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
https://www.fisheries.noaa.gov/region/southeast

09/30/2025

F/SER31: CK
SERO-2024-02041

Maria Bezanilla
Senior Project Manager
Keys Section, Jacksonville District Corps of Engineers
Department of the Army
Fanny Keys
Marathon, FL 33050

Ref.: (SAJ-1994-01991, SERO-2024-02041), David Marabella Revetment, Marathon, Monroe County, Florida

Dear Maria Bezanilla,

The enclosed Biological Opinion responds to your request for consultation with us, the National Marine Fisheries Service (NMFS), pursuant to Section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. § 1531 et seq.) for the above referenced action. The Opinion has been given the NMFS tracking number SERO-2024-02041. Please use the NMFS tracking number in all future correspondence related to this action.

The Opinion considers the effects of the federal action agency's proposal to authorize the construction of a revetment in Marathon, Monroe County, Florida on the following listed species and critical habitat: green sea turtle (North Atlantic Distinct Population Segment [DPS]), Kemp's ridley sea turtle, loggerhead sea turtle (Northwest Atlantic DPS), hawksbill sea turtle, smalltooth sawfish (United States DPS), giant manta ray, and queen conch; critical habitat for boulder star coral, lobed star coral, and mountainous star coral; and proposed critical habitat for the green sea turtle (North Atlantic DPS). The Opinion is based on information provided by the USACE, the applicant David Marabella, and the Florida Keys National Marine Sanctuary, and the published literature cited within. NMFS concludes that the proposed action is not likely to adversely affect the green sea turtle (North Atlantic DPS), Kemp's ridley sea turtle, loggerhead sea turtle (Northwest Atlantic DPS), hawksbill sea turtle, smalltooth sawfish (United States DPS), and giant manta ray, and proposed critical habitat for the green sea turtle (North Atlantic DPS). NMFS concludes that the proposed action is likely to adversely affect, but is not likely to jeopardize the continued existence of queen conch. NMFS concludes that the proposed action is likely to adversely affect, but is not likely to result in the destruction or adverse modification of critical habitat for boulder star coral, lobed star coral, and mountainous star coral.

NMFS is providing an Incidental Take Statement with this Opinion. The Incidental Take Statement describes Reasonable and Prudent Measures that NMFS considers necessary or appropriate to minimize the impact of incidental take associated with this action. The Incidental Take Statement also specifies Terms and Conditions, including monitoring and reporting

requirements with which the USACE and David Marabella must comply, to carry out the Reasonable and Prudent Measures.

We look forward to further cooperation with you on other projects to ensure the conservation of our threatened and endangered marine species and critical habitat. If you have any questions regarding this consultation, please contact Courtney Kiel, Consultation Biologist, by phone at (301) 427-7837, or by email at Courtney.Kiel@noaa.gov.

Sincerely,

AMENDOLA.KIMBERLY.BARBARA.1365830769
Digitally signed by AMENDOLA.KIMBERLY.BARBARA.1365830769
Date: 2025.09.30 16:13:06 -04'00'

for

Andrew J. Strelcheck
Regional Administrator

Enclosure (s):
NMFS Biological Opinion SERO-2024-02041
cc: Maria.I.Bezanilla@usace.army.mil
nmfs.ser.esa.consultations@noaa.gov
File: 1514-22.f.4

Endangered Species Act - Section 7 Consultation
Biological Opinion

Action Agency: United States Army Corps of Engineers

Permit number: SAJ-1994-01991

Applicant: David Marabella

Activity: Seawall Stabilization in Three Sections around Fanny Key

Location: Marathon, Monroe County, Florida

Consulting Agency: National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Regional Office, Protected Resources Division, St. Petersburg, Florida

NMFS Tracking Number: SERO-2024-02041

Approved by: for AMENDOLA.KIMBERLY.BARBARA.1365830769 Digitally signed by AMENDOLA.KIMBERLY.BARBARA.1365830769 Date: 2025.09.30 16:13:36 -04'00'

Andrew J. Strelcheck, Regional Administrator
NMFS, Southeast Regional Office
St. Petersburg, Florida

Date Issued: 09/30/2025

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ACRONYMS, ABBREVIATIONS, AND UNITS OF MEASURE

Ω_{arg}	aragonite saturation
ac	acre(s)
°C	degrees Celsius
CFR	Code of Federal Regulations
cm	centimeter(s)
DPS	Distinct Population Segment
ECO	Environmental Consultation Organizer
EFH	Essential Fish Habitat
ESA	Endangered Species Act of 1973, as amended (16 U.S.C. § 1531 et seq.)
°F	degrees Fahrenheit
FKNMS	Florida Keys National Marine Sanctuary
ft	foot/feet
FR	Federal Register
ft^2	square foot/feet
FWC	Florida Fish and Wildlife Conservation Commission
FWRI	Florida Fish and Wildlife Research Institute
in	inch(es)
IPCC	Intergovernmental Panel on Climate Change
km	kilometer(s)
km^2	square kilometers
lin ft	linear foot/feet
m	meter(s)
m^2	square meters
MHW	Mean High Water
mi	mile(s)
mi^2	square mile(s)
MLLW	Mean Lower Low Water
MMPA	Marine Mammal Protection Act
MMF	Marine Megafauna Foundation
MPA	Marine Protected Area
MSA	Magnuson-Stevens Fishery Conservation and Management Act
N/A	not applicable
NAD 83	North American Datum of 1983
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NTU	Nephelometric Turbidity Unit
Opinion	Biological Opinion, Conference Biological Opinion, or Draft Biological Opinion
SERO PRD	NMFS Southeast Regional Office, Protected Resources Division
SAV	Submerged Aquatic Vegetation
SSRIT	Smalltooth Sawfish Recovery Implementation Team
STSSN	Sea Turtle Stranding and Salvage Network
TSS	Total Suspended Solids
U.S.	United States of America
USACE	United States Army Corps of Engineers

USFWS	United States Fish and Wildlife Service

1 INTRODUCTION

1.1 Overview

Section 7(a)(2) of the ESA, 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 in carrying out these responsibilities. The NMFS and the USFWS share responsibilities for administering the ESA. Consultations on most ESA-listed marine species and their critical habitat are conducted between the federal action agency and NMFS (hereafter, may also be referred to as we, us, or our).

Consultation is required when a federal action agency determines that a proposed action "may affect" ESA-listed species or critical habitat and can be conducted informally or formally. Informal consultation is concluded after NMFS issues a Letter of Concurrence that concludes that the action is "not likely to adversely affect" ESA-listed species or critical habitat. Formal consultation is concluded after we issue a Biological Opinion (hereafter, referred to as an/the Opinion) that identifies whether a proposed action is "likely to jeopardize the continued existence of an ESA-listed species" or "destroy or adversely modify critical habitat," in which case Reasonable and Prudent Alternatives to the action as proposed must be identified to avoid these outcomes. An Opinion often states the amount or extent of anticipated incidental take of ESA-listed species that may occur, develops Reasonable and Prudent Measures necessary or appropriate to minimize such impact of incidental take on the species, and lists the Terms and Conditions to implement those measures. An Opinion may also develop Conservation Recommendations that help benefit ESA-listed species.

This document represents NMFS's Opinion based on our review of potential effects of the USACE's proposal to authorize construction of the proposed riprap revetment by David Marabella (the applicant) in Marathon, Monroe County, Florida on the following listed species and critical habitat: green sea turtle (North Atlantic DPS), Kemp's ridley sea turtle, loggerhead sea turtle (Northwest Atlantic DPS), hawksbill sea turtle, smalltooth sawfish (U.S. DPS), giant manta ray, and queen conch, critical habitat for boulder star coral (*Orbicella franksi*), lobed star coral (*O. annularis*), and mountainous star coral (*O. faveolata*) and proposed critical habitat for the green sea turtle (North Atlantic DPS). Our Opinion is based on information provided by the USACE, the applicant, the FKNMS, and the published literature cited within.

Updates to the regulations governing interagency consultation (50 CFR part 402) were effective on May 6, 2024 (89 FR 24268). We are applying the updated regulations to this consultation. The 2024 regulatory changes, like those from 2019, were intended to improve and clarify the consultation process, and, with one exception from 2024 (offsetting reasonable and prudent measures), were not intended to result in changes to the Services' existing practice in implementing section 7(a)(2) of the Act (89 FR 24268; 84 FR 45015). We have considered the prior rules and affirm that the substantive analysis and conclusions articulated in this Opinion and incidental take statement would not have been any different under the 2019 regulations or pre-2019 regulations.

1.2 Consultation History

The following is the consultation history for the NMFS ECO tracking number SERO-2024-02041, Marabella Revetment.

On August 20, 2024, we received a request for formal consultation and an official request to conference on effects to proposed critical habitat for the green sea turtle, under Section 7 of the ESA from the USACE to permit, three sections of seawall stabilization around Fanny Key by David Marabella (the applicant) in Marathon, Monroe County, Florida in a letter dated August 20, 2024.

On March 6, 2025, we requested additional information related to the project description, the action area, and authorizations from FKNMS for the activity and for the coral mitigation plan.

We received a final response on March 13, 2025, and initiated formal consultation that day.

2 PROPOSED ACTION

2.1 Project Details

2.1.1 Project Description

The USACE proposes to authorize construction of a riprap revetment located on a private island, Fanny Keys, nearshore to Marathon within the Florida Bay and the FKNMS (Figure 1). The island is supported by an existing vertical rock seawall along the perimeter of the property with portions of the shoreline also supporting dense mature mangroves. The purpose of the proposed project is to install three separate segments of riprap seaward of the existing vertical seawall to help protect the property from wave action. Work will commence upon receipt of the permit and the project will be complete within 15 days, including all in-water work.

Figure 1. Proposed Action Plan Overview. Orange hatching identifies the location of the 3 proposed segments of riprap revetment. Green hatching identifies existing mature mangroves that will be avoided. Image provided by USACE.

The riprap revetment is proposed along three separate segments totaling 425.5 lin ft of the island shoreline in water depths up to -1 ft 7.2 in from the MHWL (Figure 1). A total of 203.25 yd^3 of rip rap will be placed within a 3,048.8 ft^2 area. The riprap revetment will extend 7 ft 2 in from the existing vertical rock seawall, shifting the MHWL 4 ft 2 in waterward (Figure 2). Work will be performed by an excavator from the uplands or a pontoon barge, and work will occur during daylight hours.

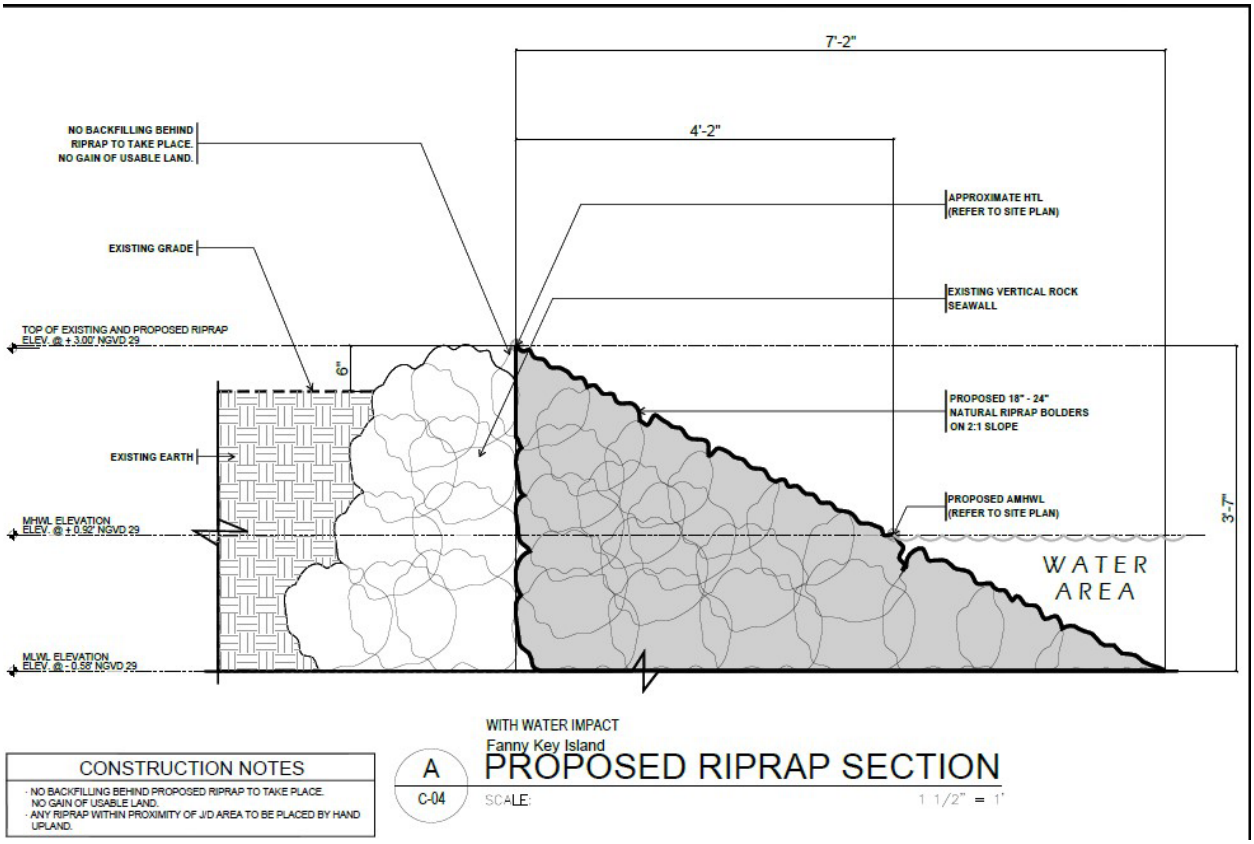

Figure 2. Proposed cross-sectional view of riprap shoreline stabilization work. Image provided by USACE.

Turbidity barriers (temporary and floating) will be placed in the water by hand around each of the three distinct sections where riprap will be placed. In total, a 5,000 ft^2 area will be encompassed by turbidity barriers for the duration of the project and will be removed once turbidity levels have returned to preconstruction conditions.

Vessels, such as a barge and/or work boat are proposed to support construction. Speeds will vary and are dependent on contractor selection and type of vessel being used. Vessel speeds will be reduced while maintaining sufficient maneuverability and navigation. The exact travel routes to and from the proposed project site will be determined based on contractor selection. However, travel routes will be restricted to existing navigation channels of the Florida Bay. All construction personnel will be responsible for observing water-related activities to detect the presence of Threatened and Endangered Species, as described in the Protected Species Construction Conditions. (NMFS 2021a).

Work in uplands is proposed; however, the effects of land-based activities do not extend into the water or otherwise effect listed species under NMFS jurisdiction. Therefore, this aspect of the proposed action will not be considered further.

2.1.2 Mitigation Measures

To minimize potential impacts to ESA-listed species, USACE will add the following conditions to the permit.

- **FKNMS Authorization:** No placement of riprap below MHW is covered under this Opinion within the boundary of the FKNMS unless the FKNMS issues a NOAA permit or authorization that signifies the proposed activity is consistent with Title III of the Marine Protection, Research, and Sanctuaries Act of 1972, as amended. Proof of authorization is included as Appendix 1. Proposed relocation plans and impacts to non-ESA corals are being reviewed by the FKNMS. The applicant has agreed to make payment to the NMFS FKNMS Coral Nursery Program Fund to mitigate for impacts to these colonies. This mitigation plan is included (Appendix 2). Impacts to trust resources are minimized by following the FKNMS guidelines.
- The applicant will implement and adhere to NMFS SERO's *Protected Species Construction Conditions* (NMFS 2021a).
- The applicant will implement and adhere to NMFS SERO's *Vessel Strike Avoidance Measures* (NMFS 2021b).
- **Daylight Hours**: All work will occur during daylight hours.
- All supporting equipment (barges and tow boats) will be shallow draft and will maintain a minimum of 1 ft of clearance above the existing bottom. Barges will be secured by mooring only (i.e., no spudding).
- **Fill Material:** The applicant shall use only clean fill material for this project. The fill material shall be free from items such as trash, debris, automotive parts, asphalt, construction materials, concrete blocks with exposed reinforcement bars, and soils contaminated with any toxic substance in toxic amounts, in accordance with Section 307 of the Clean Water Act.
- **Turbidity Barriers:** Prior to the initiation of any authorized work, and after the completion of the queen conch pre-construction survey, the applicant shall install, by hand, floating turbidity barriers with weighted skirts that extend within 1 foot off the bottom around all areas in the three distinct sections where riprap placement is proposed. The turbidity barriers shall remain in place and maintained daily until the authorized work is complete. Turbidity barriers will be removed when turbidity within the construction area has returned to ambient levels.
- The applicant will implement and adhere to NMFS SERO's *Queen Conch Survey, Construction Conditions, Relocation and Reporting Guidelines* (NMFS 2025). A pre-construction survey within 90 days of the start of construction will be conducted prior to commencing any in-water work to determine the presence of queen conch. The pre-construction survey and the daily surveys will include the entire project area including a 12m (39ft) buffer around the limits of construction. Any needed relocations will take place within one week of the initiation of construction.
- **Avoidance:** The mangroves along the shoreline and adjacent to the proposed riprap placement areas will be avoided; therefore, no impacts to the nearby mangroves will occur. Riprap will be placed by hand around red mangrove (*Rhizophora mangle*) prop roots. All direct impacts to SAV and mangroves will be avoided.

