.

E. Vessel Strike (2020 SARBO Section 3.1.4). Vessel strikes may occur during dredging or during the transportation of materials between dredging and material placement locations. This route of effect was determined to be NLAA based on adherence to the PDCs for all species; however, emphasis was placed on the risk to the NARW species population if a vessel strike occurred. The 2020 SARBO includes a North Atlantic Right Whale Conservation Plan to address this issue (2020 SARBO Appendix F). NARW typically inhabit coastal waters along coastal Georgia and northern Florida each winter, often close to shore. According to the NMFS species directory website, each fall, some NARW travel more than 1,000 miles from North Atlantic feeding grounds to their only known calving grounds in the southeast; most of the calving occurs in the shallow, coastal waters off Georgia and northeastern Florida. These whales remain near the surface with their new calves and are hard to spot in the water making them susceptible to vessel strikes, which is one of the leading causes of death for this species. Section 3.1.4.1.4 of the 2020 SARBO states that NMFS is aware of two reports of a hopper dredge collision with a NARW. “One report occurred in South Africa in 1984 involving a Southern right whale and the other report occurred in Brunswick Harbor (within the action area) in 2005, though the report is contested by the USACE.”

The conclusions made by NMFS in the 2020 SARBO are predicated on USACE shifting most of the dredging for which vessels must transit through NARW calving areas to times when they are not present. As stated in the vessel strike analysis conclusion for NARW in Section 3.1.4.1.4,

> Because there are so few North Atlantic right whales, and much of the vessel traffic associated with the proposed action will take place outside of areas and times when North Atlantic right whales may be present, the likelihood of collisions is already very rare. We believe that the implementation of these additional protective measures in the PDCs further reduces the possibility of a vessel strike. When the rarity of occurrence is combined with the requirements of the North Atlantic Right Whale Conservation Plan, we believe a vessel strike is extremely unlikely to occur.

SARBO Section 6.1.1, lists the navigation channels that USACE had proposed to be dredged in warmer months and were analyzed by NMFS (that is, Brunswick Harbor, Savannah Harbor, Charleston Harbor, Wilmington Harbor Entrance/Inner Ocean Bar, Morehead City, and Manteo Entrance Channel). NMFS noted in Section 6.1.1 that any additional locations will be evaluated using the risk-based assessment process (now referred to as the SARBO Project Assessment).

Under the North Atlantic Right Whale Conservation Plan (2020 SARBO Appendix F), USACE committed to reducing vessel traffic when and where NARW may be found. Specifically, Avoidance Measure NARW.1 in Section 2.3 of Appendix F states, “Hopper dredging and projects requiring survey vessels over 33-ft in length will be scheduled, to the maximum extent practicable, outside of North Atlantic right whale migration and calving season to avoid impacts to North Atlantic right whales, including reproducing females and newborn calves.” USACE also committed to expanding the aerial surveys used to locate NARW in the southeast. Historically, NARW aerial surveys were limited to Georgia and Northern Florida, which were co-funded by USACE, NMFS, U.S. Navy, and the U.S. Coast Guard. These surveys are used as part of the Early Warning System to alert vessels of their presence to reduce the probability of vessel strikes. The aerial survey area expanded after completion of the 2020 SARBO to include North and South Carolina at the cost of approximately $1.5 million annually that is covered solely by USACE, thus demonstrating USACE’s commitment to NARW conservation. This

expanded aerial survey area significantly increases the area in which whale alerts are provided to mariners to reduce vessel strikes while providing valuable information to researchers on NARW use of this area.

F. Species Interaction with the Placement of Material (2020 SARBO Section 3.1.5). Placement of dredged material in an uplands site or an Ocean Dredged Material Disposal Site (ODMDS). This route of effect was determined to be NLAA for the species in these areas based on adherence to the PDCs. USACE is unaware of any information that changes the analysis completed in SARBO and therefore does not require additional consideration in the SARBO Project Assessment.

G. Blocked Access by Construction or Material Placement (2020 SARBO Section 3.1.6). This route of effect was determined to be NLAA based on adherence to the PDCs. USACE is unaware of any information that changes the analysis completed in SARBO and therefore does not require additional consideration in the SARBO Project Assessment.

H. Habitat Alteration from Activities Covered under this Opinion (2020 SARBO Section 3.1.7). Activities covered are generally maintenance that are not expected to significantly alter sensitive habitat. The 2020 SARBO also covers some new areas within existing borrow sites, new borrow sites, and new beach areas. Based on the activities covered and the PDCs that limit the activities, NMFS concluded that any habitat alteration is not likely to adversely affect or will have no effect on ESA-listed species. In areas with sensitive resources (i.e., corals/coral hardbottom) that are near the activity, additional review is required including requirements for pre-construction surveys of areas within the range of ESA-listed corals to determine if coral or coral hardbottom are present. If present, additional review and coordination with NMFS is completed to determine if additional minimization measures, such as relocation of coral, is warranted. The 2020 SARBO also considers the recurring loss of benthic resources within project areas, such as foraging resources for sturgeon in maintained channels that are assumed to apply to other species as well. The habitat alteration route of effect was determined to be NLAA based on adherence to the PDCs for effects to species and does not require additional consideration in the SARBO Project Assessment. As discussed for water quality in Section J below, USACE continues to evaluate this route of effect.

I. Sound Generated by Projects Covered under this Opinion (2020 SARBO Section 3.1.8). Geophysical and geotechnical surveys. This route of effect was determined to be NLAA based on adherence to the PDCs. USACE is unaware of any information that changes the analysis completed in the SARBO and therefore does not require additional consideration in the SARBO Project Assessment.

J. Water Quality Changes. Changes in water quality from dredging, bed-leveling, and material placement are described in detail in the 2020 SARBO Section 3.2.1.3. In summary, turbidity plumes are expected to be localized, to settle out quickly, and not to result in sedimentation that would harm species or habitat in the area. USACE continues to evaluate the potential for water quality changes to result in sedimentation effecting habitat both within and adjacent to dredging and placement areas to ensure that significant effects do not occur.

USACE continues to review water quality information to ensure that the effects from sedimentation or turbidity remain low. For example, USACE is collaborating with the North Carolina Department of Environmental Quality, and NMFS Protected Resources Division and Habitat Conservation Division to complete a three-year study to better understand the effects of dredging, water quality changes, and habitat alteration associated with continued maintenance of Wilmington Harbor and Morehead City. In addition, the U.S. Army Engineer Research and Development Center is reviewing available water quality data to summarize results and provide information in future project decision making. At this time, additional consideration in the SARBO Project Assessment is not required.

Projects occurring from the St. Lucie Inlet in Martin County, Florida south through the Florida Keys, Puerto Rico, and the U.S. Virgin Islands from mean low water line to 262 ft (80 m) depth are within the range of ESA-listed corals and require additional considerations since coral are non-mobile and cannot avoid water quality changes or potential burial of coral/coral hardbottom from sedimentation. The 2020 SARBO Appendix C outlines the ESA-listed coral protective measures required for those projects within the range of corals. The first step is to identify if habitat suitable for corals (referred to as coral hardbottom) is present and then if ESA-listed corals are within defined ranges of work proposed. If corals are identified, NMFS reviews each project individually to determine if relocation of corals is necessary to add additional protection beyond the minimization measures already included.

