UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
http://sero.nmfs.noaa.gov

MAY 21 2018

F/SER31:AL

Chief, Palm Beach Gardens Permits Section
Jacksonville District Corps of Engineers
Department of the Army
4400 PGA Boulevard, Suite 500
Palm Beach Gardens, Florida 33410

Dear Sir or Madam:

The enclosed Biological Opinion ("Opinion") responds to your request for consultation with us, the National Marine Fisheries Service (NMFS), pursuant to Section 7 of the Endangered Species Act (ESA) for the following action:

Permit Number	Applicant	PCTS Number	Project Types
SAJ-2003-02932 (LP-LCK)	J.S. Family Holdings, Inc.	SER-2017-18748	Marina reconfiguration and Dredging

This Opinion analyzes the potential for the project to affect sea turtles (Northwest Atlantic Ocean Distinct Population Segment of the loggerhead sea turtle, Kemp's ridley sea turtle, hawksbill sea turtle, North and South Atlantic Distinct Population Segments of the green sea turtle, and leatherback sea turtle), smalltooth sawfish, and Johnson's seagrass. This analysis is based on project-specific information provided by the USACE, the consultant, and NMFS's review of published literature. We conclude that the project is likely to adversely affect, but is not likely to jeopardize the continued existence of Johnson's seagrass. The Opinion includes conservation recommendations for your consideration.

We look forward to further cooperation with you on other USACE projects to ensure the conservation and recovery of our threatened and endangered marine species. If you have any questions regarding this consultation, please contact Audra Livergood, Consultation Biologist, at (786) 351-2225, or by email at audra.livergood@noaa.gov.

Sincerely,

For Roy E. Crabtree, Ph.D.
Regional Administrator

Enc.: Biological Opinion

File: 1514-22.F.4
Endangered Species Act - Section 7 Consultation

Biological Opinion

Agency:	United States Army Corps of Engineers (USACE), Jacksonville District
Activity:	Proposed USACE issuance of a regulatory permit in Palm Beach County, Florida (SAJ-2003-02932)
Consulting Agency:	National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS), Southeast Regional Office, Protected Resources Division, St. Petersburg, Florida Consultation Number SER-2017-18748
Approved By:	______________________________ Roy E. Crabtree, Ph.D., Regional Administrator NMFS, Southeast Regional Office St. Petersburg, Florida
Date Issued	MAY 21 2018 ______________________________

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Glossary of Acronyms

cSEL	cumulative Sound Exposure Level
DPS	Distinct Population Segment
ESA	Endangered Species Act
MLW	Mean Low Water
NMFS	National Marine Fisheries Service
USACE	U.S. Army Corps of Engineers

Units of Measurement

<u>Length and Area</u>

ac	acres
ft	foot/feet
ft^2	square feet
in	inches

Background
Section 7(a)(2) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. § 1531 et seq.), requires that each federal agency ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat of such species. Section 7(a)(2) requires federal agencies to consult with the appropriate Secretary to meet these responsibilities; NMFS and the U.S. Fish and Wildlife Service share responsibilities for administering the ESA.

Consultation is required when a federal action agency determines that a proposed action "may affect" listed species or designated critical habitat. Consultation concludes after NMFS determines that the action is not likely to adversely affect listed species or critical habitat or issues a Biological Opinion ("Opinion") that identifies whether a proposed action is likely to jeopardize the continued existence of a listed species, or destroy or adversely modify critical habitat.

This document represents NMFS's Opinion, based on our review of impacts associated with the USACE's proposed action to issue a permit for in-water construction activities. This Opinion analyzes the project' effects to listed species, in accordance with Section 7 of the ESA, and is based on project information provided by the USACE and other sources of information, including the published literature cited herein.

1 CONSULTATION HISTORY

NMFS received a request from the USACE on July 11, 2017. We requested additional information via email on July 13, August 29, and October 30, 2017, to which the USACE responded on July 14, September 18, and October 30, 2017, respectively. We initiated formal consultation on October 30, 2017.

2 DESCRIPTION OF THE PROPOSED ACTION AND ACTION AREA

2.1 Proposed Action

The applicant proposes to reconfigure an existing marina from 52 to 39 slips (a reduction of 13 slips) by conducting the following:

- Remove 2 existing docks [5,589 square feet (ft^2)]
- Install 2 floating concrete docks with finger piers (total of 14,046 ft^2)
- Install 107 [12-inch (in) diameter] wood mooring piles by impact hammer and 50 (24-in diameter or less) steel pipe piles by vibratory hammer
- Dredge approximately 225,600 ft^2 of an existing basin and entrance channel to -10 feet (ft) measured at mean low water (MLW)

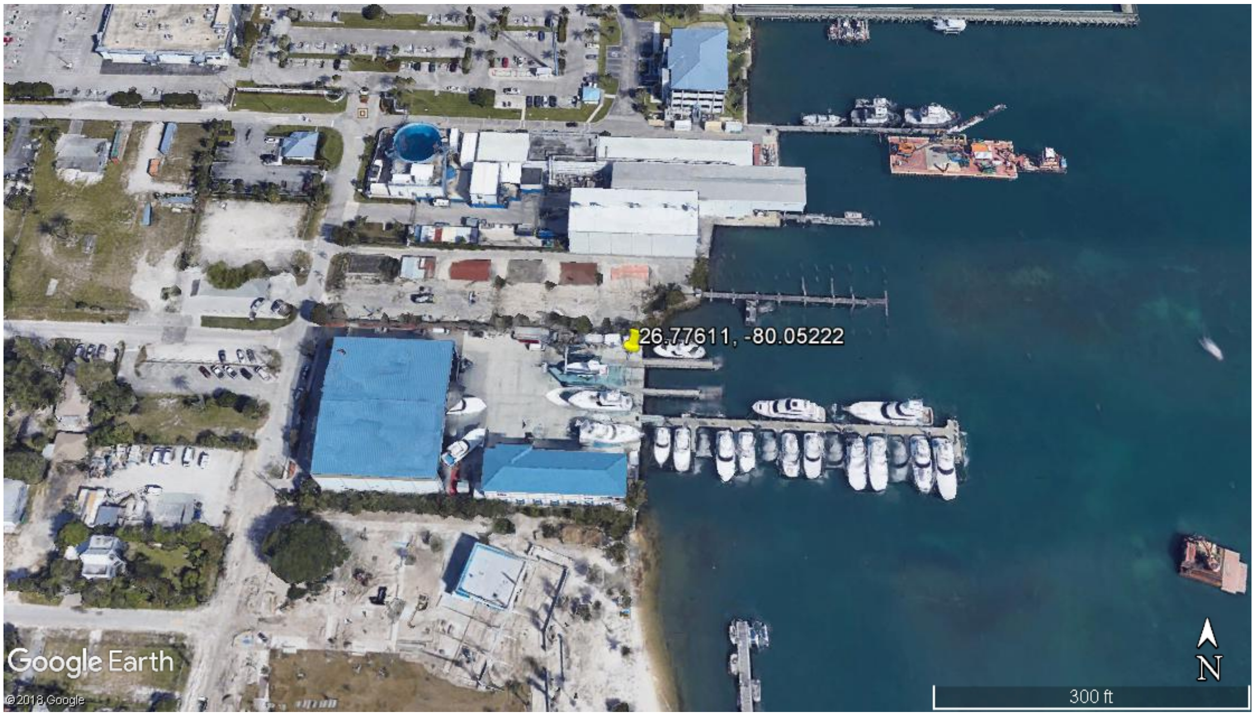

Figure 1. Image of J.S. Family Holdings property (©2018 Google Earth).