- The applicant shall report any injury to any ESA-listed species occurring during the construction phase of the project immediately to both:
    - NMFS SERO PRD via the NMFS SERO Endangered Species Take Report Form. The applicant will include the SERO ECO tracking number in all correspondence, and
    - The following local stranding and rescue organization:
        - FWC Wildlife Alert Hotline: (888) 404-FWCC/ (888) 404-3922.
- The following entities will also need to be informed of any interaction during construction, as appropriate, and may ask for additional information:
    - All interactions with any marine mammal will also be reported to 1-877-WHALE HELP (1-877-942-5343).
    - All interactions with sea turtles will also be reported to the appropriate State Sea Turtle Stranding Coordinator:
        - Dr. Alan M. Foley (State Coordinator)
          Florida Fish and Wildlife Conservation Commission
          Fish and Wildlife Research Institute
          Jacksonville Field Laboratory
          370 Zoo Parkway
          Jacksonville, FL 32218
          Allen.foley@myfwc.com
          904-696-5904-6484

2.1.3 Best Practices

- The applicant will report all ESA listed queen conch found at the property to the FWC via E-mail: SAL@MyFWC.com or telephone: 850-487-0554.
- The applicant will report all future sightings of smalltooth sawfish at the property to the FWC via E-mail: Sawfish@MyFWC.com or telephone: 844-472-9347 (1-844-4SAWFISH).

2.2 Action Area

The action area is defined by regulation as all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 CFR 402.02). For the purposes of this federal action, the action area includes a nearshore private island, Fanny Key, within the Florida Bay in the FKNMS. The project site is a developed, single-family residential lot located at 24.712778°, -81.109444° (NAD 83) in Marathon, Monroe County, Florida, approximately 0.28-mi North of Overseas Highway within Florida Bay. This action area includes the 5,000 ft^2 area within the deployed turbidity curtains, plus a 300 ft construction buffer zone around the turbidity curtains (Figure 3). The action area is within the geographic boundary of designated critical habitat for boulder star coral, lobed star coral, and mountainous star coral, and proposed critical habitat for the green sea turtle (North Atlantic DPS).

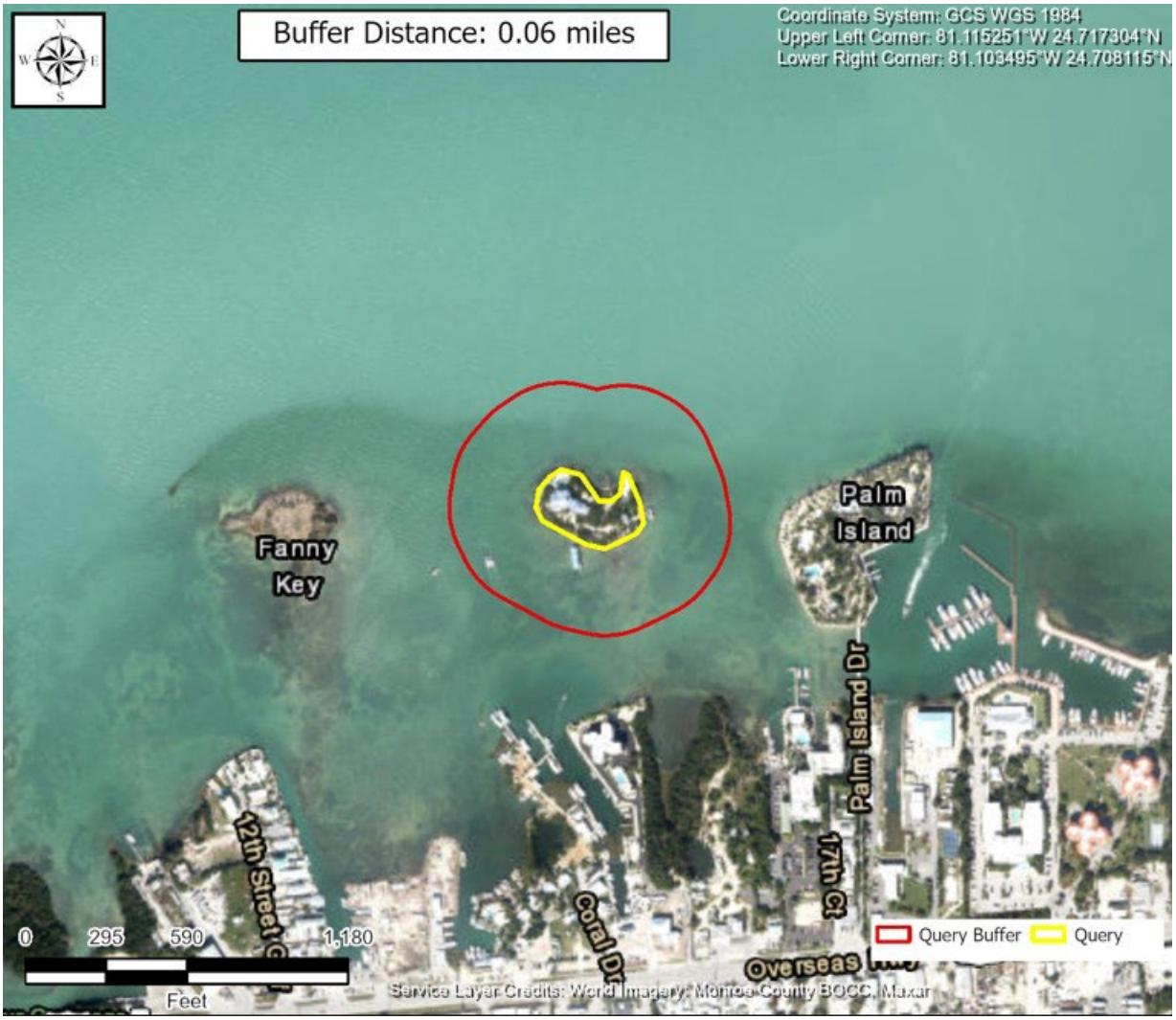

Figure 3. Marabella Revetment action area shown between the red polygon and the yellow polygon. Image provided by the USACE.

A vertical rock seawall surrounds the island along the perimeter of the property with portions of the shoreline also supporting dense mature mangroves. Red mangroves (*R. mangle*) are located across a significant portion 12,571 ft^2 (1,167.9 m^2). However, the project was designed to avoid impacts to mangrove resources. Although seagrass is located near the project footprint, no seagrass is present within the proposed riprap location. The proposed riprap will be placed along areas of the shoreline that are directly affected by wave action.

The project footprint contains exposed cap rock within the intertidal areas. The submerged project footprint supports hardbottom and coral species that are not ESA-listed. A benthic resource survey was completed on March 20, 2024 to assess existing habitats for benthic resources (e.g., stony corals, SAV, mangroves, sponges, macroalgae, etc) within the proposed project footprint and 10 ft perimeter buffer area. During the assessment, 5 queen conch were documented. In addition, resources such as non-federally listed stony coral, *Siderastrea radians,* were documented throughout the site. Impacts to non-ESA corals will be reviewed by the FKNMS and mitigation will be made by payment to the NMFS FKNMS Coral Nursery Program

Fund (Appendix 2). Turtle grass (*Thalassia testudinum*) and shoal grass (*Halodule wrightii*) seagrass beds were observed during the assessment but are located outside the project footprint. A hardbottom shelf extends outward from the shoreline across a large portion of the assessment area and is located within the geographical boundaries of designated critical habitat for the *Orbicella* spp. or star coral species complex (boulder star coral, lobed star coral, and mountainous star coral). Riprap placement will impact approximately 3,048.8 ft^2 of hardbottom. As a result of the proposed activity, natural consolidated hardbottom will be permanently altered by less suitable manmade features of transplanted boulder riprap. Beyond the limits of the hardbottom habitat, the substrate consists of unconsolidated sand with scattered large rocks.

3 EFFECTS DETERMINATIONS

Please note the following abbreviations are only used in **Table 1** and **Table 2** and are not, therefore, included in the list of acronyms: E = endangered; T = threatened; P = Proposed; LAA = likely to adversely affect; NLAA = may affect, not likely to adversely affect; NE = no effect; N/A = not applicable.

3.1 Effects Determinations for ESA-Listed Species

3.1.1 Agency Effects Determination(s)

We have assessed the ESA-listed species that may be present in the action area and our determination of the project's potential effects is shown in **Table 1** below.

Table 1. ESA-listed Species in the Action Area and Effect Determinations

Species (DPS)	ESA Listing Status	Listing Rule/Date	Most Recent Recovery Plan (or Outline) Date	USACE Effect Determination	NMFS Effect Determination
Sea Turtles					
Green sea turtle (North Atlantic DPS)	T	81 FR 20057/ April 6, 2016	October 1991	NLAA	NLAA
Hawksbill sea turtle	E	35 FR 8491/ June 2, 1970	December 1993	NLAA	NLAA
Kemp's ridley sea turtle	E	35 FR 18319/ December 2, 1970	September 2011	NLAA	NLAA
Loggerhead sea turtle (Northwest Atlantic DPS)	T	76 FR 58868/ September 22, 2011	December 2008	NLAA	NLAA
Fishes					
Giant manta ray	T	83 FR 2916/	2019 (Outline)	NLAA	NLAA

Species (DPS)	ESA Listing Status	Listing Rule/Date	Most Recent Recovery Plan (or Outline) Date	USACE Effect Determination	NMFS Effect Determination
		January 22, 2018			
Smalltooth sawfish (U.S. DPS)	E	68 FR 15674/ April 1, 2003	January 2009	NLAA	NLAA
Invertebrates					
Queen conch	T	89 FR 11208; February 14, 2024	N/A	NLAA	LAA
Boulder star coral (*Orbicella franksi*)	T	79 FR 53852/ September 10, 2014	N/A	NE	NLAA
Lobed star coral (*Orbicella annularis*)	T	79 FR 53852/ September 10, 2014	N/A	NE	NLAA
Mountainous star coral (*Orbicella faveolata*)	T	79 FR 53852/ September 10, 2014	N/A	NE	NLAA

The proposed activity is located within the species range of the ESA-listed sea turtles, fish, and invertebrates identified in Table 1. A March 20, 2024 benthic survey observed several queen conch and non-listed corals within the action area, but no ESA-listed corals observed.

3.1.2 Effects Analysis for ESA-Listed Species Not Likely to be Adversely Affected by the Proposed Action

We believe the proposed activity is not likely to adversely affect ESA-listed sea turtles, giant manta ray, smalltooth sawfish, and ESA-listed star corals. The following analyses include rationale to support NMFS's determinations that these effects are either insignificant or extremely unlikely to occur.

Physical Effects

ESA-listed sea turtles and fishes may be physically injured if struck by construction equipment, vessels, or material. We believe this effect will be extremely unlikely to occur due to the ability of these species to move away from the project site if disturbed. All barges and tow boats will be shallow draft and will maintain a minimum of 1-ft clearance above the existing bottom. Mobile species are able to avoid this type of slow-moving equipment and placement of material. In

addition, the implementation of NMFS's *Protected Species Construction Conditions* (NMFS 2021a) will require all construction workers to observe water-related activities for the presence of these species. If a protected species is seen within 100 yards of the active daily construction operation or vessel movement, all appropriate precautions shall be implemented to ensure its protection. These precautions shall include cessation of operation of any moving equipment closer than 150-ft of a protected species. Operation of any mechanical construction equipment shall cease immediately if a protected species is observed within a 150-ft radius of the equipment. Activities may not resume until the protected species has departed the project area of its own volition. Mitigation measure during all in-water construction activities also include adherence to the *Vessel Strike Avoidance Measures(NMFS 2021b)*. Further, construction would be limited to daylight hours so construction workers would be more able to see protected species, if present, and avoid interactions with them.

Habitat Effects

The proposed project will avoid impacts to mangroves and seagrass; however, the footprint for riprap placement overlaps with a hardbottom shelf that extends from the island shoreline. Although there are no ESA-listed corals present in the action area, the proposed project is within the range of star corals. Therefore, these species may be affected by the placement of the riprap due to disruption of the potential settlement of coral planula in the footprint of riprap placement (3,048.8 sf). We discuss the direct effects to designated coral critical habitat in detail in section 6.2. We believe the effect of the proposed action to boulder star coral, lobed star coral, and mountainous star coral from the loss of hardbottom that could potentially be used for settling and attachment is insignificant. Although, the natural consolidated hardbottom will be replaced with less suitable, manmade-substrate; this reduction in suitability cannot be meaningfully measured or evaluated, especially because we have observed star corals growing on manmade structures.

Mobile ESA-listed species may be affected by their inability to access the project area for foraging and resting, due to their avoidance of construction activities, related noise, and physical exclusion from areas blocked by turbidity curtains. Turbidity curtains will be removed after stabilization of the work area (approximately 15 days). Although ESA-listed species will be temporarily unable to access the construction areas, we believe these effects will be insignificant, given the project's limited footprint and construction period. The area from which animals will be excluded is relatively small in comparison to the available similar habitat nearby. In addition, construction will be limited to daylight hours only enabling mobile ESA-listed species to move around the outside of the project area during evening hours.

ESA-listed sea turtles, smalltooth sawfish, and giant manta ray may be affected by the permanent loss of 3,048.8 ft^2 of nearshore habitat used for foraging or resting due to the placement of riprap. We believe the proposed action will have an insignificant effect to these ESA-listed species due to the project's limited size, avoidance of red mangrove habitat, and availability of similar habitat in adjacent areas. In addition, macroalgae (such as *Ulva* spp.) may grow on the new riprap resulting in available foraging habitat for some ESA-listed species, such as the green sea turtle.

3.1.3 Effects Analysis for ESA-Listed Species Likely to be Adversely Affected by the Proposed Action

We have determined that queen conch are likely to be adversely affected by the proposed action and thus requires further analysis. We provide greater detail on the potential effects to these species from the proposed action in the Effects of the Action (Section 6) and whether those effects, when considered in the context of the Status of the Species (Section 4.1), the Environmental Baseline (Section 5), and the Cumulative Effects (Section 7), are not likely to jeopardize the continued existence of these ESA-listed species in the wild.

3.2 Effects Determinations for Critical Habitat

3.2.1 Agency Effects Determinations

We have assessed the critical habitats that overlap with the action area and our determination of the project's potential effects is shown in **Table 2** below.

Table 2. Critical Habitat in the Action Area and Effect Determinations

Species (DPS)	Critical Habitat Unit in the Action Area	Critical Habitat Rule/Date	USACE Effect Determination	NMFS Effect Determination (Critical Habitat)
Invertebrates				
Boulder star coral (*O. franksi*)	OFRA-1: Florida Area	88 FR 54026/ August 9, 2023	LAA	LAA
Lobed star coral (*O. annularis*)	OANN-1: Florida Area	88 FR 54026/ August 9, 2023	LAA	LAA
Mountainous star coral (*O. faveolata*)	OFAV-1: Florida Area	88 FR 54026/ August 9, 2023	LAA	LAA
Sea Turtle				
Proposed Green sea turtle	FL01: Florida	88 FR 46572, July 19, 2023	NLAA	NLAA

3.2.2 Effects Analysis for Critical Habitat Not Likely to be Adversely Affected by the Proposed Action

The project is located within the geographic boundary of proposed critical habitat for the green sea turtle (FL01: Florida). The following physical or biological features essential for the conservation of the species ("essential features") are present:

- *Migratory essential feature*: From the mean high water line to a particular depth or distance from shore (as dictated by the best available data for that DPS), sufficiently unobstructed corridors that allow for unrestricted transit of reproductive individuals between benthic foraging/resting areas and reproductive areas.

