Stantec

MEMORANDUM

To:	Binod Basnet, PE Project Manager FDOT District Four	**From:**	George Burke Senior Environmental Scientist
Date:	July 8, 2021		
Project:	Project Development & Environment Study SR A1A Over Sebastian Inlet – Bridge 880005 Bridge Replacement Indian River County and Brevard County		
FPID No.:	445618-1-22-02		
SUBJECT:	BENTHIC SURVEY TECHNICAL MEMORANDM		

1. Introduction and Background

The Florida Department of Transportation (FDOT or Department) District Four is conducting a Project Development & Environment (PD&E) Study to evaluate the replacement of the Sebastian Inlet Bridge (No. 880005) crossing the Sebastian Inlet located at the Indian River County and Brevard County boundary.

The Sebastian Inlet Bridge (Bridge), constructed in 1964, is a 1,548-foot long concrete structure with two-lanes carrying State Road (SR) A1A over the Sebastian Inlet at the Indian River and Brevard County boundary. The Bridge is located within FDOT and Sebastian Inlet District (SID) right-of-way (ROW) and is adjacent to the Sebastian Inlet State Park. The project limits extend approximately 0.95 miles from Mile Post 22.050 of Roadway ID 88070000 south of the Bridge in Indian River County north to Mile Post 0.300 of Roadway ID 70060000 in Brevard County.

The primary purpose of this project is to address the structural and functional deficiencies of the existing Bridge and the gap in system linkage for bicyclists and pedestrians. The project includes the evaluation of Build and Rehabilitation alternatives of the bridge against the No Build alternative, replacement of the existing under deck observation/fishing piers, and the addition of bicycle and pedestrian facilities across the bridge.

The Sebastian Inlet connects the Indian River Lagoon with the waters of the Atlantic Ocean and is used by a variety of marine life entering or leaving the Lagoon. Within the project area, the Sebastian Inlet has the potential to support protected marine resources, such as seagrasses and corals, provide habitat for threatened and/or endangered species, and contain Essential Fish Habitat (EFH) for species within federally managed fisheries. As the project has the potential to impact protected marine resources and EFH, the FDOT tasked Stantec to perform a benthic resource survey to determine the presence/absence, along with the general limits of any natural resources and identify existing EFH located within the project area. A previous survey of the project area was performed in 2019 and this survey effort sought to verify the conditions documented from the 2019 survey as well as provide any pertinent updates on resources present.

The purpose of this memorandum is to provide the results of the benthic survey performed on June 4, 2021 adjacent to and underneath SR A1A Bridge No. 880005 over the Sebastian Inlet (see **Attachment 1: Project Location Map**). The memo includes recommendations for avoidance and minimization measures and the

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results of this survey will be used in the development of the Natural Resources Evaluation (NRE) document for this PD&E study. The NRE is anticipated to be the basis for coordination with the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) during Section 7 and EFH Consultation for the project.

2. Benthic Survey Methods and Limits

The benthic survey covered the limits of the existing Bridge easement which extends 120-feet east and west from the centerline of SR A1A. Bridge replacement alternatives will be evaluated within the easement. The benthic survey area of potential effect (APE) included the existing Bridge in-water structures and the area that extends 100-feet east and west from the existing bridge footprint. This 100-foot buffer accounts for potential direct impacts from bridge removal and replacement work as well as any indirect impacts (i.e., downstream turbidity, shading from barge staging) during project construction. Therefore, the benthic survey effort focused on the existing bridge in-water structures and footprint and included an additional 100-foot buffer area on the east and west sides of the bridge, where feasible (see **Attachment 2. Benthic Survey Methods Map)**.

A desktop review of the project area was performed prior to the field survey using both the Efficient Transportation Decision Making (ETDM) Environmental Screening Tool (EST) and the National Oceanographic and Atmospheric Administration (NOAA) NMFS EFH Mapper to determine which listed species have the potential to occur within the project area, as well as which federally managed fisheries may have EFH in the project area.

This survey was conducted on June 4, 2021 during both the incoming and outgoing tidal cycles within the science-based seagrass survey window to accommodate the Johnson's seagrass (*Halophila johnsonii*) growing season and period of maximum abundance between the dates of June 1st and September 30th (NOAA NMFS, 2010). The survey was performed by Stantec biologists utilizing SCUBA and snorkeling (aka free diving) equipment. Transects were used to document conditions in the Sebastian Inlet which began at existing pilings and extended out 100-feet perpendicular to the bridge edge (See **Attachment 2**). Due to the dangerous high velocity current in the Sebastian Inlet, 100-feet lead-line transects were deployed and retrieved from the dive boat with buoys attached at the end points of the line. Due to safety concerns with the swift current and boat traffic, transects were not performed within the navigational channel area; as such, this area was spot checked via reconnaissance swims by the divers using free diving gear. Two (2) biologist using SCUBA equipment began each transect at the bridge pilings and surveyed the existing benthic conditions on each side of the transect line. Observations and data including depth, benthic substrate, and observed natural resources were recorded using underwater photography. The locations of any observed protected resources were documented and marked by cross referencing approximate diver positions on aerial photograph datasheets using a sub-meter accurate, Trimble RNSS 1 Receiver (a Global Positioning System (GPS) device). Finally, all observed resources were mapped and overlaid onto a project aerial using ESRI ArcGIS (See **Attachment 3: Benthic Survey Results Map**).

3. Results

The desktop review determined that the project area is within the USFWS designated consultation area for the West Indian manatee (*Trichechus manatus*), Atlantic salt marsh snake (*Nerodia clarkii taeniata*), piping plover (*Charadrius melodus*), and scrub jay (*Aphelocoma coerulescens*). In addition, the project is within the USFWS designated critical habitat for the West Indian manatee (*Trichechus manatus*). The project is not within the designated critical habitat for Johnson's seagrass (*H. johnsonii*); however, it is within the species range and portions of the Sebastian Inlet (located east of the project bridge within the Indian River Lagoon) have been designated by the NMFS as critical habitat for this species; therefore, this seagrass has the potential to be present within the survey area.