The applicant proposes to dredge (using either a barge-mounted clamshell or backhoe), and the dredged material will be transported to an appropriate upland spoil disposal location to be determined by the contractor. The wood piles will be driven using an impact hammer. The applicant initially proposed to install the metal piles using an impact hammer; however, we recommended vibratory installation (to reduce noise levels), and the applicant agreed. In-water work should take approximately 6 months and will be conducted during daylight hours only. The applicant agreed to use turbidity curtains during construction and to comply with NMFS's *Sea Turtle and Smalltooth Sawfish Construction Conditions*,[1] which requires work to stop if sea turtles or sawfish are observed within 50 ft of operating or moving construction equipment.

A benthic survey was conducted on July 26, 2016. The report states 2 species of seagrass were observed: paddle grass (5-11% cover) and Johnson's seagrass (less than 1% cover). There is approximately 225,600 ft^2 of area that presently contains Johnson's seagrass (some areas contain both species and some areas contain only Johnson's seagrass). The September 2017 mitigation plan describes the seagrass impact areas as "sparsely vegetated bottom with a substrate of sand, crushed shells, and some silt." No corals or mangroves were observed in the project area. However, within the survey area, there is a patch reef located approximately 250 ft from the proposed dredging.

[1] NMFS. 2006. Sea Turtle and Smalltooth Sawfish Construction Conditions revised March 23, 2006. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Regional Office, Protected Resources Division, Saint Petersburg, Florida.
http://sero.nmfs.noaa.gov/protected_resources/section_7/guidance_docs/documents/sea_turtle_and_smalltooth_sawfish_construction_conditions_3-23-06.pdf, accessed June 2, 2017.

2.2 Action Area

50 CFR 404.02 defines action area as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." The action area for the project includes the waters and submerged lands within, and in the immediate vicinity of, the project site. For the purposes of this Opinion, the action area for the project includes the behavioral response zone in which animals may be affected by pile-driving activities. The project proposes pile installation via impact hammer. This method of installation has a behavioral response zone of 705 ft from the pile-driving activities. The project location is noted in Table 1.

Table 1. Project Location

Project Name	Project Address in Florida	North American Datum 1983 [NAD 83]
J.S. Family	1524 Avenue C, Riviera Beach, Palm Beach County	26.77611° N, 80.05222° W

3 STATUS OF LISTED SPECIES

We believe the species listed in Table 2 may be present within the action area.

Table 2. Effects Determinations and Status for Species in or Near the Action Area that Either the Action Agency or NMFS Believes May Be Affected by the Proposed Action

Species	ESA Listing Status	Action Agency Effect Determinations	NMFS Effect Determinations
Sea Turtles			
Green (North and South Atlantic distinct population segments [DPSs])	T	NLAA	NLAA
Kemp's ridley	E	NLAA	NLAA
Leatherback	E	NLAA	NE
Loggerhead (Northwest Atlantic Ocean DPS)	T	NLAA	NLAA
Hawksbill	E	NLAA	NLAA
Fish			
Smalltooth sawfish (U.S. DPS)	E	NLAA	NLAA
Plants			
Johnson's seagrass	T	LAA	LAA; no Jeopardy
E = endangered; T = threatened; NE = no effect; NLAA = may affect, not likely to adversely affect; LAA = likely to adversely affect			

We would not expect leatherback sea turtles to be present at the site due to their very specific life history requirements which are not supported at or near the project site. Leatherback sea turtles prefer open, deepwater habitat where they forage primarily on jellyfish.

3.1 Species Not Likely to be Adversely Affected

We believe that sea turtles (green, loggerhead, hawksbill, and Kemp's ridley) and smalltooth sawfish may be found in or near the action area and may be affected by the project analyzed in this Opinion. We have identified the following potential effects to these species and concluded that the species are not likely to be adversely affected by the proposed actions for the reasons described below.

Sea turtles and smalltooth sawfish

Direct physical injury to sea turtles and smalltooth sawfish is not expected from interactions with construction machinery or materials because these species have the ability to detect and move away from the types of construction activities that will be implemented for this project, and we expect them to do so. The project will adhere to NMFS's *Sea Turtle and Smalltooth Sawfish Construction Conditions*, which will provide additional protection by requiring construction equipment to stop if a listed species is observed within 50 ft of operating machinery. Thus, direct physical effects are extremely unlikely to occur and discountable.

Sea turtles and smalltooth sawfish may be temporarily unable to use portions of the action area for forage and shelter habitat due to avoidance of construction activities and physical exclusion from areas blocked by turbidity curtains. We expect these effects will be temporary, intermittent, and small in spatial scale. Also, because these species are mobile, we expect that they will move away from the construction activities and forage and shelter in adjacent areas with similar available habitat. Therefore, the effects to sea turtles and smalltooth sawfish from the impacts of temporary loss of foraging and shelter habitat will be insignificant.

In addition, green sea turtles, hawksbill sea turtles, loggerhead sea turtles, and smalltooth sawfish foraging behavior may be affected by the potential permanent loss of seagrass habitat for foraging. Green sea turtles feed on seagrasses, and some of the prey species on which loggerhead sea turtles, hawksbill sea turtles, and smalltooth sawfish feed (echinoderms, mollusks, arthropods, and juvenile fishes) can be found in seagrass beds. NMFS estimates approximately 225,600 ft^2 of seagrass habitat may be impacted by dredging. However, based on what is known about its life history strategy, we believe it is possible that Johnson's seagrass could re-colonize the areas that, post-dredging, will not be shaded by the floating docks and vessels. Even if seagrass does not re-colonize these areas, we believe that the dredging will have an insignificant effect on sea turtles and smalltooth sawfish due to the availability of large areas of similar foraging habitat nearby.

Effects to listed species as a result of noise created by construction activities can be physically injurious to animals in the affected area, or result in behavioral changes by animals in the affected area. Physically injurious effects can occur in 2 ways. First, physical effects can result from a single noise event's exceeding the threshold for direct physical injury to animals, and these constitute an immediate adverse effect on affected animals. Second, physical effects can result from prolonged exposure to noise levels that exceed the daily cumulative exposure threshold for the animals, and these can constitute adverse effects, if animals are exposed to the noise levels for sufficient periods. Behavioral effects can be adverse depending on the circumstances in which they occur (i.e., if such effects interfere with animals' feeding, resting, or reproducing). Our evaluation of effects to listed species as a result of noise created by construction activities is based on the analysis prepared in support of the Opinion for the USACE Jacksonville District's Program (JAXBO). The noise analysis in this consultation evaluates effects to smalltooth sawfish and sea turtles that may be in the project area (see species listed in Table 2).