5. SARBO PROJECT ASSESSMENT RECOMMENDATIONS FOR ALL PROJECTS.

This SARBO Project Assessment is used to develop recommendations for each project based on the species considerations in Section 3 and routes of effects considerations in Section 4. This section provides general recommendations for all projects. Recommendations specific to projects covered under the 2020 SARBO in FY23 and FY24 are provided in the Memorandum for Record subject U.S. Army Corps of Engineers, South Atlantic Division FY23 and FY24 SARBO Project Assessment Recommendations for Projects Covered under the 2020 SARBO.

USACE typically becomes aware a project will be initiated soon by USACE awarding a contract for Civil Works projects or by being notified by a Regulatory Permittee that work will be performed that will be monitored and reported by USACE. So long as work is performed in compliance with the SARBO PDCs, the recommendations in this SARBO project assessment, and any project-specific conditions set by USACE (e.g., earliest start date for work, latest completion date, and use of certain mitigation measures), the exact timing for performing work will be left to the discretion of the entity performing the work.

Before and during dredging, USACE monitors and adjusts, as appropriate, recommended minimization measures (e.g., relocation trawling and bed-leveling). Although USACE applies all available information to make risk-informed decisions in the SARBO Project Assessment, species anomalies have and will continue to occur. These anomalies support the continued need for the three-consecutive-year take limit provided in the 2020 SARBO, as discussed above regarding takes associated with Kemp's ridley in FY22. USACE retains the discretion to stop work on any project whenever the total observed take for an individual project, or combination of projects, is deemed too high or if the probability of continued take is deemed unacceptable.

A. Equipment. Based on the information and analysis in this SARBO Project Assessment, three scenarios were identified that could result in encounters with ESA-listed species addressed in the 2020 SARBO: (1) hopper dredging and relocation trawling projects, (2) projects with vessels transiting an area when and where NARW may be present, and (3) cutterhead projects working in sturgeon rivers with project timing restrictions based on the PDC requirements in SARBO Appendix E. It is assumed that projects will use the equipment type with the greatest potential effect identified when considering anticipated upcoming projects. For example, projects that identified hopper dredge as the equipment type that will be used may also use other methods, such as cutterhead or mechanical dredging, since contracts and permits do not require the use of a specific equipment type.

A.1. Hopper Dredging. In general, the same projects use hopper dredging each year and are expected to continue to use hopper dredging based on experience and limitations of other equipment types to complete work in these environments. The analysis for these projects anticipates hopper dredging would be used but in a manner that recognizes the potential for entrainment of take of sea turtles and sturgeon. Use of certain equipment types, such as hopper dredges, may be limited by availability or may limit the ability to complete the work effectively based on the type of job and the environment it operates in. Therefore, these projects may also use other types of equipment to complete the work. For example, maintenance dredging needs on USACE higher priority projects may divert hopper dredges or other resources to address high

shoaling demands, as is the case on the Mississippi River that typically occurs annually from February to April.

Since hopper dredging may result in lethal take of sea turtles and sturgeon, project timing recommendations are provided each year for all hopper dredging projects using information in this SARBO Project Assessment and any lessons learned from prior hopper dredging events. USACE also will continue to work with species experts and industry to find ways to optimize available minimization measures that can be used when USACE deems appropriate based on the SARBO Project Assessment. If innovative equipment or equipment modifications are deemed appropriate to try to reduce species impacts, these changes will be coordinated with NMFS through the "Alternative Project Implementation and Programmatic Modification through the Superseding Process of Review," which is outlined in Section 2.9.5 of the 2020 SARBO.

A.2. Relocation Trawling. Relocation trawling remains a viable option to reduce the probability of hopper dredging entrainment of sea turtles and sturgeon. However, relocating during summer months may encounter gravid (i.e., pregnant, carrying eggs) female sea turtles, and stress and exertion from relocation increases risk of unintended harm (e.g., nonlethal reproductive loss), as analyzed in SARBO Section 6.1.4.1.2, and therefore may result in unobserved take. Consequently, the use and duration of relocation trawling will be based on a balance of stressors inflicted upon sea turtles during relocation versus the probability of entrainment from hopper dredging (i.e., will depend upon number of adult female sea turtles captured versus the number of those entrained).

Relocation trawling should be included in the contract as an optional line item to provide discretion to USACE to require its use as needed without having to modify the contract. The decision to use relocation trawling on a specific project prior to starting hopper dredging or while work is occurring will be made in coordination between the District and USACE SAD. The decision will also consider the probability of capture of species in the area including those unintentionally captured as bycatch.

A.3. Bed-Leveling. Bed-leveling during the final phase of work reduces the probability of take of species as this is when peaks and valleys left by hopper dredging make keeping the draghead firmly embedded in the sediment more challenging.

Bed-leveling should be included in the contract as an optional line item to provide discretion to USACE to require its use as needed without having to modify the contract. The decision to use bed-leveling on a specific project prior to starting hopper dredging or while work is occurring will be made in coordination between the District and USACE SAD.

A.4. Projects Completed Using Cutterhead Dredging. No project timing or other risk-minimization measures are required beyond those provided in the Sturgeon PDCs in SARBO Appendix E. This SARBO Project Assessment covers all cutterhead dredging projects that may be covered under the 2020 SARBO. If new information warrants reconsideration of the risks associated with cutterhead dredging beyond the analysis in the 2020 SARBO and this SARBO Project Assessment, then either the SARBO Project Assessment will be updated or re-initiation of consultation of the 2020 SARBO will be required depending on the level of risk identified from the use of this equipment type.

A.5. Projects Completed Using Mechanical, Government Plant/Modified Hopper, or Agitation Dredging Outside of the Range of ESA-listed Corals. No project timing or additional risk-minimization measures are required. This SARBO Project Assessment covers all mechanical, agitation, and government plant dredging projects that are covered under the 2020 SARBO and are conducted outside the range of ESA-listed corals. If new information warrants reconsideration of the risks associated with these equipment types beyond the analysis in the 2020 SARBO and this SARBO Project Assessment, then the SARBO Project Assessment will be updated or re-initiation of consultation of the 2020 SARBO will be required depending on the level of risk identified from the use of these equipment types.

B. Project Timing. Based on the information analyzed in the SARBO Project Assessment, project timing recommendations are provided for (1) hopper dredging and relocation trawling projects, and (2) projects with vessels transiting an area when and where NARW may be present. Cutterhead projects working in sturgeon rivers must follow the project timing requirements in the 2020 SARBO Sturgeon PDCs in Appendix E. For hopper dredging and vessels transiting NARW areas, the timing considerations analyzed in the SARBO Project Assessment are summarized in Table 3 below, with each species risk considered by month in areas where the species is likely to be present and a short summary of the rationale provided.