The NMFS EFH mapper tool did not identify any distinct EFH within the Sebastian Inlet. The project area does have the potential to contain EFH for species within the following fisheries which are federally managed by the South Atlantic Fisheries Management Council (SAFMC):

- Snapper-Grouper Complex
- Penaeid Shrimp
- Spiny Lobster
- Coastal Migratory Pelagics
- Red Drum
- Coral, Coral Reefs and Live/Hardbottom

The SAFMC has identified several Habitat Areas of Particular Concern (HAPCs) which may occur in the project area including mangroves, coral, and seagrass habitat. HAPCs are defined as specific subsets of EFH that provide critically important ecological functions or are especially vulnerable to degradation. These areas are designated higher protection and impacts to HAPCs would require mitigation and NMFS approval through EFH consultation. Fisheries Management Plans (FMPs) may designate a specific habitat area/type as an HAPC based on ecological importance, susceptibility to human-induced environmental degradation, susceptibility to stress from development, or rarity of the habitat type. Examples of HAPCs include coral reefs, seagrass beds, and coastal mangrove habitat. No seagrasses or mangroves were documented within the project area and only one stony coral was identified. Subsequently, it was determined that the project area does not contain any HAPCs identified in any FMPs.

The benthic survey of the project area was completed within the scientific seagrass survey window on June 4, 2021 during incoming and outgoing tidal cycles. The Sebastian Inlet experiences extremely high velocity currents which can get up to 9-ft/sec; therefore, slack tides were utilized to the greatest extent to complete this survey. The benthic substrate within the survey area is primarily rocky hard-bottom with scattered patches of sand with shell fragments. No seagrasses or corals were documented on the bottom substrate or any of the bridge pilings. Sparse to moderate coverage of sponges and algae were found along the rip-rap shorelines, rocky benthic substrate, and the in-water bridge pilings. This survey found a greater assortment of sponge and algal diversity on the northern rip-rap shoreline than the southern rip-rap shoreline. One individual smooth star coral (*Solenastrea bournoni*) was identified on the rip-rap shoreline

to the northwest of the existing bridge (See **Attachment 3**). A complete list of all marine species documented during this survey is included in **Table 1**.

The rocky hard-bottom with scattered sand is generally consistent along the shallow shoreline areas of the survey limits. Fishing lures, hooks and lead weights were observed throughout these areas as well. The Sebastian Inlet gradually slopes toward the navigational channel from the rip-rap shorelines. Depths at the shorelines range from 4-8 feet reaching depths from 12-18-ft deep within the navigational channel. Benthic substrate within the navigational channel changes to a barer sand and shell fragment substrate that did not contain any marine resources. No Johnson's seagrass, listed coral species, or any other threatened or endangered benthic species were observed within the survey area. Several manatees (*Trichechus manatus*) which are known to utilize the Sebastian Inlet, were seen swimming out into the Atlantic Ocean during the survey. Additional details on the observed benthic conditions in the project area are presented in **Attachment 4. Representative Photographs**.

Table 1. Species Observed During Benthic Survey

FISH	
Common Name	**Species Name**
sheepshead	*Archosargus probatocephalus*
queen angelfish	Snapper-Grouper, Red Drum
snapper	Corals, Spiny Lobster
barracuda	Snapper-Grouper, Red Drum
schoolmaster	Corals, Spiny Lobster
Atlantic red-lip blenny	*Ophioblennius atlanticus*
sergeant major	*Abudefduf saxatilis*
Atlantic porkfish	*Anisotremus virginicus*
French Grunt	*Haemulon flavolineatum*
tidal spray crab	*Plagusia depressa*
Mammals	
Common Name	**Species Name**
common bottlenose dolphin	*Tursiops truncatus*
West Indian manatee	*Trichechus manatus*
Coral and Sponges	
Common Name	**Species Name**
smooth star coral	*Solenastrea bournoni*
red boring sponge	*Dragmacidon sp.*
sponge	*Lissodendoryx sigmata*
blue tube sponge	*Haliclona caerulea*
fire coral	*Millepora alcicornis*
sponge	*Mycale sp.*
Marine Algae	

Table 1. Species Observed During Benthic Survey

FISH	
Common Name	**Species Name**
Common Name	**Species Name**
flat green feather algae	*Caulerpa mexicana*
brown macroalgae	*Dictyota cervicornis*
green feather algae	*Caulerpa sertulariodes*
sea grape green algae	*Caulerpa racemosa*
barnacle	*Cirripedia spp.*
mermaid's fan seaweed	Genus *Padina*

4. Conclusions and Recommendations

The Sebastian Inlet experiences some of the highest velocity currents of any inlets in Florida which has given this inlet a reputation as one of the most dangerous on the Atlantic Seaboard. This intense current is likely a significant contributing factor to the lack of observed marine resources within the project area around the existing bridge. The rip-rap which lines the northern and southern shorelines of the Sebastian Inlet diminishes this current to an extent and it was within these areas that the majority of the benthic resources were observed. The results of this survey were consistent with the 2019 survey, which included limited sponge colonization on the hardbottom substrate throughout the Sebastian Inlet and the majority of identified benthic resources being documented colonizing the large rip-rap boulders. No listed species of coral was observed as only one individual smooth star coral (*Solenastrea bournoni*) was identified on the rip-rap shoreline to the northwest of the existing bridge. Limited sponge colonization, consisting primarily of red boring sponges (*Dragmacidon* sp.), was documented on the hardbottom substrate throughout much of the Sebastian Inlet. No seagrasses, including Johnson's seagrass, were documented within the project area as the primarily rocky-hardbottom substrate, coupled with the high velocity current, likely precludes seagrasses from colonizing and establishing this area.

The Sebastian Inlet's rip-rap shorelines and existing bridge structure provides hard-substrate for encrusting organisms to adhere to and provides habitat for a variety of crustaceans, fish, mammals and other marine life. Minor impacts to existing marine resources, mainly encrusting sponges and algae, may occur from the construction of the project which includes the removal of the existing bridge (and associated in-water structures). However, the existing rip-rap shoreline is not anticipated to be impacted and is to remain. Additionally, any proposed replacement bridge will include similar in-water structures that would be anticipated to provide analogous marine habitat post construction. The biota along the rip-rap shoreline would be largely unimpacted by this project and, therefore would be expected to subsist and provide for continued natural recruitment. As such, a similar benthic community would be anticipated to naturally re-establish in the project area post construction. Protection of West Indian manatees, swimming sea turtles, and smalltooth sawfish (*Pristis pecinata*) during project construction will be accomplished through the implementation of *Standard Manatee Conditions for In-Water Work*, and *Sea Turtle and Smalltooth Sawfish Construction Conditions*. If any of the free-swimming species are found within the project area during

construction, the animal would be given the space and time required to leave the area per State and Federal regulations.

