



Keaton Beach Urchin Survey updates

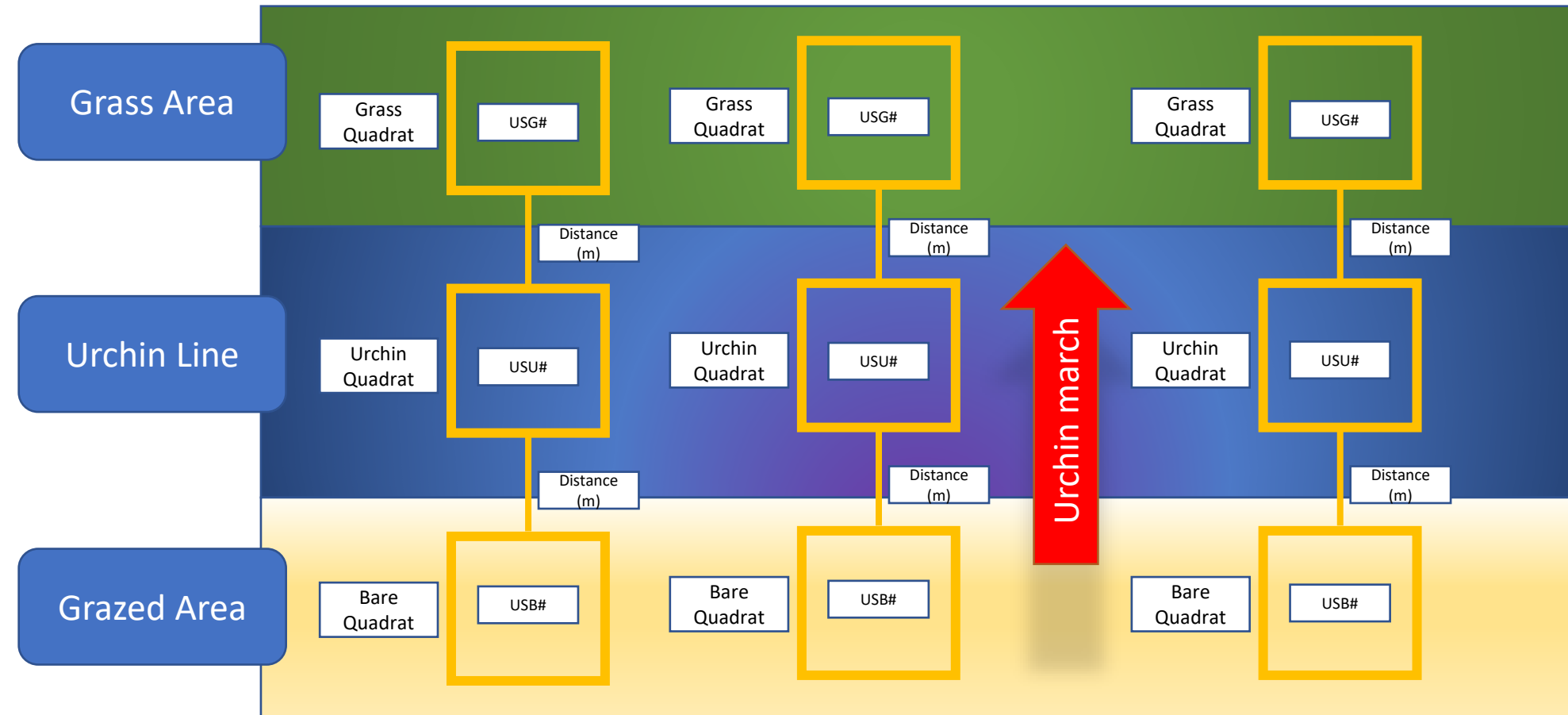
Keaton Beach
Updates from July 2023
Big Bend Seagrasses Aquatic Preserves
Contact: Kate Suchanec
katherine.suchanec@floridadep.gov



GPS coordinates taken while following the urchin line on 8 February 2023. The line extends from each end, staff had limited time to follow the full length. Aerial mapping is proposed to obtain better imagery. Urchin line is orange, green markers are continuous seagrass monitoring stations used yearly by BBSAP. Marked path is approximately 4 kilometers.

Original Survey Design

“tri-mix” method



May Survey Sites Length

Survey site 8 total transect length: 26m.

USU08 placed at 13m mark

Survey site 9 total transect length: 16m.

USU09 placed at 8m mark

Survey site 10 total transect length: 21m.

USU10 placed at 11m mark

Site 10 was placed based on the coordinates of the original February site 01 sampling event.



Urchin survey sites
labeled. USG11 is still
the furthest survey
inland.

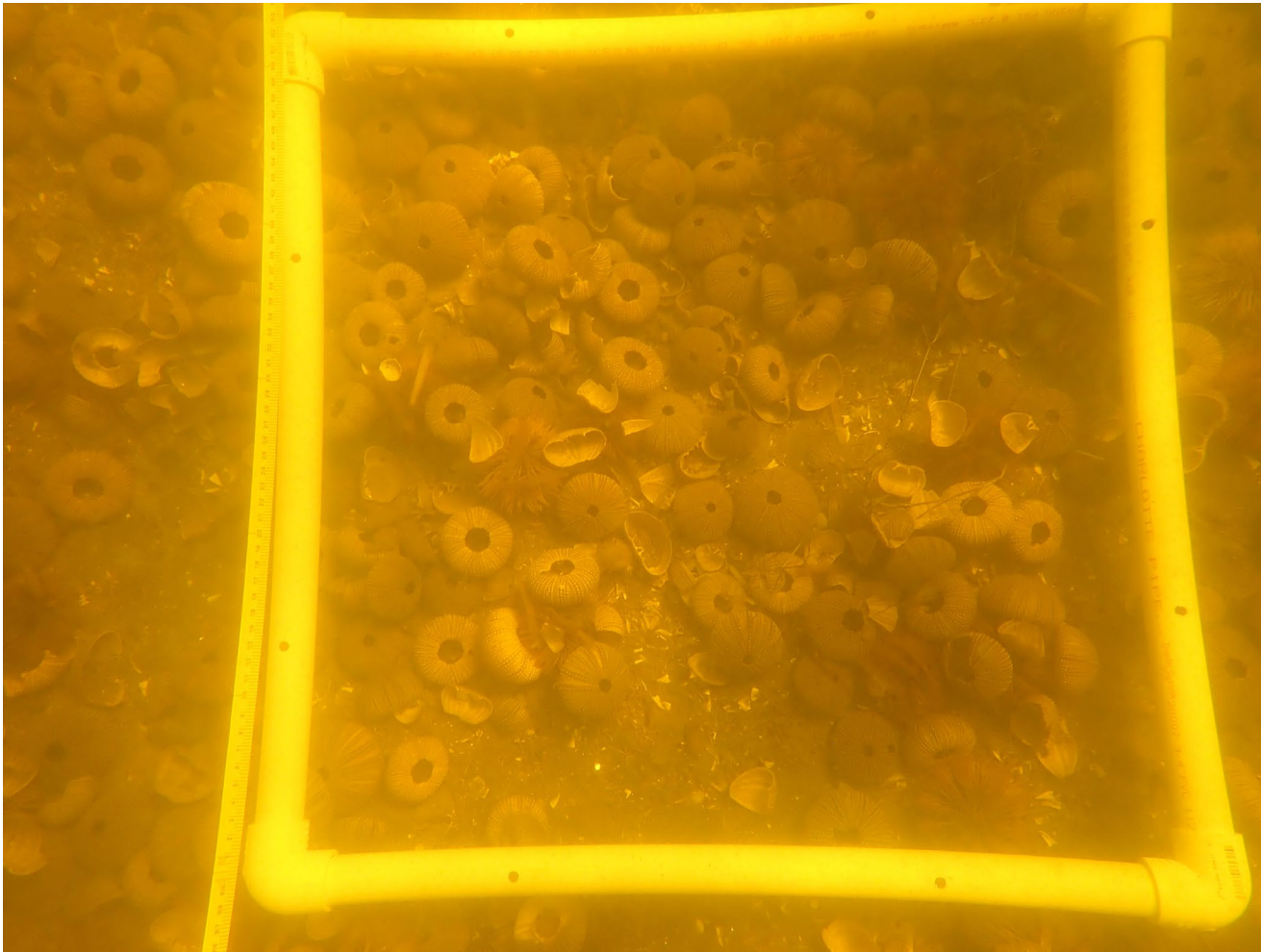
July sites added in. June site US11 was found inland from USU08. The distance between USU07 (April) and USU08 (May) is 0.08km and the distance from USU08 to USU11 (June) is 0.07km. The line did not move from US11 to US12 between June and July, the US11 site seems to have had a mass urchin die off.

Urchin Survey Quad 12

USU12

GPS: 29.80411, -83.6218

Date: 07/21/2023



Full quad (0.25m²)



