

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

June 2023

1. PURPOSE. This document is intended to reduce confusion about the term “risk assessment” and how it was used for and is required in the 2020 South Atlantic Regional Biological Opinion for Dredging and Material Placement Activities in the Southeast United States (2020 SARBO). This overview explains the Risk Assessment and Risk Management Process requirements in Section 2.9.2 of the 2020 SARBO; differentiates it from the risk assessment that was conducted for development and issuance of the 2020 SARBO; and explains how the U.S. Army Corps of Engineers (USACE), South Atlantic Division (SAD) satisfies these 2020 SARBO requirements with the SARBO Project Assessment. In summary as explained in detail below, (1) risk assessments were used in SARBO development, as explained in Appendix K of the 2020 SARBO; (2) National Marine Fisheries Service (NMFS) completed a risk assessment to determine requirements and the Incidental Take Statement (ITS), as explained in Section 2 below; and (3) USACE is required to complete a SARBO risk assessment for projects before execution of work covered under the 2020 SARBO - which are referred to as the “SARBO Project Assessment”, as explained in Sections 2 and 3 below.

2. BACKGROUND. This section differentiates between how the term risk assessment is used generically and the risk-assessment requirements outlined in the 2020 SARBO.

2.1. Risk-Based Adaptive Project Management. USACE conducted risk assessments and applied adaptive management to inform its decisions prior to the 2020 SARBO. Specifically, under the 1997 SARBO, USACE retained flexibility, within defined seasonal dredging windows, to decide when, where, and how projects would be conducted. To inform decisions under the 1997 SARBO, the USACE SAD developed a Risk Assessment and Risk Management Plan. The 2020 SARBO formalizes and expands this previously developed risk assessment process, to include the Bureau of Ocean Energy Management (BOEM) and coordination and input from the SARBO Team (consisting of members of the USACE, BOEM, and NMFS). The 2020 SARBO continues to allow USACE SAD flexibility in decisions regarding timing, location, and equipment type used for each project. This expanded process includes routine coordination by the SARBO Team, including monthly meetings and other coordination, as needed, to discuss current and upcoming projects, risk minimization measures if questions arise, and any new relevant available information. This discussed information is applied to the SARBO Project Assessments, such as the Regional Harbor Dredging Contract (RHDC) Pre-Construction Risk Assessments. The SARBO Team continually assesses and implements process improvements, such as how best to document and share information. Importantly, using the risk-based decision-making process pursuant to Section 2.9.2, with consideration of the NMFS recommendations in Appendix J,

allows dredging to be conducted outside of the previously established seasonal dredging windows. This risk-based adaptive project-management process under the 2020 SARBO has two main components: (1) a Risk Assessment; and (2) a Risk Management Process. Each is explained below.

2.2. What is a Risk Assessment? In general, a risk assessment evaluates the probability and consequence that may occur from an action. It is completed in a sequence of four steps, which are shown in Figure 1 below. Typically, an assessment applies the formula “Risk = Probability of Occurrence x Consequence” and includes a matrix showing how the level of the risk is evaluated.

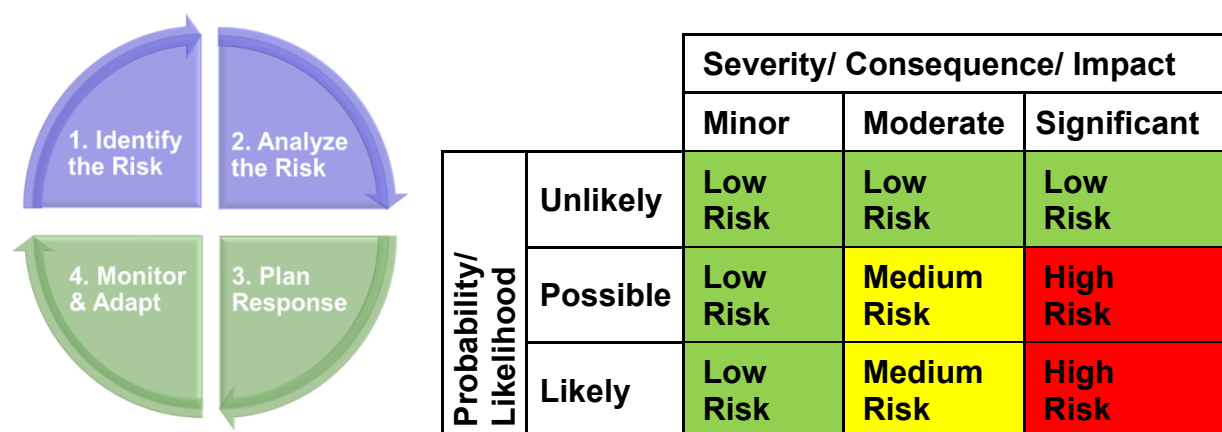


Figure 1. Generic Risk-Assessment Process

Before the SARBO was issued, a risk assessment was conducted that the NMFS applied in its development of and decision making for the SARBO. A risk assessment completed in accordance with Section 2.9.2 is different than this pre-SARBO risk assessment because Section 2.9.2 requires the USACE and BOEM to complete project-specific risk assessments that are used to inform project decisions. To avoid confusion, USACE has adopted the term “SARBO Project Assessment” to refer to the SARBO Risk Assessment that is required for projects. A SARBO Project Assessment can encompass multiple projects (e.g., to address risk associated with specific projects that will be conducted during a fiscal year) or be completed for a single project.