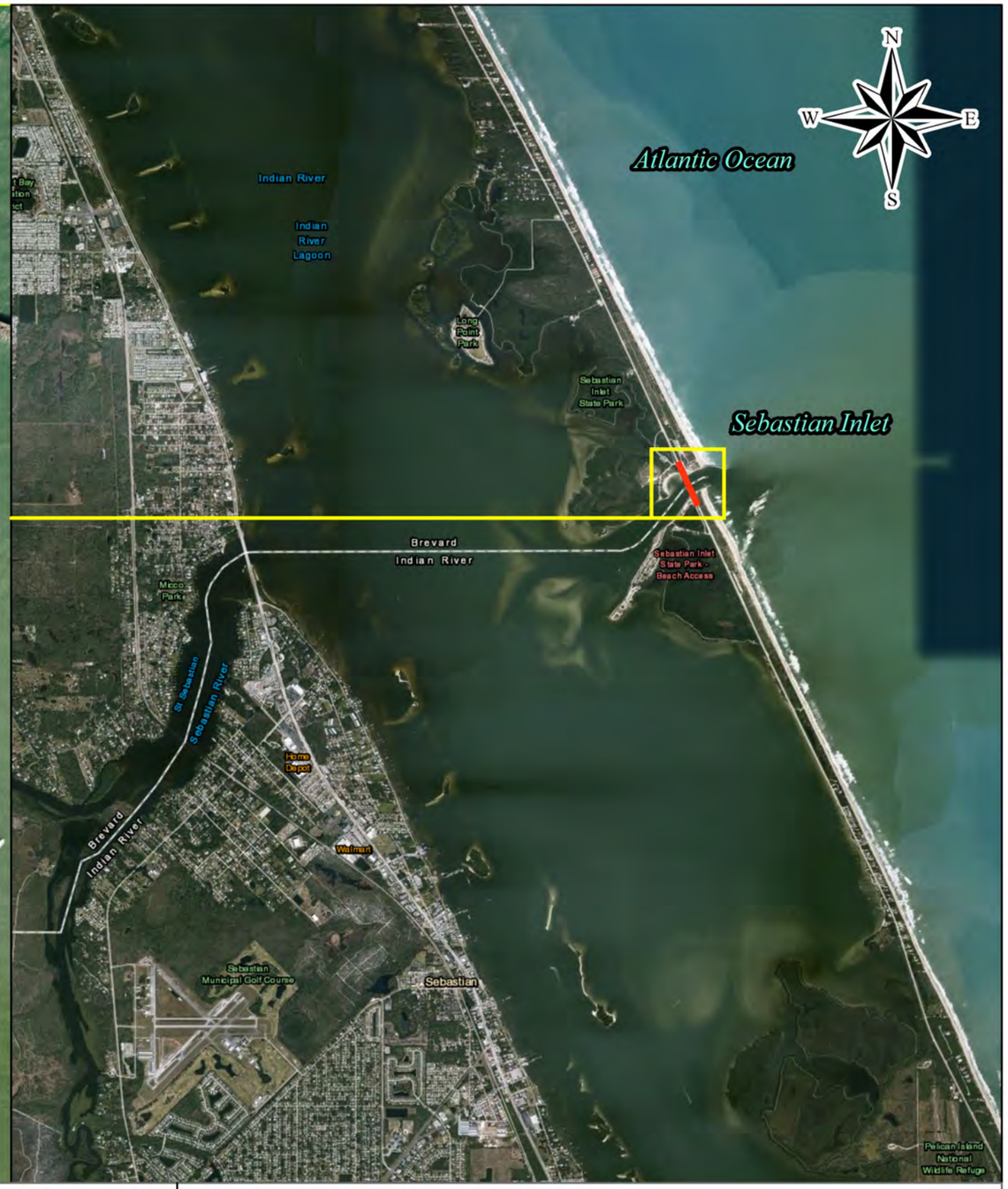
No HAPCs were identified within the project area; therefore, no HAPCs are anticipated to be impacted by the proposed project. No mangroves are present within the Sebastian Inlet adjacent to the existing bridge, no seagrasses were documented within the project area, and only one (1) individual stony coral was observed. The rip-rap, rocky-hardbottom, and bare sand substrates documented in the survey area provide EFH for species within several FMPs, including spiny lobster, snapper and grouper, migratory pelagics, red drum, and penaeid shrimp. Minor impacts/disturbance to these EFHs may occur from the proposed bridge replacement project; however as discussed, these habitats would be expected to naturally recover post construction. Therefore, it is anticipated that this project will result in ***minimal*** impacts to EFH.

Indirect/secondary impacts from project may include generated turbidity and sedimentation resulting from existing bridge demolition, pile driving, and bridge construction However, these temporary impacts would be limited to only during project construction and minimized to the greatest extent utilizing Best Management Practices (BMPs). The following avoidance and minimization measures are recommended for this project:

- Implement BMPs to control project generated turbidity and sedimentation in accordance with the current edition of FDOT's *Standard Specifications for Road and Bridge Construction*.
- Adhere to the *Standard Manatee Conditions for In-Water Work*, as well as the *Sea Turtle and Smalltooth Sawfish Construction Conditions*
- Utilize the ramp up or vibratory installation methodology for pile driving to warn and allow any listed species to vacate the area
- Utilize sound diminishing measures (such as wood blocks) to minimize potential noise impacts from pile driving
- No blasting or any explosives will be used in the removal of any bridge structures.
- Continue to review prudent avoidance and minimization measures during final design, permitting and project construction.