B.1. Hopper Dredging in Wilmington, Morehead City, Charleston, Savannah, Brunswick, and Jacksonville Harbors. USACE recommends changing the project timing for these major Civil Works navigation projects that support nationally important ports within the action area of SARBO. Historically, hopper dredging in these areas was required to occur during what was referred to as winter months - generally from 15 December and 31 March. However, information analyzed in the 2020 SARBO (including the risk-based assessment and effects analysis in Section 6.1.1) and analyzed in this SARBO Project Assessment support shifting the timing to avoid interactions with the endangered NARW that migrate through and calves in the same area as these projects, which are highly susceptible to vessel strikes. Shifting the timing also protects endangered sturgeon that are often found in large numbers in these project areas prior to migrating into rivers to spawn in the summer. In addition, data supports the conclusion that shifting dredging away from historic windows protects sea turtles that overwinter, especially in Georgia and North Florida. When overwintering, sea turtles are more vulnerable to hopper dredging entrainment because they spend significantly more time resting on the sea floor and are likely in a metabolic state that does not allow them sufficient time to respond to threats. Dredging and relocation trawling in FY22 and FY23 during historic timeframes has resulted in historically high numbers of interactions, including lethal take by hopper dredging and nonlethal take during relocation trawling of the endangered Kemp's ridley sea turtle. During FY22, hopper dredging that occurred after mid-April resulted in continued capture of this species in trawling, yet there was only one lethal take due to hopper dredging, as discussed in Section A.4 above.

USACE will continue to work with NARW, sturgeon, and turtle experts to further USACE's understanding of ways to reduce the probability of take when possible and to optimize risk minimization measures available to use based on project specific circumstances. USACE is also working to quality check, digitize, and provide relocation trawling and hopper dredging take records to aid in discussions and analyses of data with species experts.

Until the environmental compliance requirements are updated, Wilmington, Morehead City, Charleston, Savannah, and Brunswick will continue to dredge between 15 December and 31 March. Once current sources of restrictions are resolved, USACE will update the SARBO Project Assessment, as required by the SARBO, to determine the timing, equipment, and mitigation measures for conducting maintenance dredging at these five projects and minimizing the risk of takes. Jacksonville Harbor currently does not have a winter dredging restriction.

Table 3. Summary of Risk to ESA-Listed Species under the 2020 SARBO.[9]

Species	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Whales (Blue, Fin, Sei, Sperm)	These whale species are deep water pelagic species not expected to be found within areas where activity would occur. The likelihood of encounter is very low. No reported encounters with dredging or related activities. No take limit provided under SARBO.											
NARW	High Risk because often present in and/ or near project areas during calving season. Highly susceptible to vessel strikes. No take allowed. Take would affect species population and recovery.			Not expected to be present; migrate north during these months.								
Sea turtles	Sea turtles present year-round. Hopper dredging and trawling frequently result in encounters, especially in certain areas and during times of year analyzed in Section 3. Medium risk because probability of encounters is high, but risk of take changing survivability or recovery of species based on take limits in 2020 SARBO is low.											
Oceanic Whitetip shark	This shark is a deep-water pelagic species. The likelihood of encounter is very low and the risk to this species from the routes of effects identified is low, as described in the 2020 SARBO.											
Giant manta ray	Based on observations, giant manta ray may be present year-round with higher likelihood in warmer months as they migrate up the Atlantic coast in summer months. No reported encounters with hopper dredges and or relocation trawling under 2020 SARBO. Therefore, the likelihood of encounter is low and the risk to this species from the routes of effects identified is low, as described in the 2020 SARBO. Non-lethal capture by relocation trawling (take) is provided in the 2020 SARBO.											
Smalltooth sawfish	Observations north of Florida are rare and typically limited to Georgia. No reported encounters with hopper dredges or relocation trawling under 2020 SARBO. Therefore, the likelihood of encounter is very low and the risk to this species from the routes of effects identified is low, as described in the 2020 SARBO. Non-lethal capture by relocation trawling (take) is provided in the 2020 SARBO.											
Atlantic Sturgeon	Frequent encounters by hopper and trawler occur during winter months, but risk of take changing survivability or recovery of species based on take limits in 2020 SARBO is low.											
Shortnose Sturgeon	Shortnose sturgeon typically stay in spawning rivers year-round and there are no records of hopper dredging take of this species in project areas. Therefore, the likelihood of encounter is very low and the risk to this species from the routes of effects identified is low, as described in the 2020 SARBO.											

B.2. Hopper Dredging in King's Bay Entrance Channel and Mayport. These projects occur within a range of coastline that historically has resulted in the majority of sea turtle and sturgeon take and are adjacent to the core NARW calving areas. Both projects are Regulatory projects with the U.S. Navy and have national security significance that limits the timing adjustments and scope of work modifications that can be made. At this time, Kings Bay hopper dredging is restricted by environmental compliance requirements to occur between 15 December and 31 March. Mayport dredging does not have this restriction. If the current sources of restrictions are resolved for Kings Bay, USACE will update the SARBO Project Assessment, as required by the SARBO, to

[9] Risk is color coded: red is high, yellow is moderate, and green is low. Risk to species shown in this table assumes work is occurring within the range of the species as defined in the 2020 SARBO (e.g., range provided for sturgeon in the Sturgeon PDCs).

determine the timing, equipment, and mitigation measures for conducting maintenance dredging at these two projects and minimizing the risk of takes.

B.3. Beach Nourishment Projects Located North of St. Lucie Inlet, Florida Using Hopper Dredging at a Borrow Site. Projects in this area are within the range of NARW, as defined in the USACE NARW Conservation Plan in Appendix F of the 2020 SARBO. It is recommended that work in this area be initiated on or after 1 April to minimize the risk of vessel strikes. Projects that are required to work during this time will follow the minimization measures in the USACE NARW Conservation Plan. For borrow sites, under BOEM's jurisdiction, projects have also been using these sand sources for decades resulting in institutional knowledge of the probability of take when hopper dredging in these areas. As a component of the BOEM study titled "Review of Sea Turtle Entrainment Risk by Trailing Suction Hopper Dredges in the US Atlantic and Gulf of Mexico and the Development of the ASTER Decision Support Tool,"[10] a workshop with the dredging industry was conducted that identified a suite of dredging related risk factors associated with borrow area design that may increase hopper dredge sea turtle entrainment risk. In this report, it was noted that there were only 25 sea turtle takes associated with borrow area dredging between 1995 and 2017. That is equal to less than one turtle per year. The report concludes,

> Navigational dredging generally poses greater risks of entrainment of sea turtles because of their tendency to concentrate in channels in the southeastern U.S. and the constrained operating environment for TSHDs [trailing suction hopper dredge]. The number of sea turtles entrained by TSHDs in offshore borrow areas, including both state waters and the OCS [Outer Continental Shelf], has historically been relatively low when compared to navigation channel dredging (GEC 2012). Offshore borrow areas are generally more expansive and allow for more operational flexibility of dredging equipment to implement current mitigation requirements designed to minimize sea turtle entrainment risk (i.e., dredge pumps are disengaged until dragheads are firmly on the bottom).