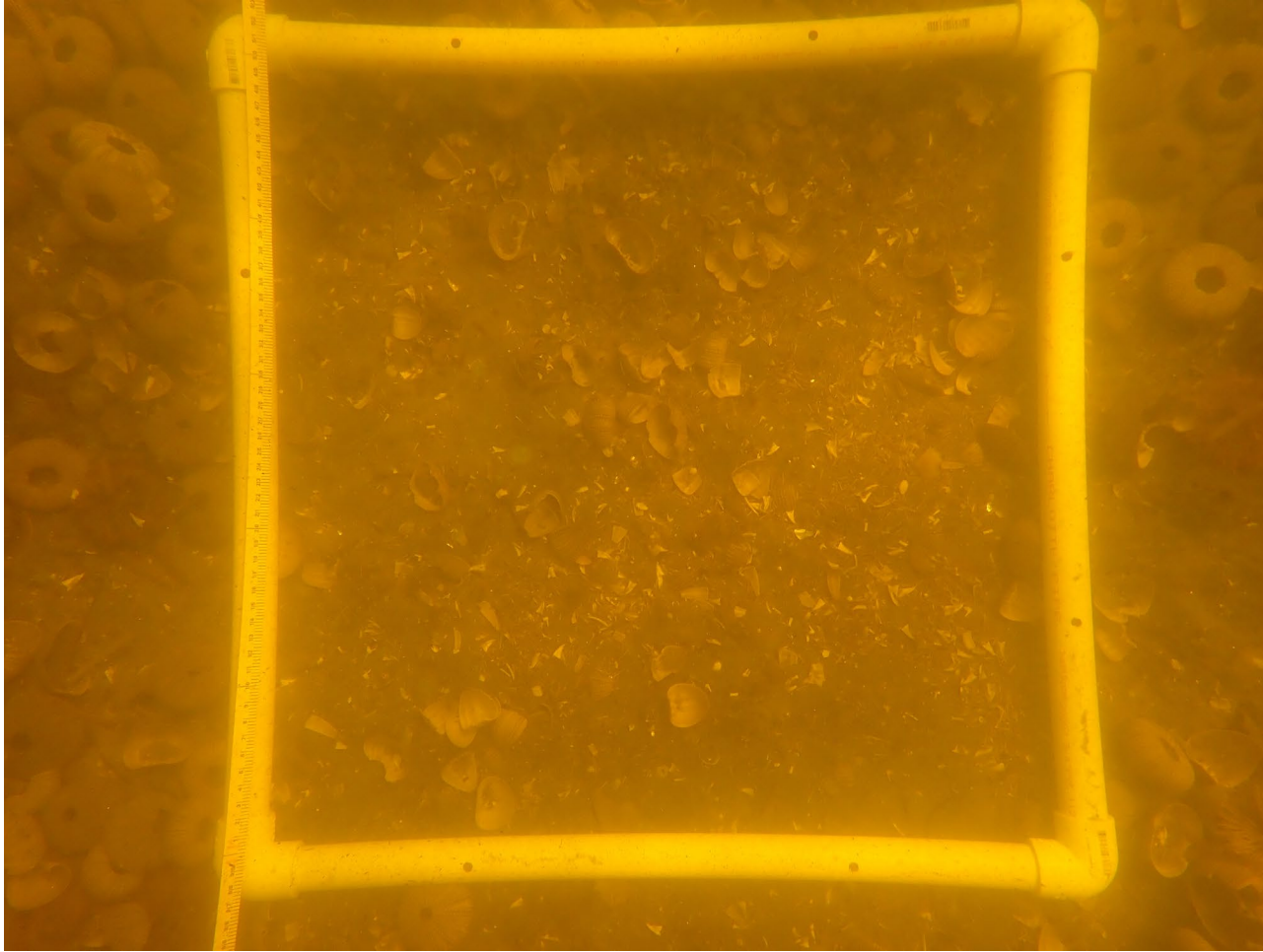
Mix of live urchins
and dead urchin
tests

Urchin Survey Quad 12

USU12

GPS: 29.80411, -83.6218

Date: 07/21/2023



USU12 after removal of
urchins and tests



Spines and broken
tests littering USU12
following removal

Urchin Survey Quad 12

USU12

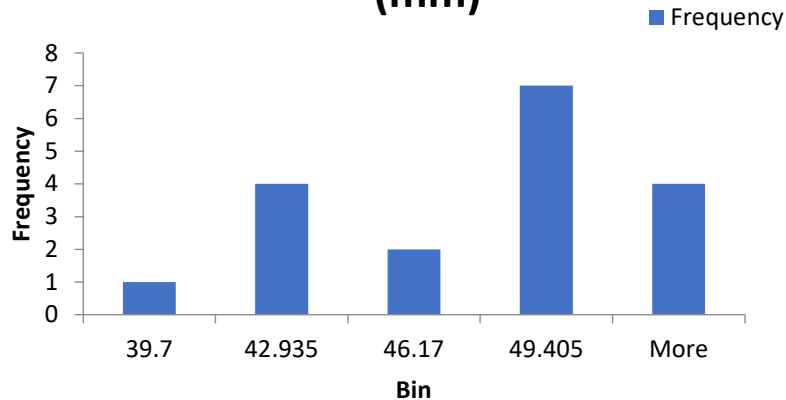
GPS: 29.80411, -83.6218

Date: 07/21/2023

Date	Site Name	Type	SPECIES	PERCENT_C OVER	Canopy Height (cm)	Canopy Height (cm)	Canopy Height (cm)	URCHINS	SCALLOPS	GRASS_ALG AE	TOTAL_SAV PERCENT_ COVER	TOTAL_GR ASS_PERCE NT	TOTAL_MA CROALGAE _PERCENT	EPIPHYTE_ DENSITY	SEDIMENT_ TYPE	Rhizomes
7/21/2023	USU12	Urchin	NGIQ	0				18	0		0	0	0		Sand Silt Mud Shell	yes

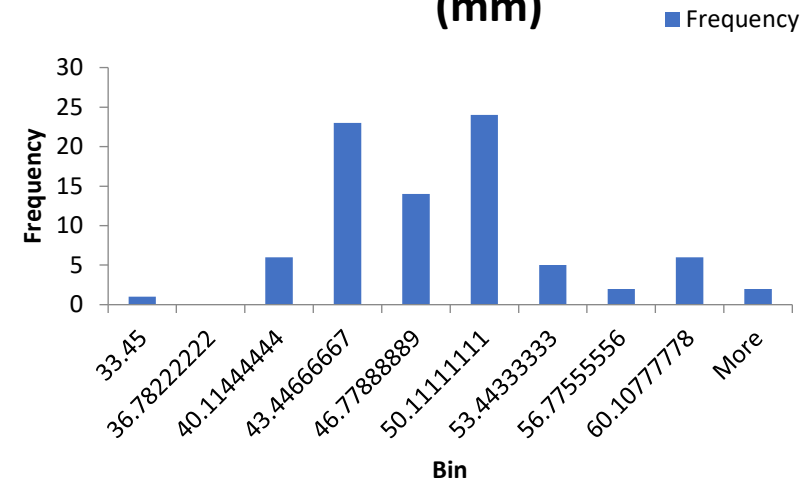
Temp	DO (mg/L/)	Salinity	pH
30.9	5.95	24.29	7.82

**USU12 Live Urchin Test Diameters
(mm)**



Mean diameter (mm)	46.41778
Standard deviation	4.094904
Range	12.94
Minimum diameter (mm)	39.7
Maximum diameter (mm)	52.64
Total Live Urchin Count	18

**USU12 Dead Urchin Test Diameters
(mm)**



Mean diameter (mm)	46.61157
Standard deviation	5.742003
Range	29.99
Minimum diameter (mm)	33.45
Maximum diameter (mm)	63.44
Total Dead Urchin Count	83

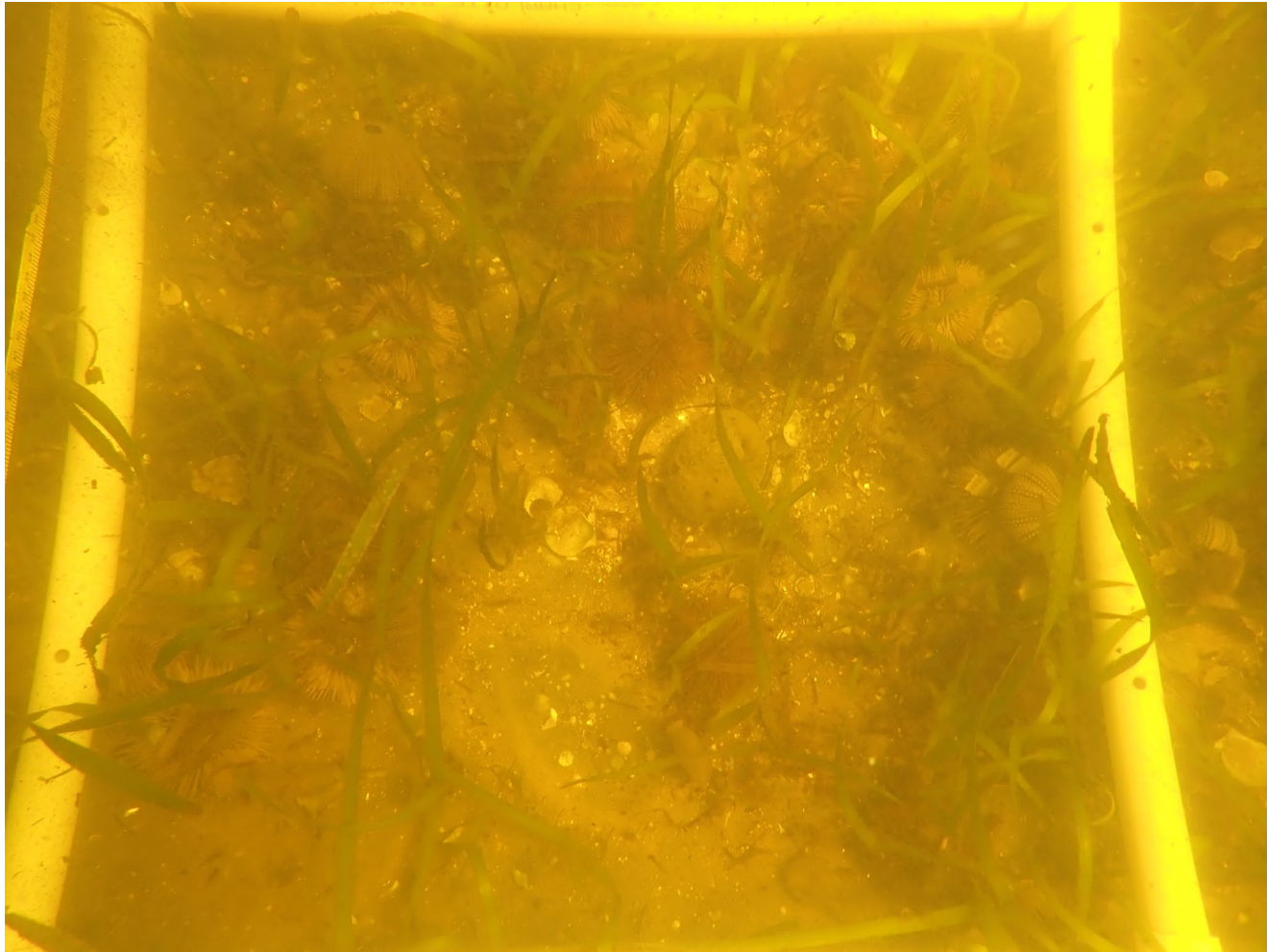
Note: urchin diameter measured transversally, test to test

