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6312145522

July 12, 2017

Richard Whalen, P.E.
Project Manager
Facilities Construction & Management
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1500 Monroe Street, 4th Floor
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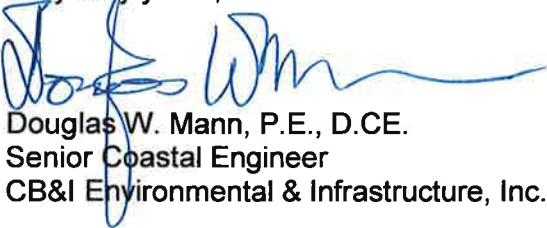
Re: Sanibel Causeway Shoreline Stabilization CN 160225

Dear Rick:

Enclosed please find our seagrass observation and aerial analysis report. This is provided as a deliverable under Task 1 of our contract.

If you have any questions, please call me.

Very truly yours,



Douglas W. Mann, P.E., D.CE.
Senior Coastal Engineer
CB&I Environmental & Infrastructure, Inc.

cc: Stacy Buck, CB&I
Katy Brown, CB&I

**SANIBEL CAUSEWAY SHORELINE STABILIZATION PROJECT
SEAGRASS OBSERVATION AND AERIAL ANALYSIS REPORT**

Survey Date: June 16, 2017
Project: Sanibel Causeway Shoreline Stabilization Project
Location: Sanibel Causeway Island B, Lee County, Florida
Commission No.: 6312145522
Field Representatives: Katy Brown (biologist) and Scott Tillman (surveyor)

CB&I conducted an *in situ* seagrass survey on June 16, 2017 for the Sanibel Causeway Shoreline Stabilization Project to verify the current location of the nearshore edge of seagrass and to characterize the seagrass resources along both shorelines of the Sanibel Causeway Island B. In addition to the seagrass field observation, CB&I delineated aerials to determine the natural variability of the extent of seagrass in the project vicinity in San Carlos Bay and Pine Island Sound over time. The goal of the *in situ* seagrass survey and desktop analysis was to provide biological data for the design and permitting phases of this project.

Regional Setting

The Sanibel Causeway is located in southwest Florida in Lee County and extends from the mainland in Punta Rassa to Sanibel Island. The causeway spans San Carlos Bay to the east and Pine Island Sound to the west including two islands that were constructed along the causeway: Island A (northern) and Island B (southern). Historically, there are extensive seagrass beds that extend both into San Carlos Bay and Pine Island Sound. Figure 1 shows the extent of seagrass surrounding Island B (the focus of this project) in 2008 as delineated by the Florida Fish and Wildlife Conservation Commission (FWC) and the Fish and Wildlife Research Institute (FWRI).



Figure 1. Regional overview of historical seagrass surrounding Sanibel Causeway Island B (FWC and FWRI, 2008). The dark green polygons represent continuous seagrass, the light green are discontinuous (patchy) seagrass, and the tan are tidal flats.

METHODS

In Situ Seagrass Survey

CB&I employed two methods during the *in situ* survey to assess the seagrass resources alongside both shorelines of the Sanibel Causeway Island B. First, the nearshore edge was delineated using Real Time Global Positioning System (RTK GPS) technology. The delineation was conducted in tandem as a biologist swam along the nearshore seagrass edge and a surveyor followed with the RTK system and recorded position data (as individual fixes) along the edge. Second, a biologist collected seagrass data to characterize the resources. CB&I biologists coordinated the survey protocol with David Rydene, National Marine Fisheries Service (NMFS) on June 5, 2017. He requested that the survey follow the Florida Fish and Wildlife Conservation Commission (FWC) Recommended Survey Protocols for Estuarine and Marine Submerged Aquatic Vegetation (SAV) related to Permitting Applications (FWC, 2011). CB&I performed the June 16, 2017 survey using the FWC protocol, which is summarized in the following sections.

At the conclusion of the nearshore edge delineation, ten (10) transects were sampled based on the current location and extent of the seagrass resources observed (Table 1; Figure 2). The transects were spaced approximately 500 ft. apart in order to efficiently collect data across the entire seagrass bed along both shorelines. The western transects are located in Pine Island Sound and the eastern transects are located in San Carlos Bay. The transects start at the nearshore edge

and extend to the edge of the seagrass bed as visibility allowed, or 30 m offshore (whichever was less). The number of quadrats per transect followed the FWC protocol, which recommends that a minimum of 10% of the transect length be quantitatively assessed (10 meter squares/100 meter long transect). For example, if the transect is 30 m long, then 3 m² is needed to fulfill the 10% coverage; therefore, six 0.5 m² quadrats would be placed at intervals along the transect. The location of each quadrat was noted on the datasheet and is provided in Appendix A.

A 0.5 m² quadrat assessment method was conducted along the transects to collect two types of seagrass data in each quadrat: (1) the Braun-Blanquet (BB) cover-abundance score was recorded for the total seagrass present and for each species present and (2) the percent cover of total seagrass present and percent cover of each species present was recorded. Seagrass canopy height was also assessed, with maximum seagrass height recorded per species within each quadrat. In addition to seagrass data, biologists recorded percent macroalgae (by genus) and epiphyte cover within each quadrat. Additional notes were recorded to describe other species (i.e. fish, invertebrates) present, substrate type and overall condition of seagrass beds. Photos were taken to supplement the data.

Table 1. Seagrass transect locations. SG W 1-5 are located in Pine Island Sound and SG E 1-5 are located in San Carlos Bay.

Transect	Start		End		Length (m)
	Northing	Easting	Northing	Easting	
SG W 1	774433.319	645704.057	774449.501	645672.729	10.1
SG W 2	774886.236	645908.795	774937.811	645824.974	30
SG W 3	775337.623	646124.181	775359.424	646027.862	30
SG W 4	775807.421	646296.502	775842.255	646203.882	27.5*
SG W 5	776280.139	646458.548	776318.651	646367.697	12.4*
SG E 1	775923.559	646773.703	775901.612	646869.331	30
SG E 2	775497.016	646512.246	775445.214	646597.091	30
SG E 3	775040.660	646300.586	774988.682	646384.734	30
SG E 4	774588.792	646085.039	774569.589	646181.227	26.4*
SG E 5	774161.197	645878.318	774147.498	645909.829	10.3

*The seagrass bed ended at the noted length; however, the end fix was taken at 30 m.

Desktop Aerial Analysis

To determine the variability of the extent of seagrass in the project vicinity in San Carlos Bay and Pine Island Sound, five aerials taken between 2012 and 2016 were delineated to assess changes in seagrass cover over time. Aerial photography was downloaded from Lee County's website for years 2012, 2014, 2015 and 2016. The aerial for 2013 was not clear enough to delineate seagrass, so a clearer aerial image from Google Earth was utilized for the 2013 delineation.

The nearshore edge of the seagrass resources was delineated from the five aerial images; however, in all cases the water clarity deteriorated quickly with distance from shore. The offshore edge of seagrass was delineated based on what could be reasonably discerned from the images but may not provide a comprehensive quantification of the waterward extent of seagrass. This is particularly true for the 2012, 2013 and 2015 images. Additionally, the *in situ* investigation of

seagrass revealed that sparse *Halodule wrightii* was often present inshore of the more dense *Thalassia testudinum* and the *Syringodium filiforme* seagrass beds. This information aided in the interpretation of the aerial images. In the cases when a faint visual signature could be identified, it was then interpreted as *H. wrightii* inshore of the more dense seagrass resources.



Figure 2. Transect locations (orange points) and *in situ* delineation (green points). The 2016 aerial was downloaded from Lee County's website.

RESULTS

In Situ Seagrass Survey

Nearshore Delineation

Figure 2 depicts the *in situ* delineation of the nearshore seagrass edge. The current location of the edge is similar to the delineation conducted by CEC in summer 2014 (CEC, 2015). The eastern edge (San Carlos Bay) extends for approximately 2,200 ft. and the western edge (Pine Island Sound) extends for approximately 2,400 ft. (including the two small patches just north of Transect SG W 5). There were also two small patches (less than 50 linear ft. each) near the southwestern end of the island (south of Transect SG W 1). Areas on the northern end of the island on both the east and west shorelines were investigated (noted on Figure 2); however, no seagrass resources were observed. Appendix B also provides a table with position data for each of the fixes taken during the delineation as well as the dominant seagrass species present at each location.

Nearshore Seagrass Community Composition

The seagrass community consisted of three species (*Halodule wrightii*, *Syringodium filiforme*, and *Thalassia testudinum*) in a similar distribution from shore on both sides of the island. *Halodule wrightii* (shoal grass) was primarily observed closest to shore, followed by *S. filiforme* (manatee grass) and *T. testudinum* (turtle grass). Along the western shoreline (Pine Island Sound), there was $19.3 \pm 17.9\%$ mean seagrass percent cover and a mean BB Scale of 2 ± 1 (2 = 5-25% cover) and along the eastern shoreline (San Carlos Bay) there was $32.8 \pm 28.1\%$ mean seagrass percent cover and a mean BB Scale of 3 ± 1 (3 = 25-50% cover). Table 2 provides transect level data including the percent area sampled per transect, canopy height, epiphyte, algae and substrate percent cover. As noted, at least 10% of each transect was sampled.

