

Benthic Survey Report for The Bay Park

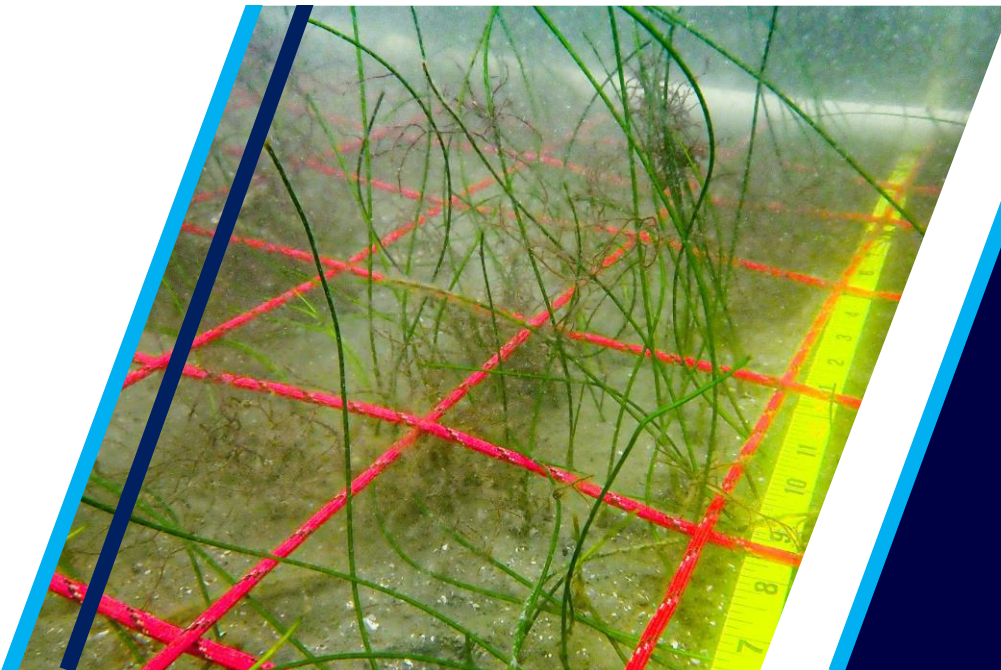
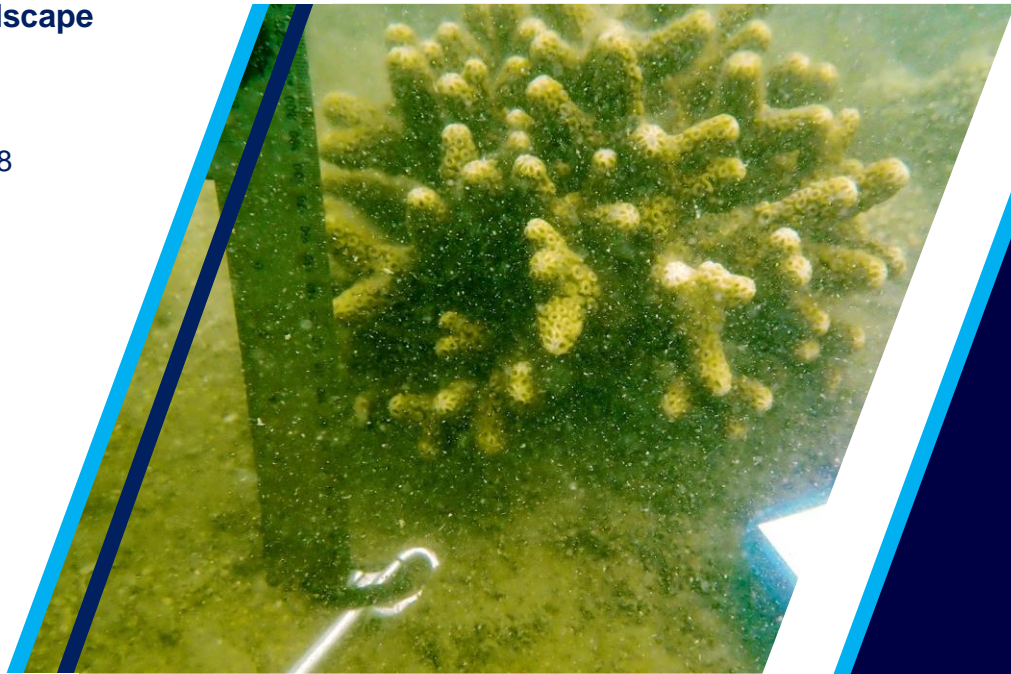
Phase 1 Site Development

Sarasota, Florida

September 2020

Prepared for:
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1.0 INTRODUCTION

This benthic survey report was prepared for Agency Landscape + Planning for The Bay Park – Phase 1 Site Development (Project) in Sarasota, Florida, following a detailed mapping and characterization field effort conducted during June 2020. The survey was performed to characterize and map the distribution of marine resources west of the restored “ecological shoreline” and prospective upland redevelopment efforts. The survey was planned to gather baseline data prior to the proposed stormwater drainage modifications and removal of fine-grained sediment from the adjacent wetlands and anticipated construction of the Sunset Pier. Figure 1 shows the location of the approximate 5-acre survey area (Project site) and its proximity to The Bay Park and Van Wezel Performing Arts Hall. A complementary effort to this benthic survey is being conducted by Mote Marine Laboratory to collect baseline information on water quality, fisheries communities, benthic infauna and shellfish populations, and sediment quality. This report presents the results of the marine survey in support of the overall effort to document background conditions and monitor these habitats over time as The Bay Park – Phase 1 elements are initiated and completed.

1.1 Project Background

Sarasota Bay is a State of Florida designated Outstanding Florida Water (OFW) and one of twelve priority waterbodies listed under the Surface Water Improvement and Management (SWIM) Act with focus on reducing stormwater runoff containing excessive nutrients and other pollutants which affect water quality. During development of The Bay Sarasota, the Project Team recognized that incorporating environmentally beneficial aspects into the Master Plan and contributing to water quality improvements in Sarasota Bay was paramount in reaching their vision and improving the natural assets of the bayfront. As part of the planning process, various alternatives for improving stormwater management and actively advancing ecological

conditions within the “Mangrove Bayou” and surrounding waters were considered. Ultimately, multiple stormwater best management practices (BMPs) and the dredging of fine-grained sediments (e.g., muck) from in the Bayou were integrated into the long-term master plan.