Urchin Survey Quad 13

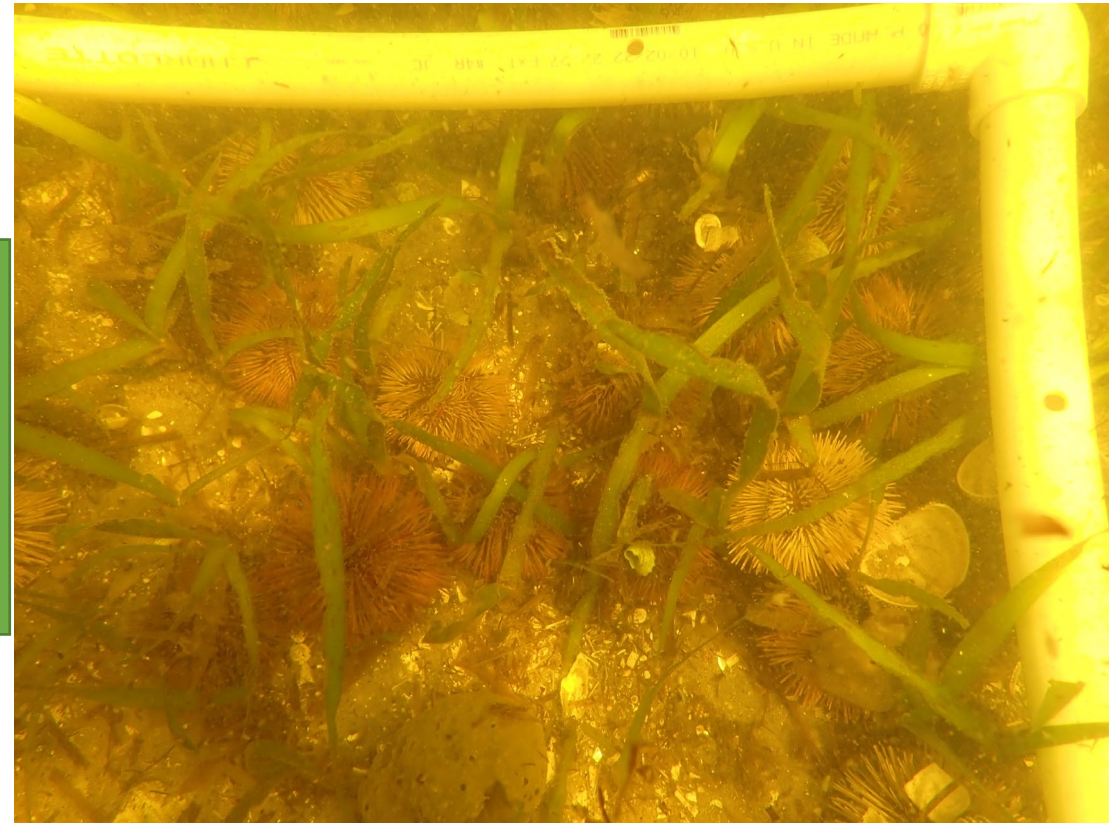
USU13

GPS: 29.80423, -83.6218

Date: 07/21/2023



Full quad (0.25m²)



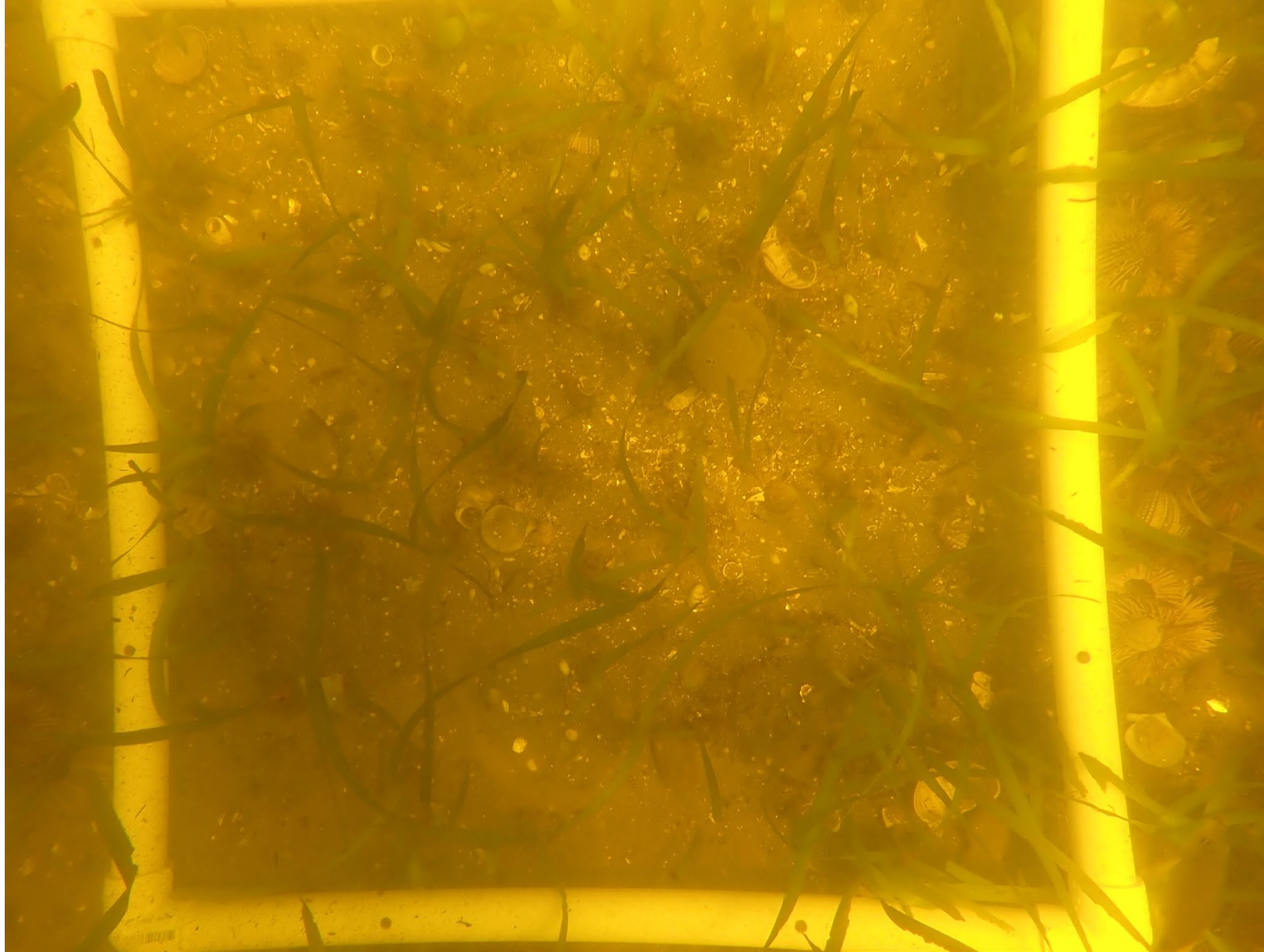
Grass and urchins
closeup in USU13

Urchin Survey Quad 13

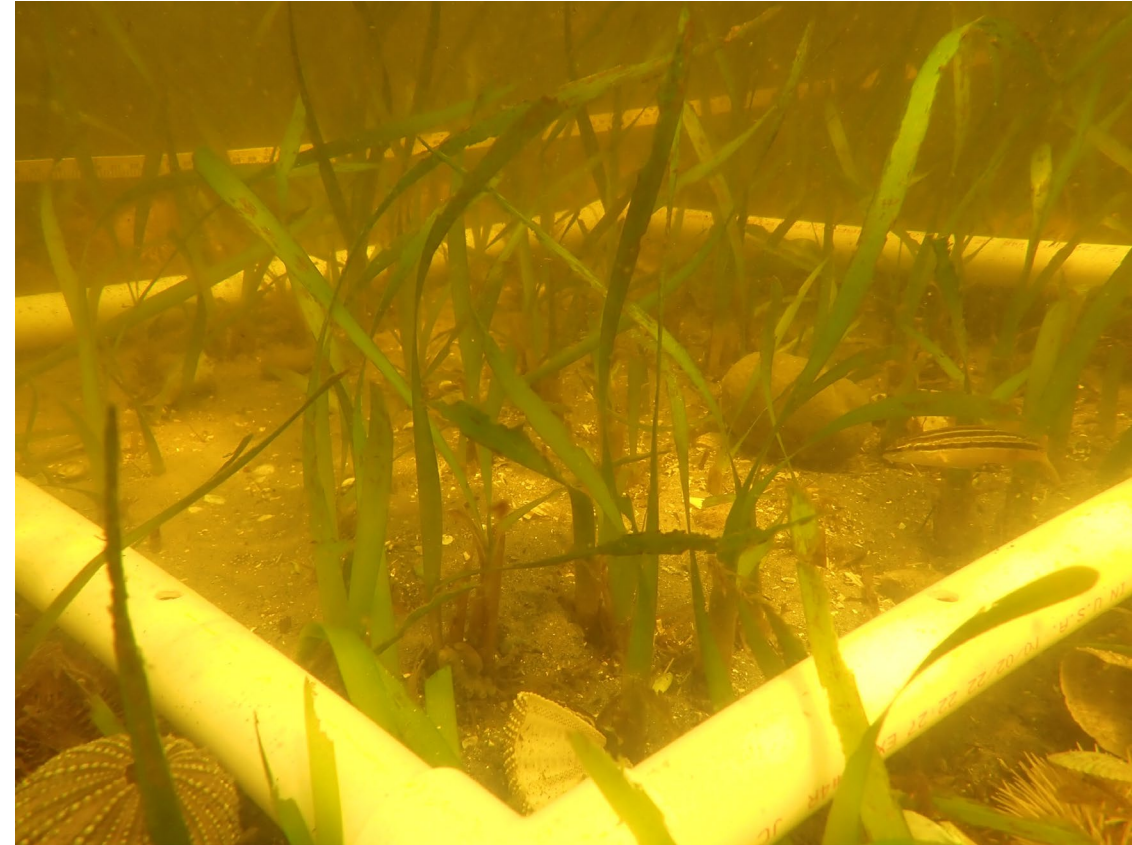
USU13

GPS: 29.80423, -83.6218

Date: 07/21/2023



Grass in USU13



Grass in USU13

Urchin Survey Quad 13

USU13

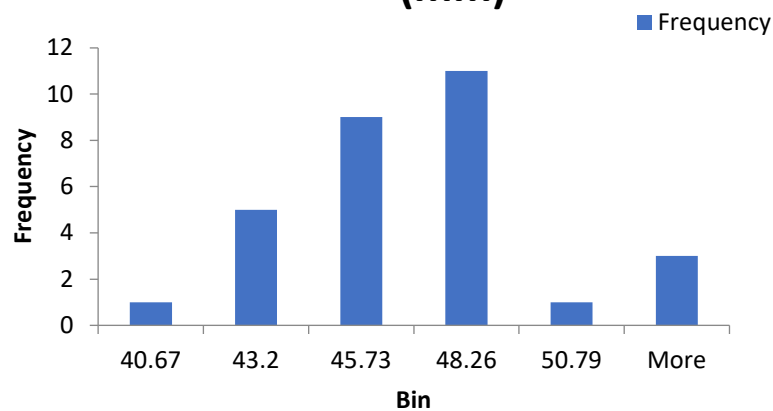
GPS: 29.80423, -83.6218

Date: 07/21/2023

Date	Site Name	Type	SPECIES	PERCENT_COVER	Canopy Height (cm)	Canopy Height (cm)	Canopy Height (cm)	URCHINS	SCALLOPS	GRASS_ALGAE	TOTAL_SAV_PERCENT_COVER	TOTAL_GRASS_PERCENT	TOTAL_MacroALGAE_PERCENT	EPIPHYTE_DENSITY	SEDIMENT_TYPE	Rhizomes
7/21/2023	USU13	Urchin	TTES	20	16.5	13.1	14.7	30		0 Grass	21	21		0 Clean	Sand Silt Mud Shell	Y
7/21/2023	USU13	Urchin	SFIL	1	7.6	4.9				Grass						