USACE is the lead agency responsible for SARBO project implementation and has worked to develop the SARBO Project Assessment process in coordination with BOEM and NMFS. The SARBO Project Assessment process allows USACE and BOEM to apply methods to reduce the probability of lethal take to species listed under the Endangered Species Act (ESA-listed species) using a science and data driven adaptive decision process. While the consideration of effects from projects and environmental compliance is not new to USACE, the level of data collection, analyses, documentation, and partnerships needed to implement the 2020 SARBO is new. This risk-based adaptive project-management process allows USACE and BOEM to continue to improve their use of adaptive management to consider institutional knowledge of

particular project sites, potential effects to ESA-listed species and designated critical habitat, and current or new best available information to select minimization measures to reduce the probability of lethal take during dredging and material placement projects.

2.3. What Does the 2020 SARBO Require and How Does it Compare to a Generic Risk Assessment? The 2020 SARBO Section 2.9.2.2 outlines four steps used for the SARBO Risk Assessment and Risk Management Process, as follows:

- Assessment Step 1. Determine the list of upcoming projects expected and pre-construction risk assessment.
- Assessment Step 2. Post-take risk assessment.
- Assessment Step 3. Post-project review and reporting; and
- Assessment Step 4. Annual review and reporting.

Table 1 describes how the four steps required for the SARBO Project Assessment are similar and different from the generic risk assessment discussed in Section 2 of this document and includes additional information on how the steps are completed.

Table 1. Comparison of Generic Risk Assessment Steps vs Assessment Steps Required under the 2020 SARBO

Generic Risk Assessment	SARBO Assessment Steps	Additional Information
Step 1. Identify the risk	N/A	NMFS completed this step in the 2020 SARBO (see Section 2.3.1 of this document)
Step 2. Analyze the risk	N/A	NMFS completed this step in the 2020 SARBO (see Section 2.3.2 of this document)
Step 3. Plan Response	Step 1. Determine the list of upcoming projects expected and pre-construction risk assessment [SARBO Project Assessment]	USACE completes this step during pre-construction for an individual project or combination of projects and provides project details to NMFS (see Section 2.3.3 of this document)
Step 4. Monitor and adapt	Step 2. Post-take Risk Assessment	USACE completes this step by monitoring projects during construction, adaptively managing them, and reporting decisions to NMFS (see Section 2.3.4 of this document)
N/A	Step 3. Post-Project Review and Reporting Step 4. Annual Review and Reporting	USACE completes this step post construction as part of internal reporting and reporting shared with NMFS (see Section 3.1 of this document)

2.3.1. Generic Risk-Assessment Step 1. Identify the Risk. Identifying risks starts with understanding the project(s) proposed. For the 2020 SARBO, USACE and BOEM provided NMFS with a request to reinitiate the ESA-consultation process for the 1997 SARBO to develop what became the 2020 SARBO to address new ESA-listed species and critical habitat within the SARBO action area as new species and new designated critical habitat are reinitiation triggers. Project information was provided in the reinitiation request and in subsequent responses to requests for information. Ultimately, the proposed action was categorized as the five actions listed in Figure 2 needed to meet USACE and BOEMs mission requirements.

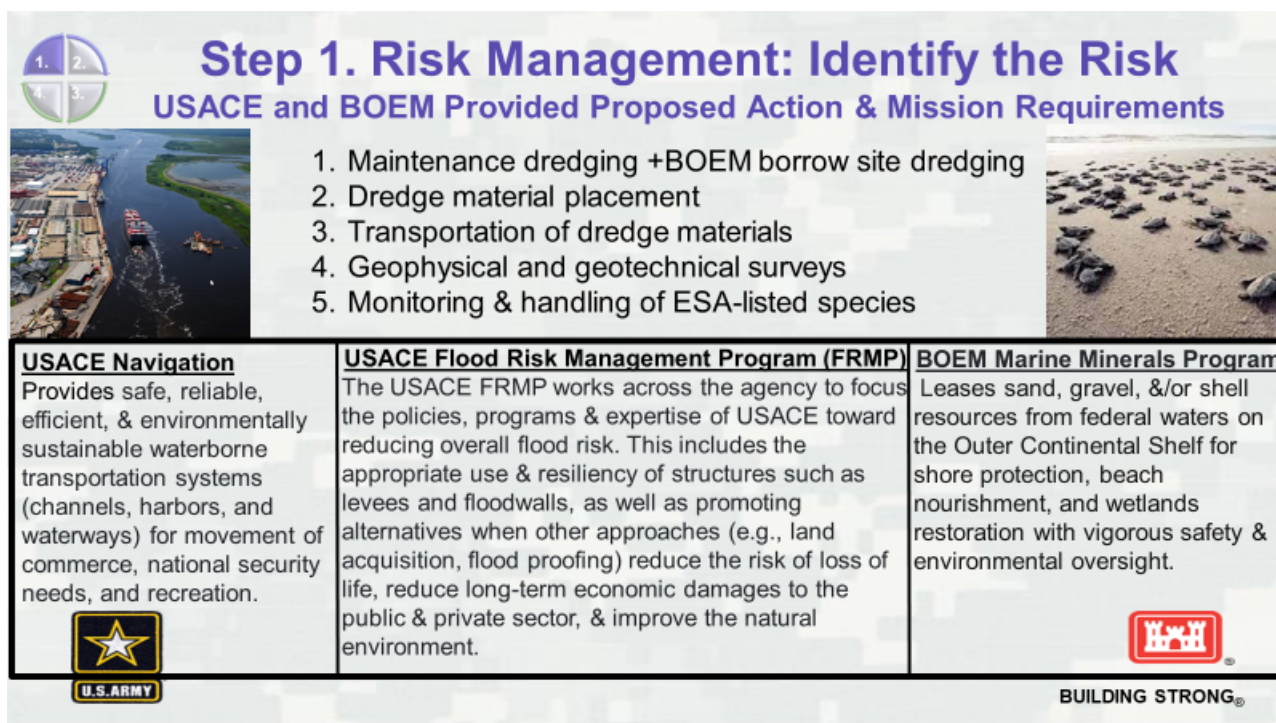


Figure 2. Outline of activities covered under the 2020 SARBO and the USACE and BOEM mission requirements that needed to be met by the request for consultation.