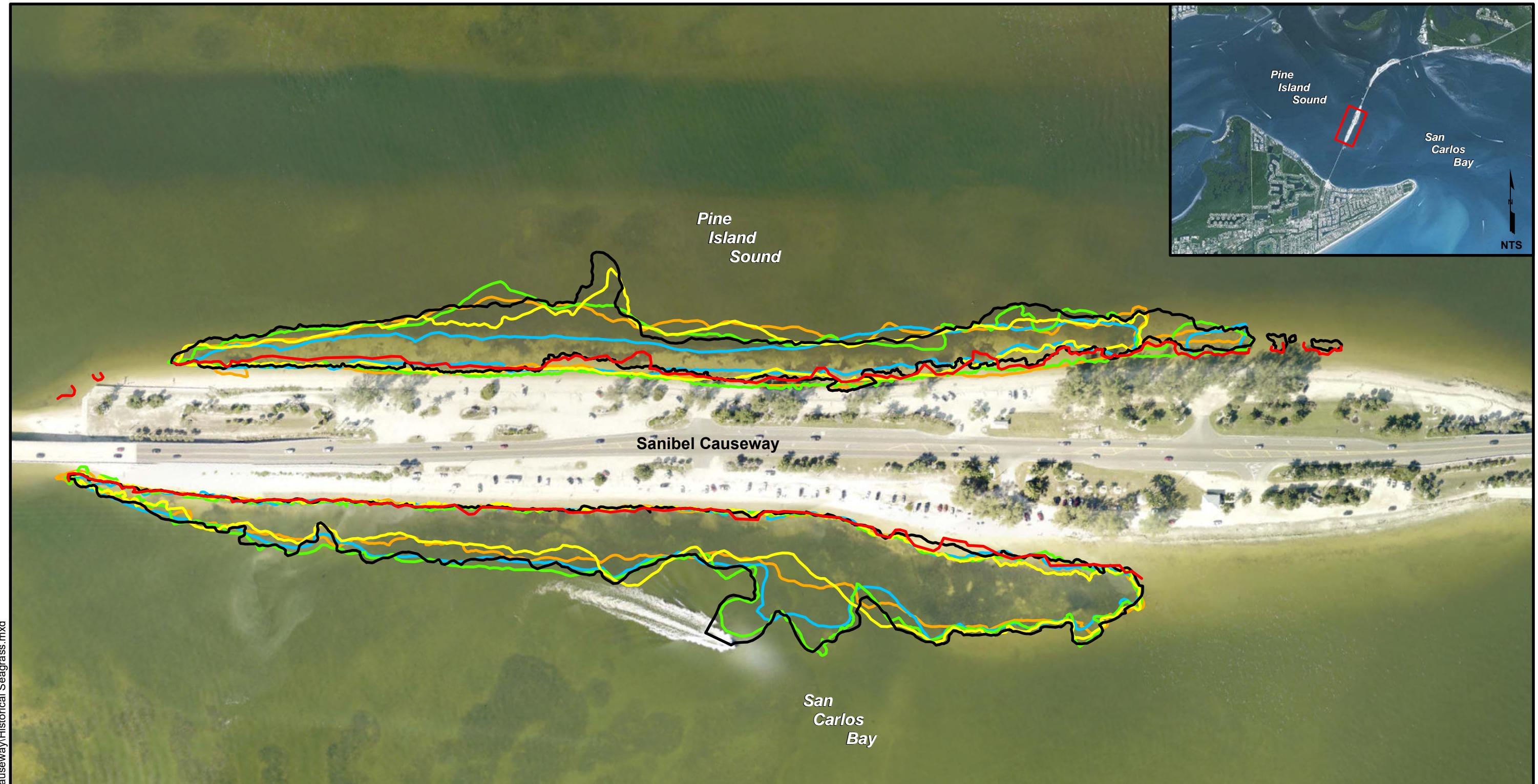
The mean canopy height varied among species; *H. wrightii* was notably shorter with a mean of 13 ± 6 cm in comparison to *S. filiforme* (36 ± 11 cm) and *T. testudinum* (35 ± 11 cm). All species had a high epiphytic load ($89 \pm 17\%$) and were growing in a sand/shell substrate. Depths ranged from 1-3 ft. at the start of the transects to 5-7 ft. at the end of the transects. The water clarity was poor as underwater visibility ranged from 1-3 ft. in Pine Island Sound and 3-4 ft. in San Carlos Bay. Detailed quadrat level data is provided in Appendix A and representative photographs are provided below (Photographs 1-8). Photographs were only taken in very shallow depths due to the limited visibility, particularly in Pine Island Sound.

Desktop Analysis

Figure 3 provides the five delineations from the aerial analysis as well as the *in situ* delineation. The nearshore seagrass edge has remained relatively constant since 2012. The 2016 aerial revealed seagrass inshore of the earlier aerial images. Aerial images from years 2012, 2013 and 2015 appear to have less seagrass but this is likely a function of poor water clarity.

Table 2. Transect level seagrass data are reported by mean with standard deviation.

Transect	Length (m)	Number of 0.5m ² Quads (% Sampled)	Overall Braun-Blanquet (BB) Scale	Species	Canopy Height (cm)	Epiphyte Percent Cover	Quadrat Data (100% total cover)		
							Seagrass Percent Cover	Algae Percent Cover	Substrate Percent Cover
SG W 1	10.1	3 (15%)	2 ± 1	<i>S. filiforme</i>	30 ± 6	93 ± 5	10 ± 9	0.3 ± 1.0	89 ± 9
SG W 2	30	7 (12%)	2 ± 1	<i>H. wrightii</i> <i>S. filiforme</i> <i>T. testudinum</i>	31 ± 11	80 ± 27	15 ± 13	0 ± 0	85 ± 13
SG W 3	30	7 (12%)	3 ± 1	<i>H. wrightii</i> <i>S. filiforme</i> <i>T. testudinum</i>	32 ± 17	94 ± 2	35 ± 24	0 ± 0	65 ± 24
SG W 4	27.5	6 (11%)	2 ± 1	<i>H. wrightii</i> <i>S. filiforme</i>	24 ± 15	79 ± 26	15 ± 13	0 ± 0	85 ± 13
SG W 5	12.4	3 (15%)	2 ± 1	<i>H. wrightii</i>	12 ± 2	50 ± 0	11 ± 8	0 ± 0	89 ± 8
SG E 1	30	7 (12%)	2 ± 1	<i>H. wrightii</i> <i>S. filiforme</i>	25 ± 8	89 ± 17	15 ± 11	1 ± 1	84 ± 11
SG E 2	30	7 (12%)	3 ± 2	<i>H. wrightii</i> <i>S. filiforme</i> <i>T. testudinum</i>	31 ± 15	96 ± 3	44 ± 34	0 ± 0	56 ± 34
SG E 3	30	7 (12%)	2 ± 1	<i>S. filiforme</i> <i>T. testudinum</i>	40 ± 14	95 ± 4	21 ± 16	0.1 ± 0.4	78 ± 16
SG E 4	26.4	6 (11%)	3 ± 1	<i>H. wrightii</i> <i>S. filiforme</i> <i>T. testudinum</i>	33 ± 12	98 ± 0	43 ± 31	0 ± 0	57 ± 31
SG E 5	10.3	3 (15%)	4 ± 2	<i>H. wrightii</i> <i>T. testudinum</i>	28 ± 14	97 ± 2	53 ± 38	0 ± 0	47 ± 38
<hr/>									
Overall		2 ± 1	<i>H. wrightii</i> <i>S. filiforme</i> <i>T. testudinum</i>	31 ± 14	89 ± 17	26.6 ± 24.7	0.1 ± 0.4	73.3 ± 24.6	
SG W 1-5		2 ± 1		28 ± 14	81 ± 22	19.3 ± 17.9	0.1 ± 0.3	80.6 ± 17.9	
SG E 1-5		3 ± 1		32 ± 14	95 ± 9	32.8 ± 28.1	0.2 ± 0.5	67.0 ± 28.0	



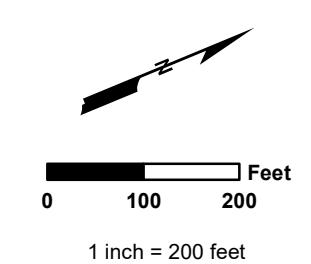
G:\Enterprise\Lee\6312145522 Sanibel Causeway\Historical Seagrass.mxd

Notes:

1. Coordinates are in feet based on the Florida State Plane Coordinate System, West Zone, North American Datum of 1983 (NAD 83).
2. Historical seagrass is overlaid on the 2016 aerial photography provided by Lee County.
3. 2017 seagrass edge delineated in situ by CB&I marine biologist on June 16, 2017.
4. Historical seagrass interpreted from historical aerials provided by Lee County and Google Earth imagery (2013) by CB&I marine biologist.

Legend:

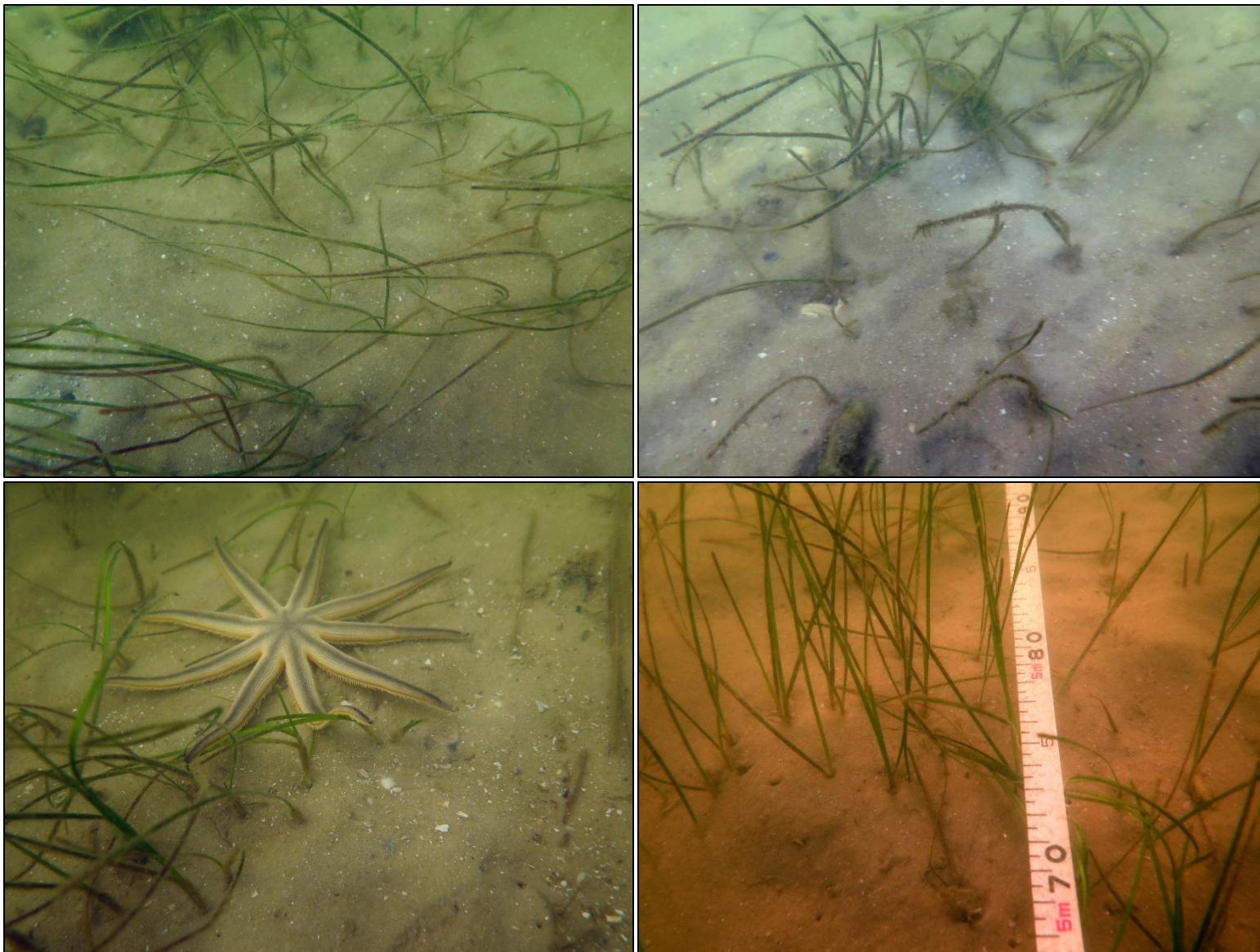
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- ~~~~ June 2017 Nearshore Edge
 - ~~~~ January 2016
 - ~~~~ January 2015
 - ~~~~ January 2014
 - ~~~~ January 2013
 - ~~~~ February 2012



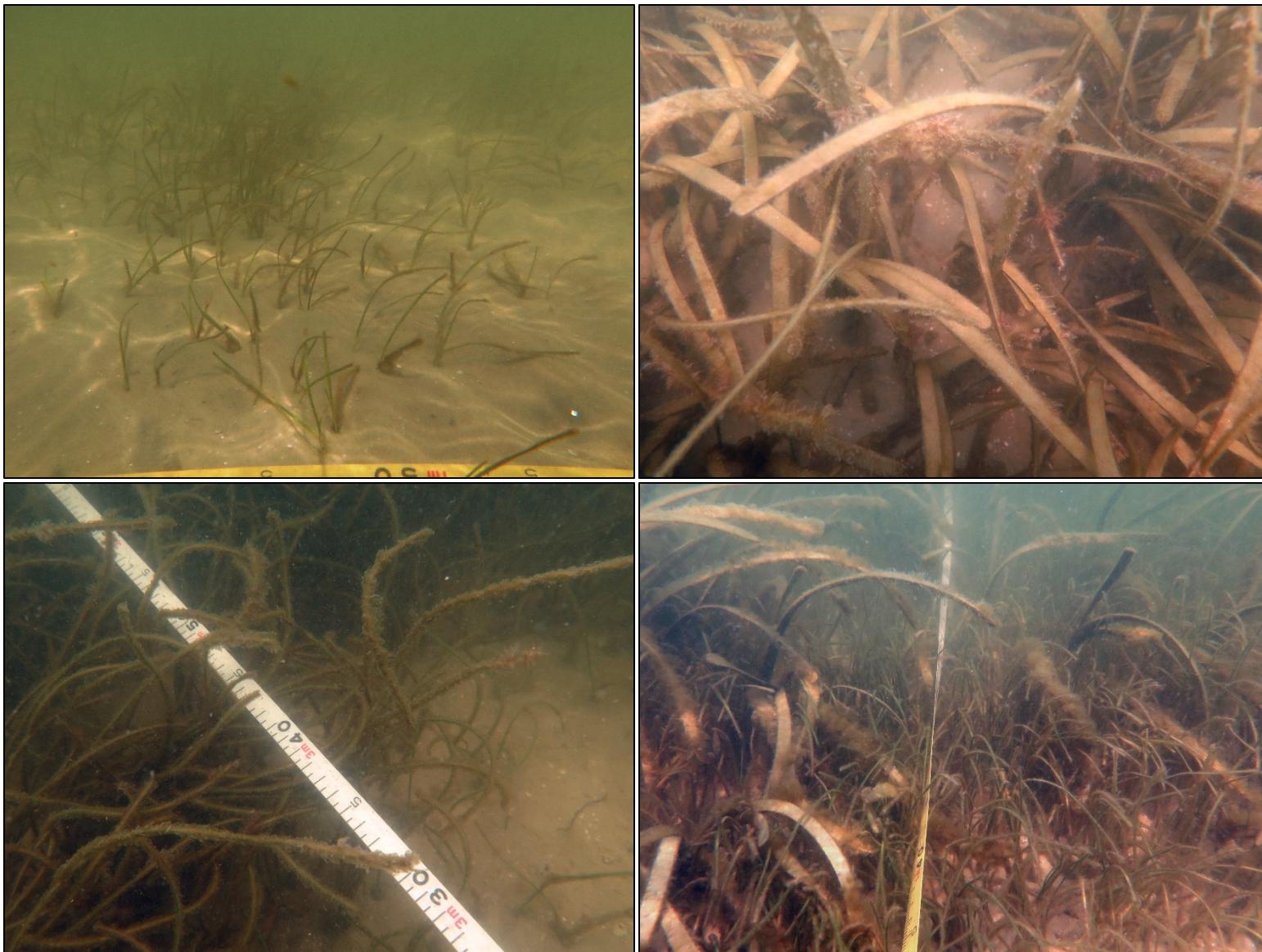
TITLE:
Nearshore Historic Seagrass
Sanibel Causeway Island B
Lee County, Florida

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Date: 06/29/17 By: HMV Comm No. : 6312145522 Figure No.: 3



Photographs 1-4. *Halodule wrightii* along SG W 2 (top left); sparse *H. wrightii* along SG W 2 (top right); *Luidia senegalensis* (nine-armed sea star) along SG W 2 (bottom left); *H. wrightii* along SG W 5 (bottom right).



Photographs 5-8. Sparse *H. wrightii* along SG E 2 (top left); *T. testudinum* along SG E 2 (top right); *S. filiforme* along SG E 3 (bottom left); *T. testudinum* and *H. wrightii* along SG E 5 (bottom right).

CONCLUSION

The nearshore seagrass edge and characterization data from this survey provide updated information to supplement previous studies and will aid in the design and permitting of the Sanibel Causeway Shoreline Stabilization Project.

REFERENCES

- Coastal Engineering Consultants, INC (CEC). 2015. Sanibel Causeway Center Island. Shoreline Stabilization Conceptual Planning Study. Prepared for Lee County Board of County Commissioners. Fort Myers, Florida. January 14, 2015.
- Florida Fish and Wildlife Conservation Commission (FWC). 2011. Recommended Survey Protocols for Estuarine and Marine Submerged Aquatic Vegetation (SAV) related to Permitting Applications. December 14, 2011 Draft. <http://myfwc.com/media/1626941/SeagrassSurveyProtocol.pdf>.
- Florida Fish and Wildlife Conservation Commission (FWC) and Fish and Wildlife Research Institute (FWRI). 2008. Seagrass Estero Bay Florida 2008. Downloaded from FWC Quickmaps at: <http://atoll.floridamarine.org/Quickmaps/>.

APPENDIX A
QUADRAT LEVEL SEAGRASS DATA

Table A1. Quadrat level seagrass data. Quadrats are 0.5m² (each side is 0.7 m long). Only quadrats within the extent of the seagrass bed were included in the analysis. Seagrass, algae, and substrate percent cover total 100% in each quadrat.

Date	Transect	Length (m)	Quad (m)	BB Overall	BB Spp.	BB #	Seagrass Spp.	Seagrass Spp. % Cover	Seagrass Total % Cover	% Algae (per genus)	% Substrate	Canopy Ht. (cm)	Condition/Inverts	% Epiphyte (total)	Substrate Type	Algae genus	Depth (ft)	Vis (ft)		
6/16/2017	SG W 1	10.1	0	2	<i>S. filiforme</i>	2	<i>S. filiforme</i>	20	20	1	79	25		98	sand/shell	<i>Hypnea</i>	3	2 to 3		
			5	1	<i>S. filiforme</i>	1	<i>S. filiforme</i>	3	3	0	97	28		90	sand/shell		3			
			9.4	2	<i>S. filiforme</i>	2	<i>S. filiforme</i>	8	8	0	92	36		90	sand/shell		5			
			15	0						100					sand/shell		5			
			20	0						100					sand/shell		6			
			25	0						100					sand/shell		6			
			29.3	0						100					sand/shell		7			
Mean		2		2		10		10		0	89	30	93							
SD		1		1		9		9		1	9	6	5							
6/16/2017	SG W 2	30	0	1	<i>H. wrightii</i>	1	<i>H. wrightii</i>	4	4	1	95	13		90	sand/shell	<i>Cyanobacteria</i>	2	2 to 3		
			5	2	<i>H. wrightii</i>	2	<i>H. wrightii</i>	7	7	0	93	20		40	sand/shell		3			
			10	2	<i>H. wrightii</i>	2	<i>H. wrightii</i>	10	10	0	90	25		40	sand/shell		3			
			15	3	<i>S. filiforme</i>	2	<i>S. filiforme</i>	20	40	0	60	34		95	sand/shell		5			
					<i>T. testudinum</i>	2	<i>T. testudinum</i>	20				28								
			20	3	<i>S. filiforme</i>	3	<i>S. filiforme</i>	25	26	0	74	32		98	sand/shell		5			
					<i>T. testudinum</i>	0.5	<i>T. testudinum</i>	1				33								
			25	2	<i>S. filiforme</i>	2	<i>S. filiforme</i>	8	8	0	92	50		98	sand/shell		6			
			29.3	2	<i>S. filiforme</i>	2	<i>S. filiforme</i>	10	10	0	90	42		98	sand/shell		7			
Mean		2		2		12		15		0	85	31	80							
SD		1		1		8		13		0	13	11	27							
6/16/2017	SG W 3	30	0	2	<i>H. wrightii</i>	2	<i>H. wrightii</i>	20	21	0	79	12		90	sand/shell		2	1		
					<i>T. testudinum</i>	0.5	<i>T. testudinum</i>	1				27								
			5	2	<i>H. wrightii</i>	2	<i>H. wrightii</i>	20	20	0	80	14		90	sand/shell		2.5			
					<i>S. filiforme</i>	3	<i>S. filiforme</i>	40				26		95						
			10	3	<i>H. wrightii</i>	0.5	<i>H. wrightii</i>	1	41	0	59	14			sand/shell		2.5			
					<i>H. wrightii</i>	0.5	<i>H. wrightii</i>	1				22		95						
			15	3	<i>H. wrightii</i>	0.5	<i>H. wrightii</i>	1	50	0	50	30			sand/shell		3			
					<i>T. testudinum</i>	3	<i>T. testudinum</i>	49				50		95						
			20	5	<i>S. filiforme</i>	3	<i>S. filiforme</i>	30	80	0	20	30			sand/shell		5			
					<i>T. testudinum</i>	4	<i>T. testudinum</i>	50				50		95						
			25	2	<i>S. filiforme</i>	2	<i>S. filiforme</i>	20	20	0	80	53		95	sand/shell		6			
					<i>S. filiforme</i>	2	<i>S. filiforme</i>	10				65		95						
			29.3	2	<i>T. testudinum</i>	0.5	<i>T. testudinum</i>	1	12	0	88	45			sand/shell		6			
					<i>H. wrightii</i>	0.5	<i>H. wrightii</i>	1				24								
Mean		3		2		19		35		0	65	32	94							
SD		1		1		19		24		0	24	17	2							

Table A1 (cont.). Quadrat level seagrass data. Quadrats are 0.5m² (each side is 0.7 m long). Only quadrats within the extent of the seagrass bed were included in the analysis. Seagrass, algae, and substrate percent cover total 100% in each quadrat.

Date	Transect	Length (m)	Quad (m)	BB Overall	BB Spp.	BB #	Seagrass Spp.	Seagrass Spp. % Cover	Seagrass Total % Cover	% Algae (per genus)	% Substrate	Canopy Ht. (cm)	Condition/Inverts	% Epiphyte (total)	Substrate Type	Algae genus	Depth (ft)	Vis (ft)		
6/16/2017	SG W 4	27.5	0	2	<i>H. wrightii</i>	2	<i>H. wrightii</i>	15	15	0	85	7		50	sand/shell		2	1		
			5	0.5	<i>H. wrightii</i>	0.5	<i>H. wrightii</i>	1	1	0	99	10		50	sand/shell		2.5			
			10	0		0			0	0	100				sand/shell		3			
			15	3	<i>S. filiforme</i>	3	<i>S. filiforme</i>	30	30	0	70	30		98	sand/shell		3			
			20	3	<i>S. filiforme</i>	3	<i>S. filiforme</i>	30	30	0	70	33		98	sand/shell		5			
			25	2	<i>S. filiforme</i>	2	<i>S. filiforme</i>	15	15	0	85	40		98	sand/shell		5			
			29.3	0							100				sand/shell		5			
Mean			2	2				18	15	0	85	24		79						
SD			1	1				12	13	0	13	15		26						
6/16/2017	SG W 5	12.4	0	2	<i>H. wrightii</i>	2	<i>H. wrightii</i>	15	15	0	85	10		50	sand/shell		2	1		
			5	2	<i>H. wrightii</i>	2	<i>H. wrightii</i>	15	15	0	85	13		50	sand/shell		2.5			
			10	1	<i>H. wrightii</i>	1	<i>H. wrightii</i>	2	2	0	98	12		50	sand/shell		3			
			15	0							100				sand/shell		5			
			20	0							100				sand/shell		5			
			25	0							100				sand/shell		6			
			29.3	0							100				sand/shell		6			
Mean			2	2				11	11	0	89	12		50						
SD			1	1				8	8	0	8	2		0						