- *Benthic foraging/resting essential features*: From the mean high water line to 20 m depth, underwater refugia and food resources (i.e., seagrasses, macroalgae, and/or invertebrates) of sufficient condition, distribution, diversity, abundance, and density necessary to support survival, development, growth, and/or reproduction.

Migratory essential feature
Although the proposed activity is sited within the range of the *Migratory* essential feature of the proposed green sea turtle critical habitat, we believe the riprap construction will have No Effect on the *Migratory* essential feature. The proposed activity is located close to the shoreline of Marathon with no nesting beaches nearby and the riprap footprint does not extend into seagrass. Due to the absence of nearby nesting beaches and the avoidance of seagrass, the placement of riprap will not affect any unobstructed corridors that allow for the transit of reproductive individuals between foraging/resting areas and reproductive areas.

Benthic foraging/resting essential features
The proposed benthic foraging/resting essential features present within the immediate vicinity of construction activities may be temporarily impacted by elevated turbidity during project construction. We believe that these impacts to these essential features will be insignificant. These impacts would be short-term and restricted to the immediate vicinity of the project area. The project is limited in duration with an expected completion timeline of 15 days and riprap placement avoids direct impacts to seagrass.

For the reasons discussed above, we believe green sea turtle (North Atlantic DPS) proposed critical habitat (FL01: Florida) is not likely to be adversely affected by the proposed action.

3.2.3 Critical Habitat Likely to be Adversely Affected by the Proposed Action

We have determined that critical habitats for boulder star coral, lobed star coral, and mountain star coral (Florida Area) are likely to be adversely affected by the proposed action and thus require further analysis. We provide greater detail on the potential effects to critical habitat from the proposed action in the Effects of the Action (Section 6.2) and whether those effects, when considered in the context of the Status of the Critical Habitat (Section 4.2), the Environmental Baseline (Section 5), and the Cumulative Effects (Section 7), are likely to cause destruction or adverse modification of critical habitat.

4 STATUS OF ESA-LISTED SPECIES AND CRITICAL HABITAT CONSIDERED FOR FURTHER ANALYSIS

4.1 Rangewide Status of the Species Considered for Further Analysis

4.1.1 Queen Conch

NMFS listed queen conch as a threatened species, effective March 15, 2024 (89 FR 11208, February 14, 2024). At the time of listing, critical habitat was not determinable because data sufficient to perform the required analysis were lacking.

4.1.2 Species Description

Aliger gigas (Linnaeus 1758), commonly known as the queen conch, is a large, slow-moving sea snail, a marine gastropod mollusk in the family of true conches (Strombidae), in the phylum Mollusca (Figure 4). Queen conch are characterized by a large, heavy, whorl-shaped shell with multiple short spines at the apex, a brown and horny operculum (a plate that closes the opening of the shell when the animal is retracted), and a pink interior of the shell lip. Adult queen conch shells can grow to 12 in in length and weigh up to 5 lbs.

Figure 4. Conch have long eye stalks that move independently and a tube like mouth called a proboscis that it can pull into its shell if threatened (Photo: Jennifer Doerr, NOAA-SEFSC).

General Habitat
Queen conch occur in different habitat types including seagrass and algae beds, sand flats, and rubble areas from a few cm deep to depths generally less than 61 m. Adult distributions are heavily influenced by food availability and fishing pressure. In unexploited areas, they are most commonly found in shallow marine waters less than 30 m. Adult queen conch prefer sandy algal flats, but are also found on gravel, coral rubble, smooth hard coral, and beach rock bottom, while juveniles are primarily associated with seagrass beds (Doerr and Hill 2018; Glazer and Kidney 2004; Stoner 2003).

General Diet
Larval conch feed on phytoplankton (Davis 2005). The primary diet of juvenile conch consists of native seagrass detritus and red and green macro algae, primarily *Laurencia* spp. and *Batophora oerstedii* (Randall 1964; Serviere-Zaragoza et al. 2009; Stoner and Sandt 1992; Stoner and Waite 1991). Juveniles are thought to feed on organic material in the sediment, such as benthic diatoms and particulate organic matter and cyanobacteria (Serviere-Zaragoza et al. 2009; Stoner et al. 1995; Stoner and Waite 1991), macro algae in seagrass beds, and epiphytes that live on the seagrass (Stoner 1989b; Stoner and Waite 1991). Adult conch feed on different types of filamentous algae (Creswell 1994; Ray and Stoner 1995). The presence of the green algae, *B. oerstedii*, in The Bahamas is correlated to areas of higher conch densities (Stoner and Lally 1994) and even caused an aggregation to shift orientation (Stoner and Ray 1993).

4.1.3 Life History Information

Reproduction

Queen conch reproduce through internal fertilization, meaning individuals must be in contact to mate. Seasonal movements are usually associated with the initiation of the reproductive season. Adult conch can move from offshore feeding areas in the winter to summer spawning grounds in shallow, inshore sand habitats; and from seagrass to sand-algal flats with the onset of winter (Hesse 1979). In locations where adult conch are abundant, migrations culminate in the formation of reproductive aggregations. These aggregations generally form in the same locations each year (Glazer and Kidney 2004; Marshak et al. 2006; Posada et al. 1997) and are dominated by older individuals that produce large, viable egg masses (Berg Jr. et al. 1992).

Queen conch have a protracted spawning season of 4 to 9 months, with peak spawning during warmer months (Table 3). Generally, queen conch located in waters within NMFS's Southeast Region have the ability to spawn year round, but peak spawning occurs during a narrower window (Stoner and Appeldoorn 2022), as presented below in Table 3. The duration and intensity of the spawning season are mediated by temperature, photoperiod, and weather events, and vary extensively throughout the queen conch's range (Table 3). Generally, reproductive activity begins earlier and extends later into the year with decreasing latitude; extending primarily from May through September in Florida (although spawning has been recorded as early as March and as late as October) (D'Asaro 1965), May to November in Puerto Rico (Appeldoorn 1985), and February through November in the USVI (Coulston et al. 1987; Randall 1964).

Table 3. Reproductive/spawning cycle of queen conch, from visual surveys. Colors indicate relative level of reproductive activity (white = none, light gray = low, medium gray = medium, dark gray = high or peak activity). Modified from Horn et al. (2022).

Time of Year												Duration (months)	Area	Source
J	F	M	A	M	J	J	A	S	O	N	D			
												4.5	Florida	(D'Asaro 1965)
												7	Florida	(Davis et al. 1984)
												6	Florida	(Delgado and Glazer 2020)
												6	Puerto Rico	(Appeldoorn 1988b)
												5	Puerto Rico	(Appeldoorn 1993)
												9	St. John	(Randall 1964)
												9	St. Croix	(Coulston et al. 1987)

Differences in spawning rates have been attributed to spawning site selection, population densities, and food selection and availability, among other factors. However, it is widely suspected that adult breeding population density is the most important factor to promote reproduction (Farmer and Doerr 2022; Stoner and Appeldoorn 2021). Conch in low-density environments produced more abundant (i.e., more batches) and larger egg masses and demonstrate a longer spawning season than conch in high-density environments (Appeldoorn 1993; Appeldoorn 2020). Variability in spawning activity may also be correlated to water temperature and weather conditions. Reproductive activity decreased with increasing water turbulence and reproduction peaked with longer days (Davis 1994).

Connectivity among queen conch populations is essential as the flow of larvae among different populations impacts the species' ability to reproduce, find mates, and maintain genetic diversity. Effective connectivity helps populations of queen conch to replenish themselves and support overall species health. There are a limited number of reproductively viable aggregation sites within the U.S. and U.S. territories (Figure 5, Figure 6, Figure 7), which play a significant role in the recovery potential of the species. For example, Puerto Rico's spawning site at the Abrir La Sierra reef, located in the southeast of the Mona Passage (García-Sais et al. 2012), connects populations in Puerto Rico and the Dominican Republic (Vaz et al. 2022). There are only two known reproductively active shallow-water aggregations in Florida. While neither aggregation is mapped completely, one aggregation exists at Port Everglades, directly to the south of the shipping channel, and the second aggregation is located next to the St. Lucie Inlet, primarily in the Intracoastal Waterway. The Port Everglades aggregation is comprised of at least 8,000 individuals, and potentially up to 40,000 individuals, corresponding to densities averaging 173 adult conch/ha and up to 700 adult conch/ha (J. Doerr, SEFSC, unpublished data). SEFSC monitoring of the Port Everglades aggregation documented active spawning of individuals as well as egg masses (J. Doerr, SEFSC, unpublished data). The aggregation at Port Everglades may play a major role in sustaining nearshore Florida populations, and may also have important seeding potential for both the Florida Keys and the nearby Bahamas archipelago (A. Vaz SEFSC pers comm. NMFS, to O. Tzadik, June 9, 2024). The Port Everglades aggregation is the second most northern documented spawning aggregations of queen conch in the world and, therefore, may represent a population that is more robust than others to changing environmental conditions. The other documented aggregation is farther north adjacent to the St. Lucie Inlet within the Intracoastal Waterway, where spawning is presumed to occur but has not been observed.

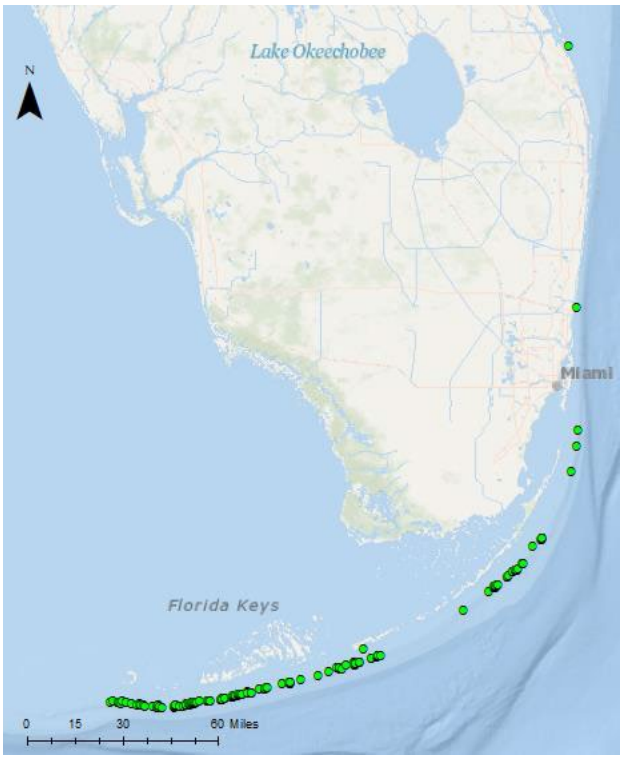

Figure 5. Aggregation locations (green dots) for queen conch in the Florida Keys. Aggregations were defined as FWC survey sites with 10 or more adult queen conch monitored (corresponding to 50 or more adult conch per hectare), and limited to locations surveyed by FWC.

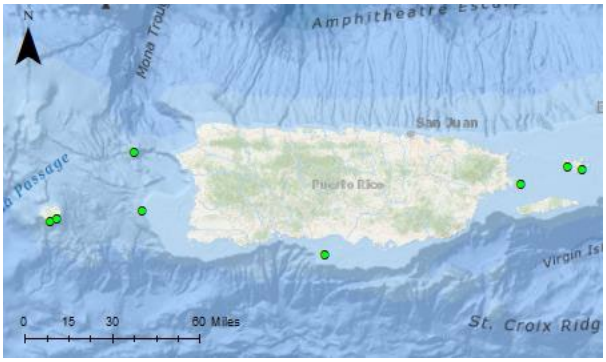

Figure 6. Known aggregation locations for queen conch in Puerto Rico, as determined by survey locations with densities of over 100 adult conch per hectare.

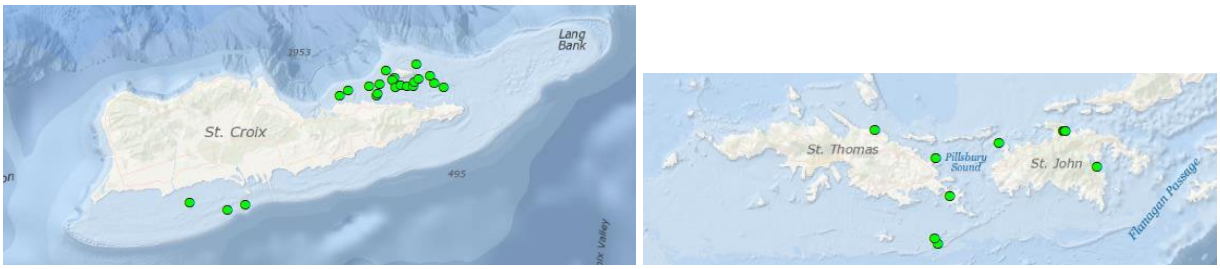

Figure 7. Known aggregation locations for queen conch in the USVI, as determined by survey locations with densities of over 100 adult conch per hectare.

Growth Rates

Queen conch size at maturity can vary depending on environmental conditions. The growth rate and shell morphology of queen conch can vary depending on sex, depth, latitude, food availability, age class, and habitat type. In addition, several different locations have reported up to four individual "morphs" that all exhibit different growth rates (Beltrán 2019). On average, females grow more quickly than males, to a larger size, and have greater weight than males (Appeldoorn 1988a). Queen conch exhibit periods of seasonal growth associated with water temperature and food availability. Summer growth rates are greater than winter growth rates (Stoner and Ray 1993).

Age at Maturity

Queen conch are a long-lived species, reaching 25–30 years in age, and are believed to reach sexual maturity around 3.5–4 years of age. They reach maximum shell length before sexual maturation. Following sexual maturation, the shell continues to grow in thickness only.

Habitat Use by Different Life Stages

Egg laying takes 24–36 hours, with females producing a continuous, crescent-shaped egg mass containing from 150,000–1,649,000 eggs (Appeldoorn 1993; Appeldoorn 2020; Berg Jr. and Olsen 1989; D'Asaro 1965; Delgado and Glazer 2020; Mianmanus 1988; Randall 1964; Robertson 1959; Weil and Laughlin 1984). The number of egg masses produced per female is highly variable, ranging between 1 and 25 egg masses per season (Appeldoorn 1993; Berg Jr. and Olsen 1989; Davis and Hesse 1983; Davis et al. 1984; Weil and Laughlin 1984). Upon hatching, the veligers (larvae) drift in the upper water column for up to 30 days (Paris et al. 2008; Posada and Appeldoorn 1994; Stoner 2003; Stoner and Davis 1997), then metamorphose into benthic infaunal (i.e., living in the substrate) juveniles, where they bury in sediments, typically adjacent to seagrass habitats in response to trophic cues (Davis 2005). Juveniles emerge from the sediment about a year later (Stoner 1989a) at around 60 mm shell length. When these epifaunal (e.g., above the substrate) juvenile conch first emerge, they move into nearby seagrass beds, where densities can be as high as 200–2,000 conch/ha.

Conch nursery areas primarily occur in back reef areas (i.e., shallow sheltered areas, lagoons, behind emergent reefs or cays) of medium seagrass density, in depths between 2–4 m (6–13 ft) (Jones and Stoner 1997), with strong tidal currents at least 50 cm/s; (Stoner 1989b), and frequent tidal water exchanges (Stoner et al. 1996; Stoner and Waite 1991). Seagrass is thought to provide both nutrition and shelter from predators (Ray and Stoner 1995; Stoner and Davis 2010). The structure of the seagrass beds decreases the risk of predation (Ray and Stoner 1995), which is

very high for juveniles (Appeldoorn 1988c; Posada et al. 1997; Stoner et al. 2019; Stoner and Glazer 1998).