The BOEM and USACE SARBO team continue to communicate with geologists and design engineers during project planning and development of final borrow area designs regarding these risk factors, related mitigation measures, and innovations to reduce risk. BOEM and USACE review project environmental conditions to promote operational efficiencies and reduce the probability of sea turtle entrainment. While the probability of entrainment of sea turtles and sturgeon is low when hopper dredging in offshore borrow sites, the project timing and potential effects to sea turtles must also be considered. Placement of sand on nesting beaches is under the jurisdiction of U.S. Fish and Wildlife Service, and sand placed above the water line is not covered by the SARBO. Beach nourishment projects completed in North Carolina in FY22 successfully hopper dredged in borrow areas during sea turtle nesting season with lower lethal take than when working during December to March timeframes, thus demonstrating that project timing to reduce the probability of in-water sea turtle entrainment is not limited to winter months.

C. Projects Located from St. Lucie Inlet, Florida South through the Florida Keys; Puerto Rico; and the U.S. Virgin Islands. Projects located in these areas are within the range of ESA-listed corals and must adhere to the Coral PDCs in Appendix C. Surveys are completed prior to initiation of these projects to confirm the presence or absence of ESA-listed corals or hardbottom habitat that supports corals. If these resources are located, additional protective measures apply, and coordination with NMFS is initiated to determine if relocation of corals may be warranted for additional protection. These areas are outside of the range of NARW and sturgeon so additional project timing considerations for those species are not necessary. Sea turtle risk-minimization measures in this area focus primarily on project timing requirements related to sea turtle nesting for beach nourishment projects as determined in coordination with the U.S. Fish and Wildlife

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[10] Ramirez, A, Kot, CY, Piatkowski, D. 2017. Review of sea turtle entrainment risk by trailing suction hopper dredges in the U.S. Atlantic and Gulf of Mexico and the development of the ASTER decision support tool. Sterling (VA): US Department of the Interior, BOEM. OCS Study BOEM 2017-084. 275 pp.
This report is available to download at https://espis.boem.gov/final%20reports/5652.pdf.

Service. For hopper dredging, sea turtle lethal take in this area is rare, and no additional risk-minimization measures are required. Relocation trawling is not covered by the 2020 SARBO within the range of ESA-listed corals, and other equipment types are limited based on the percentage of fine sediments in the project area and proximity to coral/coral hardbottom.

USACE has a long history of balancing these needs and stopping work when the risk of continuing work is deemed unacceptable. As it is impossible to predict all situations that may arise on future projects, USACE has always managed and will continue to actively manage projects by adjusting risk-minimization measures before and during construction as deemed appropriate to be protective of species while balancing USACE mission requirements.

D. Reporting Requirements. Accurate and timely reporting is essential to the SARBO Project Assessment, and the adaptive process applied by USACE. Reporting requirements are important and should be included as contract requirements. It is recommended all take and bycatch data be provided to USACE in a standardized, digital, manipulatable Excel spreadsheet. To reduce delay in reporting, all take and bycatch reports will be provided to the USACE District SARBO Point of Contact and emailed to SARBO@usace.army.mil, in addition to any other recipients identified in the contract.

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Released By: JOHN D. FERGUSON, P.E.
Chief, Operations & Regulatory Division

APPENDIX 1. SPECIES CONSIDERATIONS

As discussed in Section 3 of this SARBO Project Assessment, USACE reviewed the status of species and designated critical habitat analyzed in the 2020 SARBO to ensure that no new information has been identified that USACE concludes warrants re-initiation of consultation for the 2020 SARBO. USACE concludes the risk-minimization measures in the SARBO are sufficient to assure that each of the species' populations are not adversely affected and actions covered under the SARBO will not affect these species' ability to survive or recover. While USACE and BOEM track the status of all species and critical habitat analyzed in the 2020 SARBO, this attachment documents additional species considerations for those species most frequently encountered. This information was considered as part of the SARBO Project Assessment.

1. SEA TURTLES. Sea turtles encountered on projects covered under the 2020 SARBO include loggerhead and green sea turtles, which are listed as threatened, and Kemp's ridley sea turtle, which is listed as endangered, with the probability of encounters typically in the order listed. No endangered hawksbill sea turtles have been encountered during project activities under the 2020 SARBO. Encounters with endangered leatherback sea turtles are rare. One leatherback sea turtle was captured at Wilmington Harbor in FY20. The 2020 SARBO did not provide take for this species, assuming it was not at risk from hopper dredging as no prior reports of a leatherback take by hopper dredging had been identified. USACE coordinated with NMFS after this take and concluded that re-initiation of consultation was not required due to the rarity of this event. USACE SAD does not have species updates or new information that should be considered for hawksbill or leatherback sea turtles at this time.

Sea turtles are found in marine and estuarine areas within the SARBO action area year-round with changes in density by area and time of year. The status of each species and effects from the actions covered under the SARBO are analyzed in the 2020 SARBO, and a summary of key additional information that was reviewed as part of the SARBO Project Assessment is provided below. In general, sea turtle species populations continue to improve, and some species are starting to meet some of the recovery objectives set by NMFS in the species-specific recovery plans. However, none of the sea turtle species have fully met the recovery goals. Sea turtle recovery is believed to be linked to the implementation of turtle excluder devices that started in the 1970's and became mandatory on shrimp fishery nets in 1989 along with work continuing with foreign nations to increase sea turtle conservation.[11] Starting in the late 1990's, USACE increased the frequency of beach nourishment projects under the coastal storm risk management program that has the benefit of providing more consistent beach nesting habitat for sea turtles and other species. Sea turtle nest monitoring programs, such as the program in Georgia that started comprehensive surveys in 1989, also aid in recovery by providing consistent population data and identifying nests for protection. This is all good news for sea turtle recovery. However, with an increasing number of turtles comes an increase in the probability of encountering them, especially as USACE continues to have an increased number of dredging and beach nourishment projects. Despite the increased probability of encountering sea turtles, the SARBO incidental take statement for lethal take of loggerhead sea turtles has remained the same since the 1997 SARBO. The incidental take statement for lethal take of green and Kemp's ridley sea turtles increased in the 2020 SARBO based on the analysis completed by NMFS. The 2020 SARBO also includes a non-lethal take limit for relocation trawling used as a minimization measure to reduce the likelihood of lethal take when hopper dredging.

A. <u>Loggerhead Sea Turtles</u>. This threatened species of sea turtle is found circumglobally. While all turtles encountered during the projects included in the SARBO Project Assessment belong to the Northwest Atlantic DPS, nesting turtles encountered in North Carolina, South Carolina, and Georgia are part of the Northern Recovery Unit for

[11] https://www.fisheries.noaa.gov/southeast/bycatch/history-turtle-excluder-devices#:~:text=Since%20the%201970s%2C%20scientists%2C%20resource,fit%20into%20a%20trawl%20net.

the purposes of tracking recovery goals.[12] In 2008, NMFS set recovery goals based on nesting areas in the Recovery Plan for the Northwest Atlantic Population of the Loggerhead Sea Turtle. The SARBO action area includes both the Northern Recovery Unit for nesting beaches in North Carolina, South Carolina, and Georgia and the Peninsular Florida Recovery Unit. Individual sea turtles encountered in water may nest in either the Northern Recovery Unit or Peninsular Florida Recovery Unit. Genetic analysis indicates that some turtles nest in wider ranges than expected, with some nesting in North Carolina and Florida in a single season. The 50-year recovery goals set 14 years ago were reached for the Northern Recovery Unit in 2019 and nearly met again in 2022, though the goals have not yet been met for every state or for an average of years. Nesting totals for 2022 have not yet been posted on the Florida Fish and Wildlife Conservation Commission and the U.S. Fish and Wildlife Service, Statewide Nesting Beach Survey program website; however, the numbers posted for 2017-2021 indicate that the Peninsular Florida Recovery Unit recovery goal of 106,100 was also met in 2019 and likely met again in 2022, though not yet for an average of years (Figure 12).