Based on our analysis in JAXBO, the installation of wood piles by impact hammer will not cause single-strike or peak-pressure injurious noise effects. The cumulative sound exposure level of multiple pile strikes over the course of a day, however, may cause injury to smalltooth sawfish and sea turtles up to 30 ft (9 m) away from the pile. Due to the mobility of sea turtles and smalltooth sawfish and because the project occurs in open water, we expect them to move away from noise disturbances. Because we anticipate animals will move away, we believe that it is extremely unlikely that an animal will suffer physical injury from noise and thus the effect of the noise is discountable. An animal's movement away from the injurious sound radius is a behavioral response, with the same effects discussed below.

The installation of up to 10, 12-in diameter wood piles per day using an impact hammer could also result in behavioral effects at radii of 705 ft (215 m) for smalltooth sawfish and 151 ft (46 m) for sea turtles. Due to the mobility of sea turtles and smalltooth sawfish, we expect them to move away from noise disturbances in this open-water environment. Because there is similar habitat nearby, we believe behavioral effects will be insignificant. If an individual chooses to remain within the behavioral response zone, it could be exposed to behavioral noise impacts during pile installation. Since installation will occur only during the day, these species will be able to resume normal activities during quiet periods between pile installations and at night. Therefore, we anticipate any behavioral effects will be insignificant.

Based on our analysis in JAXBO, the installation of 24-in diameter steel piles by vibratory hammer will not cause peak-pressure injurious noise effects or cumulative noise effects. However, we do expect behavioral effects at radii of 243 ft (74 m) for smalltooth sawfish and 52 ft (16 m) for sea turtles. Due to the mobility of sea turtles and smalltooth sawfish, we expect them to move away from noise disturbances in this open-water environment. Because there is similar habitat nearby, we believe behavioral effects will be insignificant. If an individual chooses to remain within the behavioral response zone, it could be exposed to behavioral noise impacts during pile installation. Since installation will occur only during the day, these species will be able to resume normal activities during quiet periods between pile installations and at night. Therefore, we anticipate any behavioral effects will be insignificant.

3.2 Species Likely to be Adversely Affected

Johnson's Seagrass
NMFS listed Johnson's seagrass as threatened under the ESA on September 14, 1998. Kenworthy (1993; 1997; 2000) and NMFS (2002; 2007) discuss the results of numerous field studies and summarize an extensive literature review regarding the status of Johnson's seagrass. In addition to the published literature, the Johnson's Seagrass Recovery Implementation Team (Recovery Team) is in the process of updating the 2002 Recovery Plan for Johnson's Seagrass. The updated Recovery Plan will contain the latest information concerning the status of this species and potential threats to its persistence and recovery. The following discussion summarizes those findings relevant to our evaluation of the proposed action.

Life History and Population Biology
Based on the current knowledge of the species, Johnson's seagrass reproduction is believed to be entirely asexual, and dispersal is by vegetative fragmentation. Sexual reproduction in Johnson's seagrass has not been documented. Female flowers have been found; however, dedicated surveys in the Indian River Lagoon have not discovered male flowers, fertilized ovaries, fruits, or seeds, either in the field or under laboratory conditions (Hammerstrom and Kenworthy 2002; Jewett-Smith et al. 1997; NMFS 2007). Searches throughout the range of Johnson's seagrass have produced the same results, suggesting either that the species does not reproduce sexually or that the male flowers are difficult to observe or describe, as noted for other *Halophila* species (Kenworthy 1997). Surveys to date indicate that the incidence of female flowers appears to be much higher near the inlets leading to the Atlantic Ocean.

Throughout its range, Johnson's seagrass occurs in dynamic and disjunctive patches. It spreads rapidly, growing horizontally from dense apical meristems with leaf pairs having short life spans (Kenworthy 1997). Kenworthy suggested that the observed horizontal spreading, rapid growth patterns, and high biomass turnover could explain the dynamic patches observed in distribution studies of this species. While patches may colonize quickly, they may also disappear rapidly. Sometimes they will disappear for several years and then re-establish, a process referred to as "pulsating patches" (Heidelbaugh et al. 2000; Virnstein and Hall 2009; Virnstein and Morris 2007). Mortality, or the disappearance of patches, can be caused by a number of processes, including burial from bioturbation and sediment deposition (Heidelbaugh et al. 2000), erosion, herbivory, desiccation, and turbidity. In the absence of sexual reproduction, one possible explanation for the pulsating patches is dispersal and re-establishment of vegetative fragments, a process that commonly occurs in aquatic plants and has been demonstrated in other seagrasses (Di Carlo et al. 2005; Philbrick and Les 1996), and was also confirmed by experimental mesocosm[2] studies with Johnson's seagrass (Hall et al. 2006).

Johnson's seagrass is a shallow-rooted species and vulnerable to uprooting by wind, waves, storm events, tidal currents, bioturbation, and motor vessels. It is also vulnerable to burial by sand movement and siltation (Heidelbaugh et al. 2000). Having a canopy of only 2 cm -5 cm, it may be easily covered by sediments transported during storms or redistributed by macrofaunal bioturbation during the feeding activities of benthic organisms. Mesocosm experiments indicate that clonal fragments can only survive burial for up to a period of 12 days (W.J. Kenworthy, CCFHR, NOAA, Beaufort, North Carolina, 1997 unpublished). Mechanisms capable of

[2] A mesocosm is an experimental tool that brings a small part of the natural environment under controlled conditions.

disturbing patches may create clonal fragments that become dispersed. Hall et al. (2006) showed that drifting fragments of Johnson's seagrass can remain viable for 4 to 8 days, during which time they can settle, root, and grow. The process of asexual fragmentation can occur year-round. Fragments could drift several kilometers under the influence of wind and tidally-driven circulation, providing potential recruits for dispersal and new patch formation. In the absence of sexual reproduction, these are likely to be the most common forms of dispersal and patch maintenance.

Population Status and Distribution

Johnson's seagrass occurs in a variety of habitat types, including on intertidal wave-washed sandy shoals, on flood deltas near inlets, in deep water, in soft mud, and near the mouths of canals and rivers, where presumably water quality is sometimes poor and where salinity fluctuates widely. It is an opportunistic plant that occurs in a patchy, disjunctive distribution from the intertidal zone to depths of approximately 2 to 3 meters in a wide range of sediment types, salinities, and in variable water quality conditions (NMFS 2007).

Johnson's seagrass exhibits a narrow geographical range of distribution and has only been found growing along approximately 200 km of coastline in southeastern Florida north of Sebastian Inlet, Indian River County, south to Virginia Key in northern Biscayne Bay, Miami-Dade County. This apparent endemism suggests that Johnson's seagrass has the most limited geographic distribution of any seagrass in the world. Kenworthy (Kenworthy 1999; Kenworthy 1997) confirmed its limited geographic distribution in patchy and vertically disjunctive areas throughout its range. Two survey programs have monitored the presence and abundance of Johnson's seagrass within this range. One program, conducted by the St. Johns River Water Management District since 1994, continues to survey the northern section of the species' geographic range between Sebastian Inlet and Jupiter Inlet (Virnstein and Hall 2009; Virnstein and Morris 2007). The second survey, initiated in 2006, monitored the southern range of the species between Jupiter Inlet and Virginia Key in Biscayne Bay (Kunzelman 2007). This survey is no longer conducted. Since the last status review (NMFS 2007), there have not been any reported reductions in the geographic range of the species. In fact, the St. Johns River Water Management District observed Johnson's seagrass approximately 21 km north of the Sebastian Inlet mouth on the western shore of the Indian River Lagoon-a discovery that slightly extends the species' known northern range (Virnstein and Hall 2009).