As part of the comprehensive strategy, to understand the resulting positive ecological impacts of the BMPs and muck removal, a monitoring program is being developed to assess conditions prior to, during and following full implementation of these strategies. An initial step to documenting these changes includes carrying out a detailed marine benthic survey to assess the existing baseline conditions. Albeit prior surveys were conducted in 2018 and 2019, these surveys were limited to a general description on the existing habitats; thus, a more extensive survey was needed to quantitatively assess and map the seabed immediately prior to upstream modifications to stormwater runoff and muck removal. The current survey was designed to assess the density of hard corals (scleractinian) and soft corals (octocorals), determine the condition and quantity of submerged aquatic vegetation, including measurable data on epiphytic growth and short shoots (the sheath containing individual leaves), and map the habitat transitions from the shoreline waterward and from south to north.



Figure 1. The Bay - Phase 1 Overall Planned Survey Area

2.0 HABITAT MAPPING AND CHARACTERIZATION METHODS

Twenty-six (26) temporary transects were established in GIS within the survey area: four (4) transects were oriented north to south and parallel to shore; and twenty-two (22) positioned east to west and perpendicular to shore. Transect locations were pre-determined as to provide adequate sampling of the entire survey area, as shown in Figure 2. In the field, the beginning and end points of each transect were located from the survey vessel using a Trimble® Geo 7X (Trimble) handheld unit Global Positioning System (GPS) with sub-meter accuracy and marked with temporary surface buoys. An intermediate marker buoy(s) was also established at approximate equal distances between the beginning and end points. Along both the north-south and east-west transects, divers performed a line-intercept survey documenting habitat transitions along each transect. Along the east-west transects, divers also conducted: 1) a 2-m wide belt transect survey to determine density of hard corals and octocorals; and, 2) a seagrass assessment survey to collect data on the species, relative density (cover-abundance), sediment characteristics, estimated biomass via shoot counts, and average canopy height.

2.1 Habitat Characterization

Several submerged aquatic habitats are known to occur in the Sarasota Bay system and have been defined in various ways depending on the purpose of the survey or monitoring program. For the purposes of this report, and due to the variety of distinct attributes of the habitats observed within the survey area, Project-specific habitat definitions were created to describe more accurately what was observed in the field. The definitions (Table 1) were generally based on information in the (Sarasota) Bay Bottom Habitat Assessment report (Cutler and Leverone, 1993¹), but modified for this survey using scientific knowledge, professional experience, and observations in the field.

¹ Cutler, J.K., and J.R. Leverone, 1993. Bay bottom habitat assessment: Final report draft. Sarasota Bay National Estuary Program, Mote Marine Laboratory Technical Report no 303. 60 pp. + Apps.

Table 1. Benthic habitat types and characteristics

Habitat Type	Description
Artificial Hardbottom/Riprap	Manmade limestone rock or riprap material that acts as hardbottom but is not naturally occurring.
Submerged Aquatic Vegetation (SAV)	May be monospecific seagrass or include a mixture of seagrass and macroalgae species with varying percent coverages and densities. Substrate ranged from fine sediments to sand and/or shell-rubble substrate.
Unvegetated Soft Bottom	Silty/sandy bottom, often with shell rubble, and only an occasional sprig of SAV and/or other emergent biota growth but primarily unvegetated.
Hardbottom	Exposed limestone or rock outcroppings, and/or limestone rock that support numerous epibiota including, but not limited to hard corals, octocorals, sponges, tunicates, and polychaetes. Or bedrock with overlying sand with emergent hardbottom biota, primarily hard corals, octocorals, and sponges.