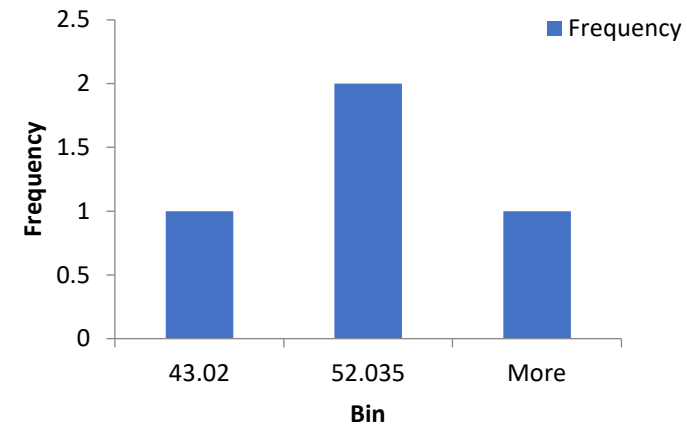
Temp	DO (mg/L/)	Salinity	pH
31.3	6.01	23.81	7.94

USU13 Live Urchin Test Diameters (mm)



Mean diameter (mm)	45.89533
Standard deviation	3.103264
Range	12.65
Minimum diameter (mm)	40.67
Maximum diameter (mm)	53.32
Total Urchin Count	30

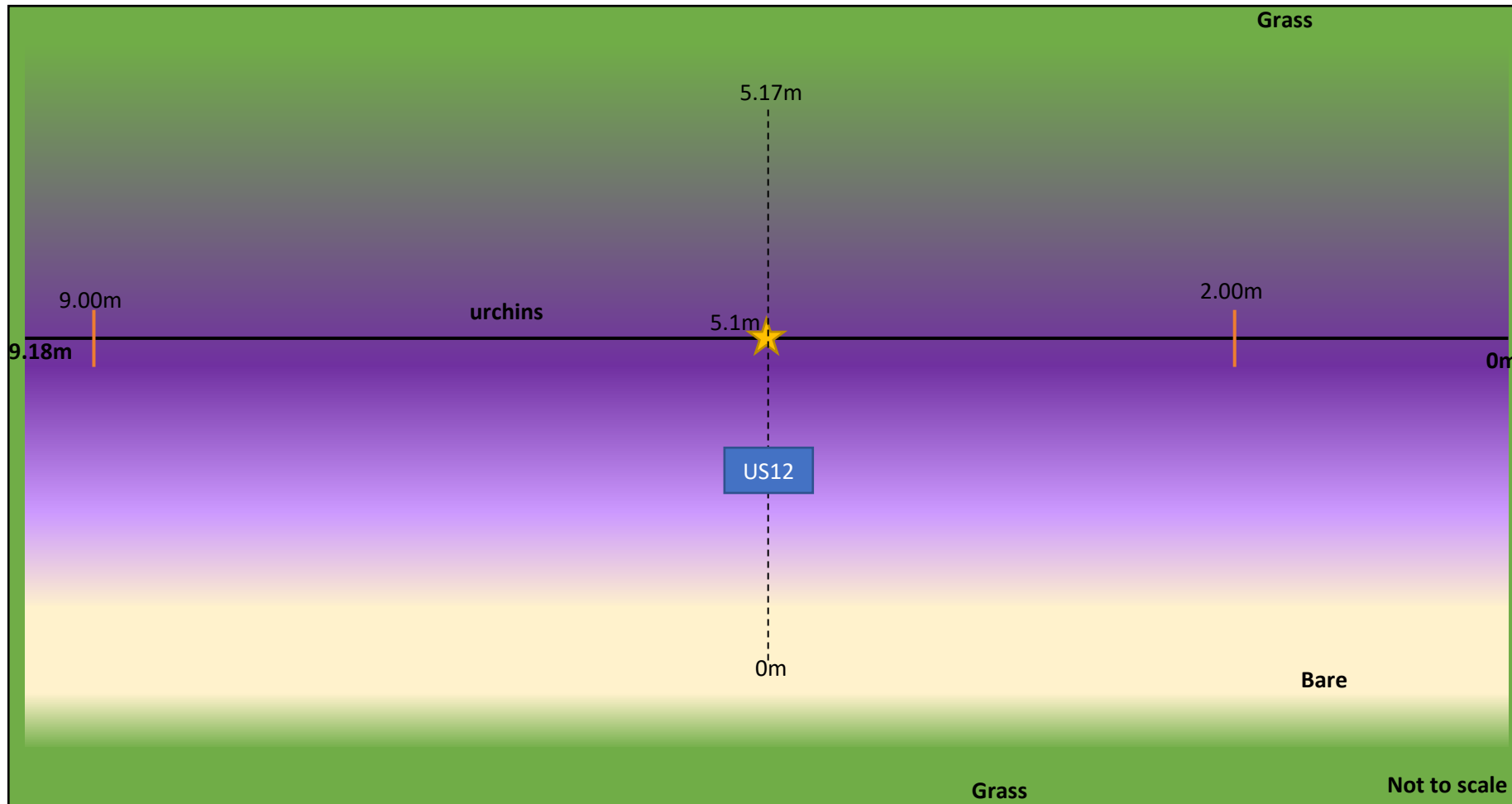
USU13 Dead Urchin Test Diameters (mm)



Mean diameter (mm)	49.9575
Standard deviation	8.034058
Range	18.03
Minimum diameter (mm)	43.02
Maximum diameter (mm)	61.05
Total Urchin Count	4

June and July measurements from urchin bloom pocket

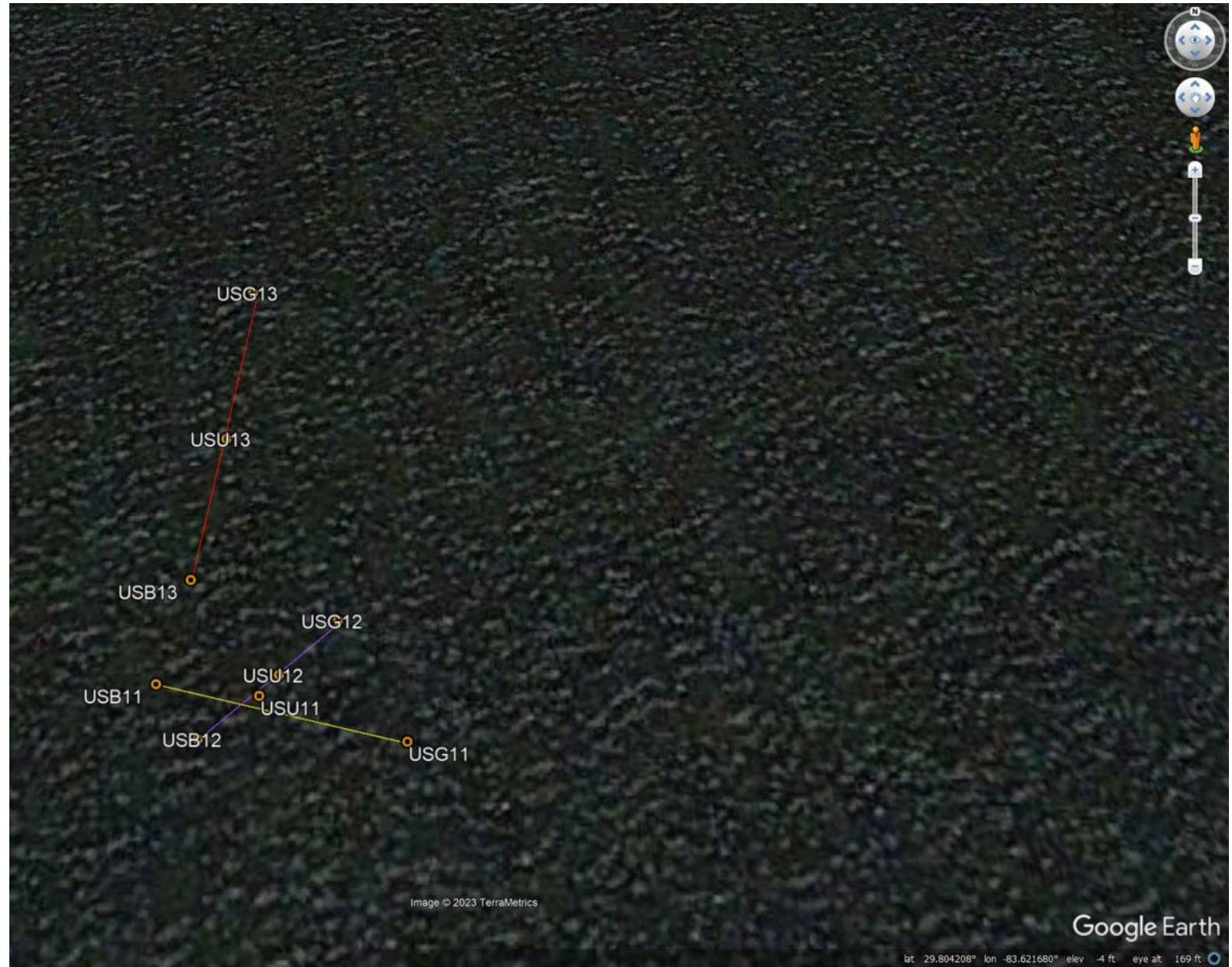
Following the completion of the US11 quadrats, we measured the length and width of the urchin mass. It seemed to be a pocket in the grass, disconnected from any front. Unsure if there were more in the area, survey time was limited due to high winds again and visibility from the surface was greatly reduced from a combination of strong halocline due to recent rain and the chop from winds. Total length across (solid line) was 9.18m, with the highest density between 2.0 and 9.0m. The widest section (dotted line) was located at the 5.1m mark and was 5.17m wide.