2.3.2. Generic Risk-Assessment Step 2. Analyze the Risk. NMFS reviewed the proposed action to determine the ESA-listed species and designated critical habitat that may occur within the action area (Figure 3). NMFS then determined the appropriate avoidance and minimization measures necessary to minimize the probability of take to species and potential to affect critical habitat features. These minimization measures were proposed to USACE and BOEM and ultimately documented as part of the proposed action (that is, measures that will be conducted) in the form of Project Design Criteria (PDCs). NMFS concluded the ESA Section 7 consultation with a Jeopardy analysis in accordance with 16 U.S.C. 1536(a)(2) to determine whether the Federal action is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. This risk analysis during development of the SARBO included an in-depth consideration of all possible routes of effects anticipated from the proposed actions and resulted in a determination that the

proposed action would not adversely modify critical habitat and would not affect the ability of analyzed species populations to survive or recover. Consequently, NMFS included an ITS for those species anticipated to result in lethal and non-lethal take based on the proposed action and PDCs in the 2020 SARBO.

As discussed in Section 3.1. of this document, the 2020 SARBO development and analysis reflect many years of NMFS reviewing research and coordinating with experts to optimize protection of ESA-listed species and critical habitat under their purview while allowing flexibility for USACE and BOEM to adapt to new information that may continue to improve both their missions and environmental protections. This resulted in the SARBO Project Assessment outlined in the document. This evolving process allows USACE to adaptively manage projects based on data, lessons learned from prior projects, and new science allowing USACE to continue to improve.

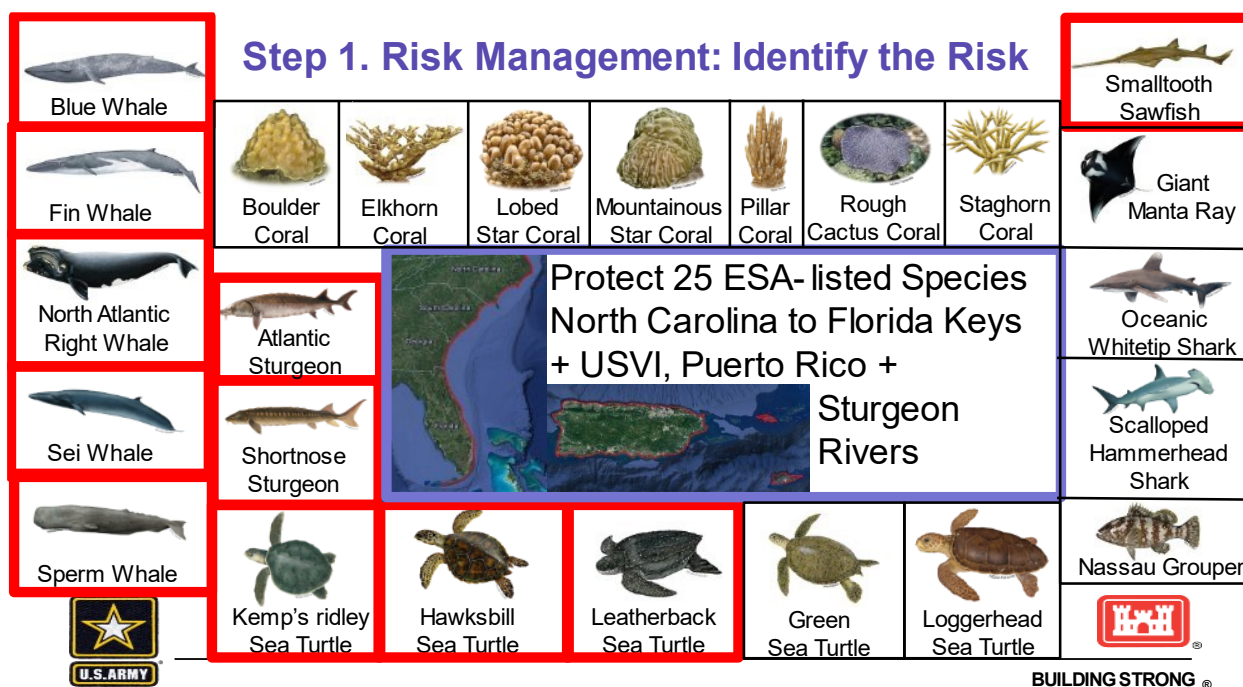


Figure 3. An image showing the species evaluated by NMFS in the 2020 SARBO based on those expected to occur with the action area shown in the center of the image. Red boxes indicate endangered species, while black boxes indicate threatened.

2.3.3. Generic Risk-Assessment Step 3. Plan Response. The role that USACE and BOEM play in the risk-assessment process described in the 2020 SARBO starts with this step by using the analysis completed by NMFS in the 2020 SARBO, risk minimization measures incorporated in the PDCs, and requirement to conduct an additional project-specific analysis that considers project details, lessons learned from past projects, and available information. The collective information is used to determine the appropriate way to complete the USACE and BOEM mission requirements for projects covered under SARBO in compliance with the 2020 SARBO and continue to

find ways to improve the process that is beneficial to species and habitat under NMFS purview. The process used by USACE and BOEM to continue to find ways to improve the process is provided in Section 3 of this risk assessment overview.