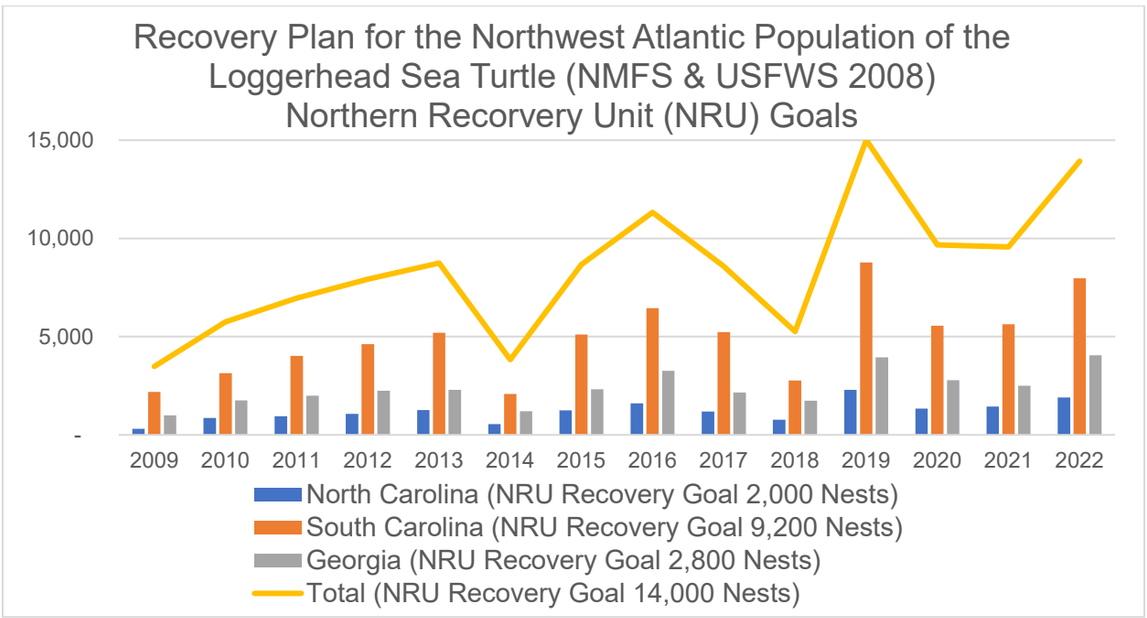

Figure 12. Loggerhead Sea Turtle Population and Northern Recovery Unit Goals

A study released in 2020 used genetics to determine that the majority (84.4%) of female loggerhead sea turtles nesting in North Carolina, South Carolina and Georgia migrate north to foraging areas north of North Carolina after nesting each summer.[13] However, not all turtles migrate, leaving a smaller resident population that moves shorter distances to forage and overwinter. This 2020 study also concluded that these turtles then migrate back south to wintering areas from Cape Hatteras, North Carolina to West Palm Beach in Florida, “where they can enter warmer waters adjacent to the Gulf Stream while minimizing the migratory distance, time and energy required to return to their northern foraging sites when water temperatures rise in the spring.” Due to the greatest number of hopper dredging lethal take of sea turtles being concentrated in this South Georgia/ Northern Florida area, this area may have a higher number of wintering sea turtles that are too cold to easily avoid interactions with hopper dredging. Some sea turtle experts believe that summer hopper dredging may have the lowest risk to sea turtles, even if abundance is high in the area. In the summer, turtles are warmer and can more easily avoid interactions and may be using areas outside of channels as they disperse throughout the region. Since most loggerhead sea turtles migrate to northern foraging grounds, the density of turtles in the summer (post-nesting) may be lower.

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[12] National Marine Fisheries Service and U.S. Fish and Wildlife Service. 2008. Recovery Plan for the Northwest Atlantic Population of the Loggerhead Sea Turtle (Caretta caretta), Second Revision. National Marine Fisheries Service, Silver Spring, MD.

[13] Pfaller JB, Pajuelo M, Vander Zanden HB, Andrews KM, Dodd MG, Godfrey MH, et al. (2020) Identifying patterns in foraging-area origins in breeding aggregations of migratory species: Loggerhead turtles in the Northwest Atlantic. PLoS ONE 15(4): e0231325. https://doi.org/10.1371/journal.pone.0231325).

B. **<u>Green Sea Turtles</u>**. This threatened species of sea turtle is also found circumglobally. NMFS determined that of the green sea turtles encountered in the SARBO action area, an estimated 95% are from the North Atlantic DPS and 5% are from the South Atlantic DPS. As discussed in SARBO Section 8.1, currently there is not a specific recovery plan for the North Atlantic and South Atlantic DPSs of green sea turtles; however, the existing recovery goals for green sea turtles for the population of Atlantic green sea turtles can still be applied (NMFS and USFWS 1991). There are two metrics tracked for recovery, nesting numbers and turtle counts at foraging grounds, that are not currently tracked. Because most nesting occurs in Florida, index beaches in Florida are used to track recovery. Green sea turtles nest in North Carolina, South Carolina, and Georgia, but usually less than 10 nests annually although those numbers have been increasing with 39 nests in North Carolina and 21 nests in South Carolina in 2022. SARBO Section 8.1.1.2 states that in Florida, the "10 year nesting average is 13,063, indicating that the first listed recovery objective is currently being met" as of 2018. The Florida index beach nesting totals are not a representation of the Florida total annual nest counts because they only collect data on 27 of the 224 beaches where this species nests. Yet, there is trend data, as shown in Figure 13 below from Florida Fish and Wildlife Conservation Commission[14] showing that green sea turtle nests in Florida have increased 80-fold since 1989, when standardized nest counts began.

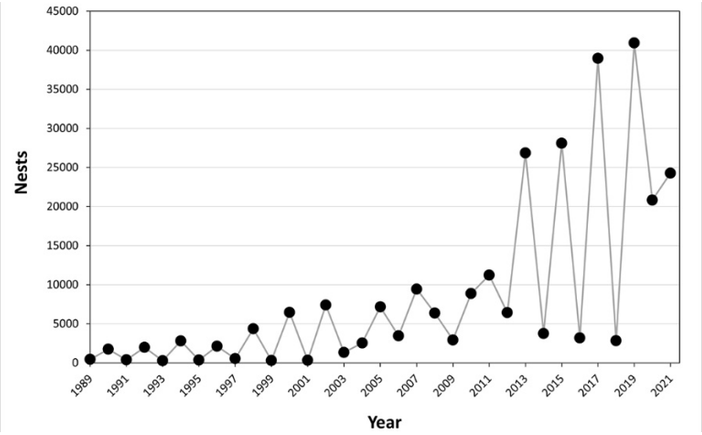

Figure 13. Annual green turtle nest counts on core index beaches in Florida.