Johnson's seagrass is a perennial species (meaning it lasts for greater than 2 growing seasons), showing no consistent seasonal or year-to-year pattern based on the northern transect surveys, but has exhibited some winter decline (NMFS 2007). However, during exceptionally mild winters, Johnson's seagrass can maintain or even increase in abundance from summer to winter. In the surveys conducted between 1994 and 2007, it occurred in 7.1% of the l m^2 quadrats in the northern range. Depth of occurrence within these surveys ranged from 0.03 to 2.5 m. Where it does occur, its distribution is patchy, both spatially and temporally. It frequently disappeared from transects only to reappear several months or several years later (NMFS 2007).

Based on the results of the southern transect sampling, it appears there is a relatively continuous, although patchy, distribution of the species from Jupiter Inlet to Virginia Key (NMFS 2007). The largest reported contiguous patch of Johnson's seagrass in the southern range was observed in Lake Worth Lagoon and was estimated to be 30 acres (Kenworthy 1997). Eiseman and McMillan (1980) documented Johnson's seagrass in the vicinity of Virginia Key (latitude 25.75°N); this location is considered the southern limit of the species' range. There have been no reports of this species further south of the currently known southern distribution. The presence of Johnson's seagrass in northern Biscayne Bay (north of Virginia Key) is well documented. In addition to localized surveys, the presence of Johnson's seagrass has been documented by various field experiences and observations of the area by federal, state, and county entities. Johnson's seagrass has been documented in various USACE and U.S. Coast Guard (USCG) permit applications reviewed by NMFS. Findings from the southern transect sampling (summer 2006 and winter 2007) show little difference in the species' frequency or abundance between the summer and winter sampling period. The lower frequencies of Johnson's seagrass occurred at those sites where larger-bodied seagrasses (e.g., turtle grass, *Thalassia testudinum,* and manatee grass, *Syringodium filiforme*) were more abundant (NMFS 2007). The southern range transect data support some of the conclusions drawn from previous studies and other surveys. This is a rare species; however, it can be found in relatively high abundance where it does occur. Based on the results of the southern transect sampling, it appears that, although it is disjunctively distributed and patchy, there is some continuity in the southern distribution, at least during periods of relatively good environmental conditions and no significant large-scale disturbances (NMFS 2007).

Information on the species' distribution and results of limited experimental work suggest that Johnson's seagrass has a wider tolerance range for salinity, temperature, and optical water quality conditions than other species such as paddle grass, *Halophila decipiens* (Dawes et al. 1989) (Kenworthy and Haunert 1991); (Gallegos and Kenworthy 1996); (Durako et al. 2003; Kenworthy and Fonseca 1996; Torquemada et al. 2005). Johnson's seagrass has been observed near the mouths of freshwater discharge canals (Gallegos and Kenworthy 1996), in deeper turbid waters of the interior portion of the Indian River Lagoon (Kenworthy 2000; Virnstein and Morris 2007), and in clear water associated with the high energy environments and flood deltas inside ocean inlets (Heidelbaugh et al. 2000; Kenworthy 1993; Kenworthy 1997; Virnstein and Morris 2007; Virnstein et al. 1997). It can colonize and persist in high-tidal energy environments and has been observed where tidal velocities approach the threshold of motion for unconsolidated sediments (35-40 cm s^{-1}). The persistent presence of high-density, elevated patches of Johnson's seagrass on flood tidal deltas near inlets suggests that it is capable of sediment stabilization. Intertidal populations of Johnson's seagrass may be completely exposed at low tides, suggesting high tolerance to desiccation and wide temperature tolerance.

In Virnstein's study areas within the Indian River Lagoon, Johnson's seagrass was found associated with other seagrass species or growing alone in the intertidal, and, more commonly, at the deep edge of some transects in water depths down to 180 cm. In areas in which long-term poor water and sediment quality have existed until recently, Johnson's seagrass appears to occur in relatively higher abundance, perhaps due to the inability of the larger species to thrive. Johnson's seagrass appears to be out-competed in seagrass habitats where environmental conditions permit the larger seagrass species to thrive (Kenworthy 1997; Virnstein et al. 1997). When the larger, canopy-forming species are absent, Johnson's seagrass can grow throughout the full seagrass depth range of the Indian River Lagoon (NMFS 2007; Virnstein et al. 2009).

Observations by researchers have suggested that Johnson's seagrass exploits unstable environments or newly-created unvegetated patches by exhibiting fast growth and support for all local ramets in order to exploit areas in which it could not otherwise compete. It may quickly recruit to locally uninhabited patches through prolific lateral branching and fast horizontal growth. While these attributes may allow it to compete effectively in periodically disturbed areas, if the distribution of this species becomes limited to stable areas it may eventually be outcompeted by more stable-selected plants represented by the larger-bodied seagrasses (Durako et al. 2003). In addition, the physiological attributes of Johnson's seagrass may limit growth (i.e., spreading) over large areas of substrate if the substrate is somehow altered (e.g., dredged to a depth that would preclude future recruitment of Johnson's seagrass); therefore, its ability to recover from widespread habitat loss may be limited. The clonal and reproductive growth characteristics of Johnson's sea grass result in its distribution being patchy, non-contiguous, and temporally fluctuating. These attributes suggest that colonization between broadly disjunctive areas is likely difficult and that the species is vulnerable to becoming endangered if it is removed from large areas within its range by natural or anthropogenic means.

Threats

The emerging consensus among seagrass experts on the Recovery Team is that the possibility of mortality due to reduced salinity over long periods of time is the most clearly identified threat to the species' long-term persistence. Some studies have shown that Johnson's seagrass has a wide tolerance for salinity. Conversely, short-term experiments have shown reduced photosynthesis and increased mortality at low salinities (<10 psu [practical salinity units, equivalent to parts per thousand]). Longer duration mesocosm experiments have resulted in 100% mortality of Johnson's seagrass after 10 days at salinities <10 psu (Kahn and Durako 2008). The Recovery Team has determined that the most significant threat to the species is the present or threatened destruction, modification, or curtailment of its habitat or range through water management practices and stochastic environmental factors that can alter the salinity of its habitat. Given that it is not uncommon for salinities to decline below 15 to 20 psu in its range (Steward et al. 2006), and that a number of natural and human-related factors can affect salinity throughout its range, the Recovery Team identified reduced salinity as a potential significant threat to the species because the potential for long-term mortality over a large scale could counteract the life history strategy the species uses to persist in the face of numerous, ongoing, environmental impacts. In previous reviews, including the critical habitat listing rule and the 2002 Recovery Plan, several additional factors were considered threats: (1) dredging and filling, (2) construction and shading from in-and over-water structures, (3) propeller scarring and anchor mooring, (4) trampling, (5) storms, and (6) siltation. In reviewing all information available since the original listing, the Recovery Team conducted assessments of each of these factors and has been unable to confirm that any of these pose a significant threat to the persistence and recovery of the species. A brief discussion of these factors follows.