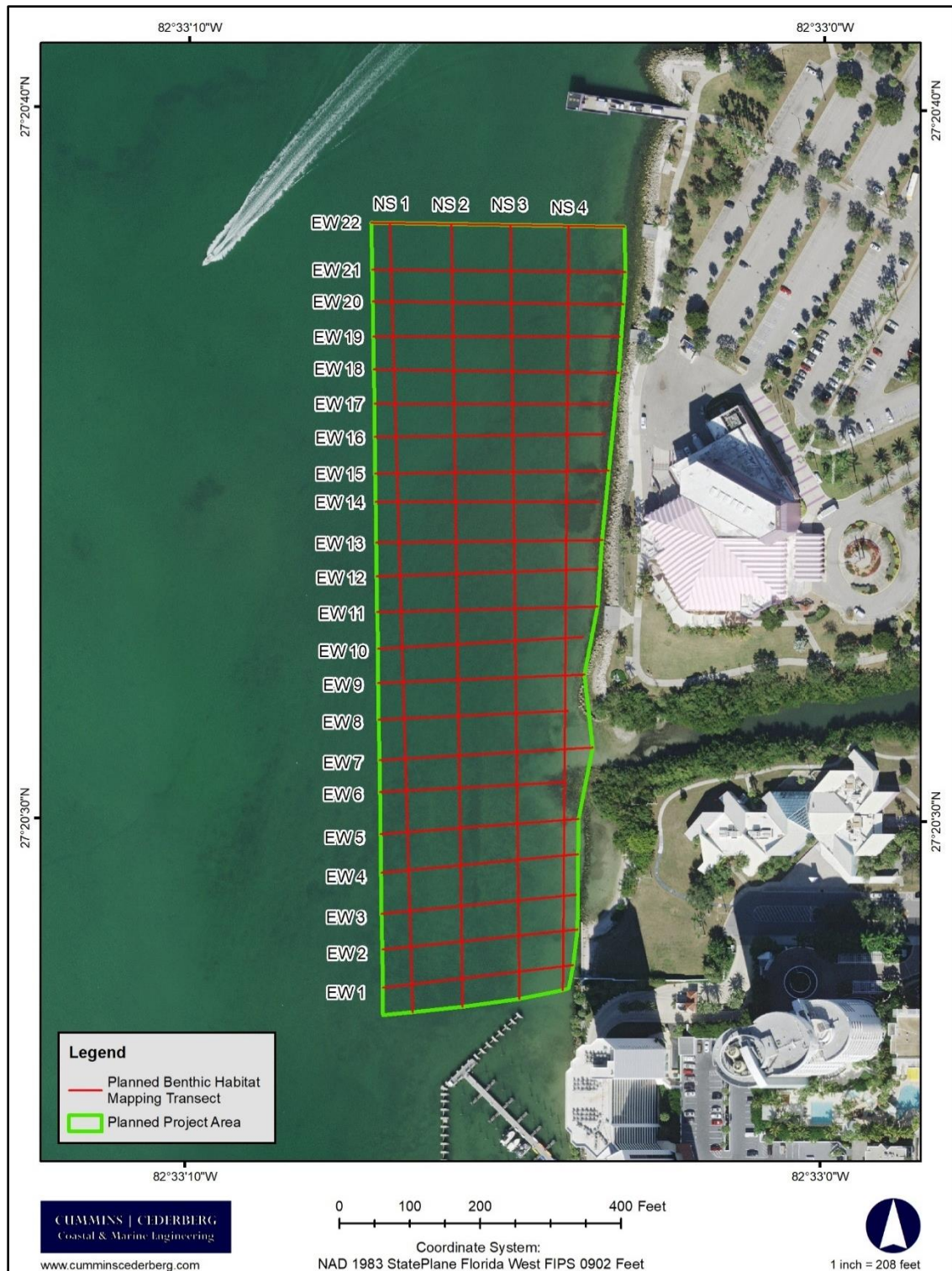


Figure 2. Pre-planned transect lines within the survey area

2.1.1 North-South Transects

Along the north-south transects, one biologist on SCUBA descended at the southernmost buoy at the south end of the transect while a second biologist stayed on the surface of the water with an innertube containing the GPS unit (Photo 1), with a guide line that hung below the innertube. As the surface biologist swam slowly northward along the transect, the diving biologist would follow the surface diver using the dangling guide line as a visual cue to progress along the same path. To document the exact path of the diver's location and for subsequent mapping within ArcGIS, the GPS unit was programmed to collect continuous positional data, referred to as a 'line feature' along the entire length of each transect at a rate of one (1) per second, corresponding to a specific time of day. Additionally, the time of day on the GPS unit and a dive watch worn by the diving biologist were synchronized for post-processing in the office. As the diving biologist observed habitat transitions or notable features, they would signal to the surface biologist to stop over a location while noting the time of day. This allowed for the GPS unit to 'hover' over a specific area to ensure accurate positional data was collected. As the diving biologist swam along the transect, they gathered data on the marine habitat types and conditions, species present, and substrate types; the diver also collected representative photographs of the substrate and marine flora and fauna.



Photo 1. Biologist guiding the GPS Unit over a survey transect

2.1.2 East-West Transects

Along the east-west transects, marker buoys were placed at the beginning of the transect near the eastern most point, at the western end, and a central point along each transect. Divers stretched field measuring tapes (**Photo 2**) between buoys and placed them temporarily on the seabed. Data collection was portioned amongst the divers with one diver conducting a line-intercept survey, denoting habitat changes at specific distances along the measuring tape from the beginning to the end of the transect, while another diver performed the belt transect survey, counting individual hard coral and octocoral colonies within one (1) meter on either side of the transect. Species and individual counts were noted, as well as the approximate size of the colonies (**Photo 3**). A third diver performed a rapid visual assessment using the Braun Blaunquet (BB) survey methodology, and a 1.0-m² quadrat divided into a 100-cell grid composed of 10 cm X 10 cm cells to assess abundance of seagrasses when encountered (primarily the nearshore area). The quadrat was placed within the submerged aquatic vegetation (SAV) (**Photo 4**) at points along the transect that were determined to be most representative of the seagrass beds that intersected that specific transect line. All seagrass species occurring in the quadrat were recorded, and a BB score based on the cover and density of the species in that quadrat was assigned. Table 2 shows the BB scoring index and corresponding cover-abundance (i.e., percent coverage). In addition to BB data, the diver also noted seagrass condition,

epiphytic coverage, and percentage of drift algae within the quad and collected shoot densities (an estimate of above ground biomass) within a smaller 30 cm x 30 cm quadrat (**Photo 5**). Two (2) to four (4) quadrats were conducted along each transect line, depending on the communities present.



Photo 2. Measuring tape on seabed



Photo 3. Biologist measuring coral colony

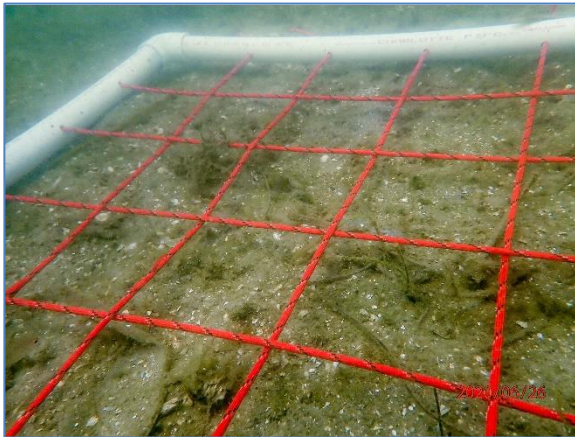


Photo 4. A 1.0-m² quadrat used for the BB assessment.



Photo 5. Smaller 30 cm x 30 cm quadrat for shoot counts in SAV habitat.

**Table 2. Braun-Blanquet scale (score) and percent cover scale values
(Fourqurean, et al., 20012)**

Braun-Blanquet Scale (Score)	Percent Cover (%)
0	Not present
0.1	Solitary shoot
0.5	Few shoots with small cover
1	Numerous shoots, but <5
2	5 to 25
3	25 to 50
4	50 to 75
5	75 to 100

2 Fourqurean, J.W., A. Willsie, C.D.Rose, and L.M. Rutten, 2001. Spatial and temporal pattern in seagrass community composition and productivity in south Florida. Marine Bio. 138: 341-354.

3.0 RESULTS

The field survey and data collection were performed 23 – 25 June 2020 by experienced marine biologists, completing all four (4) north-south transects and fifteen (15) of the pre-planned east-west transects (**Figure 3**). Due to unforeseen vessel restrictions related to COVID-19 which limited daily working hours in the field, seven (7) of the twenty-six (26) east-west transects located furthest north were not surveyed, and several of the transects were truncated toward the western extents of the transects where habitats were consistent or soft bottom was prevalent along the transect. Water depths were relatively shallow, varying between 0 and 12 feet (ft), with limited in-water visibility of approximately 3 ft. Line-intercept surveys were performed on each of the nineteen (19) transects, belt transect surveys were completed within all the hardbottom areas observed along the east-west transects, and a total of thirty-four (34) SAV assessment stations (i.e., 1-m² quadrats) were surveyed.

3.1 GIS Mapping

To create a habitat map using the both the information collected by the divers on habitat transitions, the geospatial data from north-south transects, and line-intercept data collected along the east-west transects, several steps were required. Initially, geospatial data gathered along the north-south transects were downloaded from the handheld GPS system and imported into Trimble® GPS Pathfinder® Office software for processing and data conversion. At a rate of data collection of one (1) latitude/longitude coordinate per second, an export of the line features into individual latitude/longitude coordinates resulted in over 11,000 coordinates and times collected during the north-south transect survey. Using this data, a biologist performed a desktop analysis cross-referencing the times collected in the field (associated with specific habitat features) with the times/coordinates in the spreadsheet and created a condensed spreadsheet showing times corresponding to specific locations and habitats as they were encountered along the transects. The data points were then imported into ArcMap 10.7.1 along with the associated habitat descriptions to create a visual interpolation of habitat locations along each north-south transect. A similar process was completed for the east-west transects within AutoDesk Civil 3D® software using the distances along each transect. Each of the linear features showing the lengths of habitats along the transects were overlain and the biologists created habitat polygons via spatial interpolation in GIS. As discussed in **Section 3.0**, several of the east-west lines were cut short in the field when habitat types were verified to be consistent near the western termini. Using the field observations, aerial imagery, and best professional judgement, an additional area of hardbottom habitat was interpolated within ArcMap during post-processing. **Figure 4** shows the final habitat map and **Table 3** provides the total acreage of each of the habitats within the survey area.