Although juvenile queen conch are primarily associated with native seagrass, such as Thalassia testudinum, they can occur in a variety of habitat types (Boman et al. 2019). In the USVI, juvenile queen conch were more abundant in shallow coral-rubble environments than on bare sand and seagrass beds (Randall 1964). In Puerto Rico, Torres Rosado (1987) reported higher numbers of conch in coral rubble compared with sand, seagrass, and hard bottom (Torres Rosado 1987). In Florida, juveniles are found in reef rubble, algae-covered hard bottom, and secondarily in mixed beds of algae and seagrass, depending upon general location (Glazer and Berg Jr. 1994). In St. Croix, USVI, densities of juvenile were the highest in seagrass habitats characterized as 50–90% coverage (Doerr and Hill 2013; Doerr and Hill 2018; Stoner and Waite 1991).

Adult distributions are heavily influenced by food availability and fishing pressure. They prefer sandy algal flats but are also found on gravel, coral rubble, smooth hard coral, patchy seagrass, and beach rock bottom (Acosta 2001; Doerr and Hill 2018; Glazer and Kidney 2004; Stoner 2003; Stoner and Davis 2010). In St. Croix, USVI, densities of adult queen conch were the highest in habitats characterized as 10–50% patchy seagrass (Doerr and Hill 2013; Doerr and Hill 2018; Stoner and Waite 1991). Adult queen conch are rarely, if ever, found on soft bottoms composed of silt and/or mud, or in areas with high coral cover (Acosta 2006). Adult conch are found in shallow, clear water of oceanic or near-oceanic salinities at depths generally less than 61 m, and, in less exploited areas, are most often found in waters less than 30 m (McCarthy 2007).

Seasonal Distribution Patterns and Movement

The movements of adult conch are associated with factors like changes in temperature, food availability, and predation. The average home range size for an individual queen conch is variable and has been measured at 5.98 ha in Florida (Glazer et al. 2003). Glazer et al. (2003) found that there were no significant differences in movement rate, site fidelity, or size of home range between adult males and females. However, home range in queen conch is highly variable throughout its range, and movement patterns and speeds may differ as well (Farmer and Doerr 2022). Few studies have been conducted to definitively demonstrate differences in movement patterns and speeds throughout the range of the queen conch, but the studies that have been conducted show different movement patterns and speeds in Florida as compared with St. Croix, USVI (Doerr and Hill 2013; Doerr and Hill 2018; Glazer et al. 2003). The factors that affect these differences are unclear, but may be a result of low sample size, differences in conch size, or different environmental cues that initiate movements, such as temperature or spawning migrations.

Queen conch may undertake seasonal movements, usually associated with the initiation of the reproductive season. Increasing water temperature and day length are believed to trigger large-scale migrations and the subsequent initiation of mating. Adults move at varying speeds throughout the year with movement rates increasing during seasonal migrations and slowing during foraging activities or upon reaching mating aggregations. Queen conch typically move slowly (i.e., <5 m/d) (Doerr and Hill 2018; Glazer et al. 2003) but can move faster (e.g.,

11.36±0.24 m/d (mean±sd), with a maximum observed speed of 21.24 m/d (Doerr and Hill 2018) when traveling to aggregations. Queen conch move at a greater speed during the summer, which may be due to the increased metabolic activity associated with warmer waters and increased movement related to their reproductive season (i.e., males searching for mates and females moving into egg-laying habitat) (Glazer et al. 2003).

Predation and Competition
The only known predator of adult queen conch is the nurse shark (Marshall 1992). Other organisms predate on juveniles, but the effects are not considered as limits on population structure (Ray and Stoner 1994). Competition threats to queen conch, likely from other conch species and other grazers with similar feeding styles such as urchins, are likely related to food availability, and may be directly associated with the survival and resilience of seagrass meadows and presence of invasive vegetation (Horn et al. 2022).

4.1.4 Population Dynamics

Current Population Size
Queen conch are distributed throughout the Caribbean. Horn et al. (2022) estimated the total adult queen conch abundance (i.e., the sum of median estimated abundance across all jurisdictions) at 743 million individuals; this estimate is highly uncertain and based on data of varying quantity and quality by jurisdiction. Numerous lines of evidence suggest that the vast majority of conch populations have declined and are suffering recruitment failure or Allee effects, with evidence of ongoing declines in many populations (Horn et al. 2022). U.S. waters are estimated to contain 0.61% of the total contemporary adult conch population abundance (approximately 4.5 million individuals) and 6.94% of the available conch habitat (Horn et al. 2022). These estimates were derived from extrapolating representative densities across known viable habitats, and are therefore very broad and highly uncertain. Populations of queen conch exhibit clumped and patchy distributions and cross shelf densities are difficult to extrapolate. We are currently evaluating population levels in the U.S. and abroad in an effort to improve understanding of small-scale and local population information.

Population Variability (Abundance Trends over Time)
Consistent long-term monitoring abundance trends is exceptionally sparse throughout the region. Range-wide density and abundance trends are discussed below.

Population Stability (Ability of the Population to Resist Change from Dramatic Events)
Depensatory mechanisms, or factors that can accelerate the decrease in the reproductive population, are a major factor limiting the recovery of overharvested queen conch populations (Appeldoorn 1995; Stoner et al. 2012a). Reproductive potential is primarily reduced by the removal of spawning conch from the population (Appeldoorn 1995). Observations suggest mating and egg-laying in queen conch are directly related to the density of mature adults (Stoner et al. 2011; Stoner et al. 2012b; Stoner and Ray-Culp 2000). In animals that aggregate to reproduce, particularly where physical contact is required, low population densities can make it difficult or impossible to find a mate (Appeldoorn 1995; Stephens and Sutherland 1999; Stoner and Ray-Culp 2000). Challenges associated with mate finding are likely exacerbated for slow-moving animals such as conch (Doerr and Hill 2013; Farmer and Doerr 2022). This limitation

translates directly into limited recovery because increased "search time" depletes energy and time resources, reducing the rate of gametogenesis and the overall reproductive potential of the population. Although delayed mate finding appears to be the primary driver behind reproductive failure, experiments (Gascoigne and Lipcius 2004) and simulations (Farmer and Doerr 2022) suggest other factors, including delayed functional maturity at low-density sites, contribute to declines in reproductive activity.

Due to the importance of adult spawning aggregation density, Horn et al. (2022) defined the following thresholds to determine the reproductive viability of queen conch populations throughout the greater Caribbean:

- Populations with densities above 100 adult conch/ha are considered to be at a density that support reproductive activity resulting in population growth.
- Populations with densities between 50–99 adult conch/ha are considered to have reduced reproductive activity resulting in minimal population growth.
- Populations with densities below the 50 adult conch/ha threshold are considered to be not reproductively viable.

Based on the above thresholds, Horn et al. (2022) determined the majority (i.e., 69%) of jurisdictions within the queen conch's range are characterized by populations with adult densities below the reproductively viable threshold (Figure 8). While these are general guidelines, density thresholds are location-specific and may differ among project areas. Conch densities are often measured as either "cross-shelf" or "aggregation" densities; however, these terms are poorly defined and heavily influenced by the total area surveyed, which can lead to high variance in reported data. Thus, although density is the single most important factor in determining conch reproductive success, it is difficult to make comparisons across jurisdictions.

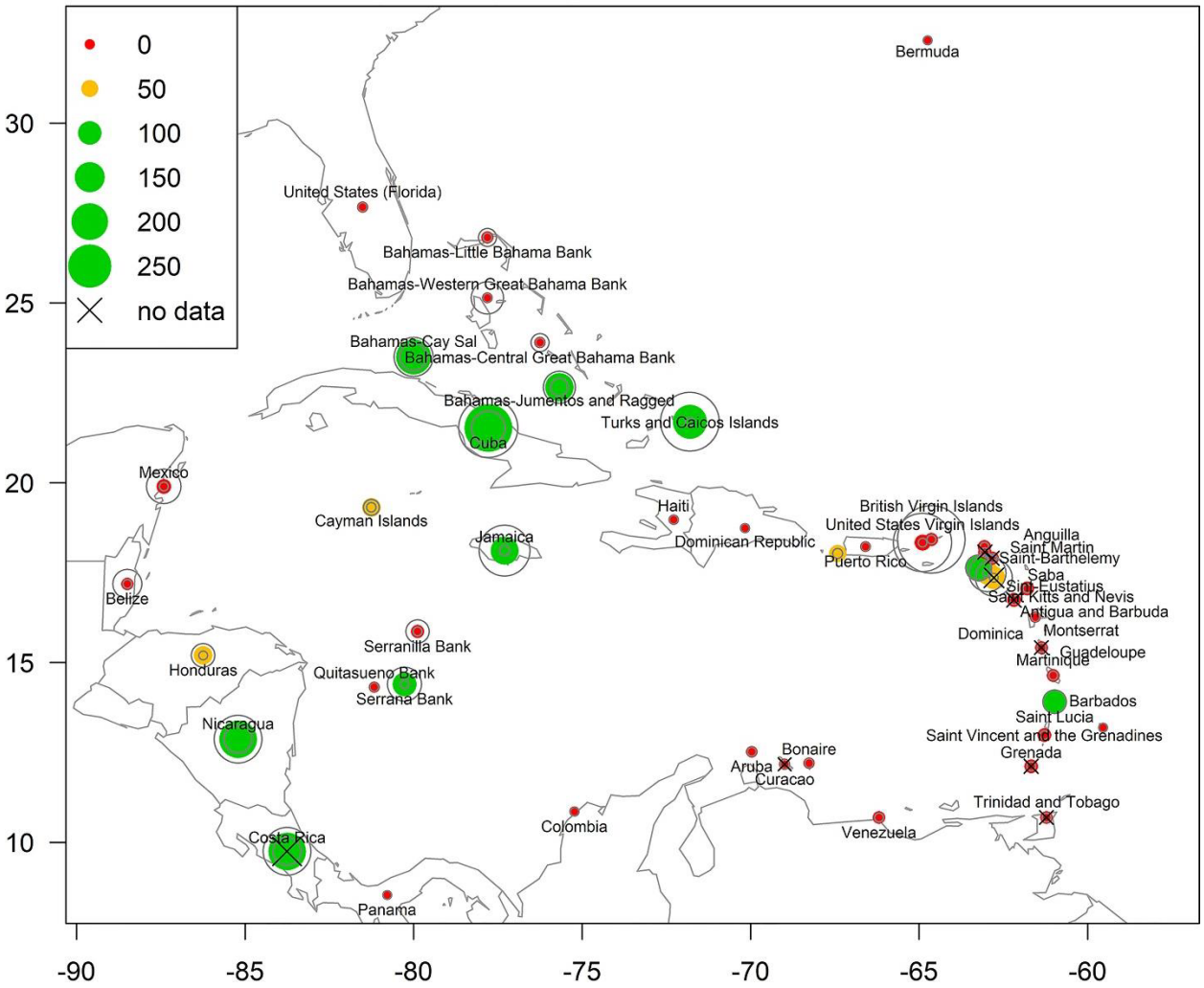

Figure 8. Adult conch densities per ha. Data points are sized relative to densities; green symbols indicate conch populations with >100 adult conch/ha, gold symbols indicate 50-99.9 adult conch/ha, and red symbols indicate <50 adult conch/ha (Vaz et al. 2022). Countries without density data are indicated with an X - data for these countries were interpolated from the nearest neighbor. Gray circles represent the 95% confidence interval (2.5 - 97.5% bounds) of density estimates for each jurisdiction. Where densities are summarized on a jurisdiction level, the points appear at the approximate center point of the jurisdiction; where densities are summarized on a subregional level the points appear at the location of fishing banks or subregions (i.e., The Bahamas and Puerto Rico).

In Florida, thresholds for reproductive viability are likely variable; however, aggregation densities of greater than 204 conch/ha appear necessary in certain locations for successful reproduction (Delgado and Glazer 2020). Extrapolated average values of adult densities in U.S. jurisdictions, as per Horn et al. 2022, are presented in Table 4 below. It should be noted that different studies done within these regions often result in highly variable adult density values. For example, the Florida Fish and Wildlife Research Institute (FWRI) developed a monitoring program that weights surveys based on the likelihood of encountering queen conch. The sampling design focused efforts in areas with a higher probability of queen conch presence, from

Key Biscayne south to the Marquesas, including both inshore and offshore zones. Although queen conch migrate and larval dispersal varies annually, aggregations generally remain relatively stable over time and space. As a result, mapping high-density areas remains one of the most effective strategies for supporting the species' recovery. The extrapolated density of queen conch per hectare in the high density areas of the FWRI study was 150 individuals (adults and juveniles) per hectare. This extreme variability across single jurisdictions makes large area quantifications challenging.

Table 4. Adult conch density and habitat area estimates calculated by the Status Review Team; reproduced from Horn et al. (2022).

Jurisdiction	Lat	Long	Habitat (km^2)	Adult Density (/ha)	Sources Used to Support the Estimate
Florida	27.7	-81.5	2372.3	7.0	Average from studies of non-aggregation sites from 2012-2019; cross-shelf densities from Glazer (2020) were derived by dividing total abundance estimates by statistical sampling domain
Puerto Rico	18.2	-66.6	2372.3	6.1	Derived distribution from sites in east, west, and south from 2001-2013; excluded unfished mesophotic site with higher density (reported separately)
Puerto Rico mesophotic reef	18	-67.4	NA	54.6	Unfished mesophotic site is only location where densities are over 20 conch/ha; reported separately
USVI	18.3	-64.9	323.5	44.5	Derived from all estimates from 3 islands; surveys done 2001-2011; most data are from St. Croix

In 2023, the Southeast Fisheries Science Center began a standardized and intensive sampling effort for queen conch in the U.S. Caribbean. In 2023 and 2024, the shelf areas of St. Thomas/St. John and St. Croix were sampled using a random stratified design of available habitats. The estimated densities for the U.S. Virgin Islands were similar to those presented above. Sampling in Puerto Rico has yet to occur and future efforts will depend on available funding.

4.1.5 Status and Distribution

Historical Range and Status Queen conch has been fished in the western tropical Atlantic since prehistoric times, but in the last four decades, pressure has increased and industrial scale fishing has developed (CITES 2003). In many range states, export fisheries have closed but artisanal subsistence fisheries and fisheries for local consumption continue. In other locations, industrial scale fishing continues despite populations with densities insufficient to support reproductive activity. Efforts to assess the condition of queen conch across its range are hampered by the lack of uniform data collection for all fishing sectors. While many jurisdictions make an effort to collect data on the main commercial fisheries, including both industrial and artisanal, data collection is difficult for small-scale fisheries. These fisheries typically land conch at a wide variety of locations, lack adequate centralized marketing outlets that can be monitored as a check on landings, and lack enforcement resources to ensure compliance with minimum size or weight requirements, quotas, and other regulations. Indirect evidence, however, strongly suggests that overfishing is affecting abundances, densities, spatial distributions, and reproductive outputs (FAO 2007, Horn et al. 2022). Spatial distributions have been affected by fishing. Adult conch populations in shallow (<60 ft) waters tend to be reduced or eliminated first. Many jurisdictions report the loss of queen conch from shallow waters and the need for their fisheries to pursue

conch with SCUBA or hookah in deeper waters (versus freediving in shallow waters). Regulations in a few jurisdictions prohibit the use of SCUBA to control fishing and subsequent depletion of deep-water stocks. Current Range and Status There has been no known contraction in the range of the species. The queen conch occurs throughout the Caribbean Sea and the Gulf of America, as well as in the Atlantic Ocean around southern Florida and around Bermuda (Figure 9).