With these avoidance and minimization measures in place, this project is anticipated to result in ***minimal*** impacts to EFH and ***no adverse impacts*** to any threatened or endangered species.

ATTACHMENT 1
Project Location Map



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Project Development and Environment (PD&E) Study
SR-A1A over Sebastian Inlet Bridge 880005
Indian River County and Brevard County, Florida

Project Location Map

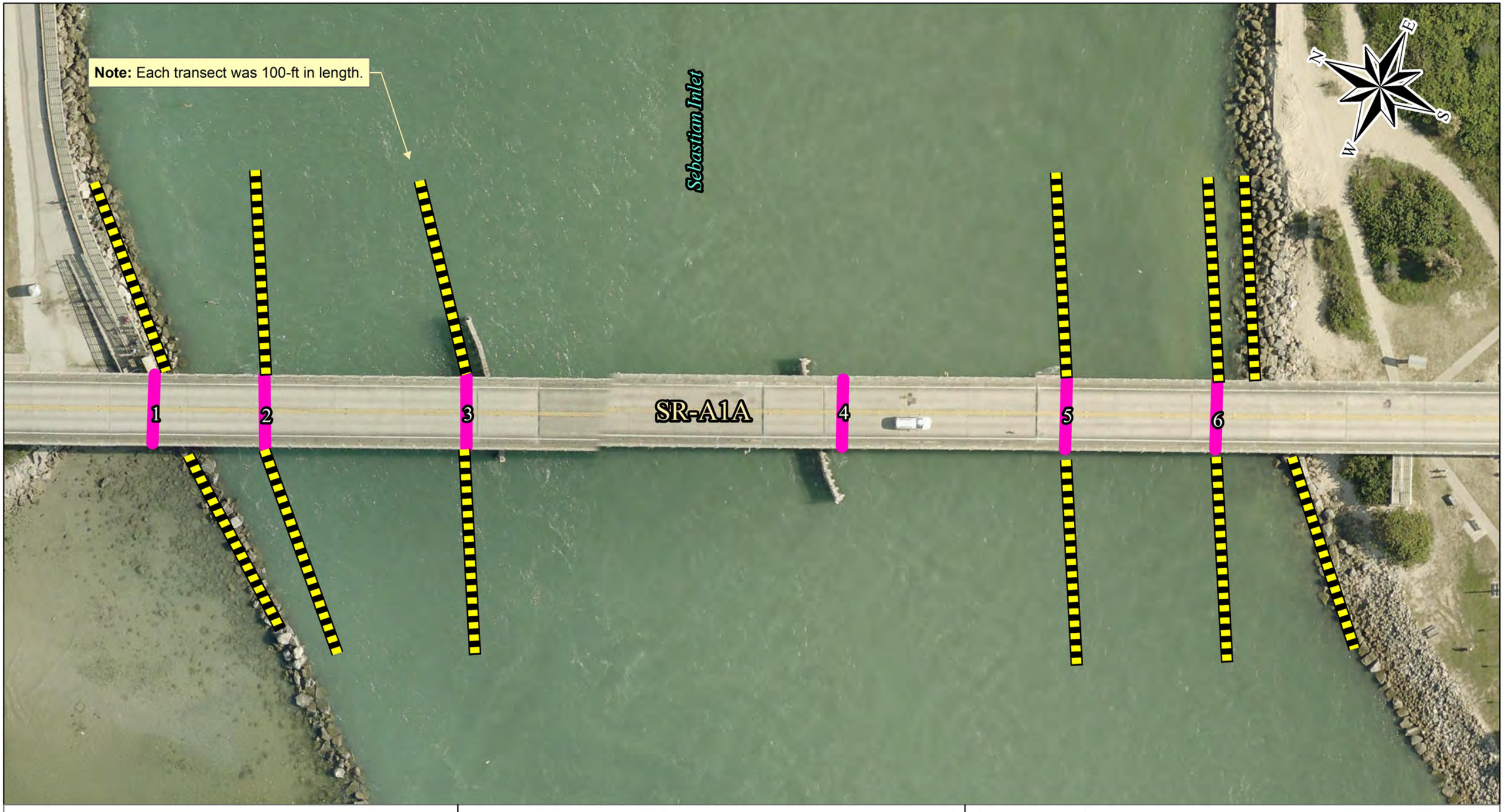
Legend

Project Location

Feet

0 250 500 1,000

ATTACHMENT 2
Benthic Survey Methodology Map



Florida Department of Transportation
District 4
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Fort Lauderdale, FL, 33309

Project Development and Environment (PD&E) Study
SR-A1A over Sebastian Inlet Bridge 880005
Indian River and Brevard Counties, Florida

Benthic Survey Methods Map

Legend

Survey Transects — Bridge Pilings

0 50 100 200 Feet

ATTACHMENT 3
Benthic Survey Results Map

Note: Sparse to moderate coverage of marine sponges and macroalgae were observed in the shallower areas within and adjacent to the rip-rap shorelines. Coverage and species diversity was greater along the northern rip-rap shoreline as compared to the southern shoreline. The middle of the inlet deepens around the navigational channel and the substrate transitions from primarily rocky-bottom with scattered sand and shell fragment patches, to a more barren, sandy-bottom, void of benthic resources. One coral (*S. bournoni*) was observed along the rip-rap. No seagrasses or other protected benthic resources were documented in the survey area.

FDOT

Project Development and Environment (PD&E) Study
SR-A1A over Sebastian Inlet Bridge 880005
Indian River County and Brevard County, Florida

Benthic Survey Results Map

Legend

- Barren Sandy Substrate
- Sparse to Moderate Sponge & Algal Coverage
- Stony Coral
- Bridge Pilings

0 125 250 500 Feet

ATTACHMENT 4
Representative Photographs

Representative Photographs

Photograph No.: 1

Date: June 4, 2021

Location: SR A1A Bridge 880005 Over Sebastian Inlet, Indian River County and Brevard County, FL

Notes: The photograph shows the project bridge looking east towards the Atlantic Ocean. This inlet experiences extremely high velocity current during tidal interchanges making it unlikely to support seagrasses or corals in the areas adjacent to the bridge.