Routine maintenance dredging associated with the constant movement of sediments in and around inlets may affect seagrasses by direct removal, light limitation due to turbidity, and burial from sedimentation. The disturbance of sediments can also destabilize the benthic community. Altering benthic topography or burying the plants may remove them from the photic zone. Permitted dredging of channels, basins, and other in- and on-water construction project cause loss of Johnson's seagrass and its habitat through direct removal of the plants, fragmentation of habitat, shading, turbidity, and sedimentation. Although dredge-and-fill activities can and do adversely affect Johnson's seagrass and its designated critical habitat, these activities and the construction of in- and over-water structures are closely scrutinized through federal, state, and local permitting programs. The USACE, under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act, has federal authority over the issuance of dredge-and-fill permits. This permitting process includes language to protect and conserve seagrasses through field evaluations, consultations, and recommendations to avoid, minimize, and mitigate for impacts to seagrasses.

Shafer et al. (2008) emphasized avoidance of seagrasses as a first priority in their study evaluating the regulatory construction guidelines to minimize impacts to seagrasses from single-family residential dock structures in Florida and Puerto Rico. While most dock construction is subject to the construction guidelines (i.e., the USACE's and NMFS's jointly-developed October 2002 *Key for Construction Conditions for Docks or Other Minor Structures Constructed in or over Johnson's Seagrass* and the 2001 guidelines), some docks meeting certain provisions are exempt from state permitting and contribute to loss of Johnson's seagrass through construction impacts and shading.

The Recovery Team has identified weaknesses in the oversight practices of state and federal agencies in the permitting process for some or all of the activities discussed above, due to budget, staffing, and technological limitations. The need for post-construction permit compliance and enforcement for dock structures in Florida and Puerto Rico has been discussed in Shafer et al. (2008). The Recovery Team also identified difficulties in monitoring Johnson's seagrass—a rare and patchily-distributed species—in single-event surveys associated with permit applications, and continues to work with collaborators to improve monitoring methods. While it is recognized that dredging and filling project and construction and shading from in- and over-water structures can adversely affect Johnson's seagrass and its habitat, the Recovery Team determined that these activities are typically local and small-scale. The deficiencies in the permitting process were not presently a significant threat to the survival of Johnson's seagrass because they will not individually or cumulatively result in long-term, large-scale mortality of Johnson's seagrass, nor preclude the species from its strategy of recolonizing areas.

Propeller scarring and improper anchoring are known to adversely affect seagrasses (Kenworthy et al. 2002; Sargent et al. 1995). These activities can severely disrupt the benthic habitat by uprooting plants, severing rhizomes, destabilizing sediments, and significantly reducing the viability of the seagrass community. Propeller dredging and improper anchoring in shallow areas are major disturbances to even the most robust seagrasses. This destruction is expected to worsen with the predicted increase in boating activity within Florida. The Florida Department of Highway Safety and Motor Vehicles (http://www.flhsmv.gov/html/safety.html) reported 963,057 registered commercial and recreational vessels (including canoes) statewide in fiscal year (FY) 2007. Registrations declined to 787,780 in FY 2012, likely due to the economic downturn. However, this number is likely to increase based on Florida's projected population growth from 18 million in 2006 to 25 million in 2025 (www.propertytaxreform.state.f1/docs/eo06141.pdf). An increase in the number of registered vessels will likely lead to an increase in adverse effects to seagrasses caused by propeller dredging/scarring.

Other indirect effects associated with motor vessels include turbidity from operating in shallow water, dock construction and maintenance, marina expansion, and inlet maintenance dredging. These activities and impacts are also likely to increase (NMFS 2007). Damage to seagrasses from propeller scarring and improper anchoring by motor vessels is recognized as a significant resource management problem in Florida (Sargent et al. 1995). A number of local, state, and federal statutes protect seagrasses from damage due to vessel impacts, and a number of conservation measures, including the designation of vessel control zones, signage, mooring fields, and public awareness campaigns, are directed at minimizing vessel damage to seagrasses. Despite these efforts, vessel damage can have significant local and small-scale (1 m^2 to 100 m^2) impacts on seagrasses (Kirsch et al. 2005), but there is no direct evidence that these small-scale local effects are so widespread that they are a threat to the persistence and recovery of Johnson's seagrass.

Trampling of seagrass beds, a secondary effect of recreational boating, also disturbs seagrass habitat, but is a lesser concern. Trampling damages seagrasses by pushing leaves into the sediment and crushing or breaking the leaves and rhizomes. Since the designation of critical habitat, however, there have been no documented observations or reports of damage by trampling, and if there were, they would be small-scale and local. Therefore, the Recovery Team determined that trampling does not constitute a significant threat to the survival or recovery of Johnson's seagrass.

Large-scale weather events such as tropical storms and hurricanes, while often generating runoff conditions that decrease water quality, also produce conditions (wind setup and abrupt water elevation changes) that can increase flushing rates. The effects of storms can be complex. There are several specifically documented storm effects on seagrasses: (1) scouring and erosion of sediments; (2) erosion of seeds and plants by waves, currents, and surge; (3) burial by shifting sand; (4) turbidity; and (5) discharge of freshwater, including inorganic and organic constituents in the effluents (Steward et al. 2006). Storm effects may be chronic, e.g., due to seasonal weather cycles, or acute, such as the effects of strong thunderstorms or tropical cyclones. Studies have demonstrated that healthy, intact seagrass meadows are generally resistant to physical degradation from severe storms, whereas damaged seagrass beds may not be as resilient (Fonseca et al. 2000; Whitfield et al. 2002). In the late summer and early fall of 2004, four hurricanes passed directly over the northern range (with wind strengths at landfall from <39 to 120 miles per hour) of Johnson's seagrass in the Indian River Lagoon. A post-hurricane random survey in the area of the Indian River Lagoon affected by the four hurricanes indicated the presence of Johnson's seagrass was similar to that reported by the St. Johns River Water Management District (SJRWMD) transect surveys prior to the storms. This indicates that while the species may temporarily decline, under the right conditions it can return quickly (Virnstein and Morris 2007). Furthermore, despite evidence of longer-term reductions in salinity, increased water turbidity, and increased water color associated with higher than average precipitation in the spring of 2005, there was no evidence of long-term chronic impacts to seagrasses and no direct evidence of damage to Johnson's seagrass that could be considered a threat to the survival of the species (Steward et al. 2006).

Silt derived from adjacent land and shoreline erosion, river and canal discharges, inlets, and internally re-suspended materials can lead to the accumulation of material on plant leaves causing light deprivation. Deposition of silt can also lead to the burial of plants, accumulation of organic matter, and anoxic sediments. Johnson's seagrass grows in a wide range of environments, including those that are exposed to siltation from all the potential sources. Documentation of the direct effects of siltation on seagrasses is generally unavailable. The absence of seagrass has been associated with the formation of muck deposits, however, and localized areas of flocculent, anoxic sediments in isolated basins and segments of the Indian River Lagoon have been observed. Furthermore, sustained siltation experimentally simulated by complete burial for at least 12 days may cause mortality of Johnson's seagrass (W.J. Kenworthy, CCFHR, NOS, Beaufort, North Carolina, unpublished data). In general, the effects of siltation are localized and not widespread and are not likely to threaten the survival of the species.