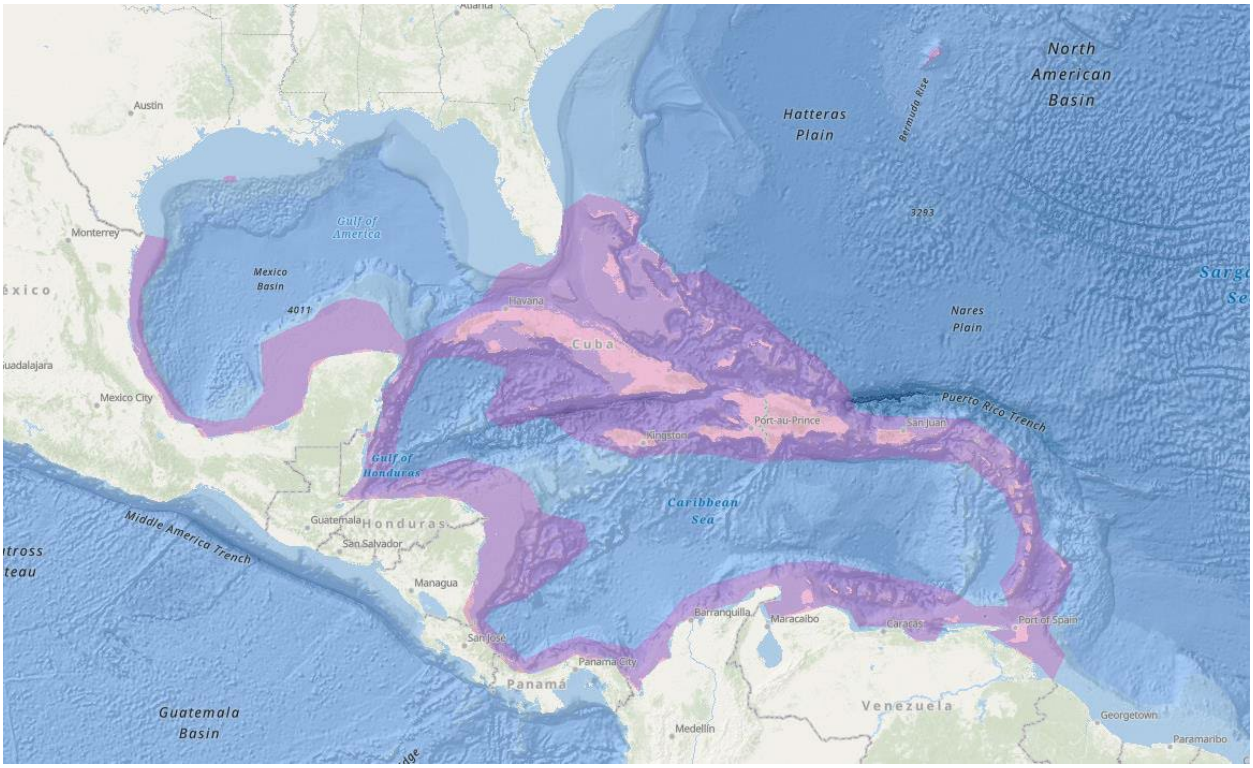

Figure 9. Map of the geographic distribution of queen conch.

Queen conch are found in marine waters at depths up to 200 ft (61 m), though they primarily occur in waters less than 100 ft (30 m) deep. U.S. waters are estimated to contain 0.61% (Puerto Rico: 0.19%, Florida: 0.22%, USVI: 0.19%) of the total contemporary adult conch population abundance and 6.94% (Puerto Rico: 3.25%, Florida: 3.25%, USVI: 0.44%) of the available conch habitat (Horn et al. 2022). Within the Southeast Region of the U.S., queen conch are most likely to occur in the following consultation areas:

- Within the 61 m (200 ft) isobaths: (1) Southeast Florida and the Atlantic Ocean side ofthe Florida Keys from St. Lucie Inlet south to Key West; (2) Marquesas Keys; (3) Dry Tortugas; (4) Puerto Rico; (5) USVI; (6) Navassa Island; and (7) Flower Garden Banks National Marine Sanctuary.
- Areas of the intracoastal waterway that are within 3 miles of any marine inlet from St.Lucie Inlet south to Palm Beach Inlet.
- Areas of the intracoastal waterway that are within 1.5 miles of any marine inlet from Boynton Inlet south to Haulover Inlet.

- The intracoastal waterway from Haulover Inlet south to Card Sound Bridge. Note that no surveys are required on the northern side of the Florida Keys from Card Sound Bridge south to Lignum Vitae key.
- Within 1.5 mi to the north of U.S. Highway 1 (US-1) from Lignum Vitae key south to the Seven Mile Bridge.
- Within the 10 m (33 ft) isobaths on the Gulf of America side of the Florida Keys from the Seven Mile Bridge (west end of Marathon) south to Key West.

The available data suggest that queen conch has been significantly depleted throughout its range with only a few exceptions. The best available information from the status review (Horn et al. 2022) indicates that only Saba, St. Lucia, Colombia's Serrana Bank, Nicaragua, Jamaica's Pedro Bank, Costa Rica, Cuba, and portions of the Bahamas and Turks and Caicos still have cross-shelf mating area densities above the 100 conch/ha threshold recommended by UNEP (2012). In most areas, surveys are not performed comprehensively, and some show evidence of local overutilization. However, it appears likely that these locations have conch populations residing in difficult to fish areas that support mating success and associated recruitment.

Biotic or Abiotic Factors Dictating Range and Distribution
Most population trends have been strongly influenced by fishing pressure, both legal and illegal, unreported, and unregulated (IUU) fishing. However, reproductive shutdown in viable aggregations has been linked with warming waters, and may further contribute to population declines (O. Tzadik, NMFS and B. Glazer, FWRI, pers. comm., November 8, 2022). Warming waters can also lead to ocean acidification, which can affect the strength and functionality of shell production. Distribution shifts may result due to these factors, but have not been observed on a detectable level.

Because queen conch require certain densities to effectively reproduce, management strategies for queen conch should aim to protect high-density reproductive aggregations and breeding habitats. Populations with densities above 100 adult conch/ha are considered to support reproductive activity resulting in population growth. Reproductively viable populations in the U.S. jurisdiction are limited, but serve as an important node for connectivity and the broader recovery of the species, particularly in Puerto Rico and the USVI. Models suggest the islands in the U.S. Caribbean (i.e., St. Thomas, St. John, St. Croix, and Puerto Rico) receive larval supply from the lesser Antilles, and potentially provide larvae to downstream sources further west and north (i.e., Dominican Republic, Turks and Caicos). The deep water populations of Puerto Rico and potentially St. Croix seem to be particularly important to maintain connectivity in the region. The unique geography of the U.S. Caribbean may therefore act as a central node to the larval connectivity of queen conch throughout the range of the species. Connectivity modelling further suggests that Florida populations are the product of upstream larval supply and self-recruitment (Vaz et al. 2022). The population at Port Everglades is likely a large contributor to the recovery of conch populations throughout Florida, including the Florida Keys (Vaz, unpublished data).

Range-Wide Trends
Queen conch fisheries and documented densities have generally declined across the range, with fishing pressure (legal and IUU) as the primary driver for declines (Horn et al. 2022). Adult densities in areas protected from fishing have been documented to be higher than those on the

fishing grounds. Queen conch population recovery and stability has been noted in areas that are closed to fishing as a result of conservation measures such as marine reserves or protective fisheries regulations (Doerr and Hill 2018). Continued recruitment in many areas is attributed to locations where reproductive activity is likely occurring in no-take reserves, deep-water populations, or larval supply from distant populations.

Currently, the only fishery for queen conch in U.S. federal waters is in St. Croix. This fishery is conducted almost exclusively near Lang Bank off the eastern tip of the island. Regulations allow fishing in the U.S. EEZ around St. Croix, with the exception of a seasonal closure from November 1 through May 31 in the area east of 64° 34' W longitude (50 CFR 622.479(b)(4)). Both the USVI and Puerto Rico have fisheries in their territorial waters. Fishing for queen conch is allowed in territorial waters of the USVI from November 1 through May 31, or until the queen conch annual quota is reached. Of note, the annual quota of 50,000 lbs. has not been reached in St. Croix since the implantation of the quota. Annual harvest averages roughly 25,000 lbs. per year. In Florida, fishing for queen conch is prohibited and a special activity license is required to handle queen conch. These measures have been in place since the mid-1980s and the population has since shown initial signs of recovery. Long term monitoring by the FWRI has recorded increasing abundances and densities at long-term monitoring locations (Glazer and Delgado 2020).

4.1.6 Threats

Past Threats That Resulted in Population Declines
Queen conch have been harvested for centuries throughout their range and they have traditionally been an important resource for many nations in the Caribbean and Central America. Increased fishing pressure, industrialized fishing practices, and ineffective regulations/enforcement has led to the overutilization of the species. Throughout the wider Caribbean region, queen conch production has shown a negative trend over time and the decrease can largely be attributed to overfishing. Some stocks have collapsed and yet to recover (Theile 2005). Overfishing and collapsing stocks have disrupted larval connectivity in queen conch populations. Historically, the southeastern part of the species' range served as a key source of larvae and genetic exchange for the Western Caribbean (Vaz et al. 2022). Although some connectivity remains among populations in the central and southwestern Caribbean, it likely persists due to a few high-density areas, such as the deep-water population off Puerto Rico and Saba Bank. Ongoing fishing pressure, illegal harvest, and weak enforcement of regulations continue to threaten these populations, increasing their risk of extinction in the near future.

Queen conch populations in Florida experienced large declines since the 1950s due to fisheries harvest and habitat degradation, despite protective regulations implemented in the 1980s and 1990s, and have recently shown initial signs of recovery. As previously discussed, the best available data indicate the density of large adults is still too low and/or compromised (i.e. non-reproductive adults in nearshore areas) to restore healthy populations across the three distribution zones in South Florida: nearshore, back reef, and deepwater (Horn et al. 2022).

Queen conch populations in Puerto Rico showed signs of steady decline beginning in the 1980s (CITES 2012). Estimated fishing mortality exceeded estimates of natural mortality and catch

continued to decline while effort increased through 2011(CITES 2012). This resulted in the catch increasingly skewed to smaller sizes, all suggesting that Puerto Rican populations have been overfished for decades (Appeldoorn 1993; SEDAR 2007). Recently, however, studies have suggested that some of the downward demographic trends may be reversing (Baker et al. 2016; Jiménez 2007). Larger size distributions, higher adult queen conch densities, an increase in the proportion of older adults, and evidence of sustained recruitment suggest that populations are recovering to some extent (Baker et al. 2016).

Queen conch populations in the USVI are depleted compared to historical values (Horn et al. 2022) due to fishing. Preliminary scientific monitoring occurred in the 1980s when population densities were well below reproductive viability (< 20 adults per hectare). However, recent studies suggest that density values are currently higher than those recorded in the 1980s (Horn et al. 2022) and nearing cross shelf densities of 50 adults per hectare. The implementation of conservation strategies that include a 5 month seasonal closure, along with area closures, is likely responsible for the increasing densities. While an annual catch limit of 50,000 lbs. was agreed to by both federal and state agencies, annual catch rarely exceeds half that value, likely due to market constraints.

Current Threats That May Be Affecting Recovery

Overutilization

Queen conch are highly sought after for their meat, shell, and pearls in the Caribbean, although the meat is the most common product in trade. The species has been harvested for centuries and they are an important fishery resource for many nations in the Caribbean and Central America. As a result, the most significant threat to queen conch is overutilization (through commercial; artisanal; and IUU fishing), and current regulatory mechanisms (e.g., regulations and enforcement) are considered inadequate to reverse this trend in the foreseeable future. The majority of the queen conch meat is landed in Belize, The Bahamas, Honduras, Jamaica, Nicaragua, and Turks and Caicos. In the artisanal fishery, queen conch are sometimes landed with the shell, but mostly as unclean meat with the majority of organs still attached. Additionally, local markets and subsistence fishing of queen conch is often not monitored or not included in catch data. In some jurisdictions, the subsistence and locally marketed catches are small, but they can be high in some jurisdictions (Prada et al. 2017). Furthermore, the best estimates of unreported catch and illegal harvest is most likely an underestimate, yet accounts for about 15 percent of total annual catch (Horn et al. 2022; Pauly et al. 2020). Furthermore, queen conch meat production shows a negative trend over time and the decrease can largely be attributed to overfishing (Prada et al. 2017).

Inadequate Regulatory Mechanisms

The best available information indicates that existing regulatory mechanisms are inadequate to control the harvest and overutilization of queen conch throughout most of its range due to: (1) the ongoing demand for queen conch; (2) issues with compliance; (3) appropriateness of certain morphometric regulations; and (4) issues with enforcement and poaching. Currently, relatively few jurisdictions (e.g., Belize, Jamaica, Nicaragua, Colombia, and the Bahamas) are conducting assessments and periodic surveys to gather relevant information on the status of their queen conch populations to inform their national management regimes (Queen Conch Population

Assessment Workshop, Belize, 2019). Despite fishery management regulations aimed at controlling commercial harvest, ineffective management measures, along with poor enforcement and significant IUU fishing, demonstrate the existing regulatory mechanisms throughout much of the range of the species are inadequate to achieve their purpose of protecting the queen conch from unsustainable harvest and continued population decline.

Ocean warming and acidification

Well-documented increases in average and extreme ocean temperatures and acidification represent significant threats to queen conch reproduction and shell calcification in the foreseeable future. Queen conch reproduction is dependent on water temperature and, therefore, any changes may disrupt reproduction. Specifically, increasing ocean temperatures may have direct effects on the timing and length of the reproductive season and ultimately decrease reproductive output during peak spawning periods (Appeldoorn et al. 2011). Early life history stages of queen conch are particularly sensitive to ocean temperature (Byrne et al. 2011; Harley et al. 2006) and rising water temperatures may have a direct impact on larval and egg development (Aldana-Aranda and Manzano 2017; Boettcher et al. 2003; Chávez Villegas et al. 2017). Warming oceans may also adversely affect the Caribbean region through ocean acidification, which impacts the calcification process of organisms with calcareous structures, such as queen conch. Ocean acidification impedes calcareous shell formation and, thereby, impacts shell development (Aldana-Aranda and Manzano 2017; Parker et al. 2013). Reduced shell strength may increase vulnerability to predation (Horn et al. 2022).

While seasonal temperature changes likely initiate spawning cues in queen conch, recent extreme warming events in Southern Florida are likely causing reproductive failure at shallow water aggregation locations in the Florida Keys (FWC, Public Comment, November 7, 2022). These shallow-water aggregations are isolated from the deep-water aggregations by Hawk Channel, which runs parallel to the reef throughout the entire reef tract of the Florida Keys. Most nearshore populations in Florida show a complete lack of reproductive activity with reduced gonadal development (Delgado et al. 2004; Glazer and Quintero 1998). The shallow-water queen conch resume spawning activity if they are relocated to deep-water aggregation locations (Delgado et al. 2004).

Pollution

Reproductive inhibition has been described for individuals that are exposed to contaminants (Spade et al. 2010). In particular, high concentrations of Tributyltin (TBT), a biocide previously used in antifouling paint and commonly found in water and sediment samples near marinas and shipping lanes (Chau et al. 1997), is known to cause imposex in conch (Titley-O'Neal et al. 2011). Imposex is a condition in which male external genitalia are present in the female conch, and female reproductive capacity is greatly reduced.

Other Threats

Beyond the major factors identified in the listing and described above, one of the largest contributors to queen conch mortalities from anthropogenic activities is likely sedimentation. Deposition of fine sediment particles onto queen conch and their associated benthic habitats will initiate a multitude of detrimental effects on the species. Developing embryos, hatching veliger larvae, and metamorphic post-settlement larvae are intolerant of fine sediments. These early life

stages may experience severe mortality in sediment accumulation as little as 0.1 mm (Doerr et al. in prep).

Sedimentation may also have indirect effects on queen conch. Juvenile and adult queen conch rely heavily on hard bottom or pavement substrates colonized by diatomaceous films and epiphytic macro algae for their primary food resource. Juvenile and adult queen conch are mostly likely to be impacted by increased sedimentation through the smothering of their primary food resource and the subsequent reduced food availability, potentially resulting in reduced assimilation of nutrients and poor physical condition, reduced growth rates contributing to increased predation, and potentially starvation (Stoner and Appeldoorn 2021).

Increased amounts of fine sediments may also compromise the gill function of juvenile and adult queen conch, leading to respiratory and physiological effects. Increased water column turbidity from fine suspended particles could interfere with visual perception of adult queen conch and disrupt mate finding for successful reproduction. The direct impact of sediment-associated chemical contaminants is largely unknown, though pesticides, heavy metals, and persistent pollutants (e.g., butyltins) that have been pervasive in the shipping industry for decades have also been shown to inhibit larval development, cause physiological abnormalities, and contribute to reproductive failure (Titley-O'Neal et al. 2011).

Predation and competition are not currently considered significant threats influencing the status of queen conch.