Representative Photographs

Photograph No.: 2

Date: June 4, 2021

Location: SR A1A Bridge 880005 Over Sebastian Inlet, Indian River County and Brevard County, FL

Notes: The photograph shows the northern rip-rap shoreline underneath the project bridge over the Sebastian Inlet.

Representative Photographs

Photograph No.: 3

Date: June 4, 2021

Location: SR A1A Bridge 880005 Over Sebastian Inlet, Indian River County and Brevard County, FL

Notes: The photograph shows a large red ball sponge/red boring sponge, *Dragmacidon sp.*, that was observed throughout much of the survey area. These ranged in size from smaller than a fist and larger as shown here within the rip-rap shoreline on the northern shore.

Representative Photographs

Photograph No.: 4

Date: June 4, 2021

Location: SR A1A Bridge 880005 Over Sebastian Inlet, Indian River County and Brevard County, FL

Notes: The photograph shows some green feather alga, *Caulerpa sertularioides* along with some sea grape *Caulerpa racemosa* observed within the rip rap shoreline habitat.

Representative Photographs

Photograph No.: 5

Date: June 4, 2021

Location: SR A1A Bridge 880005 Over Sebastian Inlet, Indian River County and Brevard County, FL

Notes: The photograph shows the general algal and sponge community and typical coverage observed within the northern rip-rap shoreline of the survey area.

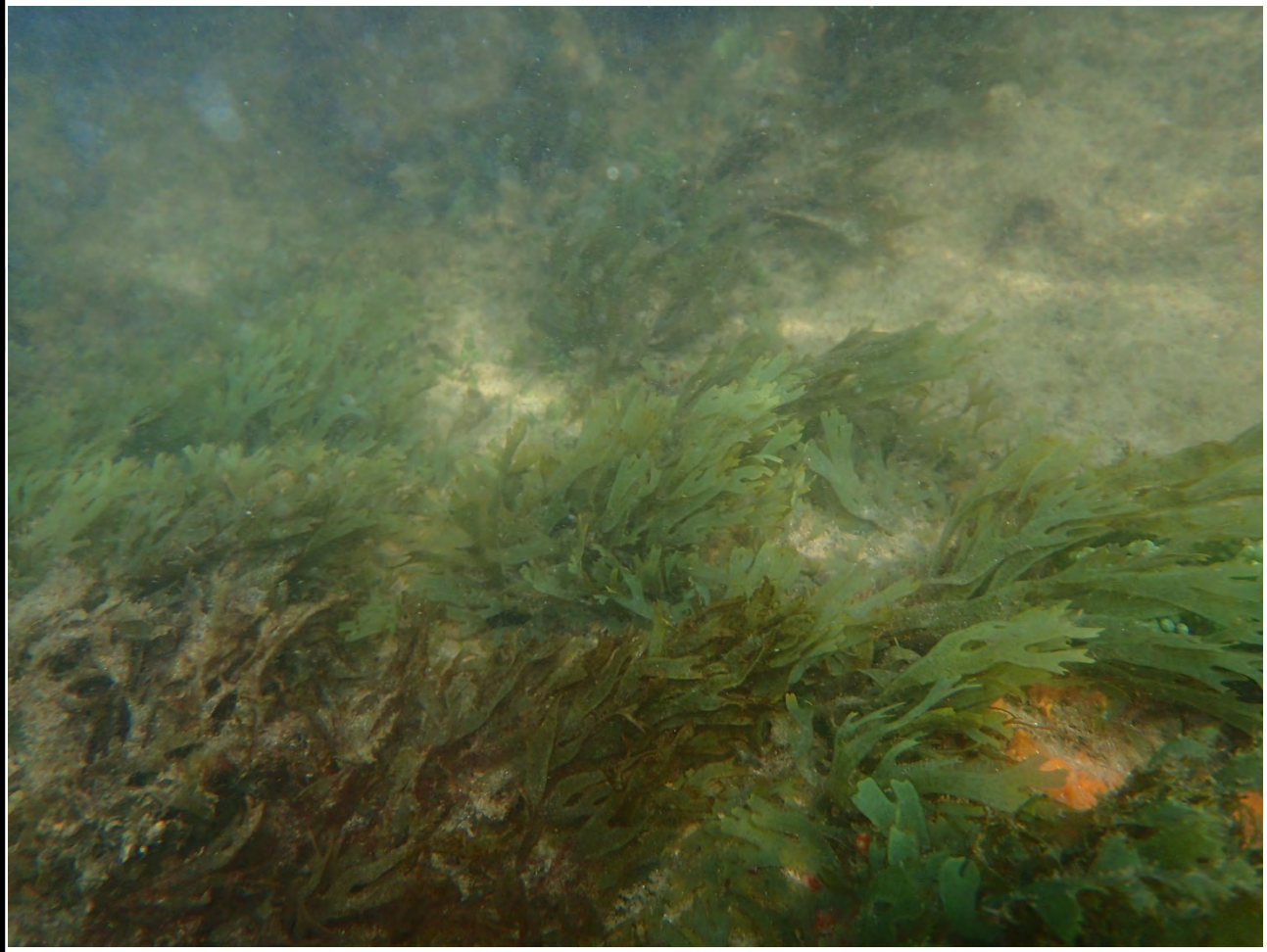
Representative Photographs

Photograph No.: 6

Date: June 4, 2021

Location: SR A1A Bridge 880005 Over Sebastian Inlet, Indian River County and Brevard County, FL

Notes: The photograph shows some brown macroalgae, *Dictyota cervicornis*, observed just off of the northern rip-rap shoreline just east of the existing bridge.



Representative Photographs

Photograph No.: 7

Date: June 4, 2021

Location: SR A1A Bridge 880005 Over Sebastian Inlet, Indian River County and Brevard County, FL

Notes: The photograph shows some mermaid's fan seaweed, Genus *Padina*, that was observed along the northern rip-rap shoreline. Additionally, some flat green feather alga *Caulerpa mexicana*.