C. **<u>Kemp's Ridley Sea Turtles</u>**. Of the seven species of sea turtles in the world, the Kemp's ridley has declined to the lowest population level. This endangered species of sea turtle is also found circumglobally and primarily nests outside of the U.S., with some nesting occurring in Texas and a few nests in the SARBO action area each year. As of the most recent available information, nesting totals for this species are also increasing (Figure 14). As analyzed in SARBO Section 8.2.2, "The recovery plan states the average number of nests per female is 2.5; it sets a recovery goal of 10,000 nesting females associated with 25,000 nests. In the last 10 years, 3 of those years reported nests of over 20,000; however, none of the years have reported over 25,000 nests for the Mexican Beaches. It is clear that the population has increased over the last 2 decades…." However, NMFS status for this species provided in biological opinions states that the significant nesting declines observed in 2010 and 2013-2014 (Figure 14) potentially indicate a serious population-level impact, and the ongoing recovery trajectory is unclear.

As with all sea turtle species, USACE will continue to monitor the population of this endangered species and ensure that the Incidental Take Statement provided in the 2020 SARBO is not exceeded. A record number of Kemp's ridley sea turtles were encountered on projects covered under the 2020 SARBO in FY22 as discussed in Section 3.

[14] https://myfwc.com/research/wildlife/sea-turtles/nesting/beach-survey-totals/

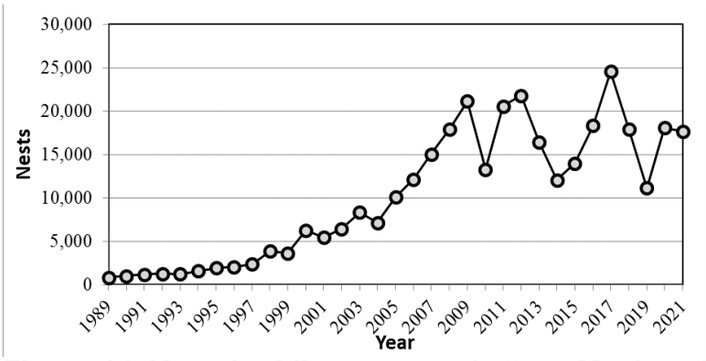

Figure 14. Kemp's ridley nest totals from Mexican beaches (Gladys Porter Zoo nesting database 2019 and CONAMP data 2020, 2021)

2. FISH. USACE SAD does not have species updates or new information that should be considered for shortnose sturgeon or Nassau grouper in FY23, and these fish were not encountered during FY22 projects. Additional information for Atlantic sturgeon is provided here. The probability of encountering sturgeon is more seasonally and regionally distinguished than for sea turtles. Atlantic sturgeon are commonly present in project areas that are in a "sturgeon river," defined in the 2020 SARBO Appendix E; the estuaries between those sturgeon rivers and the ocean; and in many project areas in the surrounding marine environment, including entrance channels to many of the ports and harbors within the range of sturgeon. Adult sturgeon migrate into spawning rivers, designated as critical habitat, in the spring and likely fall. Shortnose sturgeon, unlike Atlantic sturgeon, tend to spend relatively little time in the ocean, according to the NMFS species directory website. When they do enter marine waters, they generally stay close to shore. In the spring, adults move far upstream and away from saltwater to spawn. This difference resulted in different take limits under the 2020 SARBO as Atlantic sturgeon are more likely to be encountered by dredging covered under the Opinion than shortnose sturgeon. To date, no shortnose sturgeon have been encountered at projects covered under the 2020 SARBO, and USACE SAD does not have any species updates or new information. Therefore, the shortnose sturgeon is not discussed further in the SARBO Project Assessment.

Atlantic sturgeon are found in rivers, estuaries, and marine environments from Canada to northern Florida. There are five DPSs, and Section 8.5 of the 2020 SARBO estimated the percent of each sturgeon likely to be encountered annually for projects under the SARBO (Table 51 of SARBO). Atlantic sturgeon genetic samples collected during hopper dredging and relocation trawling are processed to determine the DPS of each fish captured. Because the percent composition of each DPS that may be encountered was the first estimate provided by NMFS using updated data, the genetic analysis completed by USACE is intended to help verify information on the DPSs. The composition is expected to vary from year to year based on the location and timing of projects, and the Incidental Take Statement was provided by DPS on a three-year average for this reason. All take has remained below the Incidental Take Statement provided in the 2020 SARBO. The status of each DPS and effects from the actions covered under SARBO are analyzed in the 2020 SARBO.

Currently there is not a recovery plan for the Atlantic sturgeon DPSs; however, the recovery plan for the Atlantic sturgeon in 2017 evaluates environmental conditions that support the species and states that recovery will require a sustained population growth. USACE does not have additional information on the status of any of the five Atlantic sturgeon DPSs. Atlantic sturgeon populations are believed to have declined due to overfishing and habitat loss. A fishing moratorium was established in 1998, though bycatch in other fisheries continues to be a concern. Habitat loss was also cited as a cause for population declines. Minimization measures are included in the 2020 SARBO that limit continued stressors to this species. USACE will continue to complete genetic analysis on sturgeon captured to aid in the understanding of the DPS of fish by location. USACE is also partnering with BOEM on research to better understand the effects to sturgeon from relocation trawling.

Atlantic sturgeon change location by time of year, and research continues to better understand the likelihood of encountering them by specific location. A study conducted by the South Carlina Department of Natural Resources and Georgia Department of Natural Resources of the "Temporal and spatial distribution of Atlantic sturgeon (*Acipenser oxyrinchus*) in U.S. Territorial waters off South Carolina and Georgia"[15] stated,

> Significant seasonal differences were observed with respect to the number of days that Atlantic sturgeon were detected relative to the number of actual days monitored ($\chi 23 = 282.3$, $P<0.001$) and also between the number of Atlantic sturgeon detected relative to the total amount of receiver monitoring effort ($\chi 23 = 4626.8$, $P<0.001$). Between 2013 and 2017, at least one Atlantic sturgeon was detected during 99% of January through March monitoring days (n = 361), but only 5% of monitoring days between July and September (n = 368; Figure 11). A similar but less pronounced pattern was observed with respect to seasonal sums of daily counts for Atlantic sturgeon, with peak occurrence between January through March (13% of 'receiver days') and least occurrence (<1%) between July and September (Figure 11).

Figure 11 of the study is included below as Figure 15 of this report. This aligns with the capture rates during hopper dredging and relocation trawling observed during USACE dredging projects in these areas and supports moving dredging in these areas outside of the January to March timeframe to reduce the probability of Atlantic sturgeon captures.