In addition to the six factors discussed above, we also consider the effects of altered water quality on Johnson's seagrass. Availability of light is one of the most significant environmental factors affecting the survival, growth, and distribution of seagrasses (Abal et al. 1994; Bulthuis 1983; Dennison 1987; Kenworthy and Fonseca 1996). Water quality and the penetration of light are affected by turbidity (suspended solids), color, nutrients, and chlorophyll, and are major factors controlling the distribution and abundance of sea grasses (Dennison 1987; Kenworthy and Fonseca 1996) (Kenworthy and Haunert 1991). Increases in color and turbidity values throughout the range of Johnson's seagrass generally are caused by high flows of freshwater discharged from water management canals, which can also reduce salinity. Wastewater and storm water discharges, as well as from land runoff and subterranean sources, are also causes of increased turbidity. Degradation of water quality due to increased land use and poor water management practices continues to threaten the welfare of seagrass communities. Declines in water quality are likely to worsen, unless water management and land use practices can curb or eliminate freshwater discharges and minimize inputs of sediments and nutrients. A nutrient-rich environment caused by inorganic and organic nitrogen and phosphorous loading via urban and agricultural runoff stimulates increased algal growth that may smother or shade Johnson's seagrass, or shade rooted vegetation, and diminish the oxygen content of the water. Low oxygen conditions have a demonstrated negative impact on seagrasses and associated communities.

A long-term monitoring program implemented by the SJRWMD assessed overall estuarine water quality in the northern and central region of Johnson's seagrass geographic range as mostly good (67%)(Winkler and Ceric 2006). Only 28% of the stations sampled had fair water quality, while 6% had poor quality. Fifty percent of the sampled estuarine sites were improving, while 6% were degrading, so many more sites were improving than were degrading. Forty-two percent of the lagoon sites had an insignificant trend while 3% had insufficient data to determine a trend. As water management experts have now become confident in the association between water quality and seagrass depth distribution, they have begun establishing water quality targets for the Indian River Lagoon based on seagrass as an indicator (Steward et al. 2005). There is a strong positive correlation between seagrass depth distribution and water quality, which enables managers to predict where seagrasses will grow based on water quality and the availability of light. Given that at least half of the sampling stations were indicating long-term improvements in water quality, it can be assumed that seagrass abundance should not be negatively impacted if water and land use management programs continue to be effective. For example, carefully controlling or reducing water flows from discharge canals will moderate salinity fluctuations and reduce turbidity, color, and light attenuation values.

There has not been a comprehensive assessment of water quality published or reported for the southern geographic range of Johnson's seagrass similar to the St. Johns River Water Management District (SJRWMD) study performed in the northern and central range. However, water quality experts at the South Florida Water Management District (SFWMD) confirm that efforts are underway to synthesize water quality information and to gain a more comprehensive understanding of the long-term status and trends of water quality in the southern range of Johnson's seagrass (Dan Crean, SFWMD, pers. comm. to Sarah Heberling, NMFS PRD, March 2011). Of particular concern is an assessment of the impacts of fluctuations in water quality corresponding with variation in climatology, especially "wet years" versus "dry years" variation. Future recovery efforts should include close coordination with the SFWMD and county environmental management agencies in Palm Beach and Dade Counties to evaluate the status and trends of water quality in these regions of the species' distribution.

Climate Change Effects on Seagrasses

Here, we consider the possible effects of climate change (i.e., rising temperatures and sea levels) on seagrasses in general and on Johnson's seagrass in particular. Earth's climate is projected to warm between 2° and 4°C by 2100, and similar projections have been made for marine systems (Sheppard and Rioja-Nieto 2005). At the margins of temperate and tropical bio-regions and within tidally-restricted areas where sea grasses are growing at their physiological limits, increased temperatures may result in losses of seagrasses and/or shifts in species composition (Short et al. 2007). The response of seagrasses to increased water temperatures will depend on the thermal tolerance of the different species and their optimum temperature for photosynthesis, respiration, and growth (Short and Neckles 1999). With future climate change and potentially warmer temperatures, there may be a 1 m-5 m rise in the seawater levels by 2100 when taking into account the thermal expansion of ocean water and melting of ocean glaciers. Rising sea levels may adversely impact seagrass communities due to increases in water depths above present meadows, reducing available light. Climate change may also reduce light by shifting weather patterns to cause increased cloudiness. Changing currents may cause erosion, increased turbidity and seawater intrusions higher up on land or into estuaries and rivers, which could increase landward seagrass colonization (Short and Neckles 1999). A landward migration of seagrasses with rising sea levels is a potential benefit, so long as suitable substrate is available for colonization.

It is uncertain how Johnson's seagrass will adapt to rising sea levels and temperatures. Much depends on how much and how quickly temperatures increase. For example, Johnson's seagrass that grows intertidally (e.g., in some parts of the Lake Worth Lagoon) may be affected by a slight change in temperature (since it may already be surviving under less than optimal conditions). However, this may be ameliorated with rising sea levels, assuming Johnson's seagrass would migrate landward with rising sea levels and assuming that suitable substrate would be available for a landward migration. However, rising sea levels could also adversely impact seagrass communities due to increases in water depths above existing meadows reducing available light.

Reduction in light availability may benefit some seagrass species (e.g., *Halophila* species) that require less light compared to the larger, canopy-forming species; therefore, much depends on the thermal tolerance of the different seagrass species and their optimum temperature for photosynthesis, respiration, and growth (Short and Neckles 1999). While sea level has changed many times during the evolutionary history of Johnson's seagrass, it is uncertain how this species will fare when considering the combined effects of rising temperatures and sea levels in conjunction with other stressors such as reduced salinity from freshwater runoff. It has been shown that evolutionary change in a species can occur within a few generations (Rice and Emery 2003), thus making it possible for seagrasses to cope if the changes occur at a rate slow enough to allow for adaptation.

3.2.1 Status Summary

Based on the results of 14 years of monitoring in the species' northern range (1994-2007) and three years of monitoring in the species' southern range (2006-2009), there has been no significant change in the northern or southern range limits of Johnson's seagrass (NMFS 2007). It appears that the populations in the northern range are stable and capable of sustaining themselves despite stochastic events related to severe storms (Steward et al. 2006) and fluctuating climatology. Longer-term monitoring data are needed to confirm the stability of the southern distribution of the species (NMFS 2007). However, based on the results of the southern transect sampling, it appears there is a relatively continuous, although patchy, distribution of Johnson's seagrass from Jupiter Inlet to Virginia Key, at least during periods of relatively good environmental conditions and no significant large-scale disturbances. Larger seagrasses, predominantly turtle grass *(Thalassia testudinum)*, begin to out-compete Johnson's seagrass in the southern range. While there has been a slight extension in the known northern range (Virnstein and Hall 2009), the limit of the southern range in the vicinity of Virginia Key (latitude 25.75°N) appears to be stable. There have been no reports of this species further south of the currently known southern distribution.

As discussed in the *Threats* section, the Recovery Team has determined that the possibility of mortality due to reduced salinity over long periods of time is a potential significant threat to the species. The other potential threats discussed above (i.e., dredging/filling, construction and shading from in and over-water structures, propeller scarring and anchor mooring, trampling, storms, and siltation) were determined to be local and small-scale and are not considered threats to the persistence and recovery of the species. It is uncertain how Johnson's seagrass will be affected by the synergistic effects of rising temperatures and sea levels associated with climate change (in conjunction with other stressors such as reduced salinity from freshwater runoff). However, evolutionary change in a species can occur within a few generations (Rice and Emery 2003), thus making it possible for seagrasses to cope if the changes occur at a rate slow enough to allow for adaptation.