As shown in Table 1, Step 3 in a generic risk assessment equates to Assessment Step 1 in the SARBO. Actions required under the SARBO Assessment Step 1 are explained in Table 2 below.

Table 2. SARBO Assessment Step 1. Determine the list of upcoming projects expected and pre-construction risk assessment.

Assessment Step 1 Detail in Section 2.9.2 of the 2020 SARBO	How assessment detail is met by USACE
“Each fiscal year, the USACE and/or BOEM will compile a list of projects proposed for the next year and beyond (e.g., projects proposed for the next 1-5 years), including relevant minimization measures based on the pre-construction risk assessment results.”	USACE provides a list of current and upcoming projects to NMFS as part of routine project reporting
“The final project timing and risk assessment will be developed and maintained by the USACE and/or BOEM. Timing of upcoming projects will minimize the risk of impacts to ESA-listed species by considering the risk to ESA-listed species posed by particular projects based on project-specific timing, location, and equipment used, as appropriate.”	USACE completes a SARBO Project Assessment
“This assessment will involve considering the presence of ESA-listed species at project locations/times, known equipment interactions with species expected to be present, and the history of interactions at a particular project site. ¹ These suggested minimization measures consider when, where, and what equipment could be used to reduce take-based species use of an area.”	USACE completes this process as part of the SARBO Project Assessment
“This information combined with past experience by the USACE and BOEM of problems encountered working in the same or similar areas will continue to be incorporated into the pre-construction risk assessment.”	USACE completes this process as part of the SARBO Project Assessment
“Individual projects that were not reviewed during the annual review (e.g., USACE Regulatory project that are proposed after the annual review and will be implemented before the next annual review) will be reviewed using the same approach and discussion with NMFS. Before permitting any activities analyzed under	All projects are evaluated by USACE either combined (such as this regional SARBO project assessment) or individually when necessary. Current and

¹ NMFS provided an initial list of specific suggested items for USACE to consider when determining how to reduce take from an upcoming project (**Error! Reference source not found.**). However, these project-specific considerations are expected to evolve for each equipment type and project area as USACE and BOEM continue to engage in projects in the action area and acquire new information.

the 2020 SARBO, conformance with the PDCs in the 2020 SARBO must be confirmed.”	upcoming projects are also discussed with NMFS at monthly SARBO Team meetings.
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Stakeholders frequently ask how the SARBO Project Assessment is used to minimize the risk of impacts to ESA-listed species, not understanding that the risk assessment and corresponding requirements to minimize risk to species are already included in the 2020 SARBO. For example, Section 2.5.2 of Appendix K in the 2020 SARBO describes the discussions related to project timing that informed the decision for additional minimization measures as part of the proposed action and development of PDCs. This section explains how information incorporated in the decision to shift timing was gathered and discussed with stakeholders during the 2020 SARBO development. A rationale for the shift in timing is included in Section 2.5.2, as follows:

Ultimately, the SARBO Team determined that the 2020 SARBO should include additional minimization measures as part of the proposed action, due to: (1) the scope and scale of this project spanning from North Carolina to the Caribbean and from inland rivers and waterways to federal water and (2) the complexity of balancing the risks to 25 ESA-listed species and 5 designated critical habitat units, and (3) the continued federal mandate for the USACE to maintain navigational waterways and beaches. Many of the ESA-listed species within the action area have overlapping ranges and habitats, and some protective measures frequently applied to projects for certain ESA-listed species conflict with protection of other listed species or critical habitats in these overlapping areas. The SARBO Team gave extensive consideration to which ESA-listed species could be affected by an activity covered under this Opinion, the probability of exposure based on project timing and anticipated species abundance in an area, and how to maximize protections for all ESA-listed species and designated critical habitat. Additional consideration was given to species’ current status and ability to recover when considering the risk to multiple species in a given area. This approach resulted in the development of the risk-based adaptive management plan outlined in 2020 SARBO Section **Error!**

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The balance necessary to address the concerns associated with all 25 ESA-listed species that are evaluated in the 2020 SARBO included acknowledgment that the needs of certain species may take priority over others depending on the project location, timing, and equipment proposed. Appendix K states, “Within the action area, potential effects to North Atlantic right whale (NARW), ESA-listed corals, and *Acropora* critical habitat were identified as being at greatest risk from the proposed action, without sufficient protective measures.” The negotiations during the development of the 2020 SARBO development considered how additional protective measures could be applied to protect these species based on the ability of USACE and BOEM to perform actions in furtherance of mission requirements and the cost/benefit analysis of the action to

provide the intended protection. Appendix K Section 2.5.2 explains the determination that the proposed action should include allowing dredging in warmer months as follows:

The SARBO Team considered and acknowledged that shifting some dredging projects to warmer months in the negotiated North Atlantic Right Whale Conservation Plan may increase the risk of entrainment of sea turtles by hopper dredges due to the potential for higher densities of sea turtles in the project area. It was determined that the proposed action should include allowing dredging in warmer months only in limited circumstances and after a risk-based assessment was completed, as outlined in the 2020 SARBO Section **Error! Reference source not found.** This decision was made because even though the risk of a vessel strike to a North Atlantic right whale is low with the agreed upon PDCs, the consequence to the species from a single vessel strike would be high. Conversely, the risk of entrainment of a sea turtle increases when moving dredging from cooler winter to warmer summer months when sea turtles are more prevalent in warmer waters; however, the risk/impact to ESA-listed sea turtle species is minimized by the PDCs in this Opinion. The SARBO Team agreed to continue to work collaboratively throughout the life of the 2020 SARBO to minimize the risk of entrainment to ESA-listed sea turtles as much as possible, through adherence to negotiated protective measures outlined in the PDCs of this Opinion and through the continued risk assessment process outlined in the 2020 SARBO Section **Error! Reference source not found.**