Table A1 (cont.). Quadrat level seagrass data. Quadrats are 0.5m² (each side is 0.7 m long). Only quadrats within the extent of the seagrass bed were included in the analysis. Seagrass, algae, and substrate percent cover total 100% in each quadrat.

Date	Transect	Length (m)	Quad (m)	BB Overall	BB Spp.	BB #	Seagrass Spp.	Seagrass Spp. % Cover	Seagrass Total % Cover	% Algae (per genus)	% Substrate	Canopy Ht. (cm)	Condition/Inverts	% Epiphyte (total)	Substrate Type	Algae genus	Depth (ft)	Vis (ft)		
6/16/2017	SG E 1	30	0	2	<i>H. wrightii</i>	2	<i>H. wrightii</i>	15	15	1	84	13	near rocks	50	sand/shell	<i>Hypnea</i>	3	3 to 4		
			5	2	<i>S. filiforme</i>	2	<i>S. filiforme</i>	7	7	0	93	20		98	sand/shell		3			
			10	2	<i>S. filiforme</i>	2	<i>S. filiforme</i>	7	7	1	92	24	<i>Luidia clathrata</i> (lined seastar)	95	sand/shell	Turf	3			
			15	2	<i>S. filiforme</i>	2	<i>S. filiforme</i>	25	25	2	73	33		95	sand/shell	<i>Hypnea/Dasya</i>	3			
			20	3	<i>S. filiforme</i>	3	<i>S. filiforme</i>	30	30	0	70	30		95	sand/shell		3			
			25	2	<i>S. filiforme</i>	2	<i>S. filiforme</i>	20	20	0	80	35	sessile worm	95	sand/shell		5			
			29.3	0.5	<i>S. filiforme</i>	0.5	<i>S. filiforme</i>	1	1	0	99	20		98	sand/shell		5			
Mean				2		2		15	15	1	84	25		89						
SD				1		1		11	11	1	11	8		17						
6/16/2017	SG E 2	30	0	1	<i>H. wrightii</i>	1	<i>H. wrightii</i>	2	2	0	98	9		90	sand/shell		1	3 to 4		
			5	3	<i>H. wrightii</i>	1	<i>H. wrightii</i>	2	29	0	71	7		95	sand/shell		1.5			
					<i>S. filiforme</i>	2	<i>S. filiforme</i>	25				17								
					<i>T. testudinum</i>	1	<i>T. testudinum</i>	2				15								
			10	5	<i>S. filiforme</i>	1	<i>S. filiforme</i>	1	81	0	19	29		98	sand/shell		3			
					<i>T. testudinum</i>	5	<i>T. testudinum</i>	80				31								
			15	5	<i>S. filiforme</i>	3	<i>S. filiforme</i>	43	85	0	15	50		98	sand/shell		3			
					<i>T. testudinum</i>	3	<i>T. testudinum</i>	42				50								
			20	4	<i>S. filiforme</i>	3	<i>S. filiforme</i>	40	60	0	40	38		98	sand/shell		6			
					<i>T. testudinum</i>	2	<i>T. testudinum</i>	20				42								
			25	3	<i>S. filiforme</i>	3	<i>S. filiforme</i>	48	50	0	50	47		98	sand/shell		6			
					<i>T. testudinum</i>	1	<i>T. testudinum</i>	2				44								
Mean				3		2		24	44	0	56	31		96						
SD				2		1		25	34	0	34	15		3						
6/16/2017	SG E 3	30	0	2	<i>T. testudinum</i>	2	<i>T. testudinum</i>	7	7	0	93	20		98	sand/shell		3	3 to 4		
			5	4	<i>S. filiforme</i>	4	<i>S. filiforme</i>	55	55	0	45	32		98	sand/shell		3			
			10	2	<i>S. filiforme</i>	2	<i>S. filiforme</i>	25	25	0	75	32		98	sand/shell		3			
			15	2	<i>S. filiforme</i>	2	<i>S. filiforme</i>	20	20	0	80	60		95	sand/shell		6			
			20	2	<i>S. filiforme</i>	2	<i>S. filiforme</i>	18	20	0	80	47		95	sand/shell		6			
					<i>T. testudinum</i>	1	<i>T. testudinum</i>	2				63								
			25	2	<i>S. filiforme</i>	2	<i>S. filiforme</i>	7	8	0	92	47		90	sand/shell		6			
					<i>T. testudinum</i>	0.5	<i>T. testudinum</i>	1				31								
			29.3	2	<i>S. filiforme</i>	2	<i>S. filiforme</i>	8	15	1	84	35		90	sand/shell	<i>Hypnea</i>	6			
Mean				2		2		15	21	0.1	78	40		95						
SD				1		1		16	16	0.4	16	14		4						

Table A1 (cont.). Quadrat level seagrass data. Quadrats are 0.5m² (each side is 0.7 m long). Only quadrats within the extent of the seagrass bed were included in the analysis. Seagrass, algae, and substrate percent cover total 100% in each quadrat.

Date	Transect	Length (m)	Quad (m)	BB Overall	BB Spp.	BB #	Seagrass Spp.	Seagrass Spp. % Cover	Seagrass Total % Cover	% Algae (per genus)	% Substrate	Canopy Ht. (cm)	Condition/Inverts	% Epiphyte (total)	Substrate Type	Algae genus	Depth (ft)	Vis (ft)	
6/16/2017	SG E 4	26.4	0	3	<i>H. wrightii</i>	3	<i>H. wrightii</i>	50	50	0	50	6		98	sand/shell		1.5	3 to 4	
			5	5	<i>T. testudinum</i>	5	<i>T. testudinum</i>	80	80	0	20	40		98	sand/shell		3		
			10	4	<i>S. filiforme</i>	2	<i>S. filiforme</i>	5	60	0	40	33		98	sand/shell		3		
					<i>T. testudinum</i>	4	<i>T. testudinum</i>	55				40							
			15	4	<i>S. filiforme</i>	4	<i>S. filiforme</i>	53	60	0	40	42		98	sand/shell		5		
					<i>T. testudinum</i>	2	<i>T. testudinum</i>	7				44							
			20	2	<i>S. filiforme</i>	1	<i>S. filiforme</i>	1	7	0	93	31		98	sand/shell		6		
					<i>T. testudinum</i>	2	<i>T. testudinum</i>	6				30							
			25	1	<i>S. filiforme</i>	1	<i>S. filiforme</i>	3	3	0	97	27	sessile worm	98	sand/shell		6		
			29.3	0				0			100				sand/shell		7		
Mean			3					29	43	0	57	33		98					
SD			1					30	31	0	31	12		0					
6/16/2017	SG E 5	10.3	0	5	<i>H. wrightii</i>	5	<i>H. wrightii</i>	74	75	0	25	11		95	sand/shell		2	3 to 4	
					<i>T. testudinum</i>	0.5	<i>T. testudinum</i>	1				24							
			5	5	<i>T. testudinum</i>	5	<i>T. testudinum</i>	75	75	0	25	35		98	sand/shell		3		
			9.6	2	<i>T. testudinum</i>	2	<i>T. testudinum</i>	10	10	0	90	42		98	sand/shell		5		
			15	0							0				sand/shell		6		
			20	0							0				sand/shell		6		
			25	0							0				sand/shell		6		
			29.3	0							0				sand/shell		7		
Mean			4					40	53	0	47	28		97					
SD			2					40	38	0	38	14		2					
Overall Mean			2					20	26.6	0.1	73.3	31		89					
Overall SD			1					21	24.7	0.4	24.6	14		17					
West Mean			2					15	19.3	0.1	80.6	28		81					
West SD			1					14	17.9	0.3	17.6	14		22					
East Mean			3					23	32.8	0.2	67.0	32		95					
East SD			1					25	28.1	0.5	28.0	14		9					

APPENDIX B
SEAGRASS DELINEATION POSITION DATA

Point Name	Northing	Easting	Species
SG EDG EAST 1	775958.841	646816.855	<i>Halodule wrightii</i>
SG EDG EAST 2	775946.296	646795.699	<i>Halodule wrightii</i>
SG EDG EAST 3	775932.789	646792.909	<i>Syringodium filiforme</i>
SG EDG EAST 4	775927.636	646774.963	<i>Syringodium filiforme</i>
SG EDG EAST 5	775895.071	646762.476	<i>Syringodium filiforme</i>
SG EDG EAST 6	775880.719	646753.034	<i>Thalassia testudinum</i>
SG EDG EAST 7	775873.749	646751.353	<i>Thalassia testudinum</i>
SG EDG EAST 8	775837.463	646737.241	<i>Halodule wrightii</i>
SG EDG EAST 9	775797.337	646721.708	<i>Halodule wrightii</i>
SG EDG EAST 10	775794.248	646698.459	<i>Halodule wrightii</i>
SG EDG EAST 11	775770.514	646686.942	<i>Halodule wrightii</i>
SG EDG EAST 12	775730.845	646679.380	<i>Halodule wrightii</i>
SG EDG EAST 13	775708.962	646659.924	<i>Halodule wrightii</i>
SG EDG EAST 14	775686.356	646633.176	<i>Halodule wrightii</i>
SG EDG EAST 15	775658.031	646619.441	<i>Halodule wrightii</i>
SG EDG EAST 16	775656.730	646611.620	<i>Halodule wrightii</i>
SG EDG EAST 17	775634.030	646597.854	<i>Halodule wrightii</i>
SG EDG EAST 18	775617.886	646586.425	<i>Halodule wrightii</i>
SG EDG EAST 19	775601.354	646601.561	<i>Halodule wrightii</i>
SG EDG EAST 20	775588.569	646603.115	<i>Thalassia testudinum</i>