4 ENVIRONMENTAL BASELINE

This section is a description of the past and ongoing human and natural factors leading to the current status of the species within the action area. The environmental baseline includes state, tribal, local, and private actions already affecting the species and that will occur contemporaneously with the consultation in progress. Unrelated federal actions affecting Johnson's seagrass that have completed formal or informal consultation or are in early consultation are also part of the environmental baseline, as are federal and other actions within the action area that may benefit Johnson's seagrass. This Opinion describes these activities in the sections below.

4.1 Factors Affecting Johnson's Seagrass in the Action Area

Federal Actions

According to a search of Google Earth and NMFS's Public Consultation Tracking System database, we identified 2 consultations on projects that are located in the Action Area that we determined may affect Johnson's seagrass, namely two formal consultations, SER-2009-7190 and SER-2013-12272. In SER-2009-7190, we issued a Biological Opinion on June 11, 2010. In that Opinion, NMFS estimated the loss of 0.17 acres (ac) of Johnson's seagrass from dredging and 0.09 ac of Johnson's seagrass from shading associated with dock construction (both the dredging and dock construction were for the purpose of renovating Lockheed Martin's existing facility to accommodate larger vessels). The second consultation, SER-2013-12272, was part of a batched Biological Opinion issued on October 23, 2014. SER-2013-12272 concerned a project to remove a subaqueous cable buried beneath the substrate. In the Opinion, NMFS estimated that, as a result of the cable removal, 9,278 ft^2 (0.21 ac) of habitat containing a combination of Johnson's seagrass and paddle grass would be impacted, and estimated the same amount of effects to Johnson's seagrass.

Private Recreational Vessel Traffic

Marina and dock construction increases recreational vessel traffic within areas of Johnson's seagrass, which increases suspended sediments from propellers and could result in propeller dredging. As mentioned above, suspended sediments are known to adversely affect Johnson's seagrass by reducing water transparency. Shading from vessel mooring may also affect Johnson's seagrass by reducing water transparency. Propeller dredging may also remove Johnson's seagrass and/or the sediments that support it.

Marine Pollution and Environmental Contamination

The project is located in a coastal area, and may be affected by coastal runoff. However, the project is not located adjacent to a freshwater canal or other direct source of freshwater discharge.

State and Federal Activities That May Benefit Johnson's Seagrass Critical Habitat in the Action Area

State and federal conservation measures exist to protect Johnson's seagrass and its habitat under an umbrella of management and conservation programs that address seagrasses in general (Kenworthy et al. 2006). These conservation measures must be continually monitored and assessed to determine if they will ensure the long-term protection of the species and the maintenance of environmental conditions suitable for its continued existence throughout its geographic distribution.

5 EFFECTS OF THE ACTION

NMFS believes the proposed action is likely to adversely affect Johnson's seagrass, which is listed as threatened under the ESA. However, no incidental take statement or reasonable and prudent measures will be issued because the ESA does not require biological opinions to contain incidental take statements for threatened plants. Yet, because the actions will result in adverse effects to Johnson's seagrass, we must evaluate whether the actions are likely to jeopardize the continued existence of the species (Section 7).

We believe the proposed dredging will adversely affect Johnson's seagrass. We believe the impact of dredging on Johnson's seagrass available habitat may be only short-term because the applicant proposes to dredge to -10 ft, which is still within the 3-4 m depth range for the species (NMFS 2007). As previously mentioned in Section 3.2 of this Opinion, observations by researchers have suggested that Johnson's seagrass exploits unstable environments or newly-created unvegetated patches by exhibiting fast growth and support for all local ramets in order to exploit areas in which it could not otherwise compete. It may quickly recruit to locally uninhabited patches through prolific lateral branching and fast horizontal growth. While these attributes may allow it to compete effectively in periodically disturbed areas, if the distribution of this species becomes limited to stable areas it may eventually be outcompeted by more stable-selected plants represented by the larger-bodied seagrasses (Durako et al. 2003). Based on what is known about its life history strategy, we believe it is possible that Johnson's seagrass could re-colonize the areas that, post-dredging, will not be shaded by the floating docks and vessels. Even if the area can recover, we still assume the loss of approximately 225,600 ft^2 of area that presently contains Johnson's seagrass with a percent coverage of approximately 1%.

6 CUMULATIVE EFFECTS

Cumulative effects include the effects of future state, tribal, or local private actions that are reasonably certain to occur in the action areas considered in this Opinion. Future federal actions that are unrelated to the proposed actions are not considered in this section because they require separate consultation pursuant to Section 7 of the ESA.

No categories of effects beyond those already described are expected in the action areas, and we did not identify any new future state, tribal, or private actions reasonably certain to occur in the action areas of the proposed action. Dock and marina construction will likely continue at current rates, with associated loss and degradation of seagrass, including Johnson's seagrass. Because these activities are subject to USACE permitting and thus, the ESA Section 7 consultation requirement, they do not lead to cumulative non-federal effects to be discussed in this section. NMFS and the USACE have developed protocols to encourage the use of light-transmitting materials in future construction of docks constructed in or over submerged aquatic vegetation (SAV), marsh or mangrove habitat, namely the *Construction Guidelines in Florida for Minor Piling-Supported Structures Constructed in or over Submerged Aquatic Vegetation (SAV), Marsh or Mangrove Habitat*, and for docks within the range of Johnson's seagrass, namely NMFS and USACE's *Key for Construction Conditions for Docks or Other Minor Structures Constructed in or over Johnson's Seagrass* (*Halophila johnsonii*). Even if all new docks are constructed in full compliance with the NMFS and USACE's guidance, NMFS acknowledges that shading impacts to Johnson's seagrass will continue via dock construction. As NMFS and the USACE continue to encourage permit applicants to design and construct new docks in full compliance with the construction guidelines discussed above, and the recommendations in (Adam 2012), Landry et al. (2008), and Shafer et al. (2008), NMFS believes that shading impacts to Johnson's seagrass will be reduced in the short- and long-term. Moreover, even with some shading from grated construction materials, researchers have found all 4 essential features necessary for Johnson's seagrass to persist under docks constructed of grated decking (Landry et al. 2008).

Upland development and associated runoff will continue to degrade the water quality in areas that support Johnson's seagrass. Flood control and imprudent water management practices will continue to result in freshwater inputs into estuarine systems, thereby degrading and altering the water quality and salinity essential features of Johnson's seagrass critical habitat, and this may adversely affect the species.

Increased recreational vessel traffic will continue to result in damage to Johnson's seagrass by improper anchoring, propeller scarring, and accidental groundings. Nonetheless, we expect that ongoing boater education programs and posted signage about the dangers to seagrass habitat from propeller scarring and improper anchoring may reduce impacts to Johnson's seagrass.

7 JEOPARDY ANALYSIS

The analyses conducted in the previous sections of this Opinion serve to provide a basis to determine whether the proposed action would be likely to jeopardize the continued existence of Johnson's seagrass. In Section 5, we outlined how the proposed action is likely to adversely affect Johnson's seagrass. Now we turn to an assessment of the species response to these impacts, in terms of overall population effects, and whether those effects of the proposed action, when considered in the context of the status of the species (Section 3), the environmental baseline (Section 4), and the cumulative effects (Section 6), will jeopardize the continued existence of the affected species.