The probability of encountering a NARW may be generally low due to the small population size, but projects completed in FY22 again highlighted that the NARW's are likely to be in many project areas in the southeast due to their concentration in calving areas located close to shore in areas that overlap with projects - including Savannah Harbor, Brunswick Harbor, Kings Bay, and others. In FY22, a NARW mother and calf pair was again sighted by the dredge personnel while working in Brunswick Harbor due to the pair's proximity and presence within the project area. Since this critically endangered species is hard to see even when in proximity, the risk of vessel strike is still a concern despite minimization measures (such as aerial surveys). The risk of vessel strike is the reason that USACE committed under the NARW Conservation Plan to shift work out of areas when and where they are present to the maximum extent practicable.

2.3.4. Generic Risk-Assessment Step 4. Monitor and Adapt. This generic step equates to Assessment Step 2 in the SARBO, which is the post-take risk assessment. USACE applies this step by monitoring projects during construction and adaptively managing each project as part of a deliberative, internal process. This also includes reviewing a SARBO Project Assessment to evaluate the benefit of adding new minimization measures based on information gained prior to the initiation of work. Monitoring and applying changes as appropriate continue until the project is complete. This step requires a continuous evaluation of the probability of take as dredging occurs and may result in changes before and during the project work. This process then includes a consideration of lessons learned after work is complete that will be used in the Assessment Step 3 as part of the Plan Response if lessons learned are relevant to

future project assessments. USACE maintains an internal SARBO Implementation Regulation and Procedures describing the roles and responsibilities in this process and internal communication process.

3. HOW DOES USACE COMPLETE THE SARBO PROJECT ASSESSMENT?

Initially, the SARBO Team anticipated the SARBO Project Assessment to be generated through an informal process involving USACE personnel and the SARBO Team to discuss current and upcoming projects, minimization options, and any new information pertinent to project implementation. However, based on stakeholder feedback, USACE and the SARBO Team determined that a more formalized and transparent process should be applied. USACE's approach to completing these assessments is described in this section.

The SARBO Project Assessment uses, as a baseline, the assessment completed in the 2020 SARBO and considers additional available information to formulate a plan of how the project(s) will be executed; what minimization measures may be used and when; and how a single project and combination of all anticipated work will comply with the 2020 SARBO requirements, including the ITS. The SARBO Project Assessment occurs at the "Plan Response" step of the generic risk assessment identified in Figure 1 as compared to the requirements of the 2020 SARBO in Table 2.

Development of the SARBO Project Assessment starts with a review of available information that is relevant to the upcoming proposed project or combination of projects. The list below provides a general understanding of the type of information considered, but it is not an exhaustive list since each review is specific to the project type and area.

- Which PDCs apply to the proposed project and which additional PDCs can or should be added or revised to reduce the probability of lethal take to ESA-listed species and adverse modification critical habitat?
- What is the likelihood that the work proposed can be successfully completed within the requirements of the 2020 SARBO, including the 2020 SARBO ITS?
- What past project successes and lessons learned may apply to the project? This may include a review of project site conditions that could increase or decrease the probability of take and require alterations to project equipment.
- What new species or habitat information should be considered?

3.1. How Information is Gathered and Incorporated. Whether it is a generic risk assessment or the SARBO Project Assessment, the analysis starts with a review of available information and reliance on the lessons learned from past projects.

3.1.1. USACE and BOEM Project Knowledge. Since the SARBO has been used to cover maintenance dredging for navigation for decades, USACE can pull from lessons learned on projects. Figure 4 provides an overview of the ports and beaches routinely maintained by USACE SAD. Much of the maintenance navigational dredging at these locations is completed by hopper dredging with some of the smaller project areas maintained by smaller USACE-owned hopper dredges (referred to in the 2020

SARBO as modified hoppers and referred to by USACE as government plants). In addition, smaller projects in rivers often are completed by cutterhead dredging under permits issued by USACE Regulatory for small, discrete areas conducted by mechanical dredging such as berth maintenance and small Regulatory projects.