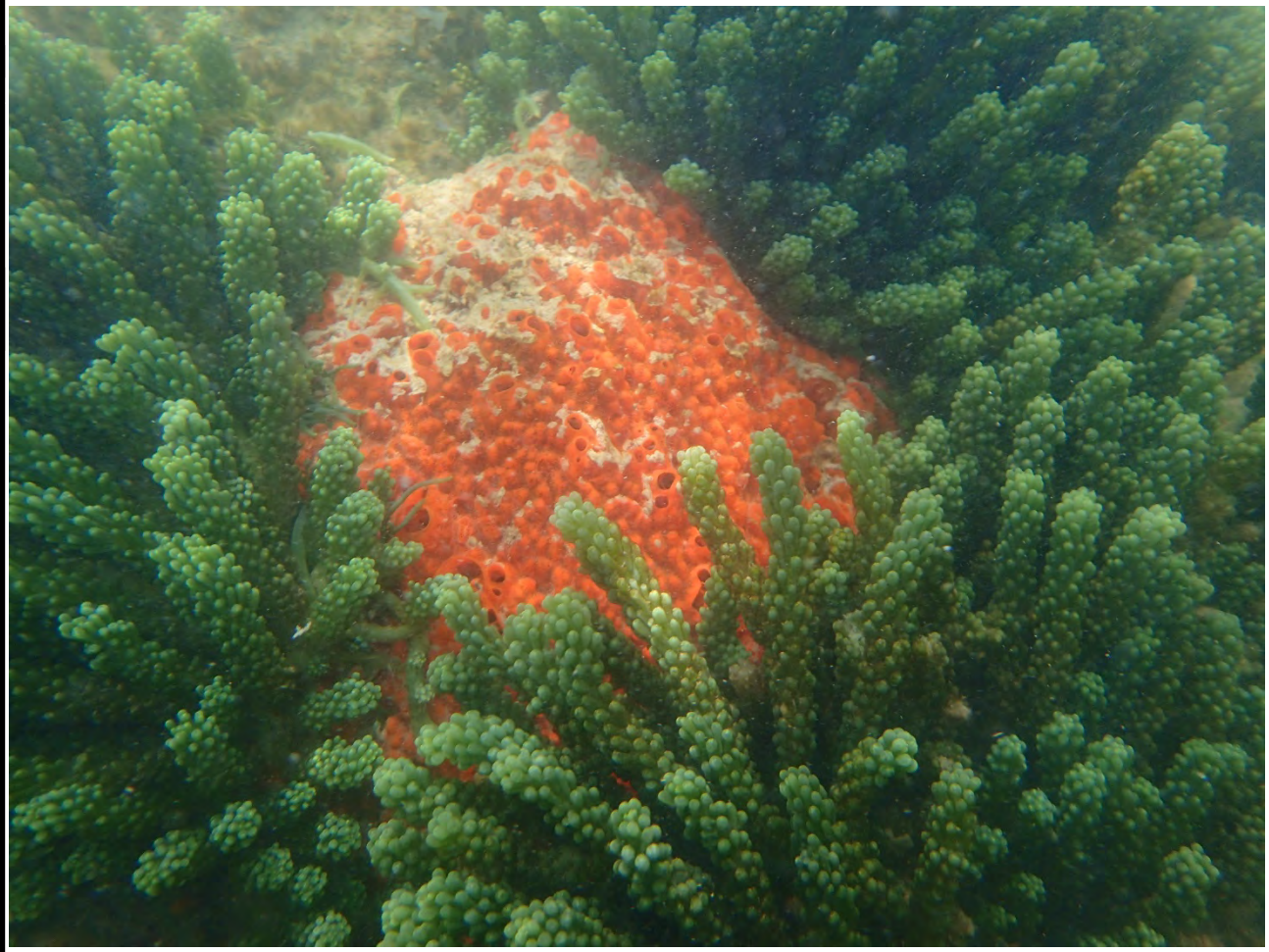
Representative Photographs

Photograph No.: 8

Date: June 4, 2021

Location: SR A1A Bridge 880005 Over Sebastian Inlet, Indian River County and Brevard County, FL

Notes: The photograph shows some sea grape green algae, *Caulerpa racemosa*, that was observed within the northern rip-rap shoreline.