SG EDG EAST 21	775556.784	646577.568	<i>Syringodium filiforme</i>
SG EDG EAST 22	775550.578	646555.218	<i>Halodule wrightii</i>
SG EDG EAST 23	775551.471	646544.746	<i>Halodule wrightii</i>
SG EDG EAST 24	775542.574	646537.159	<i>Halodule wrightii</i>
SG EDG EAST 25	775533.798	646534.067	<i>Halodule wrightii</i>
SG EDG EAST 26	775517.030	646543.519	<i>Halodule wrightii</i>
SG EDG EAST 27	775495.394	646527.779	<i>Halodule wrightii</i>
SG EDG EAST 28	775493.112	646511.357	<i>Halodule wrightii</i>
SG EDG EAST 29	775464.818	646492.926	<i>Halodule wrightii</i>
SG EDG EAST 30	775436.332	646466.364	<i>Halodule wrightii</i>
SG EDG EAST 31	775410.449	646453.007	<i>Halodule wrightii</i>
SG EDG EAST 32	775381.066	646432.711	<i>Halodule wrightii</i>
SG EDG EAST 33	775359.304	646421.937	<i>Halodule wrightii</i>
SG EDG EAST 34	775353.410	646419.022	<i>Halodule wrightii</i>
SG EDG EAST 35	775338.404	646411.801	<i>Halodule wrightii</i>
SG EDG EAST 36	775327.336	646409.536	<i>Halodule wrightii</i>
SG EDG EAST 37	775317.435	646403.981	<i>Halodule wrightii</i>
SG EDG EAST 38	775303.187	646397.491	<i>Halodule wrightii</i>
SG EDG EAST 39	775289.487	646401.000	<i>Halodule wrightii</i>
SG EDG EAST 40	775283.122	646407.649	<i>Syringodium filiforme</i>
SG EDG EAST 41	775252.478	646393.179	<i>Syringodium filiforme</i>
SG EDG EAST 42	775242.058	646388.356	<i>Syringodium filiforme</i>
SG EDG EAST 43	775234.847	646368.921	<i>Halodule wrightii</i>
SG EDG EAST 44	775205.124	646352.396	<i>Halodule wrightii</i>
SG EDG EAST 45	775203.085	646350.129	<i>Halodule wrightii</i>
SG EDG EAST 46	775187.545	646347.003	<i>Halodule wrightii</i>

Point Name	Northing	Easting	Species
SG EDG EAST 47	775170.905	646336.997	<i>Syringodium filiforme</i>
SG EDG EAST 48	775164.861	646332.762	<i>Syringodium filiforme</i>
SG EDG EAST 49	775154.892	646329.642	<i>Syringodium filiforme</i>
SG EDG EAST 50	775144.254	646325.004	<i>Halodule wrightii</i>
SG EDG EAST 51	775127.021	646321.380	<i>Halodule wrightii</i>
SG EDG EAST 52	775113.406	646317.020	<i>Thalassia testudinum</i>
SG EDG EAST 53	775082.384	646298.929	<i>Syringodium filiforme</i>
SG EDG EAST 54	775080.248	646296.668	<i>Syringodium filiforme</i>
SG EDG EAST 55	775072.680	646295.323	<i>Syringodium filiforme</i>
SG EDG EAST 56	775067.034	646294.674	<i>Syringodium filiforme</i>
SG EDG EAST 57	775057.382	646296.134	<i>Syringodium filiforme</i>
SG EDG EAST 58	775040.598	646285.952	<i>Syringodium filiforme</i>
SG EDG EAST 59	775011.347	646278.011	<i>Syringodium filiforme</i>
SG EDG EAST 60	774987.739	646263.520	<i>Syringodium filiforme</i>
SG EDG EAST 61	774973.046	646262.224	<i>Syringodium filiforme</i>
SG EDG EAST 62	774964.865	646259.382	<i>Syringodium filiforme</i>
SG EDG EAST 63	774953.568	646254.432	<i>Syringodium filiforme</i>
SG EDG EAST 64	774940.097	646249.568	<i>Syringodium filiforme</i>
SG EDG EAST 65	774932.635	646245.637	<i>Syringodium filiforme</i>
SG EDG EAST 66	774924.560	646235.376	<i>Halodule wrightii</i>
SG EDG EAST 67	774906.936	646227.567	<i>Halodule wrightii</i>
SG EDG EAST 68	774858.346	646208.185	<i>Halodule wrightii</i>
SG EDG EAST 69	774829.563	646195.260	<i>Syringodium filiforme</i>
SG EDG EAST 70	774812.548	646186.010	<i>Halodule wrightii</i>
SG EDG EAST 71	774788.967	646174.721	<i>Halodule wrightii</i>
SG EDG EAST 72	774772.585	646168.258	<i>Halodule wrightii</i>
SG EDG EAST 73	774754.603	646175.425	<i>Syringodium filiforme</i>
SG EDG EAST 74	774743.754	646171.890	<i>Syringodium filiforme</i>
SG EDG EAST 75	774736.117	646159.918	<i>Syringodium filiforme</i>
SG EDG EAST 76	774728.485	646148.506	<i>Halodule wrightii</i>
SG EDG EAST 77	774723.985	646142.849	<i>Halodule wrightii</i>
SG EDG EAST 78	774696.947	646136.114	<i>Halodule wrightii</i>
SG EDG EAST 79	774688.396	646132.033	<i>Halodule wrightii</i>
SG EDG EAST 80	774678.537	646128.055	<i>Halodule wrightii</i>
SG EDG EAST 81	774668.800	646123.665	<i>Halodule wrightii</i>
SG EDG EAST 82	774656.851	646119.147	<i>Thalassia testudinum</i>
SG EDG EAST 83	774645.178	646113.996	<i>Thalassia testudinum</i>
SG EDG EAST 84	774637.375	646107.505	<i>Thalassia testudinum</i>
SG EDG EAST 85	774630.256	646104.091	<i>Halodule wrightii</i>
SG EDG EAST 86	774617.091	646103.288	<i>Halodule wrightii</i>
SG EDG EAST 87	774609.848	646094.995	<i>Halodule wrightii</i>
SG EDG EAST 88	774608.336	646091.947	<i>Halodule wrightii</i>
SG EDG EAST 89	774600.123	646087.065	<i>Halodule wrightii</i>
SG EDG EAST 90	774592.268	646084.985	<i>Halodule wrightii</i>
SG EDG EAST 91	774584.783	646082.933	<i>Halodule wrightii</i>
SG EDG EAST 92	774572.875	646077.044	<i>Halodule wrightii</i>

Point Name	Northing	Easting	Species
SG EDG EAST 93	774565.966	646076.948	<i>Thalassia testudinum</i>
SG EDG EAST 94	774561.113	646068.440	<i>Halodule wrightii</i>
SG EDG EAST 95	774556.537	646066.065	<i>Halodule wrightii</i>
SG EDG EAST 96	774547.400	646062.206	<i>Halodule wrightii</i>
SG EDG EAST 97	774536.217	646057.968	<i>Halodule wrightii</i>
SG EDG EAST 98	774531.083	646052.705	<i>Halodule wrightii</i>
SG EDG EAST 99	774520.110	646045.994	<i>Halodule wrightii</i>
SG EDG EAST 100	774506.764	646042.856	<i>Halodule wrightii</i>
SG EDG EAST 101	774499.273	646041.563	<i>Halodule wrightii</i>
SG EDG EAST 102	774491.658	646036.218	<i>Halodule wrightii</i>
SG EDG EAST 103	774484.836	646031.797	<i>Halodule wrightii</i>
SG EDG EAST 104	774476.049	646028.128	<i>Halodule wrightii</i>
SG EDG EAST 105	774466.156	646026.911	<i>Halodule wrightii</i>
SG EDG EAST 106	774460.273	646026.306	<i>Halodule wrightii</i>
SG EDG EAST 107	774454.812	646025.920	<i>Halodule wrightii</i>
SG EDG EAST 108	774446.558	646017.634	<i>Halodule wrightii</i>
SG EDG EAST 109	774438.318	646011.166	<i>Halodule wrightii</i>
SG EDG EAST 110	774424.844	646007.679	<i>Halodule wrightii</i>
SG EDG EAST 111	774413.880	646004.661	<i>Halodule wrightii</i>
SG EDG EAST 112	774402.571	645998.516	<i>Halodule wrightii</i>
SG EDG EAST 113	774393.902	645994.183	<i>Halodule wrightii</i>
SG EDG EAST 114	774384.233	645990.585	<i>Halodule wrightii</i>
SG EDG EAST 115	774376.358	645986.802	<i>Halodule wrightii</i>
SG EDG EAST 116	774368.771	645985.097	<i>Halodule wrightii</i>
SG EDG EAST 117	774359.433	645982.129	<i>Halodule wrightii</i>
SG EDG EAST 118	774352.160	645980.660	<i>Halodule wrightii</i>
SG EDG EAST 119	774346.166	645975.813	<i>Halodule wrightii</i>
SG EDG EAST 120	774333.606	645972.177	<i>Halodule wrightii</i>
SG EDG EAST 121	774316.971	645964.721	<i>Halodule wrightii</i>
SG EDG EAST 122	774309.272	645964.088	<i>Halodule wrightii</i>
SG EDG EAST 123	774308.691	645955.410	<i>Halodule wrightii</i>