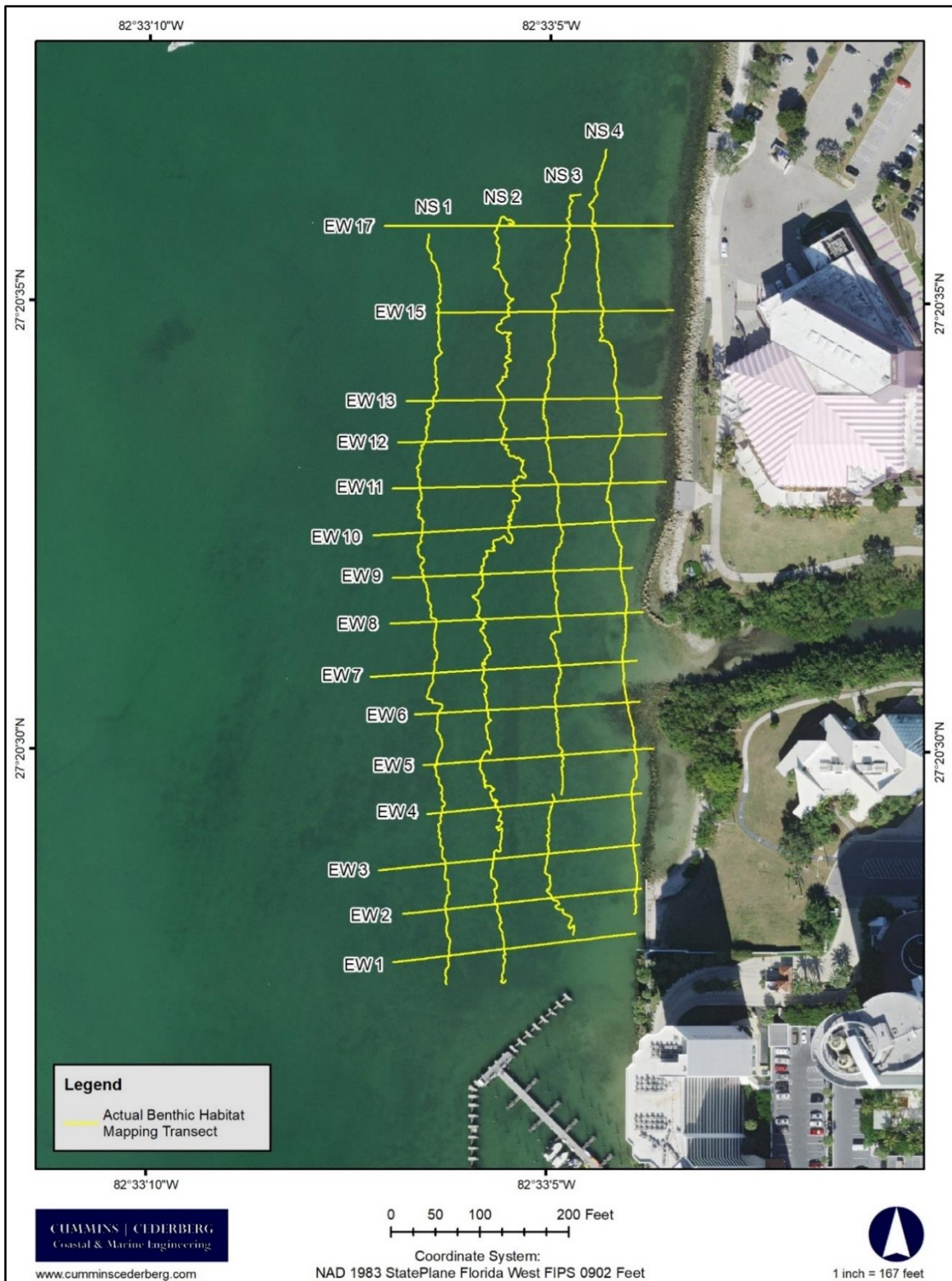


Figure 3. Transect locations and extents completed during the benthic habitat survey