"To jeopardize the continued existence of" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and the recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR 402.02). Thus, in making this determination, we must first determine whether there will be a reduction in the reproduction, numbers, or distribution. Then, if there is a reduction in one or more of these elements, we evaluate whether it will cause an appreciable reduction in the likelihood of both the survival and the recovery of the species.

7.1 Effects of the Action on the Likelihood of Survival in the Wild

Based on our current knowledge of the species, Johnson's seagrass reproduction is entirely asexual, is presumed to occur by fragmentation, and growth appears to be rapid. Johnson's seagrass occurs in dynamic and disjunct patches throughout its range and is sparsely distributed in the action area. The proposed dredging will result in the removal of approximately 225,600 ft^2 of habitat that presently contains Johnson's seagrass (approximately 1% coverage). This constitutes a small reduction in the numbers of the species; however, NMFS believes that the species' status will not be affected by this very small reduction. NMFS (2007) found that, though there has been no improvement in the species' risk of extinction since its listing, populations in the portion of its range, including the action area, appear stable and capable of sustaining themselves. Therefore, due to the fact that the population has remained stable even with some development, we believe that the small reduction in numbers of Johnson’s seagrass from this activity, combined with the loss in the baseline, will not appreciably reduce the species’ likelihood of survival in the wild.

Reproduction will be minimally reduced by the aforementioned reduction in Johnson’s seagrass numbers, but NMFS believes this reproductive loss will not appreciably reduce the likelihood of survival of Johnson’s seagrass in the wild. Johnson’s seagrass will continue to reproduce and spread, since healthy, non-disturbed Johnson’s seagrass exists nearby (in the Peanut Island area) and will remain. Because we believe that unaffected areas of Johnson’s seagrass will persist at the project site, we expect that the reproductive potential of the species in the action area, and in this portion of its range, will persist.

The action will not result in a reduction of Johnson’s seagrass distribution; Johnson’s seagrass will continue to exist in areas surrounding the action area and throughout its 200-km range.

NMFS concludes that the proposed action will not appreciably reduce the likelihood of survival of Johnson’s seagrass in the wild.

7.2 Effects of the Action on the Likelihood of Recovery in the Wild

Recovery for Johnson's seagrass, as described in the recovery plan (NMFS 2002), will be achieved when the following recovery objectives are met: (1) the species’ present geographic range remains stable for at least 10 years or increases; (2) self-sustaining populations are present throughout the range at distances less than or equal to the maximum dispersal distance to allow for stable vegetative recruitment and genetic diversity; and (3) populations and supporting habitat in its geographic range have long-term protection (through regulatory action or purchase acquisition).

NMFS’s 5-year review (2007) of the status of the species concluded that the first recovery objective has been achieved. In fact, the range has increased slightly northward. The proposed action will not preclude the ability to achieve the first recovery objective because the proposed action will not have any effect on the species’ present geographic range; the action area is not located at the edge of the species’ range. In terms of achieving the second recovery objective, self-sustaining populations are present throughout the range of the species. The species' overall reproductive capacity will be only minimally reduced by the reduction in Johnson’s seagrass numbers (225,600 ft^2 of habitat that presently contains 1% coverage of Johnson’s seagrass) and reproduction resulting from the proposed action. This loss, in combination with the loss of habitat in the baseline (0.47 ac of habitat), is minimal. The proposed action, when added to the baseline, will not lead to separation of self-sustaining Johnson’s seagrass patches to an extent that might lead to adverse effects to 1 or more patches of the species. Therefore, we believe the proposed action will not preclude the ability to achieve the second recovery objective. In terms of achieving the third recovery objective, the proposed action, when added to the baseline, is not likely to adversely affect the availability of suitable habitat in which the species can spread/flow in the future. While additional individual impacts may continue to occur, over the last decade the species has not demonstrated any declining trends. The proposed action, when added to the baseline, will not reduce or destabilize the present range of Johnson’s seagrass, and it will not impede the ability to achieve the third recovery objective. Based on the preceding, we conclude the proposed action will not appreciably reduce the likelihood of recovery of Johnson's seagrass in the wild.

8 CONCLUSION

We have analyzed the best available data, the current status of the species, environmental baseline, effects of the proposed action, and cumulative effects to determine whether the proposed action is likely to jeopardize the continued existence of Johnson's seagrass. It is our Opinion that the proposed action is likely to adversely affect, but is not likely to jeopardize the continued existence of Johnson's seagrass.

9 INCIDENTAL TAKE STATEMENT

NMFS does not anticipate that the proposed action will incidentally take any species and no take is authorized. Nonetheless, any take of sea turtles or smalltooth sawfish shall be immediately reported to takereport.nmfsser@noaa.gov. Refer to the present Biological Opinion by issuance date, NMFS PCTS identifier number (SER-2017-18748), and USACE permit number, SAJ-2003-02932 (LP-LCK). At that time, consultation must be reinitiated.

10 CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

NMFS believes the following conservation recommendations are reasonable, necessary, and appropriate to conserve and recover Johnson's seagrass. NMFS strongly recommends that these measures be considered and adopted.

1. NMFS recommends that the USACE, in coordination with seagrass researchers and industry, support ongoing research on light requirements and transplanting techniques to preserve and restore Johnson's seagrass, and on collection of plants for genetics research, tissue culture, and tissue banking.

2. NMFS recommends that the USACE continue promoting the use of the October 2002 *Key for Construction Conditions for Docks or other Minor Structures Constructed in or over Johnson's Seagrass* as the standard construction methodology for proposed docks located in the range of Johnson's seagrass.

3. NMFS recommends that the USACE review and implement the recommendations in the July 2008 report, *The Effects of Docks on Seagrasses, With Particular Emphasis on the Threatened Seagrass, Halophila johnsonii* (Landry et al. 2008).

4. NMFS recommends that the USACE review and implement the Conclusions and Recommendations in the October 2008 report, *Evaluation of Regulatory Guidelines to*

Minimize Impacts to Seagrasses from Single-family Residential Dock Structures in Florida and Puerto Rico (Shafer et al. 2008).

5. NMFS recommends that a report of all current and proposed USACE project in the range of Johnson's seagrass be prepared and used by the USACE to assess impacts on the species from these project, to assess cumulative impacts, and to assist in early consultation that will avoid and/or minimize impacts to Johnson's seagrass and its critical habitat. Information in this report should include location and scope of each project and identify the federal lead agency for each project. The information should be made available to NMFS.

6. NMFS recommends that the USACE conduct and support research to assess trends in the distribution and abundance of Johnson's seagrass. Data collected should be contributed to the Florida Fish and Wildlife Conservation Commission's Florida Wildlife Research Institute to support ongoing geographic information system mapping of Johnson's seagrass and other seagrass distribution.

7. NMFS recommends that the USACE prepare an assessment of the effects of other actions under its purview on Johnson's seagrass for consideration in future consultations.

11 REINITIATION OF CONSULTATION

As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if (1) the amount or extent of taking specified in the proposed action is exceeded, (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered, (3) the identified action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in the Biological Opinion, or (4) a new species is listed or critical habitat designated that may be affected by the identified action.

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