4.2 Status of Critical Habitat for Lobed Star, Mountainous Star, and Boulder Star Corals

The ESA defines critical habitat under section 3(5)(A) as the (1) specific areas within the geographical area occupied by the species at the time it is listed, on which are found those physical or biological features essential to the conservation of the species (hereafter also referred to as ''PBFs'' or ''essential features'') and which may require special management considerations or protection; and (2) specific areas outside the geographical area occupied by the species at the time it is listed, upon a determination by the Secretary of Commerce (Secretary) that such areas are essential for the conservation of the species (16 U.S.C. 1532(5)(A)).

On August 9, 2023, a Final Rule designating critical habitat for lobed star, mountainous star, and boulder star corals was published in the Federal Register. The Final Rule was amended on March 19, 2024 to correctly identify the northern geographic extent of critical habitat designated for boulder star coral as St. Lucie Inlet, Martin County, Florida. Within the geographical area occupied by a listed species, critical habitat consists of specific areas on which are found those physical or biological features essential to the conservation of the species. The feature essential to the conservation of these star coral species (also known as the essential feature) is: sites that support the normal function of all life stages of the corals, including reproduction, recruitment, and maturation. These sites are natural, consolidated hard substrate or dead coral skeleton, which is free of algae and sediment at the appropriate scale at the point of larval settlement or fragment reattachment, and the associated water column. Several attributes of these sites determine the

quality of the area and influence the value of the associated feature to the conservation of the species:

(1) Substrate with the presence of crevices and holes that provide cryptic habitat, the presence of microbial biofilms, or presence of crustose coralline algae;
(2) Reefscape with no more than a thin veneer of sediment and low occupancy by fleshy and turf macroalgae;
(3) Marine water with levels of temperature, aragonite saturation, nutrients, and water clarity that have been observed to support any demographic function; and
(4) Marine water with levels of anthropogenically-introduced (from humans) chemical contaminants that do not preclude or inhibit any demographic function.

Areas containing this feature have been identified in six locations within the jurisdiction of the United States: the Florida area; the Puerto Rico area; the St. John/St. Thomas area; the St. Croix area; the Flower Garden Banks area, and the Navassa Island area. Critical habitat for the star corals is defined as all marine waters in the particular depth ranges relative to mean low water as described in Table 3 of the locations of the critical habitat units for each of the star coral species. There are a total of 18 critical habitat units across the three species which are mostly overlapping with one another.

Table 5. Locations of the Critical Habitat Units for lobed star coral, mountainous star coral, and boulder star coral.

Species	Critical Habitat Unit Name	Location	Geographic Extent	Water Depth Range
Lobed Star Coral (*Orbicella annularis)*	OANN-1	Florida	Lake Worth Inlet, Palm Beach County to Government Cut, Miami-Dade County	2-20 m (6.5-65.6 ft)
		Florida	Government Cut, Miami-Dade County to Dry Tortugas	0.5-20m (1.6-65.6 ft)
	OANN-2	Puerto Rico	All islands	0.5-20m (1.6-65.6 ft)
	OANN-3	USVI	All islands of St. Thomas and St. John	0.5-20m (1.6-65.6 ft)
	OANN-4	USVI	All islands of St. Croix	0.5-20m (1.6-65.6 ft)
	OANN-5	Navassa	Navassa Island	0.5-20m (1.6-65.6 ft)
	OANN-6	FGB	East and West Flower Garden, Rankin, Geyer, and McGrail Banks	16-90 m (53-295 ft)
Mountainous Star Coral	OFAV-1	Florida	St. Lucie Inlet, Martin County to Government Cut, Miami-Dade County	2-40 m (6.5-131 ft)

Species	Critical Habitat Unit Name	Location	Geographic Extent	Water Depth Range
(Orbicella faveolata)		Florida	Government Cut, Miami-Dade County to Dry Tortugas	0.5-40 m (1.6-131 ft)
	OFAV-2	Puerto Rico	All islands of Puerto Rico	0.5-90 m (1.6-295 ft)
	OANN-3	USVI	All islands of St. Thomas and St. John	0.5-90 m (1.6-295 ft)
	OFAV-4	USVI	All islands of St. Croix	0.5-90 m (1.6-295 ft)
	OFAV-5	Navassa	Navassa Island	0.5-90 m (1.6-295 ft)
	OFAV-6	FGB	East and West Flower Garden, Rankin, Geyer, and McGrail Banks	16-90 m (53-295 ft)
Boulder Star Coral (*Orbicella franksi)*	OFRA-1	Florida	Lake Worth Inlet, Palm Beach County to Government Cut, Miami-Dade County	2-40 m (6.5-131 ft)
		Florida	Government Cut, Miami-Dade County to Dry Tortugas	0.5-40 m (1.6-131 ft)
	OFRA-2	Puerto Rico	All islands of Puerto Rico	0.5-90 m (1.6-295 ft)
	OFRA-3	USVI	All islands of St. Thomas and St. John	0.5-90 m (1.6-295 ft)
	OFRA-4	USVI	All islands of St. Croix	0.5-90 m (1.6-295 ft)
	OFRA-5	Navassa	Navassa Island	0.5-90 m (1.6-295 ft)
	OFRA-6	FGB	East and West Flower Garden, Rankin, Geyer, and McGrail Banks	16-90 m (53-295 ft)

Only natural substrates provide the quality and quantity of habitat necessary for the conservation of ESA-listed corals. Existing federally authorized or permitted man-made structures such as artificial reefs, boat ramps, docks, pilings, aids to navigation, seawalls, wrecks, navigation channels, canals, and marinas do not provide the feature essential for the conservation of these coral species and are not included as critical habitat. Managed areas that do not provide the quality of substrate essential for the conservation of the star corals and are therefore, not included as critical habitat, are defined as particular areas whose consistently disturbed nature renders them poor habitat for coral growth and survival over time. These managed areas include specific areas where the substrate has been disturbed by planned management authorized by local, state, or Federal governmental entities at the time of critical habitat designation, and will continue to be periodically disturbed by such management. Examples include, but are not necessarily limited

to, dredged navigation channels, shipping basins, vessel berths, and active anchorages. Specific federally-authorized channels and harbors considered as managed areas not included in the designations are: (i) St. Lucie Inlet; (ii) Palm Beach Harbor; (iii) Hillsboro Inlet; (iv) Port Everglades; (v) Baker's Haulover Inlet; (vi) Miami Harbor; (vii) Key West Harbor; (viii) Arecibo Harbor; (ix) San Juan Harbor; (x) Fajardo Harbor; (xi) Ponce Harbor; (xii) Mayaguez Harbor; (xiii) St. Thomas Harbor; and (xiv) Christiansted Harbor.

The essential feature can be found unevenly dispersed throughout the critical habitat units, interspersed with natural areas of loose sediment, fleshy, or turf macroalgae covered hard substrate. The proximity of this habitat to coastal areas subjects this feature to impacts from multiple activities including dredging and disposal activities, stormwater run-off, coastal and maritime construction, land development, wastewater and sewage outflow discharges, point and non-point source pollutant discharges, fishing, placement of large vessel anchorages, and installation of submerged pipelines or cables. The impacts from these activities, combined with those from natural factors (i.e., major storm events), significantly affect the quality and quantity of available habitat for these ESA-listed species to successfully sexually and asexually reproduce.

A shift in benthic community structure from coral-dominated to algae-dominated has been documented since the 1980s (Hughes and Connell 1999). While algae, including crustose coralline algae, turf, and fleshy macroalgae, are natural components of healthy reef ecosystems, increases in the dominance of algae impedes attachment of fragments and settlement of larvae, hindering coral recruitment and recovery from disturbance (Birrell et al. 2005; Connell et al. 1997; Edmunds et al. 2004; Hughes 1985; Rogers et al. 1984; Vermeij 2006). The overexploitation of grazers through fishing has contributed to the persistence of fleshy macroalgae in reef and hard bottom areas formerly dominated by corals (Hughes et al. 2007). Impacts to water quality associated with coastal development, in particular nutrient inputs, can enhance the growth of fleshy macroalgae by providing them with nutrient sources. Fleshy macroalgae are able to colonize dead coral skeleton and other hard substrate, and some are able to overgrow living corals and crustose coralline algae. Because crustose coralline algae is thought to provide chemical cues to coral larvae indicating an area is appropriate for settlement, overgrowth by macroalgae may affect coral recruitment (Steneck 1986). In addition to preempting space for coral larval settlement, many fleshy macroalgae produce secondary metabolites with generalized toxicity, which also may inhibit settlement of coral larvae (Kuffner and Paul 2004). Algal turfs can also trap sediment, leading to longer residence time and further exacerbating coral recruitment (Birrell et al. 2005; Speare et al. 2019).

Sediments can accumulate on dead and living corals and exposed hard bottom and impede sexual and asexual reproductive success by preempting available substrate and smothering coral recruits (Fabricius 2005). The rate, frequency, and duration of sediment input from natural and anthropogenic sources can affect reef distribution, structure, growth, and coral recruitment, and severe and/or long-lasting sedimentation can cause coral mortality (Erftemeijer et al. 2012; Nelson et al. 2016). In addition, the source and size of sediments can have differing effects on habitat suitability. Fine and terrigenous sediments (i.e., sediments that derive from terrestrial environments) are more deleterious to substrates needed to colonize corals than coarser grained carbonate sediments that originate on the reef (Torres 2001). In particular, fine and terrigenous

sediments are more easily re-suspended in the water column, affecting water clarity and light penetration, and can negatively impact coral reproduction, larval survival, recruitment, and growth (Erftemeijer et al. 2012; Fabricius 2005; Fourney and Figueiredo 2017).

Corals require hard, consolidated substrate, including attached, dead coral skeleton, devoid of turf or fleshy macroalgae for their larvae to settle. Benthic data from the National Coral Reef Monitoring Program indicate that macroalgae cover is much higher on reefs in the US Virgin Islands, Puerto Rico, and Florida than coral cover. In 2017 and 2018 surveys, coral cover on average was about 5% in the US Virgin Islands, 6% in Puerto Rico, 2% in southeast Florida, and 10% in the Florida Keys (NOAA 2018). In comparison, macroalgae cover was on average about 20%-24% in the US Virgin Islands, 24% in Puerto Rico, 27% in southeast Florida, and 23% in the Florida Keys (NOAA 2018). Compared to historical data, these values are considered impaired for the US Virgin Islands, fair for Puerto Rico, critical for southeast Florida, and fair for the Florida Keys (NOAA 2020a; NOAA 2020b; NOAA 2020c). Since these surveys, stony coral tissue loss disease has caused significant declines in coral abundance and cover throughout these regions. As a result, coral cover values are likely lower than those reported here for everywhere except southeast Florida where effects of the disease had already started to occur during the survey time period. Thus, suitability of available habitat has declined with the decrease in coral cover and resulting increase in macroalgae cover that affects the essential feature of coral critical habitat.

5 ENVIRONMENTAL BASELINE

5.1 Overview

This section describes the effects of past and ongoing human and natural factors contributing to the current status of the affected star corals designated critical habitat and ecosystem within the action area without the additional effects of the proposed action. In the case of ongoing actions, this section includes the effects that may contribute to the projected future status of the species, their habitats, and ecosystem. The environmental baseline describes the critical habitat's health based on information available at the time of the consultation.

By regulation, the environmental baseline for an Opinion refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. The impacts to listed species or designated critical habitat from Federal agency activities or existing Federal facilities that are not within the agency's discretion to modify are part of the environmental baseline (50 CFR 402.02).

Focusing on the impacts of the activities in the action area specifically, allows us to assess the prior experience and state (or condition) of areas of critical habitat that occur in an action area, that will be exposed to effects from the action under consultation. This focus is important

because, in some areas, critical habitat features will commonly exhibit, or be more susceptible to, adverse responses to stressors than they would be in other areas. These localized stress responses or stressed baseline conditions may increase the severity of the adverse effects expected from the proposed action.

5.2 Baseline Status of ESA-Listed Species and Critical Habitat Considered for Further Analysis

As stated in Section 2.2 (Action Area), the proposed action includes a nearshore private island, Fanny Key, within the Florida Bay in the FKNMS. The project site is a developed, single-family residential lot located at 24.712778°, -81.109444° (NAD 83) in Marathon, Monroe County, Florida, approximately 0.28-mi North of Overseas Highway. Substrate in the nearshore project area consists of coral reef and hardbottom habitats (consolidated hardbottom and rubble), non ESA-listed corals, mangroves, seagrasses, other invertebrates, sponges, macroalgae and fauna. As discussed in Section 3.1.2, queen conch may be adversely affected by the proposed action.

The status of queen conch in the action area, as well as the threats to this species, is supported by the species account in Section 4 (Status of the Species). The action area around Fanny Key documented the presence of queen conch on January 9 and 15, 2024 in a benthic report submitted by New Leaf Environmental, LLC. The benthic resource assessment was conducted in general accordance with the FKNMS Resource Assessment Survey Protocols for Nearshore Construction Projects (November 30, 2022), FDEP's Guidance on Surveys for Potential Impacts to Submerged Aquatic Vegetation (December 8, 2020), and related industry standards.

The status of star coral critical habitat in the action area is supported by the species' critical habitat accounts in Section 4 (Status of Critical Habitat Considered for Further Analysis).

5.3 Additional Factors Affecting the Baseline Status of ESA-Listed Species and Critical Habitat Considered for Further Analysis

5.3.1 Federal Actions

Activities funded, authorized, or carried out by federal agencies have been identified as threats and may affect queen conch and designated critical habitat for the star coral complex in the action area.

Environmental Protection Agency (EPA)
The EPA regulates discharge of pollutants, such as oil, toxic chemicals, radioactivity, carcinogens, mutagens, teratogens, or organic nutrient-laden water, including sewage water, into the waters of the U.S. Elevated nutrients in the water column typically lead to increased algal growth. The EPA has been involved in ongoing litigation over the sufficiency of standards promulgated by the State of Florida to regulate discharges of nutrients into state waters, including habitats occupied by ESA-listed corals.

Vessel Operations
Federal vessel operations in the action area are unlikely; however it is possible that federally operated vessels may travel through the action area. Through the Section 7 process, where applicable, NMFS will continue to establish conservation measures for federal agency vessel operations to avoid or minimize adverse effects to listed species and critical habitat.

5.3.2 State and Private Actions

Within the jurisdiction of the State of Florida, regulatory measures were put in place in the 1970s, 1980s, and 1990s (Florida Administrative Code, 1971, 1985, 1990) to first limit and then prohibit commercial and recreational take of queen conch (Florida Department of State 2021; Glazer and Berg Jr. 1994). The 1990 regulations also provided a stricter framework for shell possession.

The State of Florida regulates activities that involve and occur in coral reefs in Florida. Statutes and rules protect all corals from collection, commercial exploitation, and injury/destruction on the seafloor (FS 253.001, 253.04, Chapter 68B-42.008 and 68B-42.009), except as authorized by a Special Activity License for the purposed of research. Therefore, the State regulates alterations to the reef. Additionally, Florida has a comprehensive state regulatory program that permits upland, wetland, and surface water alterations helping to limit the land-based sources of nutrients or sediment that may adversely affect ESA-listed coral critical habitat.

The reef fish fishery has negatively affected coral species and *Acropora* critical habitat through indirect impacts (e.g., altering ecosystem functions and the resilience of these systems) on the algae control due to the removal of herbivorous fish that inhabit the coral reefs off Puerto Rico and the USVI (NMFS 2011). Similarly, fishing has fundamentally altered the ecological structure of the fish community in Florida's reefs (Ault et al. 2014). Since *Orbicella* spp. critical habitat share essential feature attributes with *Acropora* spp. critical habitat, and overlap with reef fish and lobster fisheries locations, we expect impacts to *Orbicella* spp. critical habitat to be equivalent. Florida has a recreational and commercial lobster fishery with regulations that include commercial use of lobster traps.

Vessel groundings and anchor damage from commercial and recreational vessels within southeast Florida have historically resulted in severe negative impacts to the Florida Reef Tract. According to Sansgaard (2013) the FDEP Coral Reef Conservation Program has responded to, and managed, 124 of incidents related to vessel groundings and anchor damage. Typically, only large vessel groundings alter the substrate to render it unconsolidated. However, several of the documented events have been large vessels. For example, in 2006, the M/V Clipper Lasco (a 645-ft cargo ship) grounded offshore of Fort Lauderdale resulting in over 6,000 ft^2 of impacted reef. Due to the large number of vessel groundings in the area, the U.S. Coast Guard relocated the anchorage.