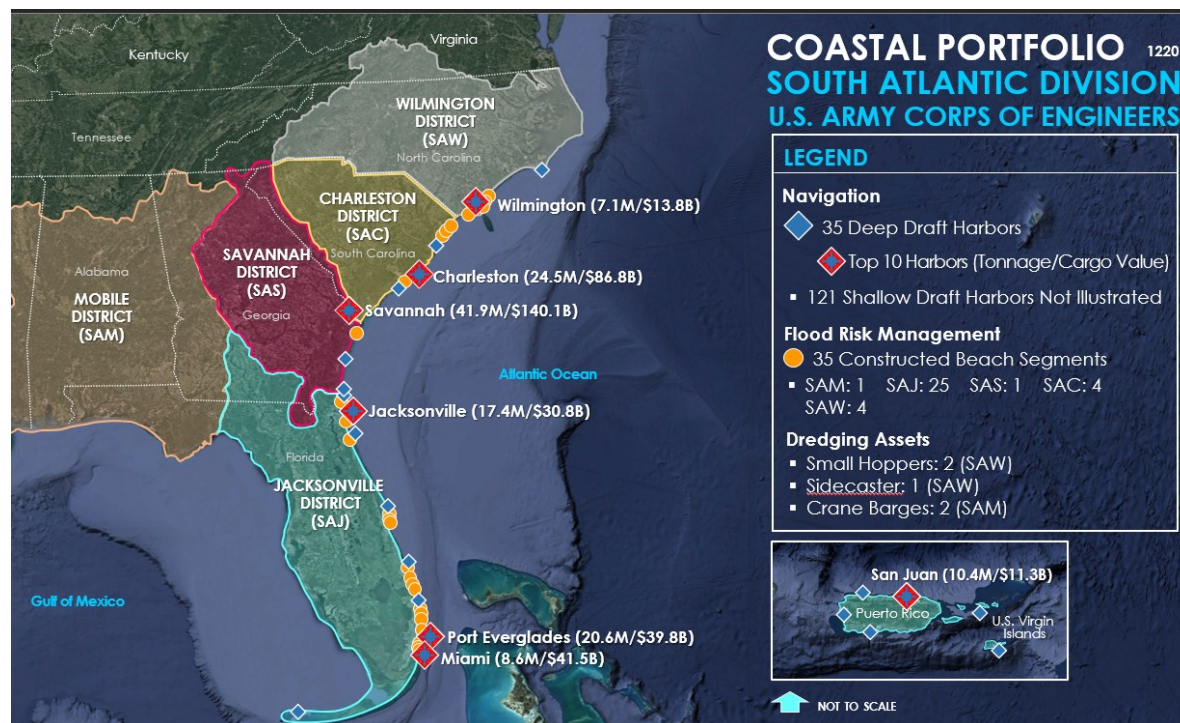


Figure 4. An image showing the overview of ports and beaches routinely maintained by USACE SAD.

For borrow sites under BOEM’s jurisdiction, projects also have 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 Tool²,” 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 total 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 Outer Continental Shelf, has historically been relatively low when compared to

² Ramirez, A, Kot, CY, Piatkowski, D. 2017. 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. Sterling (VA): US Department of the Interior, BOEM. OCS Study BOEM 2017-084. 275 pp. This report is available to download at <https://epis.boem.gov/final%20reports/5652.pdf>.

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)."

To assure that data is accurate, USACE initiated multiple efforts in 2020 to gather and verify available data and to develop systems to share this information with the public. USACE also continues to work with stakeholders and researchers to assure that relevant new information is included in the SARBO Project Assessments.

3.1.2. Systems Currently Used to Collect and Report Project and Take Data.

The Operations and Dredging Endangered Species System (ODESS) public website (<https://dqm.usace.army.mil/odess/#/home>) was developed to track incidental take from USACE dredging projects. During the past several years, USACE has developed methods to improve data collection, assure data accuracy, and develop better ways to display and provide the data to those using it. USACE continues to work on an updated version of ODESS that will meet those goals, and USACE intends to continue work to improve the system. Improvements will include, but are not limited to, tracking more species, more project details, and improved collection and reporting of species caught incidental to a project and recorded as bycatch starting with the highest priority species concerns by state and federal agencies. Currently, ODESS does not digitally collect, or record species captured during relocation trawling. An application has been developed to meet this need and is being beta tested. The application will be released after the ODESS update is complete and all issues identified are addressed. In the interim, information concerning relocation trawling captures of ESA-listed species covered under the 2020 SARBO and those species recorded as bycatch has been recorded in Excel spreadsheets starting in FY21 to ensure the data was usable in the SARBO Project Assessment and could be more easily incorporated into the updated version of ODESS.

3.1.3. Digitizing and Verifying Existing Data.

Reviewing data from past projects is essential to evaluating the probability of take on future projects. Numerous efforts are underway to verify and validate relocation data, to make that data available to the public and researchers, and for USACE staff to be able to leverage important information in risk-based decisions. USACE hired a contractor to independently verify the project details for work that was conducted from 2010 to 2020 under the 1997 SARBO and updated the project information in ODESS. This effort started in 2020 and was completed in August 2022, with all updated information integrated into the current version of ODESS. ODESS staff are reviewing and updating other records in ODESS that are not undergoing review by the contractor.

In FY21, USACE and BOEM partnered with U.S. Geological Survey (USGS) to digitize historic relocation trawling records, including trawling reports for each tow and reporting form that provide additional data collected for each captured species. When the digitization effort is complete, this data will be publicly available in ODESS and will help to inform future project-level impact tradeoff decisions. In addition, USACE, BOEM, NMFS, and USGS are collaborating to determine how best to summarize the collected

data to inform future risk-based decisions. The USGS has spent over 1,000 hours processing and digitizing the data, which is anticipated to be complete in FY23.

3.1.4. Additional Information Being Gathered to Inform the SARBO Project Assessment. In addition to improving data collection, USACE and/or BOEM have undertaken numerous efforts to improve the understanding of species and habitat effects from the types of activities covered under the 2020 SARBO. These include partnering with other agencies and researchers to answer questions and verify information used in SARBO Project Assessments. A list of current research efforts and partnerships will be provided annually in the SARBO Annual Review.