Upon return in July we set out to find US11 and then planned to drive inshore until we could find where the urchin pocket had moved, however when we arrived at US11 the pocket was in the same spot. In our scouting we noticed that the majority of the urchins in the US11 pocket were now dead, we laid a transect line along what was the US11 widest part (the star in the figure) and the transect line ran along the width of the original pocket (dotted line). After we completed US12 we found that if we swam over the grass edge we found a sparse urchin area with a mixed amount of live and dead urchins where we laid US13.

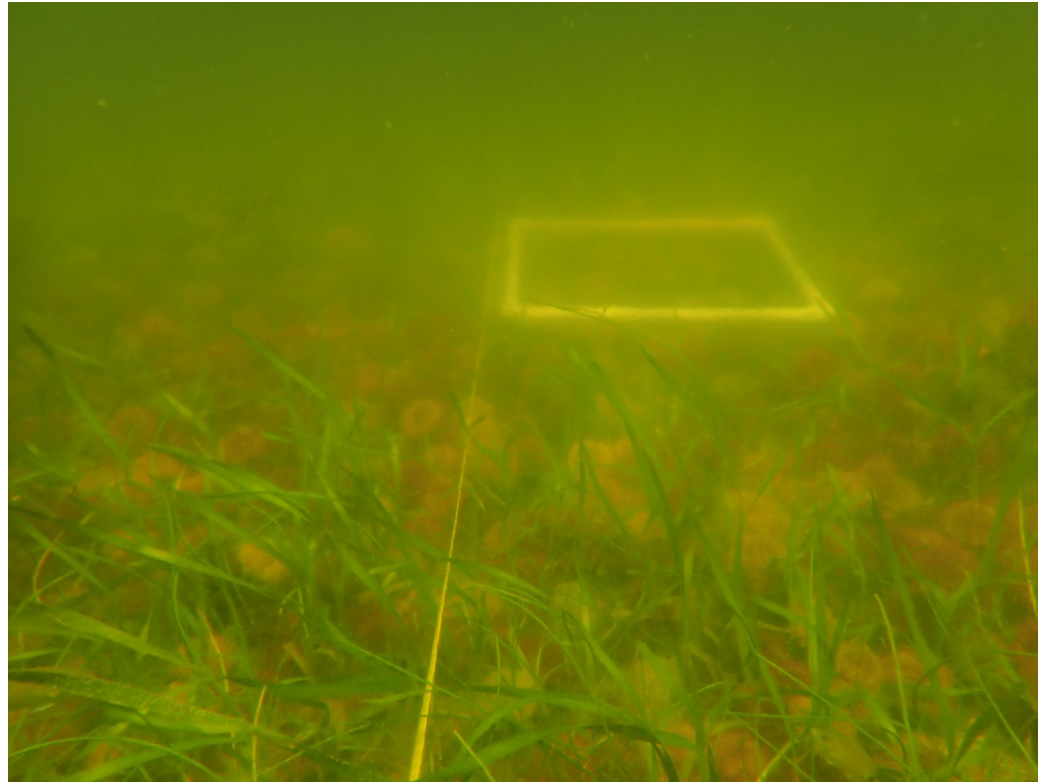
June and July measurements from urchin bloom pocket

Yellow line is the US11 survey, purple is US12 and US13 is the survey to the north over the grass line outside of the urchin bloom pocket.



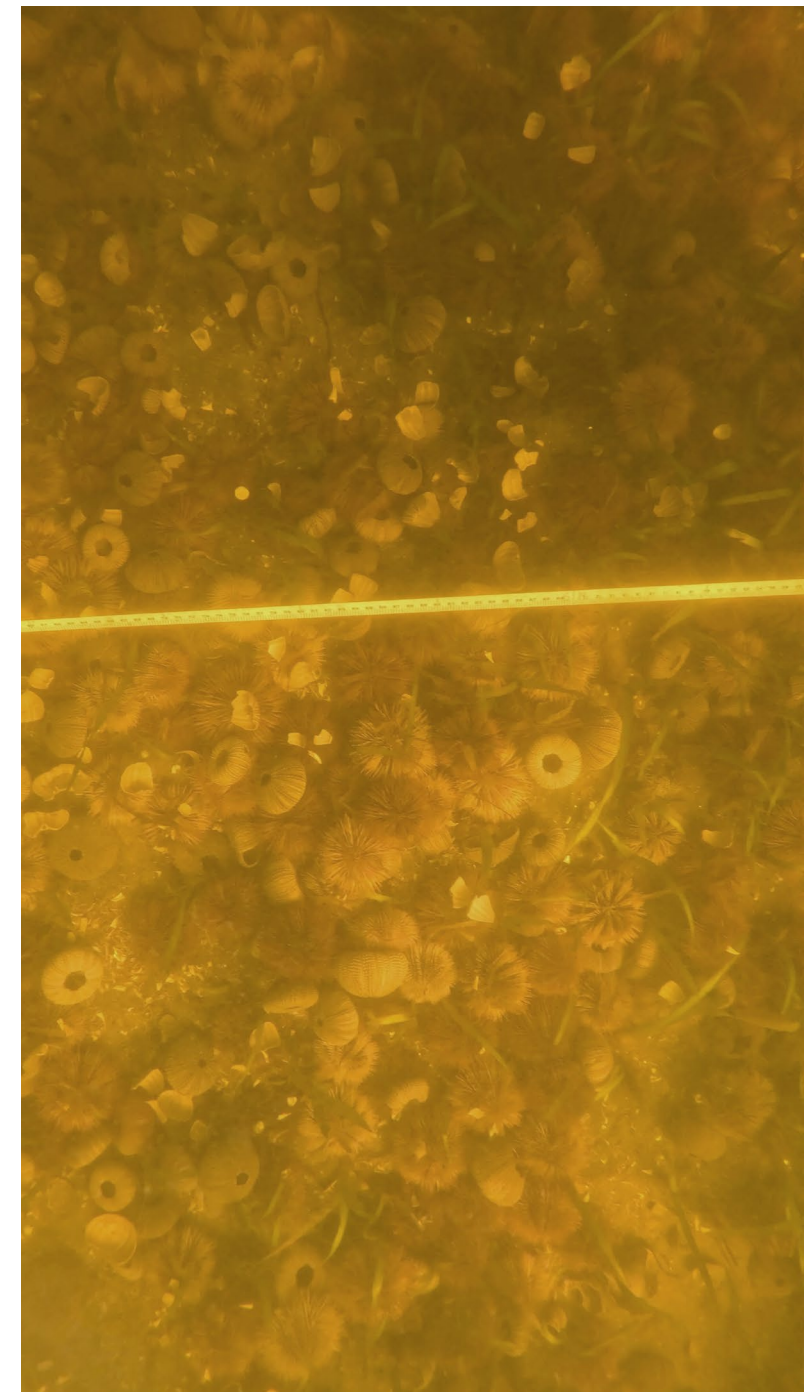
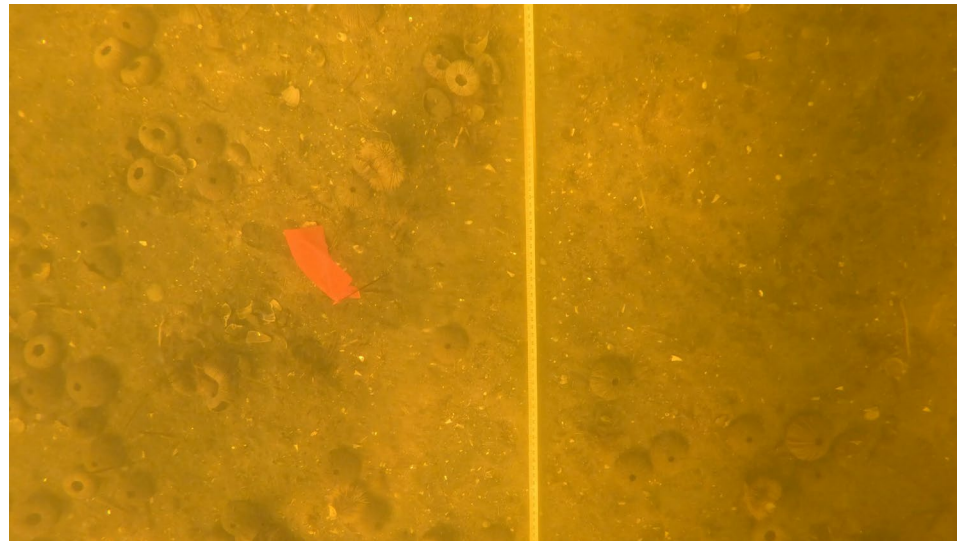
Pics from Urchin Survey 11 transect

While swimming the length of the widest part of the urchin bloom, there were about 47 dead urchins touching the transect line (5.1m). The dead urchins were in varying states, some still with spines and some which had completely lost their spines.



Pics from Urchin Survey 12 transect

Vast majority of the urchins along the transect line are now dead. The orange flag represents where the widest point of the urchin pocket was in June at USU11. Area within the pocket is now littered with dead urchin tests and spines, the line along the bare and grass interface had some live urchins but the majority were dead.