SG EDG EAST 124	774300.969	645949.430	<i>Halodule wrightii</i>
SG EDG EAST 125	774291.413	645945.231	<i>Halodule wrightii</i>
SG EDG EAST 126	774280.333	645940.103	<i>Halodule wrightii</i>
SG EDG EAST 127	774266.241	645934.345	<i>Halodule wrightii</i>
SG EDG EAST 128	774254.168	645926.816	<i>Halodule wrightii</i>
SG EDG EAST 129	774245.895	645922.302	<i>Halodule wrightii</i>
SG EDG EAST 130	774239.679	645919.044	<i>Halodule wrightii</i>
SG EDG EAST 131	774231.091	645913.871	<i>Halodule wrightii</i>
SG EDG EAST 132	774225.933	645912.622	<i>Halodule wrightii</i>
SG EDG EAST 133	774219.068	645910.449	<i>Halodule wrightii</i>
SG EDG EAST 134	774208.658	645903.163	<i>Halodule wrightii</i>
SG EDG EAST 135	774203.799	645898.242	<i>Halodule wrightii</i>
SG EDG EAST 136	774198.840	645895.863	<i>Halodule wrightii</i>
SG EDG EAST 137	774189.282	645890.386	<i>Halodule wrightii</i>
SG EDG EAST 138	774180.513	645885.140	<i>Halodule wrightii</i>

Point Name	Northing	Easting	Species
SG EDG EAST 139	774165.330	645881.060	<i>Halodule wrightii</i>
SG EDG EAST 140	774159.234	645877.092	<i>Halodule wrightii</i>
SG EDG EAST 141	774147.677	645874.627	<i>Halodule wrightii</i>
SG EDG EAST 142	774138.758	645872.163	<i>Halodule wrightii</i>
SG EDG EAST 143	774129.970	645867.843	<i>Halodule wrightii</i>
SG EDG EAST 144	774137.107	645864.076	<i>Halodule wrightii</i>
SG EDG EAST 145	774133.513	645858.418	<i>Halodule wrightii</i>
SG EDG EAST 146	774129.139	645857.041	<i>Halodule wrightii</i>
SG EDG EAST 147	774124.137	645854.746	<i>Halodule wrightii</i>
SG EDG EAST 148	774120.554	645853.081	<i>Halodule wrightii</i>
SG EDG EAST 149	774112.970	645852.988	<i>Halodule wrightii</i>
SG EDG EAST 150	774111.545	645846.652	<i>Halodule wrightii</i>
SG EDG EAST 151	774109.762	645842.154	<i>Halodule wrightii</i>
SG EDG EAST 152	774103.806	645836.751	<i>Halodule wrightii</i>
SG EDG EAST 153	774097.087	645831.675	<i>Halodule wrightii</i>
SG EDG EAST 154	774089.909	645828.067	<i>Halodule wrightii</i>
SG EDG EAST 155	774081.800	645825.390	<i>Halodule wrightii</i>
SG EDG EAST 156	774076.489	645820.743	<i>Halodule wrightii</i>
SG EDG EAST 157	774068.799	645817.031	<i>Halodule wrightii</i>
SG EDG EAST 158	774065.511	645813.947	<i>Halodule wrightii</i>
SG EDG EAST 159	774061.546	645811.204	<i>Halodule wrightii</i>
SG EDG EAST 160	774057.328	645807.812	<i>Halodule wrightii</i>
SG EDG EAST 161	774051.591	645800.196	<i>Halodule wrightii</i>
SG EDG EAST 162	774045.983	645794.124	<i>Halodule wrightii</i>
SG EDG EAST 163	774034.343	645787.158	<i>Halodule wrightii</i>
SG EDG EAST 164	774025.693	645784.977	<i>Halodule wrightii</i>
SG EDG EAST 165	774022.407	645784.310	<i>Halodule wrightii</i>
SG EDG EAST 166	774018.421	645791.145	<i>Halodule wrightii</i>
SG EDG EAST 167	774018.580	645795.279	<i>Halodule wrightii</i>
SG EDG EAST 168	774018.614	645797.230	<i>Halodule wrightii</i>

Point Name	Northing	Easting	Species
SG EDG WEST 1	774061.454	645634.091	<i>Halodule wrightii</i>
SG EDG WEST 2	774071.311	645631.690	<i>Halodule wrightii</i>
SG EDG WEST 3	774081.855	645635.519	<i>Halodule wrightii</i>
SG EDG WEST 4	774090.004	645639.718	<i>Halodule wrightii</i>
SG EDG WEST 5	774095.147	645638.595	<i>Halodule wrightii</i>
SG EDG WEST 6	774099.691	645632.147	<i>Halodule wrightii</i>
SG EDG WEST 7	774099.276	645626.422	<i>Halodule wrightii</i>
SG EDG WEST 8	774097.610	645621.425	<i>Halodule wrightii</i>
SG EDG WEST 9	774146.038	645617.609	<i>Halodule wrightii</i>
SG EDG WEST 10	774146.023	645623.637	<i>Halodule wrightii</i>
SG EDG WEST 11	774148.248	645627.231	<i>Halodule wrightii</i>
SG EDG WEST 12	774150.657	645631.031	<i>Halodule wrightii</i>
SG EDG WEST 13	774158.948	645631.724	<i>Halodule wrightii</i>
SG EDG WEST 14	774163.350	645629.464	<i>Halodule wrightii</i>
SG EDG WEST 15	774161.614	645619.610	<i>Halodule wrightii</i>
SG EDG WEST 16	774306.693	645656.708	<i>Halodule wrightii</i>
SG EDG WEST 17	774313.798	645663.755	<i>Halodule wrightii</i>
SG EDG WEST 18	774325.497	645666.923	<i>Halodule wrightii</i>
SG EDG WEST 19	774339.079	645668.576	<i>Halodule wrightii</i>
SG EDG WEST 20	774346.186	645668.477	<i>Halodule wrightii</i>
SG EDG WEST 21	774353.529	645674.550	<i>Syringodium filiforme</i>
SG EDG WEST 22	774354.061	645676.770	<i>Syringodium filiforme</i>
SG EDG WEST 23	774366.757	645679.641	<i>Syringodium filiforme</i>
SG EDG WEST 24	774378.763	645686.082	<i>Syringodium filiforme</i>
SG EDG WEST 25	774381.269	645685.608	<i>Halodule wrightii</i>
SG EDG WEST 26	774391.631	645688.944	<i>Thalassia testudinum</i>
SG EDG WEST 27	774396.201	645692.036	<i>Thalassia testudinum</i>
SG EDG WEST 28	774399.861	645700.897	<i>Thalassia testudinum</i>
SG EDG WEST 29	774403.672	645705.871	<i>Thalassia testudinum</i>
SG EDG WEST 30	774408.767	645706.476	<i>Thalassia testudinum</i>
SG EDG WEST 31	774414.196	645702.636	<i>Thalassia testudinum</i>
SG EDG WEST 32	774417.486	645698.774	<i>Syringodium filiforme</i>
SG EDG WEST 33	774427.598	645707.164	<i>Syringodium filiforme</i>
SG EDG WEST 34	774436.770	645705.989	<i>Syringodium filiforme</i>
SG EDG WEST 35	774445.269	645710.159	<i>Syringodium filiforme</i>
SG EDG WEST 36	774454.485	645711.974	<i>Syringodium filiforme</i>
SG EDG WEST 37	774476.928	645713.950	<i>Halodule wrightii</i>
SG EDG WEST 38	774498.166	645721.353	<i>Halodule wrightii</i>
SG EDG WEST 39	774527.875	645738.466	<i>Halodule wrightii</i>
SG EDG WEST 40	774561.242	645756.405	<i>Halodule wrightii</i>
SG EDG WEST 41	774596.247	645765.939	<i>Halodule wrightii</i>
SG EDG WEST 42	774648.844	645786.607	<i>Halodule wrightii</i>
SG EDG WEST 43	774661.358	645791.556	<i>Halodule wrightii</i>
SG EDG WEST 44	774683.730	645804.228	<i>Halodule wrightii</i>
SG EDG WEST 45	774721.457	645814.817	<i>Halodule wrightii</i>
SG EDG WEST 46	774738.482	645822.443	<i>Halodule wrightii</i>

Point Name	Northing	Easting	Species
SG EDG WEST 47	774749.147	645840.769	<i>Halodule wrightii</i>
SG EDG WEST 48	774770.909	645850.450	<i>Halodule wrightii</i>
SG EDG WEST 49	774780.235	645859.510	<i>Halodule wrightii</i>
SG EDG WEST 50	774796.133	645865.018	<i>Halodule wrightii</i>
SG EDG WEST 51	774818.700	645870.539	<i>Halodule wrightii</i>
SG EDG WEST 52	774822.627	645875.775	<i>Halodule wrightii</i>
SG EDG WEST 53	774823.984	645881.138	<i>Halodule wrightii</i>
SG EDG WEST 54	774829.911	645883.601	<i>Halodule wrightii</i>
SG EDG WEST 55	774848.299	645890.441	<i>Halodule wrightii</i>
SG EDG WEST 56	774861.777	645893.062	<i>Halodule wrightii</i>
SG EDG WEST 57	774868.481	645897.363	<i>Halodule wrightii</i>
SG EDG WEST 58	774888.863	645908.088	<i>Halodule wrightii</i>