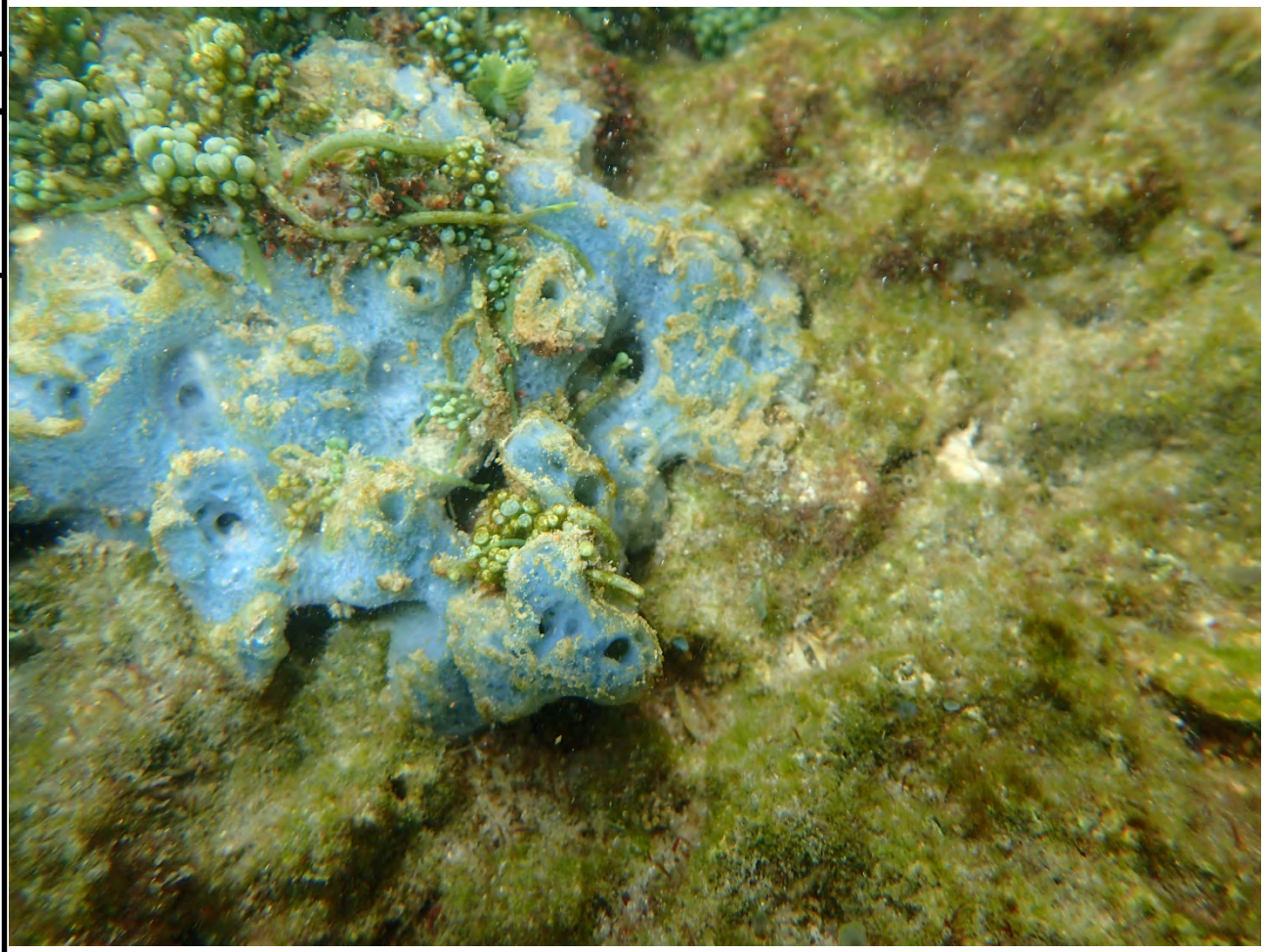
Representative Photographs

Photograph No.: 9

Date: June 4, 2021

Location: SR A1A Bridge 880005 Over Sebastian Inlet, Indian River County and Brevard County, FL

Notes: The photograph shows a blue tube sponge, *Haliclona caerulea*, that was observed throughout much of the survey area.



Representative Photographs

Photograph No.: 10

Date: June 4, 2021

Location: SR A1A Bridge 880005 Over Sebastian Inlet, Indian River County and Brevard County, FL

Notes: The photograph shows a sheepshead (*Archosargus probatocephalus*) utilizing the rip-rap shoreline habitat.

Representative Photographs

Photograph No.: 11

Date: June 4, 2021

Location: SR A1A Bridge 880005 Over Sebastian Inlet, Indian River County and Brevard County, FL

Notes: The photograph shows a sponge, *Lissodendoryx sigmata*, observed utilizing the rip-rap shoreline habitat.

Representative Photographs

Photograph No.: 12

Date: June 4, 2021

Location: SR A1A Bridge 880005 Over Sebastian Inlet, Indian River County and Brevard County, FL

Notes: The photograph shows a tidal spray crab, *Plagusia depressa*, utilizing the rip-rap shoreline habitat within the survey area.

Representative Photographs

Photograph No.: 13

Date: June 4, 2021

Location: SR A1A Bridge 880005 Over Sebastian Inlet, Indian River County and Brevard County, FL

Notes: The photograph shows the observed sponge, algal and barnacle coverage on the existing bridge piling. No corals were observed on any of the in-water bridge structures.