Sample sites US07,US08, US11, and US12

Fig. 1 Number of Live Urchins by Type of Quadrat

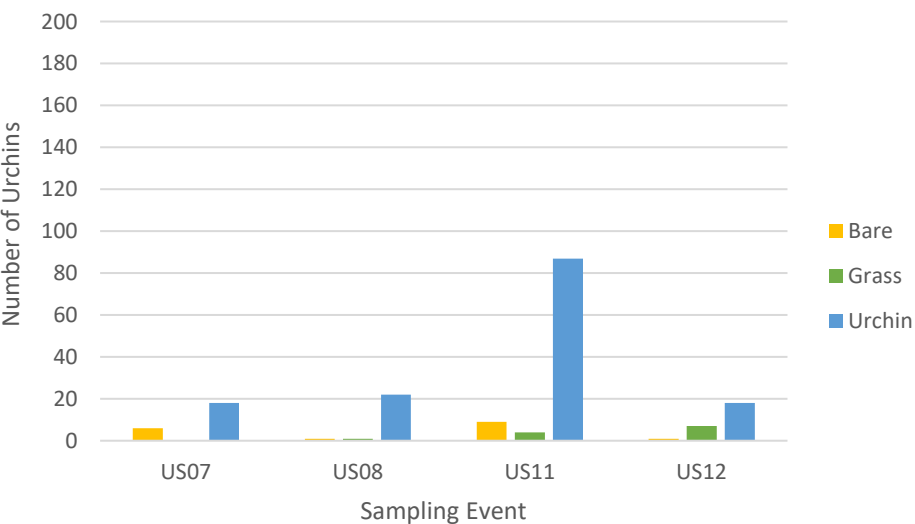


Fig. 2 Average Total Seagrass Percent Cover

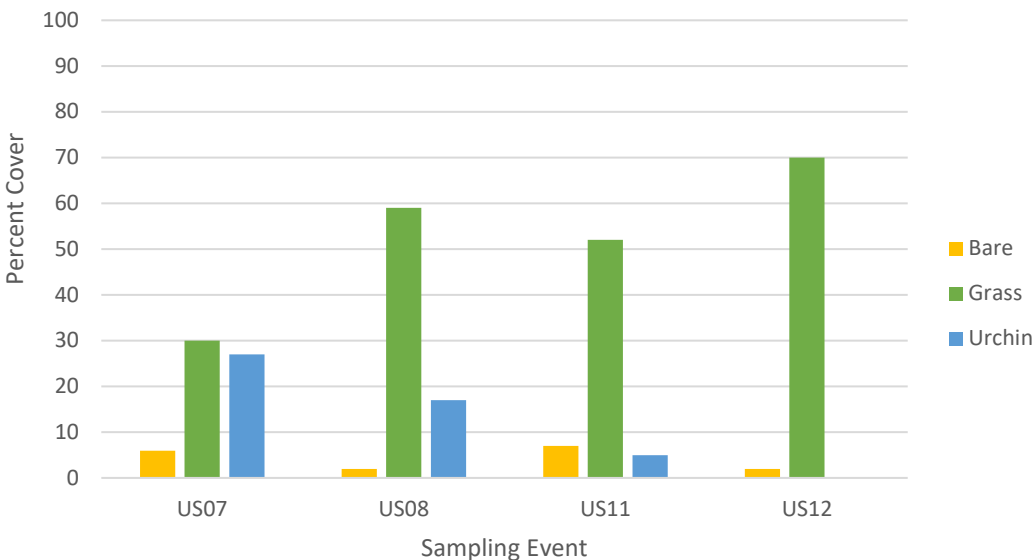


Figure 1: Urchins present in each quadrat at time of sampling event. USU11 (June) had the most urchins present in any quad. Figure 2: Total seagrass percent cover for each quadrat, US07 had the lowest grass coverage, US08 had the most coverage for Grass and Urchin, US11 had the highest percent cover for Bare. Figure 3: Average canopy height of all seagrass species present in quadrat. Figure 4: comparing the frequency of urchin diameters between sites, USU11 had the most urchins out of the three urchin quads with 87 in the quad, USU08 had the largest range in size, 31.74mm between the minimum-34.73mm and maximum-66.47.

Fig. 3 Average Total Seagrass Canopy Height per Sampling Event

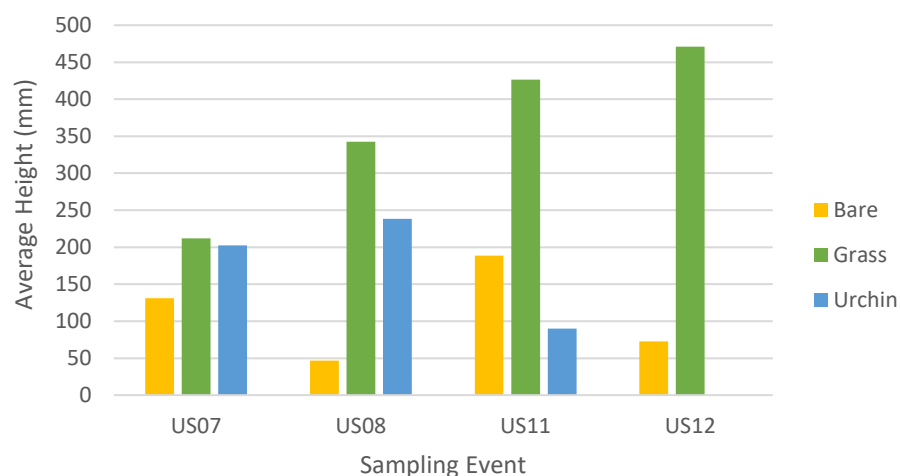
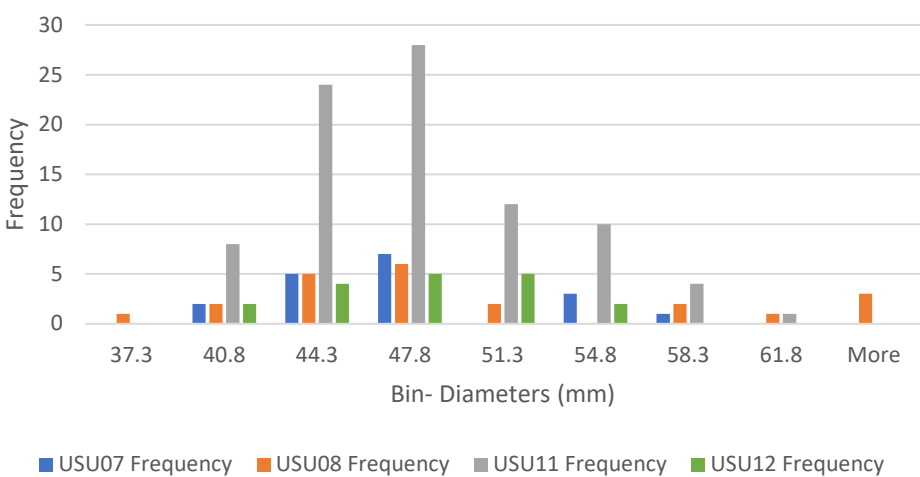


Fig. 4 Comparative Histogram of Live Urchin Diameters between USU07, USU08, USU11, and USU12



Test	USU07	USU08	USU11	USU12
Mean	46.159	48.346	46.401	46.417
Standard Deviation	44	36	95	78
Range	17.54	31.74	23.75	12.94
Minimum	38.77	34.73	37.63	39.7
Maximum	56.31	66.47	61.38	52.64
Count	18	22	87	18

Urchin quads by the numbers

	Measured Test-Test	
	survey site	data
most Live urchins	USU04	196 urchins
widest range	USU04	34.56
smallest standard deviation	USU13	3.103264
largest average diameter (mm)	USU08	48.34636
smallest average diameter (mm)	USU06	40.01729
largest maximum diameter (mm)	USU04	68.25
smallest minimum diameter (mm)	USU06	31.5

	Measured spine-spine	
	survey site	data
widest range	USU02	42.68
smallest standard deviation	USU01	4.946864523
largest average diameter (mm)	USU03	66.64226415
smallest average diameter (mm)	USU02	55.82704403
largest maximum diameter (mm)	USU03	86.55
smallest minimum diameter (mm)	USU02	43.85

Dead urchin test numbers, out of USU08, UrchCo02, USU11, USU12, and USU13		
Dead Urchins	site	data
most dead urchins	USU12	83
widest range	USU12	29.99
smallest standard deviation	USU11	5.381083
largest average diameter (mm)	UrchCo02	50.73889
smallest average diameter (mm)	USU11	43.665
largest maximum diameter (mm)	UrchCo02	68.81
smallest minimum diameter (mm)	USU12	33.45

Test-test vs Spine-spine measurements

Location	Urchin_spine (mm)	Urchin_test (mm)	difference
USU04	57.95	40.01	17.94
USU04	74.15	54.36	19.79
USU04	62.11	48.06	14.05
USU04	67.29	48.81	18.48
USU04	65.86	45.61	20.25
USU04	65.5	49.42	16.08
USU04	64.71	49.08	15.63
USU04	64.57	45.59	18.98
USU04	65.68	47.61	18.07
USU04	60.25	46.01	14.24

Average	17.351
St.Dev	2.104692
ST.err	0.701564
Av.Dev	1.8808

During the February surveys, urchins were measured spine to spine. For best science practices this was changed to test-test measurements in march. We measured 10 urchins both ways to see if we could figure out a way to adjust the February urchin measurements. The difference was found between the two measurements and descriptive statistics performed. They were similar in ranges, so individual spine size was estimated by halving the difference. The sample size is small and the urchins recorded at USU4 were similar in size so this method was not utilized since it would not be representative. Including it here if anyone is interested. Will try to collect more spine measurements in the future.

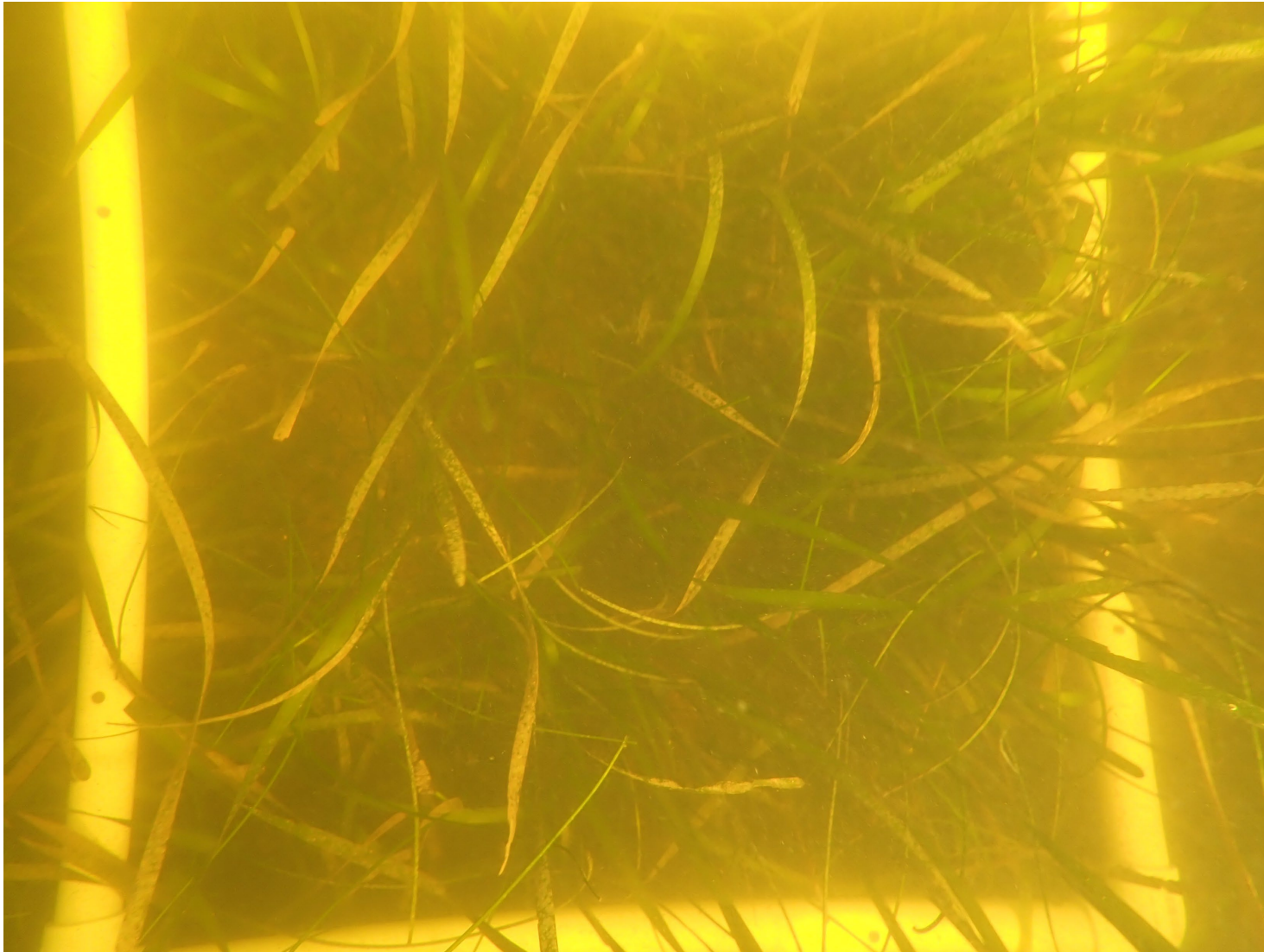
difference	estimated spine
17.94	8.97
19.79	9.895
14.05	7.025
18.48	9.24
20.25	10.125
16.08	8.04
15.63	7.815
18.98	9.49
18.07	9.035
14.24	7.12
Average	8.6755
St.Dev	1.052346
ST.err	0.350782
Av.Dev	0.9404