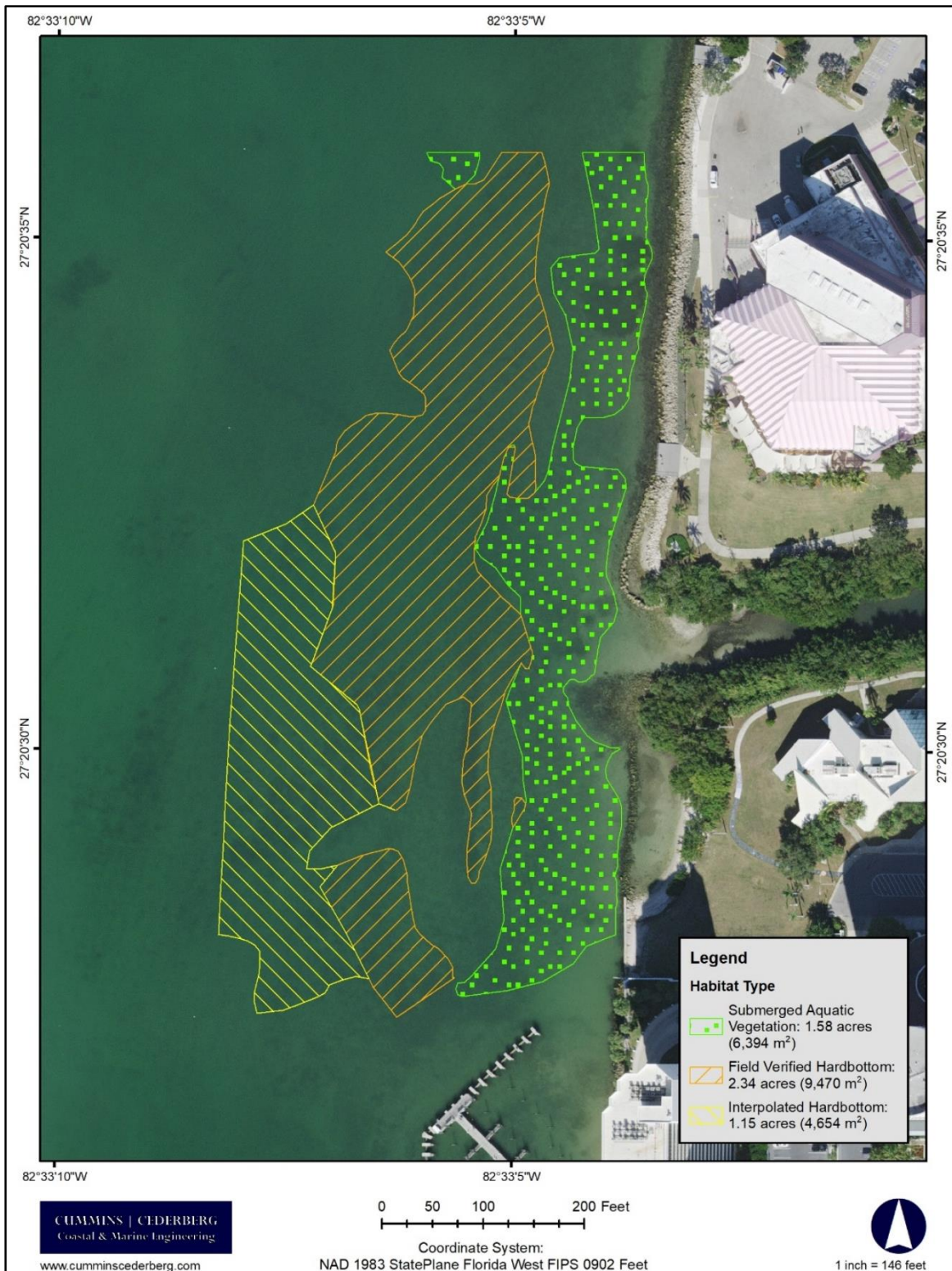


Figure 4. Benthic habitat types and acreage within the survey area

Table 3. Acreage of habitat types within survey area

Habitat Type	Acreage (m2)
Hardbottom (Field Verified)	2.34 (9,470)
Hardbottom (Interpolated)	1.15 (4,654)
Submerged Aquatic Vegetation (SAV)	1.59 (6,394)

3.2 Habitat Characterization

Habitats observed and mapped are shown in **Figure 4**; hardbottom habitat (**Photo 6**) was the most abundant covering 3.49 acres [14,124 m²] (field verified and interpolated) in the western portion of the survey area and SAV habitat (**Photo 7**) in varying abundances covering 1.58 acres (6,394 m²). Along the eastern shoreline, artificial hardbottom/riprap (**Photo 8**) comprised of small boulders and rocks are lined along the banks, having been placed there to minimize erosion and scouring of the shoreline. Parts of the shoreline, along the southern bank of the Project area, were rehabilitated into a resilient ecological shoreline, replacing an old crumbling seawall with a sloping shoreline comprised of four small, emergent groins that dissipate wave energy. Submerged aquatic vegetation (**Section 3.2.1**) was observed just west of the riprap either as scattered seagrass with mixed macroalgae or as continuous beds of seagrass in varying abundances. Separating seagrass and hardbottom areas, in slightly deeper waters, was unvegetated softbottom habitat (**Photo 9**) with minimal to no flora or fauna present. Hardbottom habitat (**Section 3.2.2**), as either continual hardbottom or interspersed with sediment layers, was found in the central and western most survey areas.



Photo 6. Hardbottom habitat with hard coral and emergent rock



Photo 7. SAV habitat with mixed seagrass and macroalgae



Photo 8. Artificial hardbottom/riprap along shoreline colonized with macroalgae

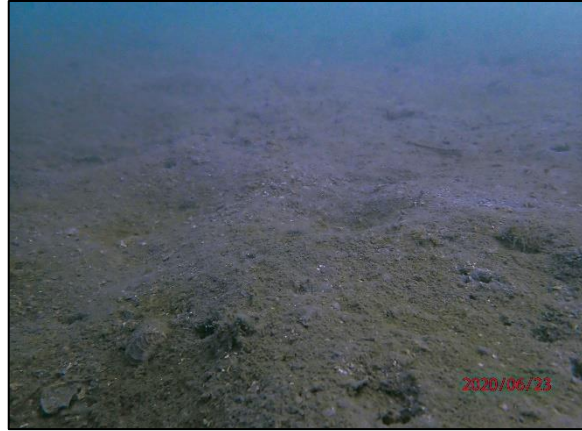


Photo 9. Typical unvegetated softbottom habitat

3.2.1 Submerged Aquatic Vegetation (SAV)

Divers collected seagrass data along fourteen (14) of the east-west transects using thirty-four (34), 1-m² quadrats. Quadrat sampling occurred at two (2) to four (4) stations randomly placed areas, approximately 20 to 40 ft apart within areas where seagrass habitat was found along the transects. Information on the seagrass abundance by species, total seagrass, and macroalgae cover by genus was recorded within each quadrat by visually assessing coverage using the standard BB method and scoring the category of cover (using BB scores from 0 to 5). The BB score for total SAV cover, including all taxa, was also recorded. Additionally, the amount of epiphytic coverage³ (high, medium, or low) growing on the seagrass and percentage of drift (unattached) algae within the quadrat were also estimated. In the northwestern corner of the 1-m² quadrat, a smaller quadrat (30 cm X 30 cm) was deployed to count the emergent short shoots and measure the canopy height (max blade length, in triplicate) by species.

Within the 1.59 acres of SAV habitat, four species of seagrass and several species of green (Chlorophyta), red (Rhodophyta), and brown (Phaeophyta) macroalgae were observed. As shown in **Table 4**, the most frequently recorded seagrass was shoal grass (*Halodule wrightii*), followed by manatee grass (*Syringodium filiforme*), turtle grass (*Thalassia testudinum*), and paddle grass (*Halodule decipiens*). Shoal grass was more commonly observed in the central and southern portions but was found throughout the SAV habitat and along each of the transects. Although less abundant, manatee grass was found throughout survey but predominantly further west along the transects. Turtle grass was concentrated more centrally around transects EW-8, EW-9, and EW-10 (refer to **Table 2**). Paddle grass was only documented on the western edge of the habitat, where it transitioned to soft sediments and hardbottom. The only area where all three

³ Epiphytes are a mix of micro-and macro algae, bacteria, fungi, small crustaceans, bryozoans that settle and grow on the leaves of seagrass.

primary seagrass species (*H. wrightii*, *S. filiforme*, and *T. testudinum*) were found was in the central survey area.