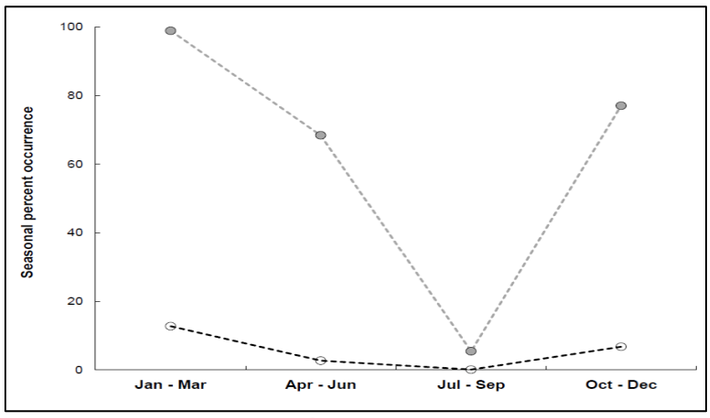

Figure 15. Figure 11 of the study titled, "Atlantic sturgeon were detected in coastal waters off South Carolina and Georgia throughout the year, but great observation occurred between January and March both with respect to general monitoring days (grey series) and relative coverage (black series)"

3. ELASMOBRANCHS. USACE SAD does not have species updates or new information that should be considered for elasmobranchs (which includes giant manta ray, scalloped hammerhead shark, oceanic whitetip shark, and smalltooth sawfish) in FY23. No elasmobranchs were encountered during FY22 projects.

4. WHALES. USACE SAD does not have species updates or new information that should be considered for the blue, fin, sei, or sperm whale. These species of whales only have the potential of encounters when a project is using an ODMDS for dredged material placement. None of these whale species were encountered in FY22.

A. <u>North Atlantic Right Whale (NARW)</u>. This endangered species is of particular concern to NMFS due to its critically low population numbers, low annual calving rates - including no calves born in 2018, and an unusual mortality event starting in 2017. Each October, the North Atlantic Right Whale Consortium meets to review the best available information and release an annual report card on the status of the species. In 2022, the

[15] MICHAEL ARENDT, WILLIAM POST, BRYAN FRAZIER, MICHELLE TALIERCIO, DANIEL FARRAE, AND TANYA DARDEN South Carolina Department of Natural Resources, FINAL (2013–2017) REPORT TO THE NATIONAL MARINE FISHERIES SERVICE For "Temporal and spatial distribution of Atlantic sturgeon (*Acipenser oxyrinchus*) in U.S. Territorial waters off South Carolina and Georgia", 22 December 2017.

update continued to show a decline in the population, which is now reported to be 340 individuals with an error rate of +/- 7, as shown in the updated Figure 16 below.[16] The Consortium report raised concerns about the decreasing number of calves born (10 calves in 2019/2020, 20 in 2020/2021, and 15 in 2021/2022 calving season and none in 2017/2018[17]) and that "no first-time mothers were identified in 2021 which supports the findings of a new paper on breeding females showing a downward trend in the number of female NARW capable of breeding. Research has also found concerning evidence of declining body size, in part due to frequent entanglements in fishing gear, with smaller female NARW producing fewer calves". In 2020 NMFS believed this loss represented an estimated 10% population loss, which was updated to a loss of 14% population in 2021 and likely will be higher in 2022. At this rate, experts believe that the species will be extinct within the next couple of decades unless the rate of deaths each year is greatly reduced. The continued decline does not constitute a reinitiation trigger for the 2020 SARBO since the declining species population was considered in the consultation, conservation measures to protect the species are included in the NARW Conservation Plan in Appendix F, and no take of the species is allowed under the 2020 SARBO. USACE will continue to support NARW conservation as outlined in the NARW Conservation Plan.

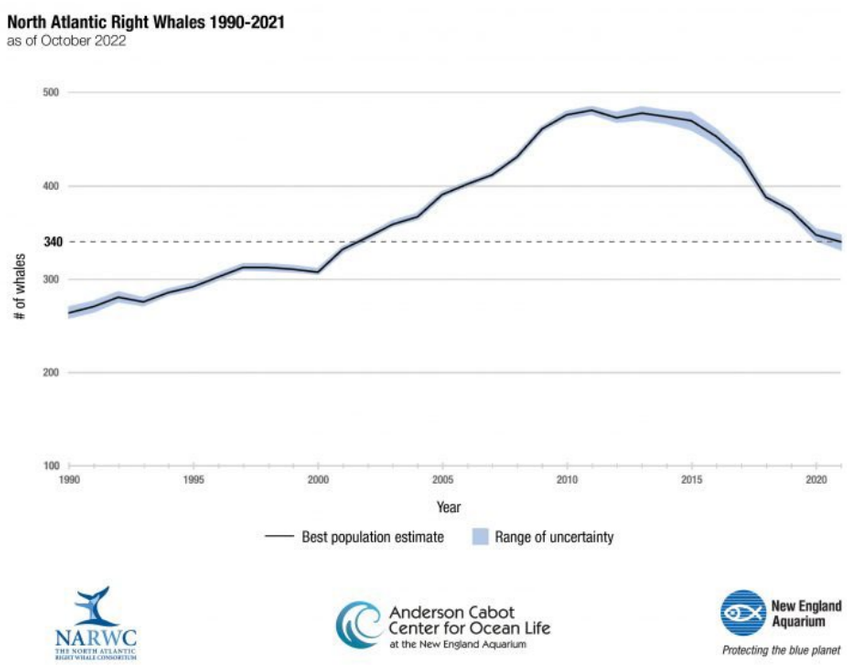

Figure 16. North Atlantic Right Whale Population

As noted in Section 3.1.4.1.4 of the 2020 SARBO,

> We [NMFS] believe that the risk of a vessel strike occurring during a project analyzed under this Opinion is very low, [fn omitted] since we are only aware of two reported interactions with vessels related to dredging, worldwide with North Atlantic or the closely related South Atlantic right whales despite decades of dredging both within the action area and globally. However, the consequences of potential take of a North Atlantic right whale to the small population of the species is high. While we do not normally discuss the status of a species when evaluating effects to a species if the effects from the action are not likely to adversely affect the species, the risk of vessel strikes and potential outcome of a strike to a North Atlantic right whale is unique due to the critical status of the population of this species. (emphasis added)

[16] https://www.neaq.org/about-us/news-media/press-kit/press-releases/north-atlantic-right-whales-downward-trend-continues-as-updated-population-numbers-released/.
[17] https://www.fisheries.noaa.gov/national/endangered-species-conservation/north-atlantic-right-whale-calving-season-2023.