SG EDG WEST 59	774898.360	645911.143	<i>Halodule wrightii</i>
SG EDG WEST 60	774903.825	645915.952	<i>Halodule wrightii</i>
SG EDG WEST 61	774918.386	645923.181	<i>Halodule wrightii</i>
SG EDG WEST 62	774931.095	645926.864	<i>Halodule wrightii</i>
SG EDG WEST 63	774947.285	645935.465	<i>Halodule wrightii</i>
SG EDG WEST 64	774958.066	645937.367	<i>Halodule wrightii</i>
SG EDG WEST 65	774970.353	645945.348	<i>Halodule wrightii</i>
SG EDG WEST 66	774980.820	645950.979	<i>Halodule wrightii</i>
SG EDG WEST 67	774991.921	645953.830	<i>Halodule wrightii</i>
SG EDG WEST 68	775002.157	645952.668	<i>Halodule wrightii</i>
SG EDG WEST 69	775008.161	645949.006	<i>Halodule wrightii</i>
SG EDG WEST 70	775020.814	645946.711	<i>Halodule wrightii</i>
SG EDG WEST 71	775028.084	645949.795	<i>Halodule wrightii</i>
SG EDG WEST 72	775035.275	645952.032	<i>Halodule wrightii</i>
SG EDG WEST 73	775042.844	645951.108	<i>Halodule wrightii</i>
SG EDG WEST 74	775048.763	645952.847	<i>Halodule wrightii</i>
SG EDG WEST 75	775050.885	645959.072	<i>Halodule wrightii</i>
SG EDG WEST 76	775067.991	645956.356	<i>Halodule wrightii</i>
SG EDG WEST 77	775077.987	645963.592	<i>Halodule wrightii</i>
SG EDG WEST 78	775083.122	645972.755	<i>Halodule wrightii</i>
SG EDG WEST 79	775087.784	645974.124	<i>Halodule wrightii</i>
SG EDG WEST 80	775112.676	645977.811	<i>Halodule wrightii</i>
SG EDG WEST 81	775126.938	645982.038	<i>Syringodium filiforme</i>
SG EDG WEST 82	775134.325	645998.188	<i>Syringodium filiforme</i>
SG EDG WEST 83	775137.639	645998.957	<i>Halodule wrightii</i>
SG EDG WEST 84	775149.013	646005.998	<i>Halodule wrightii</i>
SG EDG WEST 85	775165.353	646003.271	<i>Halodule wrightii</i>
SG EDG WEST 86	775172.364	646003.523	<i>Halodule wrightii</i>
SG EDG WEST 87	775185.735	645999.035	<i>Syringodium filiforme</i>
SG EDG WEST 88	775199.047	646002.909	<i>Syringodium filiforme</i>
SG EDG WEST 89	775208.368	646015.991	<i>Thalassia testudinum</i>
SG EDG WEST 90	775204.448	646030.912	<i>Thalassia testudinum</i>
SG EDG WEST 91	775197.217	646039.067	<i>Halodule wrightii</i>
SG EDG WEST 92	775207.055	646044.160	<i>Halodule wrightii</i>

Point Name	Northing	Easting	Species
SG EDG WEST 93	775213.607	646050.302	<i>Halodule wrightii</i>
SG EDG WEST 94	775218.096	646057.982	<i>Halodule wrightii</i>
SG EDG WEST 95	775227.296	646064.177	<i>Halodule wrightii</i>
SG EDG WEST 96	775240.397	646067.798	<i>Halodule wrightii</i>
SG EDG WEST 97	775248.751	646072.718	<i>Halodule wrightii</i>
SG EDG WEST 98	775258.213	646076.328	<i>Halodule wrightii</i>
SG EDG WEST 99	775270.468	646080.732	<i>Halodule wrightii</i>
SG EDG WEST 100	775279.498	646090.556	<i>Halodule wrightii</i>
SG EDG WEST 101	775292.738	646096.199	<i>Halodule wrightii</i>
SG EDG WEST 102	775300.889	646102.084	<i>Halodule wrightii</i>
SG EDG WEST 103	775314.925	646110.077	<i>Halodule wrightii</i>
SG EDG WEST 104	775319.280	646111.756	<i>Halodule wrightii</i>
SG EDG WEST 105	775331.129	646119.430	<i>Halodule wrightii</i>
SG EDG WEST 106	775340.111	646125.305	<i>Halodule wrightii</i>
SG EDG WEST 107	775347.421	646128.111	<i>Halodule wrightii</i>
SG EDG WEST 108	775358.333	646133.168	<i>Halodule wrightii</i>
SG EDG WEST 109	775366.726	646138.707	<i>Halodule wrightii</i>
SG EDG WEST 110	775375.918	646142.329	<i>Halodule wrightii</i>
SG EDG WEST 111	775386.664	646149.191	<i>Halodule wrightii</i>
SG EDG WEST 112	775397.015	646149.813	<i>Halodule wrightii</i>
SG EDG WEST 113	775414.212	646149.224	<i>Halodule wrightii</i>
SG EDG WEST 114	775423.437	646152.581	<i>Halodule wrightii</i>
SG EDG WEST 115	775432.021	646160.362	<i>Halodule wrightii</i>
SG EDG WEST 116	775441.504	646164.714	<i>Halodule wrightii</i>
SG EDG WEST 117	775447.575	646168.947	<i>Halodule wrightii</i>
SG EDG WEST 118	775465.347	646176.176	<i>Halodule wrightii</i>
SG EDG WEST 119	775486.301	646177.679	<i>Halodule wrightii</i>
SG EDG WEST 120	775491.996	646182.061	<i>Halodule wrightii</i>
SG EDG WEST 121	775512.951	646169.179	<i>Syringodium filiforme</i>
SG EDG WEST 122	775527.178	646174.986	<i>Syringodium filiforme</i>
SG EDG WEST 123	775530.010	646181.908	<i>Syringodium filiforme</i>
SG EDG WEST 124	775530.162	646189.257	<i>Halodule wrightii</i>
SG EDG WEST 125	775545.579	646210.047	<i>Halodule wrightii</i>
SG EDG WEST 126	775546.713	646213.526	<i>Halodule wrightii</i>
SG EDG WEST 127	775556.865	646217.798	<i>Halodule wrightii</i>
SG EDG WEST 128	775569.593	646220.328	<i>Halodule wrightii</i>
SG EDG WEST 129	775580.475	646223.173	<i>Halodule wrightii</i>
SG EDG WEST 130	775589.343	646221.973	<i>Halodule wrightii</i>
SG EDG WEST 131	775596.819	646218.011	<i>Halodule wrightii</i>
SG EDG WEST 132	775603.360	646221.171	<i>Halodule wrightii</i>
SG EDG WEST 133	775608.992	646224.143	<i>Halodule wrightii</i>
SG EDG WEST 134	775619.301	646229.679	<i>Halodule wrightii</i>
SG EDG WEST 135	775627.721	646234.675	<i>Halodule wrightii</i>
SG EDG WEST 136	775636.381	646241.902	<i>Halodule wrightii</i>
SG EDG WEST 137	775645.407	646240.792	<i>Halodule wrightii</i>
SG EDG WEST 138	775653.097	646247.766	<i>Halodule wrightii</i>

Point Name	Northing	Easting	Species
SG EDG WEST 139	775660.325	646253.562	<i>Halodule wrightii</i>
SG EDG WEST 140	775676.804	646255.195	<i>Halodule wrightii</i>
SG EDG WEST 141	775686.864	646255.874	<i>Halodule wrightii</i>
SG EDG WEST 142	775696.709	646256.855	<i>Halodule wrightii</i>
SG EDG WEST 143	775717.150	646245.213	<i>Thalassia testudinum</i>
SG EDG WEST 144	775725.507	646260.147	<i>Halodule wrightii</i>
SG EDG WEST 145	775730.866	646273.168	<i>Halodule wrightii</i>
SG EDG WEST 146	775741.771	646277.939	<i>Halodule wrightii</i>
SG EDG WEST 147	775753.461	646279.358	<i>Halodule wrightii</i>
SG EDG WEST 148	775762.853	646285.025	<i>Halodule wrightii</i>
SG EDG WEST 149	775787.574	646279.917	<i>Halodule wrightii</i>
SG EDG WEST 150	775801.266	646275.796	<i>Halodule wrightii</i>
SG EDG WEST 151	775811.967	646274.786	<i>Halodule wrightii</i>
SG EDG WEST 152	775819.119	646259.640	<i>Syringodium filiforme</i>
SG EDG WEST 153	775825.176	646262.381	<i>Syringodium filiforme</i>
SG EDG WEST 154	775830.189	646269.200	<i>Syringodium filiforme</i>
SG EDG WEST 155	775842.630	646275.640	<i>Syringodium filiforme</i>
SG EDG WEST 156	775845.855	646283.291	<i>Syringodium filiforme</i>
SG EDG WEST 157	775849.992	646287.664	<i>Syringodium filiforme</i>
SG EDG WEST 158	775856.892	646292.866	<i>Syringodium filiforme</i>
SG EDG WEST 159	775855.622	646303.323	<i>Syringodium filiforme</i>
SG EDG WEST 160	775852.972	646309.448	<i>Halodule wrightii</i>