Total seagrass coverage ranged from 5 to 25% (BB score = 2) at 44% of the sites, and between 25 to 50% (BB score = 3) at 35% of the sites. Coverage at 15% of the sites was 50 to-75% coverage (BB score = 4); the remaining sites (6%) had either <5% or >75% coverage within the sampled quadrat. Macroalgae abundance recorded in each of the quadrats indicate they are a persistent component of the SAV habitat but not a significant contributor to the overall flora makeup. No monospecific areas of macroalgae were observed. **Table 5** provides a comprehensive species list of seagrasses, macroalgae, and other fauna observed during the survey.

Sediment types within the SAV habitat were primarily silty sand and fine sands (**Photo 10**) in the southern and central portions of the survey area, transitioning more to medium sands and shell hash (**Photo 11**) progressing to the north. Epiphytic coverage was observed in lower to moderate levels when shoal grass was the predominant species and in higher coverages where manatee and turtle grasses were documented (**Photo 12**). Similarly, drift algae were more common and in higher coverages where the taller (e.g., manatee grass) and wider bladed (e.g., turtle grass) seagrasses were located (**Photo 13**). Mean emergent short shoot counts and blade (canopy) height for all species is provide in **Table 6**. Not unexpectedly, due to their growth form and narrower shoot and blade configurations, *H. wrightii* (shoal grass) and *S. filiforme* (manatee grass) had higher mean shoot count densities at 365 ± 218 and 345 ± 188 shoots/m², respectively, than *T. testudinum* (turtle grass) with 49 ± 27 shoots/m². Mean Blade (canopy) height was greatest for *T. testudinum* (turtle grass) at 45 ± 9 cm and *S. filiforme* (manatee grass) at 41 ± 10 cm (**Photo 14**), with *H. wrightii*'s (shoal grass) mean blade length much lower at 23 ± 5 cm.

Within the SAV habitat and softbottom habitats, several invertebrates were observed including the upside-down jellyfish (**Photo 15**), blue crabs, tunicates (**Photo 16**), the prickly cockle (**Photo 17**) and the Florida horse conch (**Photo 18**), and an egg casing (**Photo 19**) from the large tropical Tulip snail.



Photo 10. Silty sand substrate in the southern portion of the survey area.



Photo 11. Medium sands with shell hash in the northern portion of the survey area.



Photo 12. Heavy epiphytic coverage on manatee grass (*Syringodium filiforme*).



Photo 13. High percentage of drift algae in SAV habitat

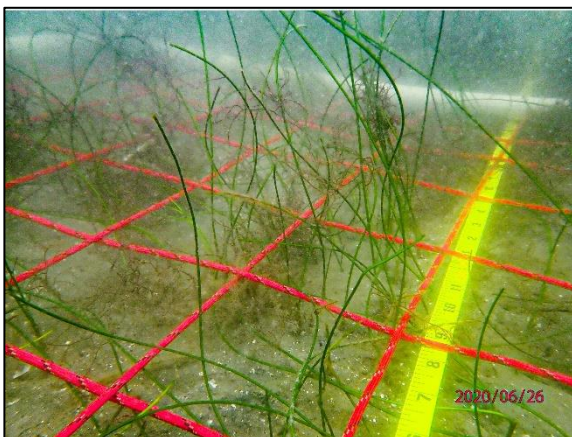


Photo 14. Manatee grass (*Syringodium filiforme*) displaying taller blade canopy



Photo 15. Upside-down jellyfish (*Cassiopea frondosa*)



Photo 16. Common tunicates (*Ascidacea*)



Photo 17. Prickly cockle (*Acanthocardia echinata*)



Photo 18. Florida horse conch (*Triplofusus papillosus*)



Photo 19. Egg casing from a Tulip snail

Table 4. Submerged aquatic vegetation assessment data

Transect No.	Quadrat Number	Distance along transect (ft)	Sediment Type	BB Score & Percent Cover							Epiphytic Coverage (L, M, H)	Canopy Height (cm)			Avg. Height	% Drift Algae	Shoot Count	Shoots per m ²
				TT	SF	HW	Hd'	Macro-algae	Total SG	Converted Percent Cover (%)		1	2	3				
EW1	1	6	FS			2		1	2	5-25	M	15	15	16	15	5	71	284
	2	45	SS			3			3	25-50	M/H	27	33	31	30	10	--	--
	3	85	Silt, FS			2.5			2.5	37.5	M	18	23	23	21	30	52	208
	4	130	SS				4		4	50-75	L	--	--	--	N/A	< 5	--	--
EW2	5	9	SS, R, SH			4		1	4	50-75	M/H	21	28	29	26	10	102	408
	6	35	SS, Sh, R		2				2	5-25	H	67	70	42	60	25	47	470
EW3	7	15	SS	1					3	25-50	M	39	34	40	38	10	4	44
						2						35	34	30	33		53	589
	8	60	SS			2		1	2	5-25	M	22	28	23	24	25	22	244
EW4	9	10	FS, Silt			3			3	25-50	L-M	22	22	22	22	< 5	48	533
	10	68	SS, Sh, Silt			2		2	2	5-25	M	36	23	25	28	10	26	289
EW5	11	17	MS, SH		3				3	25-50	M	41	39	39	40	20	53	589
	12	60	FS, Silt			4			4	50-75	M	32	32	30	31	15	36	400
EW6	13	52	FL, Silt, SH			3			3	25-50	L-M	32	27	31	30	20	42	467
	14	80	SS, SH			3			3	25-50	M	31	32	23	29	15	48	533
EW7	15	19	MS, CS, SH			1		0.5	1	<5%	L	13	12	16	14	0	38	422
	16	41	MS, Sh, Silt			3		0.5	3	25-50	M	19	22	28	23	0	47	522
EW8	17	8	MS, SH			2		0.5	3	25-50	L/M	23	23	21	22	< 5	22	244
				2								42	30	47	40		9	100
	18	25	MS, SH	2				0.5	4	50-75	M/H	60	64	61	62	40	2	22
					1							49	34	45	43		15	167
						2						25	34	40	33		60	667
	19	63	SS, SH, FS	3				0.5	4	50-75	H	38	53	39	43	5	6	67