The NARW Conservation Plan states that the USACE and BOEM (as appropriate) will implement the plan within the Atlantic coastal action area extending from the Virginia/North Carolina border south to Cape Canaveral, Florida, during the NARW migration and calving season from 1 November to 30 April. However, aerial survey coverage from Brunswick, Georgia through North Carolina is only required from 15 November through 15 April and NARW Early Warning System surveys are conducted from 1 December to 31 March. Based on available data found in WhaleMap.org from the beginning of calving season in 2018 (1 November 2018) to the end of calving season in 2022 (30 April 2022) from North Carolina to Florida (2020 SARBO action area), sightings are rare after 15 March (Figure 17). According to the data in WhaleMap.org, only two sightings have been recorded in April and both were in North Carolina in early April as whales migrated back north (6 April 2020, and 4 April 2022). Based on this information, we believe the risk of encountering NARW after 1 April is very low, which has been supported in conversations with other organizations involved in NARW protection.

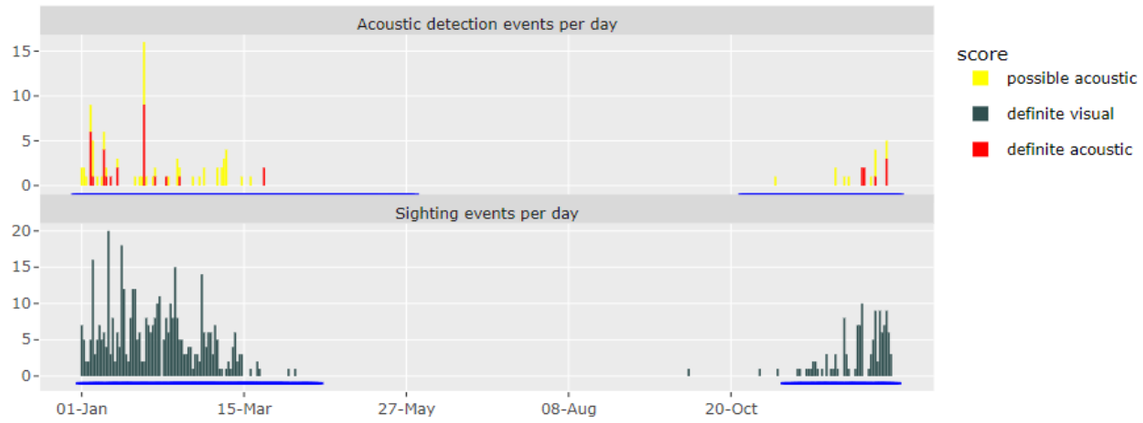

Figure 17. NARW sightings from 1 November 2018 to 30 April 2022. This figure shows acoustic and visual sightings along the east coast of North Carolina, South Carolina, Georgia, and Florida. The blue line at the bottom of each table indicates days with survey effort. Map from https://whalemap.org.

Table 4. Effects Determination(s) for Species the Action Agencies and/or NMFS Identify as Potentially Affected by the Proposed Action

2020 SARBO, Table 8			Probability of Occurrence in Action Area by State			
ESA-listed Species	**ESA Listing Status[18]**	**NMFS Determination[19]**	**North Carolina**	**South Carolina**	**Georgia**	**Florida**
Sea Turtles						
Green (North Atlantic DPS)	T	LAA	High			
Green (South Atlantic DPS)	T	LAA	Low	Low	Low	Low
Hawksbill	E	NLAA	Not expected			Low
Kemp's ridley	E	LAA	Low, most years. Unusually high in FY22 and FY23			
Leatherback	E	LAA	Low			
Loggerhead (Northwest Atlantic DPS)	T	LAA	High			
Fish						
Atlantic sturgeon (Carolina DPS)	E	LAA	High	High	Low	Low
Atlantic sturgeon (SA DPS)	E		Low	High	High	High
Atlantic sturgeon (Gulf of Maine DPS)	T		Low	Low	Low	Low
Atlantic sturgeon (New York Bight DPS)	E		Low	Low	Low	Low
Atlantic sturgeon (Chesapeake Bay DPS)	E		Low	Low	Low	Low
Shortnose sturgeon	E		Low	Low	Low	Low
Elasmobranchs						
Giant manta ray	T	LAA	Moderate			
Smalltooth sawfish (U.S. DPS)	E	LAA	Not expected		Low	
Whales						
Blue whale	E	NLAA	Low, ODMDS only			
Fin whale	E	NLAA	Low, ODMDS only			
North Atlantic right whale	E	NLAA	High Seasonally			
Sei whale	E	NLAA	Low, ODMDS only			
Sperm whale	E	NLAA	Low, ODMDS only			
Coral						
Boulder star coral (*Orbicella franksi)*	T	LAA	Not expected			High, within range
Elkhorn coral (Acropora palmata)	T	LAA				
Lobed star coral (Orbicella annularis)	T	LAA				
Mountainous star coral (Orbicella faveolata)	T	LAA				
Pillar coral (Dendrogyra cylindrus)	T	LAA				
Rough cactus coral (Mycetophyllia ferox)	T	LAA				
Staghorn coral (Acropora cervicornis)	T	LAA				

Table 5. SARBO Projects 2010-2022

Project	Atlantic Sturgeon	Green Sea Turtle	Kemp's Ridley Sea Turtle	Leatherback Sea Turtle	Loggerhead Sea Turtle	Total Turtles	Total Take	Total Turtle Take	Total Sturgeon Take
Brevard Co, FL- Coastal Storm Risk Management (CSRM)					3	3	3	1%	0%
Brunswick Co, NC- Holden Beach		1			2	3	3	1%	0%
Brunswick Harbor, GA- O&M	16	6	18		11	35	51	16%	39%
Charleston Harbor, SC- O&M	2	1	7		7	15	17	7%	5%
Dare Co, NC- Kill Devil Hills		1				1	1	0%	0%
Duval Co, FL- CSRM		1	1		1	3	3	1%	0%
Holden Beach, NC			2		2	4	4	2%	0%
Jacksonville Harbor, FL- O&M		1	1		10	12	1	5%	0%
Juno Beach - Jacksonville			1			1	1	0%	0%
Kings Bay Entrance Channel O&M	14	20	13		22	55	69	25%	34%
Martin Co, FL- CSRM					2	2	2	1%	0%
Mayport, FL- O&M	1	4			4	8	9	4%	2%
Morehead City Harbor, NC- O&M		3	2		4	9	9	4%	0%
Oak Island			1		2	3	3	1%	0%
Palm Beach, FL - North Boca Beach					1	1	1	0%	0%
Palm Beach, FL- Jupiter/Carlin		1			1	2	2	1%	0%
Palm Beach Harbor, FL- O&M					1	1	1	0%	0%
Palm Beach, FL- Mid-Town/ North Boca					2	2	2	1%	0%
Savannah Harbor, GA- O&M	6	3			6	9	15	4%	15%
St Lucie Co, FL- Fort Pierce Beach					1	1	1	0%	0%
Hilton Head, NC- Beach					1	1	1	0%	0%
West Palm Beach		1			4	5	5	2%	0%
Wilmington Harbor, NC- O&M	2	4	3	1	5	13	15	6%	5%
Grand Total	41	61	50	1	110	222	263	100%	100%
Savannah, Brunswick, Kings Bay, Jacksonville, Mayport							55%	54%	90%

[18] E= endangered; T= threatened
[19] NE = no effect, NLAA (may affect, not likely to adversely affect), LAA (may affect, likely to adversely affect).