Many of the questions being asked and research relate to how site conditions increase or decrease the probability of take and affect the operational efficiencies of dredging equipment. For example, specific project areas may routinely have environmental conditions that add additional challenges in completing the project, which are documented as lessons learned, and that information is used in future SARBO Project Assessments. A list of site conditions that may require additional consideration when hopper dredging is provided below:

- Bathymetry, rugosity, and geomorphology of the dredged area and how this impacts draghead deflector efficacy. For example, the weight and leading-edge angle of deflectors can influence the path the draghead takes when dredging over highly rugose areas (i.e., “crabbing”), which may lead to inefficient dredging and increased entrainment risk.
- Trenching created by hopper dredging may increase the probability of take due to the draghead falling into the trench where turtles may be present.
- Sediment type may affect draghead operations. Dense sediments may result in the inability of the deflector to plow through the sediment effectively, raising the draghead off the bottom, and increasing entrainment risk
- Debris and other obstacles (such as after a hurricane) can clog screens and reduce the ability to observe take during hopper dredging or make relocation trawling difficult or ineffective.
- Dense sediments may clog screening reducing the likelihood of observing take on hopper dredging.
- Consideration for the difference between the required channel dredging depth and the maximum allowed dredging depth as to allow potential flexibility in dredging operations. Larger allowance between these two depths, if not prohibited for other environmental or technical reasons, could improve environmental aspects of dredging operations. For example, the tighter the distance between these two targeted depths requires precision dredging and skimming minimal amounts of material from the channel. This can result in the

draghead not being fully embedded in the sea floor. Conversely, allowing a greater difference in these two depths gives enough material to “plow” with the deflector and create the wave of material needed to move species away from the draghead.

3.2. How much detail is needed? Section 2.9.2 of the 2020 SARBO provides general information on the types of things to consider and includes additional recommendations in Appendix J of the 2020 SARBO. Appendix J provides the following for consideration when developing the SARBO Project Assessment:

The USACE and/or BOEM will develop a risk assessment plan as outlined in the 2020 SARBO Section 2.9 that will incorporate information provided by the SARBO Team, including information on species presence in different areas and at different times, among other items. This appendix provides NMFS suggestions of specific factors for USACE and BOEM to consider with initial project planning, including items already discussed with the SARBO Team that are likely to be relevant to the risk assessment. A general description on the ways in which the USACE and/or BOEM will use the risk-based assessment are outlined in the 2020 SARBO Section 2.9.2.

This section of SARBO does not, however, prescribe the level of detail needed in a SARBO Project Assessment. Therefore, the process initially used during the implementation of the 2020 SARBO and the process currently used by USACE are outlined in the following sections.

3.3. How are risk related decisions made? After the available project, species, and habitat information is gathered, the risk to species and critical habitat are evaluated by considering the probability or likelihood of an effect occurring. To complete this step, USACE relies on the standardized risk matrix shown in Figure 1 (the image on the right) resulting in an analysis summarized in Table 3 below.

Table 3. Risk Assessment Considering that Risk = Probability of Occurrence x Consequence

		Severity/ Consequence to Project Completion		
		<u>Low</u> No Take Expected	<u>Medium</u> Take may occur, but covered by SARBO or Other Opinion	<u>High</u> Take may exceed the 2020 SARBO ITS
Probability/ Likelihood of Species or Critical Habitat Occurrence	Unlikely to be in area	Low Risk	Low Risk	Low Risk
	May be in area	Low Risk	Medium Risk Monitor Closely & use appropriate risk minimization measures	High Risk Prioritize risk minimization measures & monitor closely
	Likely to be in area	Low Risk	Medium Risk Monitor Closely & use appropriate risk minimization measures	High Risk Prioritize risk minimization measures & monitor closely

3.3.1. Probability of Species Occurrence. Determining the probability or likelihood that a specific ESA-listed species or critical habitat features may occur within the proposed project area is first based on information analyzed in the 2020 SARBO and then followed by an additive review of information gained from projects completed in the area, lessons learned, and available literature on species presence and likelihood of the species to be susceptible to the action due to a route of effect. The 2020 SARBO Table 8 provides a summary of NMFS's final effects determination for all species that the action agencies and/or NMFS believe may be affected by the proposed action. It is a good starting point to identify the ESA-listed species that were analyzed within the geographic extent of the SARBO action area and may be affected by proposed projects. Table 8 was used to develop a similar table in the SARBO Project Assessment, Appendix B that provides USACE's considerations of species that occur with a smaller geographic area by state. A SARBO Project Review will take this a step further to understand the species that may be present in an action area by the location and time of year.

Since the SARBO Project Assessment stacks upon the analysis completed in the 2020 SARBO, the framework used to consider risk to species follows the same potential routes of effects that are outlined in the 2020 SARBO Section 3.1. This approach also aligns with the suggested factors to consider, which are in Appendix J of the 2020 SARBO. The species routes of effects are divided by those effects that may affect mobile species (e.g., sea turtles, sturgeon, rays, whales) and non-mobile species (i.e., coral and seagrass). Of note, Johnson's seagrass is the only seagrass analyzed; it was delisted in the final rule issued on 14 April 2022, effective 16 May 2022, and is no longer considered in the SARBO Project Assessment. Due to differences in the potential effects to non-mobile species, mobile and non-mobile species are considered separately.

3.3.2. Severity/ Consequence of Completing Project. This determination is based on the probability of encountering a species and then considers the likelihood that this will result in take. For example, the 2020 SARBO outlines the probability of take based on equipment type and concludes that most lethal take will result from work performed by hopper dredge that may result in lethal take of sea turtles and/or sturgeon. USACE then considers the probability of take that will occur from hopper dredging and other routes identified to determine the likelihood of occurrence based on project equipment, timing, and available methods to minimize the risk. The analysis results in three general categories of risk evaluated in the Plan Response step of the generic risk-assessment process:

Green. USACE concludes that the risk of take (lethal or non-lethal) of ESA-listed species covered under the 2020 SARBO is unlikely based on information available about species presence in an area, species likelihood of harm by equipment type, and lessons learned from past projects completed in the area. While the risk may be considered low in the Plan Response step, it is still monitored as part of the next step in the risk-assessment process.