5.3.3 Natural Disturbance and Changing Environmental Conditions

There is a large and growing body of literature on past, present, and future impacts changes in sea temperatures and salinity (due to melting ice and increased rainfall), ocean currents, storm frequency and weather patterns, and ocean acidification. These changes have the potential to affect species behavior and ecology including migration, foraging, reproduction (e.g., success), and distribution. Ocean surface warming and ocean acidification may also affect marine forage species, either negatively or positively. It may also affect migratory behavior (e.g., timing, length of stay at certain locations).

Hurricanes can be beneficial in areas outside of heavy storm surge, as they lower water temperatures providing fast relief to corals during periods of high thermal stress (Heron et al. 2016). Low energy hurricanes may also act to scour competing macroalgae off patches of reef, which also may be beneficial to reef health. However, hurricanes and large coastal storms can also significantly harm corals and critical habitat. Major hurricanes have caused significant losses in coral cover and changes in the physical structure of many reefs. For example, hurricane David in 1979 caused a reduction in mean coral cover along transects at Flat Cay Reef, St. Thomas, by up to 65% and Hurricane Hugo in 1989 caused up to a 40% decline in coral cover along transects and within quadrats in Great Lameshur Bay, St. John (Rogers et al. 2008). Following the 2017 hurricanes, an average of 11% of Puerto Rico's corals were damaged with some reef sites experiencing up to 100% coral damage.

With regard to the action area, ocean surface warming and ocean acidification may affect the timing and extent of population movements and their range, distribution, composition of prey, and the range and abundance of competitors and predators. Changes in distribution including displacement from ideal habitats, decline in fitness of individuals, population size due to the potential loss of foraging opportunities, abundance, migration, community structure, susceptibility to disease and contaminants, and reproductive success are all possible impacts that may occur as the result of climate change. Still, more information is needed to better determine the full and entire suite of impacts of ocean surface warming and ocean acidification on queen conch and coral critical habitat and specific predictions regarding impacts in the action area are not currently possible.

5.3.4 Conservation and Recovery Actions Shaping the Environmental Baseline

Florida Administrative Code Ann. R. 68B-16.004, prohibits the harvesting, killing, molestation, harm, or possession of living queen conch at any time, in any location, and regardless of origin. While you can possess queen conch shells in Florida, they must not contain a living queen conch at the time of collection. Any attempt to take a live queen conch is illegal and can result in penalties.

NOAA Fisheries listed the queen conch *Aliger gigas* as a threatened species under the Endangered Species Act (ESA) in a final rule published in the Federal Register on February 14, 2024, with an effective date of March 15, 2024.

On November 26, 2008, NMFS published a final rule designating critical habitat for listed elkhorn and staghorn corals (73 FR 72210). On August 9, 2023, NMFS published a final rule designating critical habitat for five threatened Caribbean coral species, lobbed star coral, mountainous star coral, boulder star coral, pillar coral, and rough cactus coral, pursuant to section 4 of the ESA (FR 54026). The critical habitat designations requires that all actions with a federal nexus be evaluated to ensure that adverse modification of critical habitat will not occur.

The NOAA Coral Reef Conservation Program (CRCP) is authorized to protect and manage coral reefs through the implementation of the Coral Reef Conservation Act of 2000. The Program, through its internal and external grants, has provided funding for several activities with an education and outreach component for informing the public about the importance of Florida's Coral Reef Tract and the status of ESA-listed corals. NOAA conducts activities such as mapping, monitoring, assessment, research, restoration, and assisting states to remove abandoned vessels and marine debris from reefs to benefit coral reef ecosystems, enhancing public awareness, and for cooperative management of coral reef ecosystems.

The Southeast Regional Office of NMFS has developed outreach materials regarding the listing of ESA-listed corals, the Section 4(d) regulations, and the designation of critical habitat. These materials have been circulated to constituents during education and outreach activities and public meetings, and as part of other Section 7 consultations.

Section 6 of the ESA allows NMFS to enter into cooperative agreements with states to assist in recovery actions of ESA-listed species, including scientific research related to documenting species condition and trends in presence and abundance. Species Recovery Grants are a primary form of federal funding provided under Section 6 agreements. The most recent section 6 agreement with Florida was in 2024.

Numerous management mechanisms exist to protect corals and the habitats on which they grow, thus indirectly benefiting ESA-listed coral designated critical habitat. The Coral Reef Conservation Act and the Magnuson-Stevens Act require the protection of corals and prohibit the collection of hard corals. Depending on the specifics of zoning plans and regulations, marine protected areas (MPAs) can help prevent damage from collection, fishing gear, groundings, and anchoring. This action area is within the FKNMS.

6 EFFECTS OF THE ACTION

6.1 Overview

Effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action but that are not part of the action. A consequence is caused by the proposed action if the effect would not occur but for the proposed action and the effect is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (50 CFR 402.02).

In this section of our Opinion, we assess the effects of the action on listed species and critical habitat that are likely to be adversely affected. The analysis in this section forms the foundation for our jeopardy analysis and destruction or adverse modification analysis in Section 8. The quantitative and qualitative analyses in this section are based upon the best available commercial and scientific data on species biology and the effects of the action.

6.2 Effects of the Proposed Action on ESA-Listed Species Considered for Further Analysis

6.2.1 Routes of Effect That Are Not Likely to Adversely Affect ESA-Listed Species

Queen conch may be physically injured if struck by construction equipment and materials, or by direct impact during the riprap installation if found within the action area during construction. However, we believe the risk of physical injury due to construction activity is extremely unlikely to occur. The applicant will implement and adhere to NMFS's *Protected Species Construction Conditions* (NMFS 2021a). Additionally, because of previous observations of queen conch in the action area, the applicant will implement and adhere to *NMFS Queen Conch Survey, Construction Conditions and Relocation Guidelines* (NMFS 2025). If queen conch are found within the project footprint or survey area, the applicant will cease all in-water work and follow the procedures outlined in the queen conch document referenced above. Work will not resume until conditions outlined in this document have been met. Additionally, construction would be limited to daylight hours only, working in three distinct sections, and complete in approximately 15 days.

Habitat alteration

The proposed project will avoid impacts to mangroves and seagrass; however, the footprint for riprap placement overlaps with a hardbottom shelf that extends from the island shoreline. Queen conch may be indirectly affected by the placement of the riprap. The placement of riprap on hardbottom habitat will disrupt the potential foraging and resting in the footprint of riprap placement (3,048.8 ft^2). The natural consolidated hardbottom will be replaced by the proposed riprap with less suitable, manmade-substrate for marine species to inhabit. However, when individually and cumulatively viewing the areal scale, we believe this loss will not appreciably reduce the abundance of area available suitable for foraging and resting. Juvenile and adult queen conch rely heavily on hard bottom or pavement substrates colonized by diatomaceous films and epiphytic macro algae for their primary food resource.

6.2.2 Routes of Effect That Are Likely to Adversely Affect ESA-Listed Species

Queen Conch Relocation

The proposed action includes the construction of shoreline protection via the placement of a riprap revetment. Five (5) queen conch were documented in January 2024 during the benthic survey. Therefore queen conch present in the construction footprint will need to be relocated prior to the start of construction. Queen conch are likely to be adversely affected as a result of the relocation. To account for seasonal movement within the action area we will analyze the potential need to relocate up to 11 adults and up to 11 juveniles.

In January 2025, the FWC and FKNMS received interim reporting on a 2024 translocation (relocation) experiment with tagged queen conch among three locations in the Upper Keys and a smaller scale 1-km translocation near Port Everglades (Interim Report to FWC and FKNMS, Gutzler and Kough, 2025). Individual queen conch were relocated to queen conch aggregations outside of their natal placement, in-line with the relocation work as described in the proposed action. Within 6 months, 7 of the 25 relocated individuals died, and no control (non-relocated) animals died. It is possible that differences in shell algal coloration patterns or some other factors result in increased predation rates on relocated individuals. Based on these observations, NMFS assumes a 28% (7 ÷ 25 = 0.28) mortality rate for conch relocated during the proposed action. Therefore, of the 22 queen conch that may be relocated as part of the proposed action, up to 7 queen conch (22 x 0.28 = 6.16; rounded to a whole number 7 total) may experience mortality post-relocation. Mortality of queen conch post-relocation constitutes the death of the animal. Mortality numbers are rounded up to the nearest whole number. While this results in an increase in the total number of queen conch, this approach ensures that we are adequately analyzing the effects of the proposed action on whole animals, and that impacts from the proposed action can be more easily tracked. NMFS believes this mortality rate is lower than the mortality rate that would result if the individuals were left in place throughout the project.

An appropriate relocation site will be determined by Florida's Special Activity License which is required for queen conch relocation in Florida.

6.2 Effects of the Proposed Action on Critical Habitat Considered for Further Analysis

The proposed action area is within the boundary of the Florida Area Units of *Orbicella* spp. critical habitat (i.e., boulder star coral, the lobed star coral, and the mountainous star coral: collectively referred to as star coral). As described in Section 4.2, the essential feature includes sites that support the normal function of all life stages of the corals, including reproduction, recruitment, and maturation; these sites are natural, consolidated hard substrate or dead coral skeleton, which is free of algae and sediment at the appropriate scale at the point of larval settlement or fragment reattachment, and the associated water column. There are four attributes of this essential feature that determine the quality of the habitat and influence the conservation success of the species (88 FR 54026):

1. Substrate with the presence of crevices and holes that provide cryptic habitat, the presence of microbial biofilms, or presence of crustose coralline algae (CCA);
2. Reefscape with no more than a thin veneer of sediment and low occupancy by fleshy and turf macroalgae;
3. Marine water with levels of temperature, aragonite saturation, nutrients, and water clarity that have been observed to support any demographic function; and
4. Marine water with levels of anthropogenically-introduced (from humans) chemical contaminants that do not preclude or inhibit any demographic function.

We believe the permanent placement of the riprap revetment (approximately 3,048.8 ft^2) may affect all four of the attributes of the essential feature for boulder star coral, lobed star coral, and

mountainous star coral designated critical habitat as outlined below. Some of those pathways are not likely to adversely affect the critical habitat and some are likely to result in adverse effects. We describe these routes of effect and the consequences to the substrate, reefscape, and marine water parameters free from contaminants for boulder star coral, the lobed star coral, and the mountainous star coral critical habitat in the following sections.

6.2.1 Routes of Effect that Are Not Likely to Adversely Affect Critical Habitat

We believe construction of the riprap revetment material may affect, but is not likely to adversely affect water column attributes of the essential feature (#3 and #4 in Section 6.2, above). The proposed installation of riprap boulder material is not expect to alter the temperature, aragonite saturation, and nutrients of the water column; however, there may be temporary turbidity with the placement of material (attribute #3). We believe the impacts to water clarity will be insignificant because the use of turbidity barriers will minimize turbidity and the potential for exposure is limited because the project is expected to be complete in a short 15 day duration. In addition, we believe any impacts from anthropogenically-introduced chemical contaminants (attribute #4) will be extremely unlike to occur. The proposed riprap boulder material will be free from items such as trash, debris, and soils contaminated with any toxic substances, in accordance with Section 307 of the Clean Water Act.

6.2.2 Routes of Effect that Are Likely to Adversely Affect Critical Habitat

We believe the permanent placement of riprap revetment material over 3,048.8 ft^2 of benthos is likely to adversely affect the substrate and reefscape attributes of the essential feature (#1 and #2 in Section 6.2, above). The proposed activity will permanently cover consolidated hardbottom or dead coral skeleton that is free from fleshy macroalgae cover and sediment cover. While the available hardbottom attribute within the project footprint will be diminished, the area is small when compared to nearby habitat that will remain available for potential larval settlement. Still, the ecological function provided to settling star coral larvae by the hardbottom present within the project footprint will be lost; therefore, we believe the project is likely to adversely affect the Florida Area Unit of star coral critical habitat.

7 CUMULATIVE EFFECTS

ESA Section 7 regulations require NMFS to consider cumulative effects in formulating its Opinions (50 CFR 402.14). Cumulative effects include the effects of future state or private actions, not involving federal activities, that are reasonably certain to occur within the action area considered in this Opinion (50 CFR 402.02). NMFS is not aware of any future projects that may contribute to cumulative effects. Within the action area, the ongoing activities and processes described in the environmental baseline are expected to continue and NMFS did not identify any additional sources of potential cumulative effect. Although the present human uses of the action area are expected to continue.

8 INTEGRATION AND SYNTHESIS JEOPARDY ANALYSIS AND DESTRUCTION OR ADVERSE MODIFICATION ANALYSIS

8.1 Jeopardy Analysis

To "jeopardize the continued existence of" a species 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 for each species, we must look at whether the proposed action directly or indirectly reduces the reproduction, numbers, or distribution of a listed species. If there is a reduction in 1 or more of these elements, we evaluate whether the action would be expected to cause an appreciable reduction in the likelihood of both the survival and the recovery of the species.

The NMFS and USFWS's ESA Section 7 Handbook (USFWS and NMFS 1998) defines survival and recovery, as these terms apply to the ESA's jeopardy standard. Survival means "the species' persistence…beyond the conditions leading to its endangerment, with sufficient resilience to allow recovery from endangerment." The Handbook further explains that survival is the condition in which a species continues to exist into the future while retaining the potential for recovery. This condition is characterized by a sufficiently large population, represented by all necessary age classes, genetic heterogeneity, and number of sexually mature individuals producing viable offspring, which exists in an environment providing all requirements for completion of the species' entire life cycle, including reproduction, sustenance, and shelter. Per the Handbook and the ESA regulations at 50 CFR 402.02, recovery means "improvement in the status of listed species to the point at which listing is no longer appropriate under the criteria set out in Section 4(a)(1) of the Act." Recovery is the process by which species' ecosystems are restored or threats to the species are removed or both so that self-sustaining and self-regulating populations of listed species can be supported as persistent members of native biotic communities.

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 queen conch. In Section 6.0, we outlined how the proposed action can adversely affect this species. 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 4.0), the Environmental Baseline (Section 5.0), and the Cumulative Effects (Section 7.0), will jeopardize the continued existence of the affected species. For queen conch, which is listed globally, our jeopardy determination must evaluate whether the proposed action will appreciably reduce the likelihood of survival and recovery at the species' global range.

8.2 Queen Conch

8.2.1 Survival

The proposed action allows the relocation of up to 11 queen conch adults and up to 11 juveniles prior to the start of construction. Of the 22 individuals relocated, we expect the mortality of approximately 28%, or up to 7 individuals. Twenty- eight percent of 22 totals 6.16 rounded to the nearest whole number is 7. The remaining 15 relocated individuals are expected to survive relocation. These survivors are expected to fully recover over time, although the process is

expected to stress the animals, potentially leading to negative effects on reproductive activity for the stressed individual.

The loss of up to 7 individuals would be a reduction in numbers but would not reduce the distribution of queen conch, which are found throughout the Caribbean Sea and the Gulf of America, as well as in the Atlantic Ocean around southern Florida and around Bermuda. The loss of up to 7 individuals could result in reduction in future reproduction, assuming that some of the individuals are females and would have reproduced in the absence of the relocation. Assuming that half of the individuals experiencing mortality through this action are potentially reproductive females (n = 4 individuals), and each female produces 3–4 clutches per season with a clutch size of 250,000–750,000 eggs, reproductive output could diminish by approximately 12,000,000 eggs (= 4 clutches x 750,000 eggs x 4 females) (Stoner and Appeldoorn 2022). Although specific survival rates for queen conch have not been determined, gastropods typically exhibit significant variability in survival. If we assume a 1% survival rate for eggs under normal conditions, this translates to a decrease of approximately 120,000 individuals per season due to the mortality events resulting from the proposed action.