Urchin Survey Grass Quad 12

USG12

GPS: 29.80413, -83.6217

Date: 07/21/2023



Urchin Survey Grass Quad 12

USG12
GPS: 29.80413, -83.6217
Date: 07/21/2023

Data

Date	Site Name	Type	SPECIES	PERCENT_C OVER	Canopy Height (cm)	Canopy Height (cm)	Canopy Height (cm)	URCHINS	SCALLOPS	GRASS_ALG AE	TOTAL_SAV _PERCENT_ COVER	TOTAL_GRA SS_PERCEN T	TOTAL_MA CROALGAE_ PERCENT	EPIPHYTE_ DENSITY	SEDIMENT_ TYPE	Rhizomes
7/21/2023	USG12	Grass	TTES	35	72	57	42.5	7	0	Grass	70	70	0	Heavy	Sand Mud Shell	Yes
7/21/2023	USG12	Grass	SFIL	35	30.5	28	52.5			Grass						
7/21/2023	USG12	Grass	Drift	20												

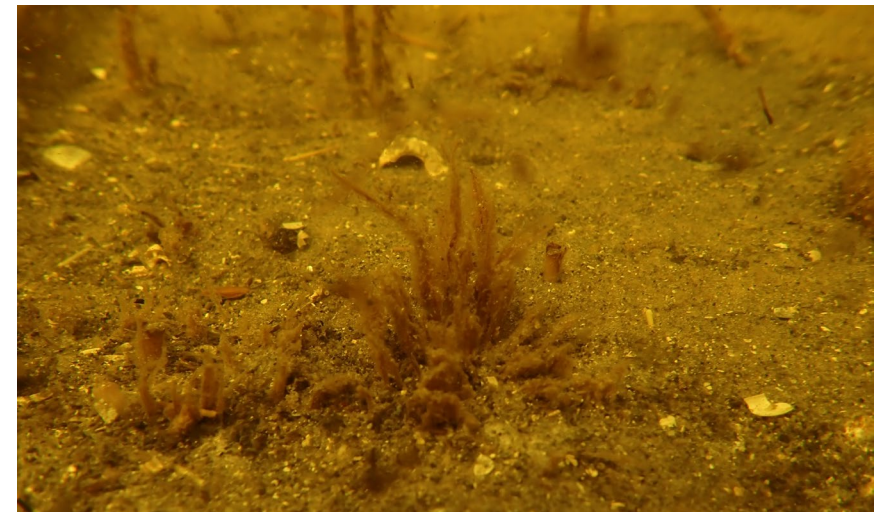
Temp	DO (mg/L/)	Salinity	pH
30.9	5.95	24.29	7.82

Urchin Survey Bare Quad 12

USB12

GPS: 29.80408, -83.6218

Date: 07/21/2023



Urchin Survey Bare Quad 12

USB12
GPS: 29.80408, -83.6218
Date: 07/21/2023

Data

Date	Site Name	Type	SPECIES	PERCENT_C OVER	Canopy Height (cm)	Canopy Height (cm)	Canopy Height (cm)	URCHINS	SCALLOPS	GRASS_AL GAE	TOTAL_SAV _PERCENT_ COVER	TOTAL_GR ASS_PERCE NT	TOTAL_MA CROALGAE _PERCENT	EPIPHYTE_ DENSITY	SEDIMENT _TYPE	Rhizomes
7/21/2023	USB12	Bare	SFIL	2	3.2	7.9	10.7	1	0	Grass	2	2	0	Clean	Sand Silt Mud Shell	yes, they looked healthy despite most shoots being dead

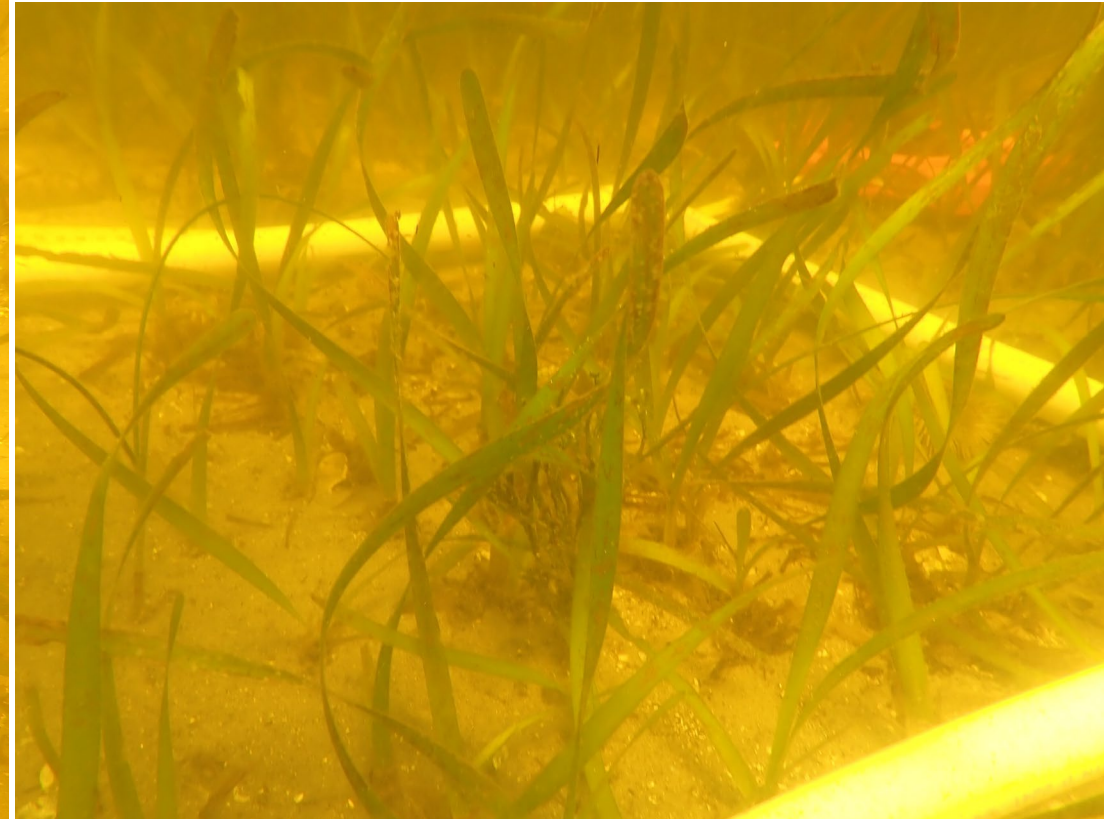
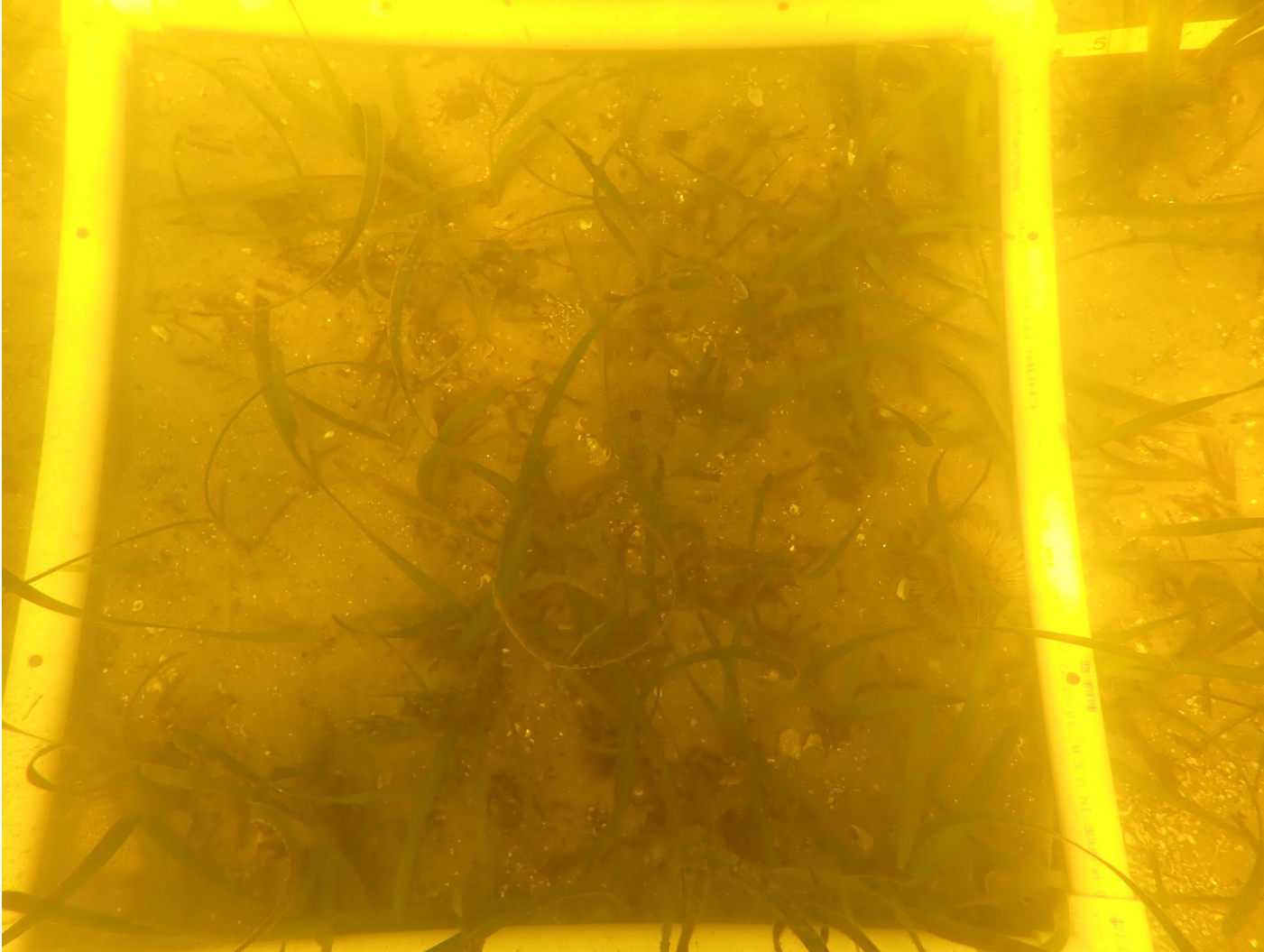
Temp	DO (mg/L/)	Salinity	pH
30.9	5.95	24.29	7.82