SG EDG WEST 161	775858.127	646315.187	<i>Halodule wrightii</i>
SG EDG WEST 162	775864.892	646315.826	<i>Halodule wrightii</i>
SG EDG WEST 163	775875.457	646315.701	<i>Halodule wrightii</i>
SG EDG WEST 164	775895.596	646321.386	<i>Halodule wrightii</i>
SG EDG WEST 165	775903.097	646327.525	<i>Halodule wrightii</i>
SG EDG WEST 166	775906.111	646332.349	<i>Halodule wrightii</i>
SG EDG WEST 167	775911.232	646333.928	<i>Halodule wrightii</i>
SG EDG WEST 168	775924.501	646335.651	<i>Halodule wrightii</i>
SG EDG WEST 169	775941.503	646338.518	<i>Halodule wrightii</i>
SG EDG WEST 170	775947.064	646332.153	<i>Halodule wrightii</i>
SG EDG WEST 171	775956.851	646331.669	<i>Halodule wrightii</i>
SG EDG WEST 172	775964.779	646326.858	<i>Halodule wrightii</i>
SG EDG WEST 173	775973.405	646328.132	<i>Halodule wrightii</i>
SG EDG WEST 174	775980.375	646322.674	<i>Halodule wrightii</i>
SG EDG WEST 175	775992.439	646322.007	<i>Syringodium filiforme</i>
SG EDG WEST 176	776001.766	646327.757	<i>Syringodium filiforme</i>
SG EDG WEST 177	775998.635	646335.946	<i>Syringodium filiforme</i>
SG EDG WEST 178	775999.308	646337.847	<i>Thalassia testudinum</i>
SG EDG WEST 179	776002.049	646341.251	<i>Thalassia testudinum</i>
SG EDG WEST 180	776010.487	646340.944	<i>Thalassia testudinum</i>
SG EDG WEST 181	776015.527	646348.587	<i>Halodule wrightii</i>
SG EDG WEST 182	776023.394	646347.408	<i>Halodule wrightii</i>
SG EDG WEST 183	776029.252	646350.247	<i>Halodule wrightii</i>
SG EDG WEST 184	776034.366	646349.813	<i>Halodule wrightii</i>

Point Name	Northing	Easting	Species
SG EDG WEST 185	776039.655	646353.631	<i>Halodule wrightii</i>
SG EDG WEST 186	776045.414	646355.716	<i>Halodule wrightii</i>
SG EDG WEST 187	776052.363	646351.566	<i>Thalassia testudinum</i>
SG EDG WEST 188	776052.237	646351.588	<i>Thalassia testudinum</i>
SG EDG WEST 189	776059.036	646354.573	<i>Thalassia testudinum</i>
SG EDG WEST 190	776063.940	646356.574	<i>Thalassia testudinum</i>
SG EDG WEST 191	776059.879	646362.275	<i>Thalassia testudinum</i>
SG EDG WEST 192	776057.197	646365.903	<i>Halodule wrightii</i>
SG EDG WEST 193	776064.838	646374.718	<i>Halodule wrightii</i>
SG EDG WEST 194	776072.834	646378.511	<i>Halodule wrightii</i>
SG EDG WEST 195	776081.337	646375.515	<i>Halodule wrightii</i>
SG EDG WEST 196	776085.190	646380.683	<i>Halodule wrightii</i>
SG EDG WEST 197	776096.957	646383.754	<i>Halodule wrightii</i>
SG EDG WEST 198	776101.383	646385.498	<i>Halodule wrightii</i>
SG EDG WEST 199	776106.698	646387.413	<i>Halodule wrightii</i>
SG EDG WEST 200	776112.777	646388.073	<i>Halodule wrightii</i>
SG EDG WEST 201	776119.528	646386.446	<i>Halodule wrightii</i>
SG EDG WEST 202	776126.806	646387.240	<i>Halodule wrightii</i>
SG EDG WEST 203	776135.383	646387.522	<i>Halodule wrightii</i>
SG EDG WEST 204	776140.860	646383.685	<i>Halodule wrightii</i>
SG EDG WEST 205	776144.296	646380.073	<i>Halodule wrightii</i>
SG EDG WEST 206	776153.244	646377.962	<i>Halodule wrightii</i>
SG EDG WEST 207	776165.829	646391.999	<i>Halodule wrightii</i>
SG EDG WEST 208	776175.180	646393.998	<i>Halodule wrightii</i>
SG EDG WEST 209	776183.334	646391.442	<i>Halodule wrightii</i>
SG EDG WEST 210	776189.172	646391.967	<i>Halodule wrightii</i>
SG EDG WEST 211	776199.261	646397.153	<i>Halodule wrightii</i>
SG EDG WEST 212	776204.820	646404.648	<i>Halodule wrightii</i>
SG EDG WEST 213	776199.907	646410.877	<i>Halodule wrightii</i>
SG EDG WEST 214	776199.962	646419.645	<i>Halodule wrightii</i>
SG EDG WEST 215	776202.616	646424.896	<i>Halodule wrightii</i>
SG EDG WEST 216	776209.013	646425.054	<i>Halodule wrightii</i>
SG EDG WEST 217	776217.575	646431.400	<i>Halodule wrightii</i>
SG EDG WEST 218	776224.378	646439.241	<i>Halodule wrightii</i>
SG EDG WEST 219	776230.171	646444.961	<i>Halodule wrightii</i>
SG EDG WEST 220	776238.955	646444.599	<i>Halodule wrightii</i>
SG EDG WEST 221	776243.403	646442.789	<i>Halodule wrightii</i>
SG EDG WEST 222	776253.939	646441.950	<i>Halodule wrightii</i>
SG EDG WEST 223	776266.464	646447.887	<i>Halodule wrightii</i>
SG EDG WEST 224	776268.454	646452.973	<i>Halodule wrightii</i>
SG EDG WEST 225	776277.550	646455.359	<i>Halodule wrightii</i>
SG EDG WEST 226	776283.378	646460.320	<i>Halodule wrightii</i>
SG EDG WEST 227	776292.662	646461.063	<i>Halodule wrightii</i>
SG EDG WEST 228	776301.881	646461.480	<i>Halodule wrightii</i>
SG EDG WEST 229	776307.135	646463.190	<i>Halodule wrightii</i>
SG EDG WEST 230	776312.661	646468.078	<i>Halodule wrightii</i>

Point Name	Northing	Easting	Species
SG EDG WEST 231	776320.607	646471.015	<i>Halodule wrightii</i>
SG EDG WEST 232	776326.549	646474.136	<i>Halodule wrightii</i>
SG EDG WEST 233	776334.645	646476.480	<i>Halodule wrightii</i>
SG EDG WEST 234	776339.285	646469.456	<i>Halodule wrightii</i>
SG EDG WEST 235	776383.314	646483.468	<i>Halodule wrightii</i>
SG EDG WEST 236	776379.745	646488.006	<i>Halodule wrightii</i>
SG EDG WEST 237	776381.586	646491.390	<i>Halodule wrightii</i>
SG EDG WEST 238	776388.640	646493.271	<i>Halodule wrightii</i>
SG EDG WEST 239	776394.335	646499.089	<i>Halodule wrightii</i>
SG EDG WEST 240	776397.217	646501.971	<i>Halodule wrightii</i>
SG EDG WEST 241	776400.870	646502.491	<i>Halodule wrightii</i>
SG EDG WEST 242	776403.319	646499.735	<i>Halodule wrightii</i>
SG EDG WEST 243	776403.146	646499.702	<i>Halodule wrightii</i>
SG EDG WEST 244	776406.419	646492.029	<i>Halodule wrightii</i>
SG EDG WEST 245	776407.222	646485.303	<i>Halodule wrightii</i>
SG EDG WEST 246	776447.724	646501.565	<i>Halodule wrightii</i>
SG EDG WEST 247	776444.665	646504.770	<i>Halodule wrightii</i>
SG EDG WEST 248	776443.669	646508.594	<i>Halodule wrightii</i>
SG EDG WEST 249	776445.566	646512.252	<i>Halodule wrightii</i>
SG EDG WEST 250	776445.979	646517.588	<i>Halodule wrightii</i>
SG EDG WEST 251	776453.819	646517.987	<i>Halodule wrightii</i>
SG EDG WEST 252	776464.583	646524.352	<i>Halodule wrightii</i>
SG EDG WEST 253	776468.732	646530.214	<i>Halodule wrightii</i>
SG EDG WEST 254	776467.475	646534.721	<i>Halodule wrightii</i>
SG EDG WEST 255	776473.991	646535.989	<i>Halodule wrightii</i>
SG EDG WEST 256	776479.974	646540.172	<i>Halodule wrightii</i>
SG EDG WEST 257	776483.937	646541.972	<i>Halodule wrightii</i>
SG EDG WEST 258	776487.644	646540.915	<i>Halodule wrightii</i>
SG EDG WEST 259	776493.553	646538.800	<i>Halodule wrightii</i>
SG EDG WEST 260	776501.237	646536.572	<i>Halodule wrightii</i>
SG EDG WEST 261	776502.867	646541.461	<i>Halodule wrightii</i>
SG EDG WEST 262	776511.563	646544.165	<i>Halodule wrightii</i>
SG EDG WEST 263	776514.162	646536.935	<i>Halodule wrightii</i>