Whether the reductions in queen conch numbers and reproduction attributed to the proposed action would appreciably reduce the likelihood of survival depends on the changes relative to current population sizes and trends. The state of Florida accounts for only approximately 0.22% of the global queen conch population (Horn et al. 2022). Surveys by the FWRI indicate that the queen conch population trend in Florida was stable following the 1985 fishery closure and has shown recent increases. Florida has an estimated overall population of 1.66 million individuals (FWRI, pers. comm. to NOAA, 2024). The presumed size of the largest known aggregation in Florida, the Port Everglades aggregation, is roughly 20,000 individuals, with the aggregation demonstrating significant growth, increasing up to four times its original abundance estimates from 2012 (Berry et al. 2016).While these increasing trends in Florida are encouraging and highlight the positive impact of effective management, the species continues to decline across its broader range (Horn et al. 2022). We believe that the loss of up to 7 queen conchs, which a small fraction of the Florida population, would have no detectable effect on current statewide or global population trends.

After analyzing the magnitude of the effects of the proposed action, alongside the past, present, and future expected impacts to the species discussed in this Opinion, we believe that the proposed action is not expected to appreciably reduce the likelihood of queen conch survival in the wild.

8.2.2 Recovery

The queen conch currently lacks an official recovery plan or outline. However, the primary threats identified in the status review (Horn et al. 2022) are overutilization (including commercial, artisanal, illegal, unreported, or unregulated fishing), inadequate existing regulations, and changing ocean conditions across the species' range. Therefore, recovery efforts are anticipated to focus on international collaboration to address these major threats, including encouragement of sustainable fishing practices and improved enforcement of regulations. Florida has maintained a complete fishing moratorium for queen conch since 1985, with strict enforcement against harvesting the species and to minimize poaching. The proposed action is not

expected to exacerbate or contribute to the major threats affecting the species' status. The proposed action also is not expected to hinder the potential recovery strategies or the overall recovery of the queen conch throughout its range.

Relocation will reduce harm to queen conch relative to leaving them in place during the proposed action, but is anticipated to result in behavioral disruption of all relocated conch and the potential lethal take of approximately 28% of relocated individuals. In an ideal scenario, the relocation of up to 22 individuals will augment existing sub-populations and individuals will continue to be reproductively successful.

As outlined above, the potential capture, collection, harassment, behavioral disruption, and death associated with this action will result in a reduction in population abundance; however, the action is unlikely to influence the recovery objectives and trends noted above, when considered in the context of the Status of the Species, the Environmental Baseline, and Cumulative Effects discussed in this Opinion. Thus, the proposed action will not result in an appreciable reduction in the likelihood of queen conch recovery in the wild.

8.2.3 Conclusion

The take of up to 22 individuals, including the lethal take of up to 7 individuals expected to result from the proposed action is not expected to cause an appreciable reduction in the likelihood of either the survival or recovery of queen conch in the wild.

8.3 Critical Habitat Destruction or Adverse Modification Analysis

NMFS's regulations define *destruction or adverse modification* to mean "a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species" (50 CFR 402.02). Alterations that may destroy or adversely modify critical habitat may include impacts to the area itself, such as those that would impede access to or use of the essential features. NMFS will generally conclude that a federal action is likely to "destroy or adversely modify" critical habitat if the action results in an alteration of the quantity or quality of the essential physical or biological features of critical habitat and if the effect of the alteration is to appreciably diminish the value of critical habitat as a whole for the conservation of the species.

This analysis takes into account the geographic and temporal scope of the proposed action, recognizing that "functionality" of critical habitat necessarily means that the critical habitat must now and must continue in the future to support the conservation of the species and progress toward recovery. The analysis takes into account any changes in amount, distribution, or characteristics of the critical habitat that will be required over time to support the successful recovery of the species. Destruction or adverse modification does not depend strictly on the size or proportion of the area adversely affected, but rather on the role the action area and the affected critical habitat serves with regard to the function of the overall critical habitat designation, and how that role is affected by the action.

8.3.1 Designated Critical Habitat to Support Recovery of the 5 Caribbean Corals

In establishing the Recovery Outline for the 5 Caribbean coral species, we developed a Recovery Vision to describe the appearance of a fully recovered species. The Recovery Vision describes populations present across their historical ranges, that are large enough and genetically diverse enough to support successful reproduction and recovery from mortality events, and dense enough to maintain ecosystem function (https://www.fisheries.noaa.gov/s3//dam-migration/recovery_outline_sero_corals_508.pdf). The key conservation objective that facilitates this Recovery Vision, and is assisted through critical habitat designations, is supporting successful reproduction and recruitment, and survival and growth of all life stages by abating threats to the corals' habitats. The final listing rule for the 5 Caribbean corals identifies 6 major threats contributing to their extinction risk: ocean warming, disease, ocean acidification, trophic effects of reef fishing, nutrient enrichment, and sedimentation (79 FR 53851); five of these threats (i.e., all but disease) impact corals, in part, by changing the corals' habitat, making it unsuitable for them to carry out the essential functions at all life stages. Protecting sites that support the normal function of all life stages of the corals, including reproduction, recruitment, and maturation, from these threats will facilitate the recovery of the 5 Caribbean corals. As described in Section 4.2, these are sites having an essential feature that is a composite of substrate and water column attributes that determine the quality of the habitat. The following analysis demonstrates that while the proposed action will adversely affect the substrate and reefscape attributes of star coral designated critical habitat, it will not appreciably reduce the critical habitat's ability to support conservation of all 3 *Orbicella* species as a whole. Despite permanent adverse effects to approximately 3,048.8 ft^2 of suitable settlement habitat, the Florida Area Units will continue to serve its intended conservation role for boulder star, lobed star, and mountainous star corals.

The critical habitat designated within the Florida Area Units provides many thousands of acres of similar consolidated hardbottom habitat that will continue to provide optimal settling habitat for each of the *Orbicella* species. There are no star corals currently located within the project action area; however, there is available additional consolidated hardbottom and existing aggregate reef located nearby, particularly to the east and west of the project footprint. These critical habitat areas will remain unaffected by the proposed action. The area expected to be affected constitutes only ~ 0.000003-0.000004% of the total area of critical habitat designated for each of the star coral species (Table 4) within their Florida Area Units.

Table 6. Percent of designated critical habitat, Florida Unit covered by the proposed activity.

Star Coral	Area Impacted (ft^2)	Area of Approximate DCH (ft^2)	% DCH Covered with rip rap
Boulder	3,048.8	75,347,000,000	0.000004
Lobed	3,048.8	99,028,000,000	0.000003
Mountainous	3,048.8	103,330,000,000	0.000003

Given the limited permanent adverse effects to the essential feature attributes and the limited area of designated critical habitat affected in comparison to the amount available within the Units, we believe the impact to the overall value of available critical habitat will not affect population sizes or distributions, and will not impede recovery of these species. NMFS

concludes that the effects of the project will not discernibly impact the ecological function of the Florida Area Units of designated critical habitat for bolder star, lobed star, and mountainous star coral, and that the designated critical habitat will continue to serve its intended conservation role.

9 CONCLUSION

We reviewed the Status of Species, Status of the Critical Habitat, the Environmental Baseline, the Effects of the Action, and the Cumulative Effects using the best available data.

The proposed action may result in the lethal take of up to 7 queen conch. However, given the nature of the proposed action and the information provided above, we conclude that the action, as proposed, is not likely to jeopardize the continued existence of queen conch.

We conclude that the permanent loss of approximately 3,048.8 ft^2 of substrate and reefscape essential features due to the proposed action will not interfere with achieving the relevant habitat-based recovery objectives for boulder star coral, lobed star coral, and mountainous star coral, and will not impede the critical habitat's ability as a whole to support the conservation of the boulder star coral, despite permanent adverse effects. Therefore, given the nature of the proposed action and the information provided above, we conclude that the action, as proposed, is not likely to destroy or adversely modify the critical habitat of the three star coral species.

10 INCIDENTAL TAKE STATEMENT

10.1 Overview

Section 9 of the ESA and protective regulations issued pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. *Take* is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct (ESA Section 2(19)). *Incidental take* refers to takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or permittee. Under the terms of section 7(b)(4) and section 7(o)(2), taking that would otherwise be considered prohibited under section 9 or section 4(d) but which is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA, provided that such taking is in compliance with the Reasonable and Prudent Measures and the Terms and Conditions of the Incidental Take Statement of the Opinion.

The take of queen conch by the proposed action is not prohibited under ESA section 9, as no section 4(d) rules for the species have been promulgated. However, a circuit court case held that non-prohibited incidental take must be included in the Incidental Take Statement (*CBD v. Salazar*, 695 F.3d 893 [9th Circuit 2012]). Though the *Salazar* case is not a binding precedent for this action, which occurs outside of the 9th Circuit, NMFS finds the reasoning persuasive and is following the case out of an abundance of caution and because we anticipate that the ruling will be more broadly followed in future cases. Providing an exemption from Section 9 liability is not only important purpose of specifying take in an Incidental Take Statement. Specifying

incidental take ensures we have a metric against which we can measure whether or not reinitiation of consultation is required. Including this species in the Incidental Take Statement also ensures that we identify Reasonable and Prudent Measures that we believe are necessary or appropriate to minimize the impact of the incidental take on the species.

As soon as the applicant or the USACE becomes aware of any take of an ESA-listed species under NMFS's purview that occurs during the proposed action, David Marabella or the USACE shall report the take to NMFS SERO PRD via the NMFS SERO Endangered Species Take Report Form (https://forms.gle/85fP2da4Ds9jEL829). This form shall be completed for each individual known reported capture, entanglement, stranding, or other take incident. Information provided via this form shall include the title, Marabella Revetment, the issuance date, and ECO tracking number, SERO-2024-02041, for this Opinion; the species name; the date and time of the incident; the general location and activity resulting in capture; condition of the species (i.e., alive, dead, sent to rehabilitation); size of the individual, behavior, identifying features (i.e., presence of tags, scars, or distinguishing marks), and any photos that may have been taken. At that time, consultation may need to be reinitiated.

The USACE has a continuing duty to ensure compliance with the reasonable and prudent measures and terms and conditions included in this Incidental Take Statement. If the USACE (1) fails to assume and implement the terms and conditions or (2) fails to require the terms and conditions of the Incidental Take Statement through enforceable terms that are added to the permit or grant document or other similar document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the USACE must report the progress of the action and its impact on the species to NMFS as specified in the Incidental Take Statement (50 CFR 402.14(i)(4)).

10.2 Amount of Extent of Anticipated Incidental Take

Based on the above information and analyses, NMFS believes that the proposed action is likely to adversely affect queen conch. These effects will result from conch relocation activities and includes potential mortality events as a result of relocation. NMFS anticipates the following incidental take may occur as a result of the proposed action during the initial queen conch relocation action prior to the revetment construction.

Relocation of up to 22 individuals, and the potential lethal take of up to 7 queen conch.

Table 7. Anticipated Incidental Take Related to for Marabella Revetment

Queen Conch	Relocation	Potential Mortality
Adults & Juveniles	22	7

10.3 Effect of Take

NMFS has determined that the anticipated incidental take specified in Section 10.2 is not likely to jeopardize the continued existence of queen conch if the project is developed as proposed.

10.4 Reasonable and Prudent Measures

Section 7(b)(4) of the ESA requires NMFS to issue to any federal agency whose proposed action is found to comply with section 7(a)(2) of the ESA, but may incidentally take individuals of listed species, a statement specifying the impact of that taking. The Incidental Take Statement must specify the Reasonable and Prudent Measures necessary or appropriate to minimize the impacts of the incidental taking from the proposed action on the species, and Terms and Conditions to implement those measures. "Reasonable and prudent measures" refer to those actions the Director considers necessary or appropriate to minimize the impact of the incidental take on the species" (50 CFR 402.02). Per section 7(o)(2), any incidental taking that complies with the specified terms and conditions is not considered to be a prohibited taking of the species concerned.

The Reasonable and Prudent Measures and terms and conditions are required to document the incidental take by the proposed action and to minimize the impact of that take on ESA-listed species (50 CFR 402.14(i)(1)(ii) and (iv)). These measures and terms and conditions must be implemented by the USACE for the protection of section 7(o)(2) to apply. The USACE has a continuing duty to ensure compliance with the reasonable and prudent measures and terms and conditions included in this Incidental Take Statement. If USACE fails to adhere to the terms and conditions of the Incidental Take Statement through enforceable terms, or fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of Section 7(o)(2) may lapse. To monitor the impact of the incidental take, the USACE must report the progress of the action and its impact on the species to SERO PRD as specified in the Incidental Take Statement [50 CFR 402.14(i)(4)].

NMFS has determined that the following Reasonable and Prudent Measures are necessary or appropriate to minimize impacts of the incidental take of ESA-listed species related to the proposed action. The following Reasonable and Prudent Measures and associated terms and conditions are established to implement these measures, and to document incidental takes. Only incidental takes that occur while these measures are in full implementation are not considered to be a prohibited taking of the species. These restrictions remain valid until reinitiation and conclusion of any subsequent Section 7 consultation.

1. The USACE must ensure the permittee minimizes the likelihood of injury or mortality to queen conch resulting from relocation by including a special condition in its permit requiring the permittee to implement the relocation protocol specified in the small scale Queen Conch Survey Construction Conditions and Relocation Guidelines specified on NMFS's website here: (https://www.fisheries.noaa.gov/s3/2024-09/Queen-Conch-Survey-Construction-Conditions-and-Relocation-Guidelines.pdf).
2. The USACE must ensure that the permittee monitors and reports the impacts of its activities on queen conch by including a special condition in its permit requiring the permittee to submit all queen conch monitoring and reporting documents to USACE and NMFS.

10.5 Terms and Conditions

In order to be exempt from the prohibitions established by section 9 of the ESA, the USACE must comply (or must ensure that any permittee complies) with the following Terms and Conditions.

The following Terms and Conditions implement Reasonable and Prudent Measure #1:

- The USACE shall include a special permit condition that directs the permittee to submit all project-related monitoring reports completed in accordance with this Opinion to NMFS SERO PRD by email (takereport.nmfsser@noaa.gov) with the NMFS tracking number for this Opinion (SERO-2024-02041, Marabella Revetment) and date of issuance.
- The USACE shall include a special permit condition that directs the permittee to transmit the notice of relocation activities and results to the NMFS Queen Conch Survey and Relocation Form (https://forms.gle/Xg74LA3dx4sZsVPP6).

11 CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs federal agencies to utilize their authority to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation Recommendations identified in Opinions can assist action agencies in implementing their responsibilities under Section 7(a)(1). Conservation recommendations are discretionary activities designed to minimize or avoid adverse effects of a proposed action on ESA-listed species or critical habitat, to help implement recovery plans, or to develop information. The following conservation recommendations are discretionary measures that NMFS believes are consistent with this obligation and therefore should be carried out by the federal action agency:

1. NMFS recommends that queen conch relocation occur outside of peak summer spawning months (May- September).

2. Fund and support restoration efforts that rehabilitate coral reefs. Implement ecosystem-level actions to improve habitat quality and restore keystone species and functional processes to maintain adult colonies and promote successful natural recruitment.

3. Reduce locally manageable coral stress and mortality sources (e.g., acute sedimentation, nutrients, contaminants, or overfishing of reef grazers).

4. Provide payment to the NMFS FKNMS Coral Nursery Program Fund to promote the recovery of threatened coral species.

5. Support efforts in the forthcoming Queen Conch Recovery Plan.

6. Continue public outreach and education on smalltooth sawfish and smalltooth sawfish critical habitat in an effort to minimize interactions, injury, and mortality.

7. Fund and support restoration efforts that rehabilitate and create shallow, euryhaline and mangrove fringe habitats within the range of smalltooth sawfish.

To stay abreast of actions that minimize or avoiding adverse effects or benefit listed species or their habitat, we request notification of the implementation of any conservation recommendations.

12 REINITIATION OF CONSULTATION

This concludes formal consultation on the proposed action. As provided in 50 CFR 402.16, reinitiation of formal consultation is required and shall be requested by the USACE, where discretionary federal action agency involvement or control over the action has been retained, or is authorized by law, and if: (a) the amount or extent of incidental take specified in the Incidental Take Statement is exceeded, (b) new information reveals effects of the action on listed species or critical habitat in a manner or to an extent not considered in this Opinion, (c) the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this Opinion, or (d) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, the USACE must immediately request reinitiation of formal consultation and project activities may only resume if the USACE establishes that such continuation will not violate Sections 7(a)(2) and 7(d) of the ESA.

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