Yellow. USACE concludes that the risk of take (lethal or non-lethal) of ESA-listed species covered under the 2020 SARBO may occur based on information available about species presence in an area, species likelihood of harm by equipment type, and lessons learned from past projects completed in the area. However, USACE believes the project can be completed with appropriate risk-minimization measures (e.g., using relocation trawling to reduce the likelihood of lethal take by hopper dredging) and that if take occurs, it is covered under the SARBO ITS limit. As stated above, NMFS acknowledged that USACE has a long history of stopping work early if take occurs that USACE deems unacceptable even when take is under the ITS limit. Additional examples of USACE's management of projects to reduce take is provided in the RHDC 6.0 Pre-Construction Risk-Assessment. USACE will monitor the projects closely and continue to evaluate appropriate risk-minimization measures available during construction as described in the next step of the risk-assessment process.

Red. USACE concludes that the risk of take (lethal or non-lethal) of ESA-listed species covered under the 2020 SARBO is high, based on information available about species presence in an area, species likelihood of harm by equipment type, and lessons learned from past projects completed in the area. The determination of a high risk may result from either an analysis that estimates the probability of the total take may be so high that take may exceed the ITS limit; the probability of the total take may be so high that it may exceed the ITS limit for this project in combination with all other anticipated projects; or take may occur of a species not covered by the ITS. A determination of a high risk does not preclude USACE from completing the action; however, it does mean that USACE will prioritize available risk-minimization measures and will closely monitor the project and may cease work if take total numbers or frequency are deemed unacceptable by USACE to assure the project remains compliant with the 2020 SARBO, as described in the next risk assessment step.

3.4. Who Reviews and Approves the SARBO Project Assessment? The process described in Section 2.9.2.2 states, "The final project timing and risk assessment will be developed and maintained by the USACE and/or BOEM." It does not prescribe a specific assessment format or level of detail needed to complete it. By describing the process as being developed and maintained by USACE and BOEM, it also does not state, nor was it intended to state, that the assessment would need to be shared or approved by any entity other than USACE or BOEM. USACE has internal procedures outlining the roles and responsibilities to assure the 2020 SARBO is appropriately implemented, to include completion of the SARBO Project Assessment.

USACE considers all work completed under the 2020 SARBO to be environmentally acceptable as to the effects on ESA-listed species under NMFS purview. USACE operates under the requirements for dredging and discharge of dredging materials into waters of the U.S. as defined by law (33 CFR Part 336). Part 336 sets forth the evaluation factors that USACE will use, as appropriate, to evaluate the discharge of dredged material into waters of the U.S. One evaluation factor is "Navigation and Federal Standard," which includes a requirement for projects to be completed in an

“environmentally acceptable manner” with consideration to endangered species also defined and copied below:

Navigation and Federal standard. The maintenance of a reliable Federal navigation system is essential to the economic well-being and national defense of the country. The district engineer will give full consideration to the impact of the failure to maintain navigation channels on the national and as appropriate, regional economy. It is the Corps’ policy to regulate the discharge of dredged material from its projects to assure that dredged material disposal occurs in the least costly, environmentally acceptable manner, consistent with engineering requirements established for the project. The environmental assessment or environmental impact statement, in conjunction with the section 404(b)(1) guidelines and public notice coordination process, can be used as a guide in formulating environmentally acceptable alternatives. The least costly alternative, consistent with sound engineering practices and selected through the 404(b)(1) guidelines or ocean disposal criteria, will be designated the Federal standard for the proposed project.

Endangered species. All Corps operations and maintenance activities will be reviewed for the potential impact on threatened or endangered species, pursuant to the Endangered Species Act of 1973. If the district engineer determines that the proposed activity will not affect listed species or their critical habitat, a statement to this effect should be included in the public notice. If the proposed activity may affect listed species or their critical habitat, appropriate discussions will be initiated with the U.S. Fish and Wildlife Service or National Marine Fisheries Service, and a statement to this effect should be included in the public notice. (See 50 CFR Part 402).

The effects on ESA-listed species under NMFS purview were considered in the Opinion by the agency responsible for this evaluation and an ITS was provided. USACE must manage the projects under the 2020 SARBO to ensure that individually and cumulatively appropriate minimization measures as defined in the PDCs are used and any take does not exceed the non-lethal and lethal take limits outlined in Section 10 of the 2020 SARBO. These limits are provided for most species, including sea turtles and sturgeon, on a three consecutive year timeframe to account for natural variability, as described in Section 6 of the 2020 SARBO. Take may fluctuate by location, time of year, and from one year to another based on many factors including seasonal variability and stochastic events like hurricanes. As stated in Section 2.9.2.1,

Utilizing adaptive management in this manner allowed the USACE to consider the anticipated risk of harm to ESA-listed species in the context of shifting variables (e.g., environmental, financial, regulatory, etc.). Subsequent decisions made regarding project timing and equipment use maximized the ability to complete dredging and material placement projects, while minimizing the risk of incidental take. The USACE has a proven history of using this process to further reduce the likelihood of incidental take and will continue to do so under the 2020 SARBO.

USACE will continue to regionally monitor work covered under the 2020 SARBO to assure the Incidental Take Limits are not exceeded and will continue to work to keep all take low, to the maximum extent practicable, by considering risk to species and USACE mission requirements through the risk-based decision process discussed in this document. If, for any reason, USACE deems an individual project or a combination of projects occurring regionally to have undesirable effects – even if take limits are not exceeded, work will cease. USACE also would not allow a single project to use all take allowed under the SARBO for a single species or combination of species since it must manage all USACE navigation projects covered under the 2020 SARBO. This history of managing take is demonstrated in Table 36 in the 2020 SARBO, which lists the minimum, maximum, and average take by species from hopper dredging and continues to be demonstrated as documented in the SARBO Project Assessments.

Approved By:

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