					3							33	37	28	33		47	522
EW9	20	6	MS, SH			3		0.5	3	25-50	M	24	23	30	26	< 5	98	1089
	21	50	SS, Silt	1				0.5	2	5-25	H	47	47	41	45	60	4	44
					0.5						--+	--+	--+	--+	--		--	
						2						27	23	17	22		36	400
22	Not recorded	Silt, FS				5	1	5	75-100	M/H	--	--	--	N/A	0	--	--	
EW10	23	12	MS, CS w/ SH	2				1	2	5-25	M	31	34	40	35	30	2	22
						2						22	15	26	21		31	344
	24	38	SS	2					2	5-25	H	33	48	52	44	60	4	44
						2						25	27	24	25		17	189
25	44	SS			2	2	0.5	2	5-25	M	11	18	19	16	15	11	122	
EW11	26	17	CS, SH, FS, Silt			2		1	2	5-25	L/M	27	21	22	23	10	19	211
	27	31	FS, HS, Silt			2		0.5	2	5-25	M	19	15	19	18	20	11	122
EW12	28	5	CS, SH			2		0.5	2	5-25	M	24	14	22	20	40	21	233
	29	40	SS		2			0.5	2	5-25	H	38	33	56	42	97	34	378
	30	63	MS, SH, silty			2		0.5	2	5-25	M	19	17	21	19	15	16	178
EW15	31	47	MS, SH, Silt		2				2	5-25	H	32	26	30	29	100	6	67
	32	20	MS, SH		3				3	25-50	H	32	33	30	32	100	35	389
EW17	33	14	MS, SH			2		1	2	5-25	M	19	18	27	21	< 5	31	344
	34	44	MS, SH			1		2	3	25-50	M	16	14	24	18	90	7	78
					3							41	47	60	49		16	178
Sediment Types: Silt = Silts & Clays, SS = Silty Sand, FS=Fine Sand, MS = Medium Sand, CS = Coarse Sand, SH = Shell Hash, Sh = Shell, R=Rubble/Rock																		
Seagrass Species: Tt = Thalassia testudinum, Sf = Syringodium filiforme, Hw = Halodule wrightii, Hd = Halophila decipiens																		
Epiphytic coverage: L = Low, M = Medium, H = High																		
* Canopy height and shoot count data was not collected on this species due to the growth form.																		
+Species was in the main quadrat, but not present in the smaller quadrat where shoot counts and canopy height data were collected.																		

Table 5. Comprehensive species list of flora and fauna observed during the benthic survey

Genus*	Species	Common Name	Genus*	Species	Common Name
Seagrass			Hard corals		
<i>Halodule</i>	<i>wrightii</i>	Shoal grass	<i>Solenastrea</i>	<i>hyades</i>	Knobby star coral
<i>Syringodium</i>	<i>filiforme</i>	Manatee grass	<i>Solenastrea</i>	<i>bourmoni</i>	Smooth star coral
<i>Thalassia</i>	<i>testudinum</i>	Turtle grass	<i>Oculina</i>	<i>robusta</i>	Ivory tree coral
<i>Halodule</i>	<i>decipiens</i>	Paddle grass	<i>Siderastrea</i>	<i>siderea</i>	Massive starlet coral
Macroalgae			<i>Phyllangia</i>	<i>americana</i>	Hidden cup coral
<i>Caulerpa</i>	<i>sertularioides</i>	Green feather algae	Octocorals		
<i>Caulerpa</i>	<i>prolifera</i>	Leaf Caulerpa algae	<i>Pseudopterogorgia</i>	<i>americana</i>	Slimy sea plume
<i>Spyridia</i>	<i>filamentosa</i>	Feathery red seaweed	<i>Leptogorgia</i>	<i>virgulata</i>	Sea whip
<i>Hypnea</i>	<i>cervicornis</i>	Hooked red weed	<i>Leptogorgia</i>	<i>hebes</i>	Regal sea fan
<i>Gracilaria</i>	<i>tikvahiae</i>	Graceful red weed	Macroinvertebrates		
<i>Laurencia</i>	<i>sp.</i>	Red algae	<i>Cliona</i>	<i>celata</i>	Yellow boring sponge
<i>Acanthophora</i>	<i>spicifera</i>	Spiny seaweed	<i>Pinna</i>	<i>carnea</i>	Penshell
<i>Agardhiella</i>	<i>sp.</i>	Agardh's red weed	<i>Menippe</i>	<i>mercenaria</i>	Florida stone crab
<i>Spyridia</i>	<i>sp.</i>	Red algae	<i>Tedania</i>	<i>ignis</i>	Fire sponge
<i>Padina</i>	<i>sanctae-crucis</i>	Scroll algae	<i>Oliva</i>	<i>reticularis</i>	Netted olive snail
<i>Sargassum</i>	<i>sp.</i>	Sargassum	<i>Trachycardium</i>	<i>egmontianum</i>	Prickly cockle
Cyanophyta ⁺		Blue-green algae	<i>Triplofusus</i>	<i>papillosus</i>	Florida horse conch
<i>Dictyota</i>	<i>cervicornis</i>	Brown algae	<i>Callinectes</i>	<i>sp.</i>	Blue crab
<i>Codium</i>	<i>fragile</i>	Sponge seaweed	<i>Cassiopea</i>	<i>frondosa</i>	Upside down jellyfish
Fish			<i>Arbacia</i>	<i>punctulata</i>	Purple sea urchin
<i>Lutjanus</i>	<i>griseus</i>	Gray snapper	<i>Piona</i>	<i>lampe</i>	Orange boring sponge
<i>Abudefduf</i>	<i>saxatilis</i>	Sgt Major	<i>Elysia</i>	<i>chlorotica</i>	Eastern emerald elysia
<i>Trachinotus</i>	<i>falcatus</i>	Permit	Ctenophores		Comb jellies
<i>Archosargus</i>	<i>probatoccephalus</i>	Sheepshead	Ascidacea		Tunicates
<i>Epinephelus</i>	<i>morio</i>	Red grouper	Porifera		Unidentified yellow sponge
<i>Bothus</i>	<i>mancus</i>	Peacock flounder	Porifera		Unidentified orange sponge
Scaridae		Parrotfish	Order: Decapoda		Hermit crabs
Marine Mammals			Polychaeta		Annelid worms

<i>Trichechus</i>	<i>manatus</i>	West Indian Manatee			
*Lowest Classification; *Not a true alga					

Table 6. Short shoot counts and canopy heights for seagrass species

Seagrass Species	Mean	Median	Minimum	Maximum
	Short shoot counts (per m ²)			
<i>Halodule wrightii</i>	365 ± 218	344	78	1,089
<i>Syringodium filiforme</i>	345 ± 188	383	67	589
<i>Thalassia testudinum</i>	49 ± 27	44	22	100
Seagrass Species	Canopy Height (cm)			
<i>Halodule wrightii</i>	23 ± 5	23	14	33
<i>Syringodium filiforme</i>	41 ± 10	41	29	60
<i>Thalassia testudinum</i>	45 ± 9	44	35	62

3.2.2 Hardbottom

As described in **Table 1**, hardbottom habitat in the survey area varied from exposed limestone bedrock, small ledges, and rocky outcroppings (**Photo 20**) to open areas of sand overlying bedrock with emergent hardbottom fauna, at times resembling softbottom habitat with the exception of the presence of “reef” epifaunal organisms. By nature, hard corals and octocorals are sessile and require solid, stable substrate to attach to and grow. Within the survey area, the presence of these Gulf coast “reef” fauna extending upward from what appears to be softbottom habitat (e.g, sand) indicates submerged bedrock is present beneath the overlying sediments and is defined as hardbottom habitat.