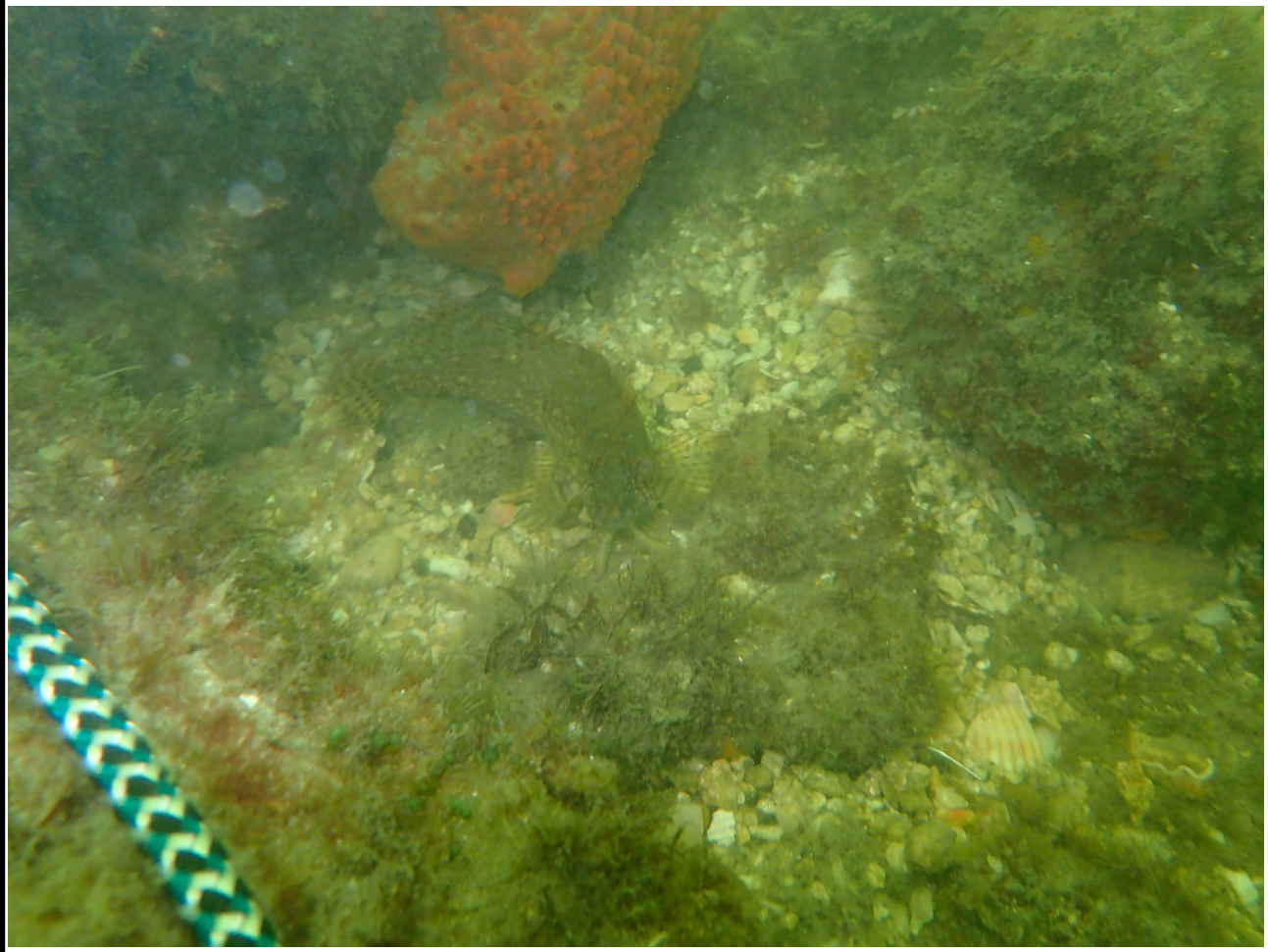
Representative Photographs

Photograph No.: 14

Date: June 4, 2021

Location: SR A1A Bridge 880005 Over Sebastian Inlet, Indian River County and Brevard County, FL

Notes: The photograph shows a hairy blenny, *Labrisomus nuchipinnis*, that was observed along a transect within the survey area.



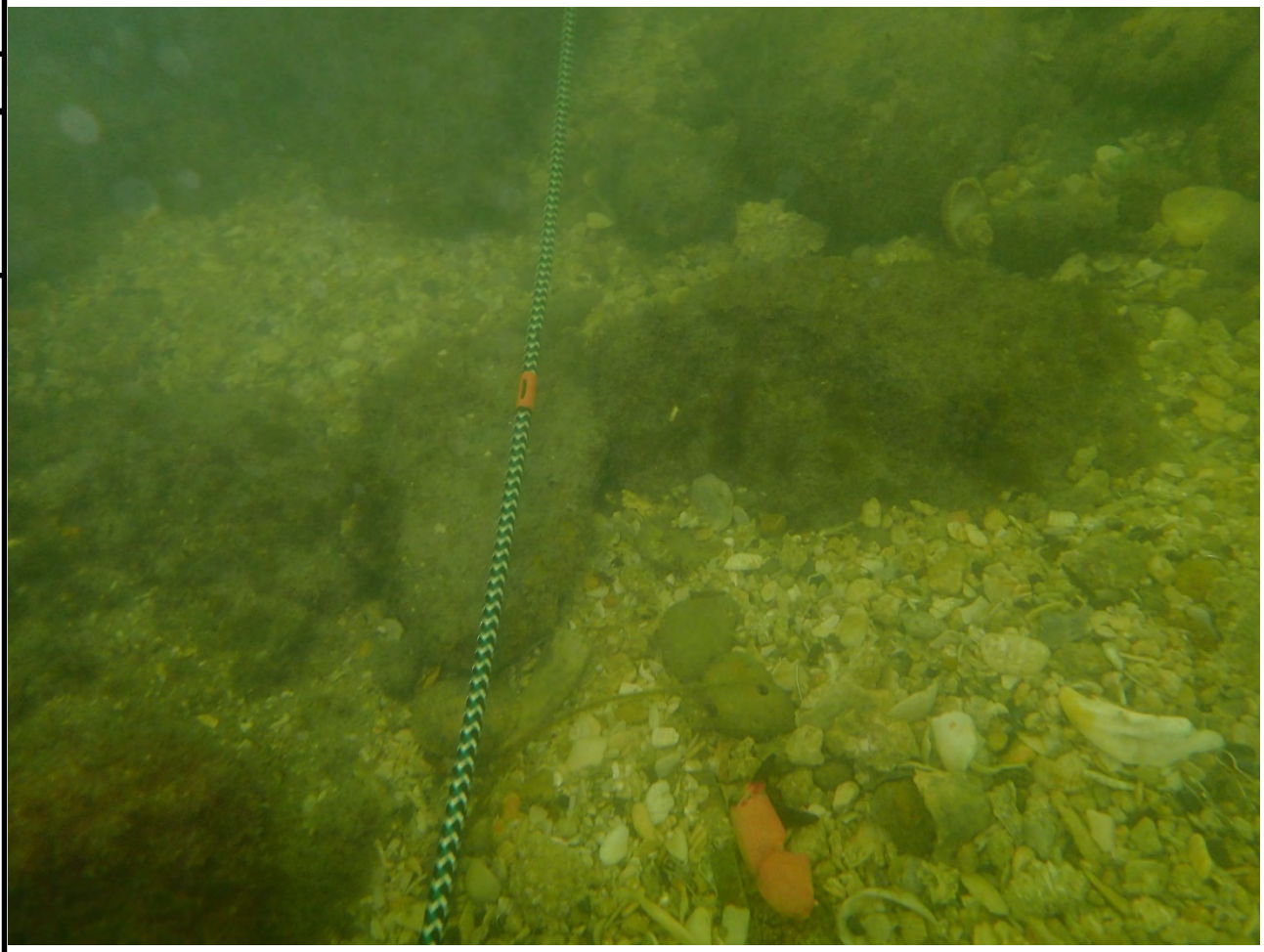
Representative Photographs

Photograph No.: 15

Date: June 4, 2021

Location: SR A1A Bridge 880005 Over Sebastian Inlet, Indian River County and Brevard County, FL

Notes: The photograph shows the shell substrate along the rocky bottom benthic conditions observed within the northern area of the survey.



Representative Photographs

Photograph No.: 16

Date: June 4, 2021

Location: SR A1A Bridge 880005 Over Sebastian Inlet, Indian River County and Brevard County, FL

Notes: The photograph shows some fire coral, *Millepora alcicornis*, colonizing the rip-rap shoreline.

Representative Photographs

Photograph No.: 17

Date: June 4, 2021

Location: SR A1A Bridge 880005 Over Sebastian Inlet, Indian River County and Brevard County, FL

Notes: The photograph shows a smooth star coral, *Solenastrea bournoni*, colonizing the rip-rap shoreline. This coral appears to be bleaching as the majority of this individual has turned white.