Photo 20. Hardbottom ledge with gray snapper (*Lutjanus griseus*)

The hardbottom community supported five (5) species of hard corals, three (3) species of octocorals, several species of sponges including the yellow (*Cliona celata*, **Photo 21**) and orange boring sponges (*Piona lampa*), and numerous other invertebrate and fish species (**Table 5**), including the Florida stone crab (*Menippe mercenaria*) and the a juvenile permit (*Trachinotus falcatus*). The belt transect survey (**Table 7**) conducted within the hardbottom community resulted in approximately 847 m² (0.21 acres) of seabed surveyed, or ~ 9% of the field-verified hardbottom. A total of ~500 hard coral colonies were enumerated, with *Solenastrea* spp. (knobby and smooth star corals, **Photos 22 and 23**) being the most frequently observed. Coral colonies ranged in size from <10 cm to >50 cm and ranged in colony density from 0.07 to 2.46 colonies/m² with a mean overall density of ~ 0.59 colonies/m² of hardbottom (**Table 7**). Of the 117 octocorals recorded, *Leptogorgia* spp. (sea whip and regal sea fan, **Photos 24 and 25**) were the most common with octocoral density estimated to be 0.14 colonies/m². A few colonies of the slimy sea plume (*Antillogorgia americana*, **Photo 26**) were also observed within the survey area.



Photo 21. Yellow boring sponge (*Cliona celata*) commonly observed in the survey area



Phone 22. Smooth star coral (*Solenastrea bournoni*)



Photo 23. Knobby star coral (*Solenastrea hyades*)



Photo 24. Sea whip octocoral (*Leptogorgia virgulata*)



Photo 25. Regal sea fan (*Leptogorgia hebes*)



Photo 26. Slimy sea plume (*Antillogorgia americana*)

3.2.3 Artificial Habitat/Riprap

The eastern shoreline consists of bulkhead and/or riprap colonized with turf algae and macroalgae (**Photo 27**) and a few sparse colonies of the lesser starlet coral *Siderastrea radians*, a small shallow-water coral commonly found on artificial habitats such as boulders and seawalls. Numerous crabs, small fish, mollusks, and small shrimp were observed taking refuge within the crevices and amongst the macroalgae. A West Indian Manatee aggregation was also seen swimming within close proximity to the shoreline.



Photo 27. Riprap colonized with macroalgae along the shoreline

Table 7. Belt transect data along hardbottom (HB) habitat along the east-west transects

Transect No.	Total Distance Along Hardbottom (m)	Belt Transect Width (m)	Total HB Area Surveyed (m ²)	Hard Coral Colony Counts			Octocoral Colony Counts	Coral Density (# colonies/m ² of HB)	
				<i>Solenastrea</i> spp.	<i>Oculina</i> spp.	Total		Hard Corals	Octo-corals
EW3	22.9	2	45.7	3	0	3	1	0.07	0.02
EW4	5.8	2	11.6	1	0	1	0	0.09	0.00
EW5	7.6	2	15.2	17	2	19	2	1.25	0.13
EW5	13.4	2	26.8	1	0	1	3	0.04	0.11
EW6	9.4	2	18.9	3	0	3	2	0.16	0.11
EW6	25.6	2	51.2	12	3	15	3	0.29	0.06
EW7	23.8	2	47.5	15	2	17	14	0.36	0.29
EW7	26.8	2	53.6	24	2	26	6	0.48	0.11
EW8	40.2	2	80.5	27	0	27	6	0.34	0.07
EW9	40.8	2	81.7	13	0	13	9	0.16	0.11
EW10	45.7	2	91.4	69	1	70	20	0.77	0.22
EW11	39.3	2	78.6	37	1	38	9	0.48	0.11
EW12	34.1	2	68.3	39	2	41	11	0.60	0.16
EW13	49.4	2	98.8	70	0	70	11	0.71	0.11
EW15	28.7	2	57.3	123	18	141	10	2.46	0.17
EW17	9.8	2	20	16	1	17	10	0.87	0.51
Total			847	470	32	502	117	0.59	0.14

4.0 DISCUSSION

Habitats within the survey area transitioned from a narrow band of artificial substrate/riprap along the western shoreline to seagrass, softbottom, and hardbottom moving westward. The most documented seagrass was shoal grass (*H. wrightii*) with most sites ranging from 25 to 50% total seagrass coverage. Paddle grass (*H. decipiens*) was observed less frequently and primarily as monospecific, dense patches in silty substrate.

Hardbottom was relatively continual in the central portions of the survey area and was the predominant offshore habitat while seagrass was more prevalent nearshore. Silt and comparably turbid water were ubiquitous throughout the survey area; silt and fine sediments occurred as a thin veneer on hardbottom or layered over the bedrock. The coral species identified during the survey are commonly found in Sarasota Bay are tolerant of turbid waters and are native to hardbottom communities along the Gulf Coast. The survey team observed that almost all coral colonies appeared “healthy” with no signs of disease and only some partial mortality. Two colonies, however, were bleached but had not succumbed to the unknown stressor at the time of the survey. Additionally, these areas supported numerous commercially important Florida stone crab and the recreationally valuable permit, a targeted finfish of the sportfishing industry on both Florida coasts.

4.1 Monitoring Program Development

All data and information gathered during this baseline benthic survey will be used to develop and make recommendations for a longer-term monitoring program to assess changes within the system following completion of specific program elements (e.g., muck removal, stormwater improvements). Data will be evaluated alongside information gathered by Mote Marine Laboratory including water and sediment quality, and benthic infauna and fish communities within and adjacent to the bayou. Monitoring plan development will include both permit-required data collection (i.e., special conditions) and additional parameters that will allow for a more in-depth understanding of improvements in the ecological functioning of the habitat areas following implementation of Phase I. The plan will follow standard Florida Department of Environmental Protection (FDEP) protocols for nearshore hardbottom monitoring and standard seagrass monitoring methods used by the Florida Fish and Wildlife Conservation Commission (FWC), the Sarasota Bay Estuary Program, and others. Upon approval of the final design of the Sunset Pier, baseline data collected and provided in this report can be used to assess potential impacts to corals, octocorals and seagrass, including estimates of total coral colonies within the construction footprint for potential relocation, and any possible indirect impacts.