Urchin Survey Grass Quad 13

USG13

GPS: 29.80431, -83.6218

Date: 07/21/2023



Urchin Survey Grass Quad 13

USG13
GPS: 29.80431, -83.6218
Date: 07/21/2023

Data

Date	Site Name	Type	SPECIES	PERCENT_C OVER	Canopy Height (cm)	Canopy Height (cm)	Canopy Height (cm)	URCHINS	SCALLOPS	GRASS_ALG AE	TOTAL_SAV _PERCENT_ COVER	TOTAL_GRA SS_PERCEN T	TOTAL_MA CROALGAE_ PERCENT	EPIPHYTE_D ENSITY	SEDIMENT_ TYPE	Rhizomes
7/21/2023	USG13	Grass	TTES	22	29.5	33	28.5	1	0	Grass	25	24	1	Clean	Sand Mud Shell	Yes
7/21/2023	USG13	Grass	SFIL	2	27	4.1	7.5			Grass						
7/21/2023	USG13	Grass	HINC	1						Algae						

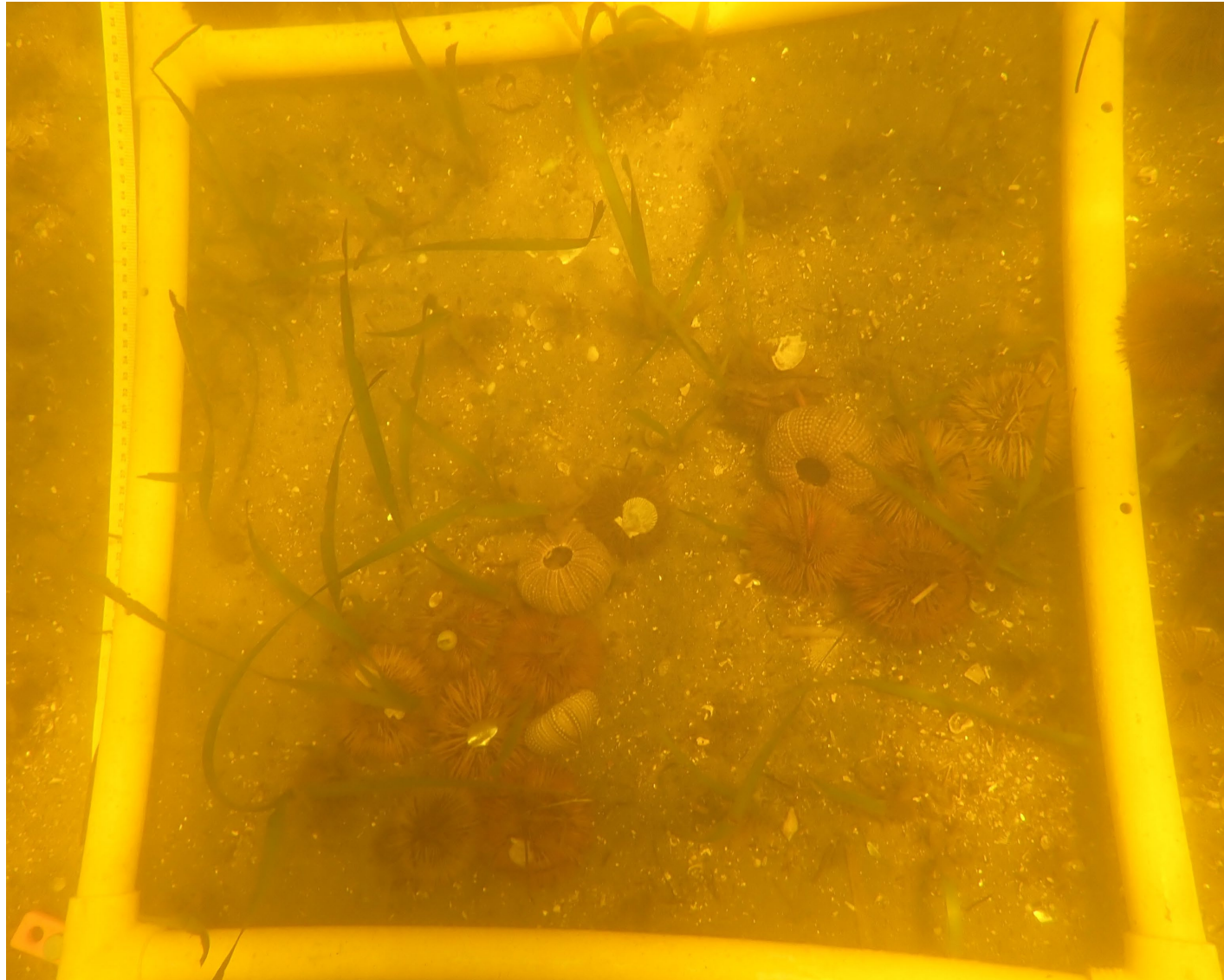
Temp	DO (mg/L/)	Salinity	pH
31.3	6.01	23.81	7.94

Urchin Survey Bare Quad 13

USB13

GPS: 29.80415, -83.6218

Date: 07/21/2023



Urchin Survey Bare Quad 13

USB13
GPS: 29.80415, -83.6218
Date: 07/21/2023

Data

Date	Site Name	Type	SPECIES	PERCENT_C OVER	Canopy Height (cm)	Canopy Height (cm)	Canopy Height (cm)	URCHINS	SCALLOPS	GRASS_ALG AE	TOTAL_SAV _PERCENT_ COVER	TOTAL_GRA SS_PERCEN T	TOTAL_MA CROALGAE_ PERCENT	EPIPHYTE_D ENSITY	SEDIMENT_ TYPE	Rhizomes
7/21/2023	USB13	Bare	TTES	8	24	15	35	11	0	Grass	10	10	0	Clean	Sand Silt Mud Shell	Y
7/21/2023	USB13	Bare	SFIL	2	4.2	4.9	6.6			Grass						

Temp	DO (mg/L/)	Salinity	pH
31.3	6.01	23.81	7.94

Averages for All Sampling Events

Fig.1

Average Total Seagrass Canopy Height per Sampling Event

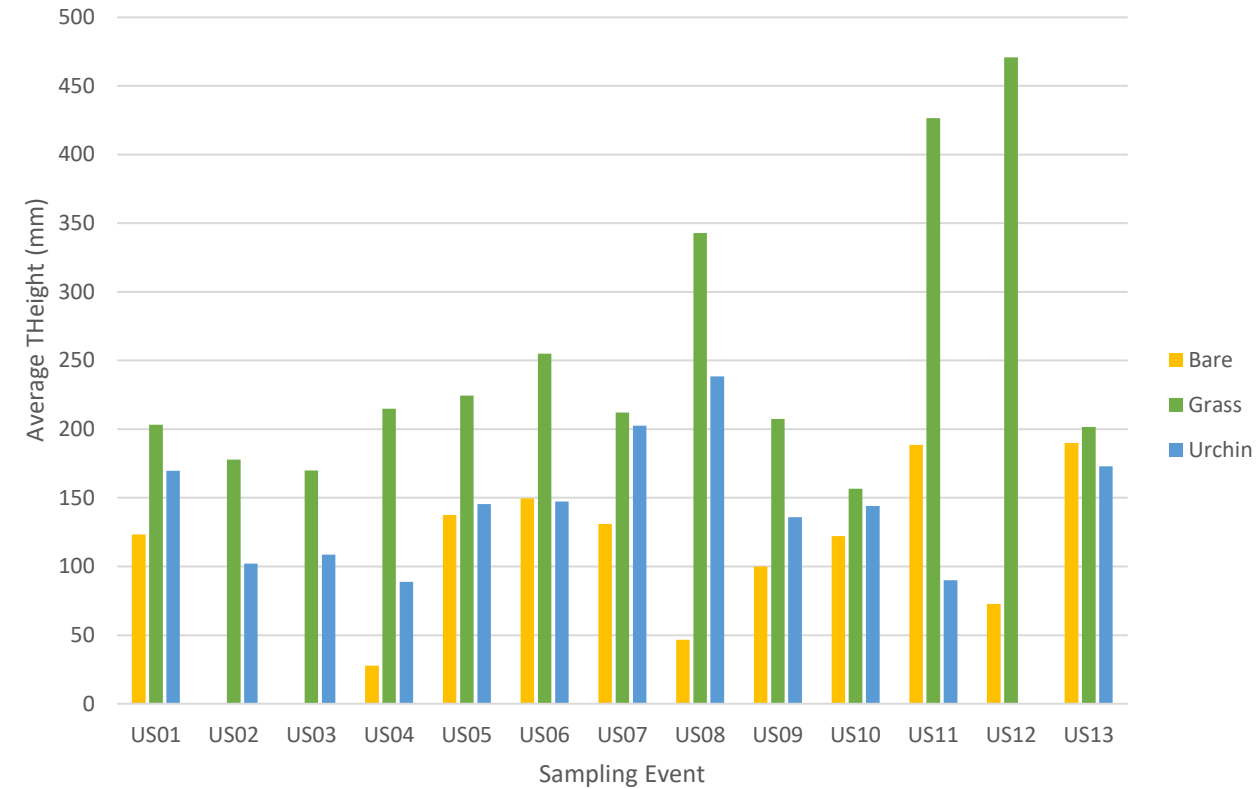


Figure 1. The average canopy height for all seagrass species within a quad.

Fig.2

Average Total Seagrass Percent Cover

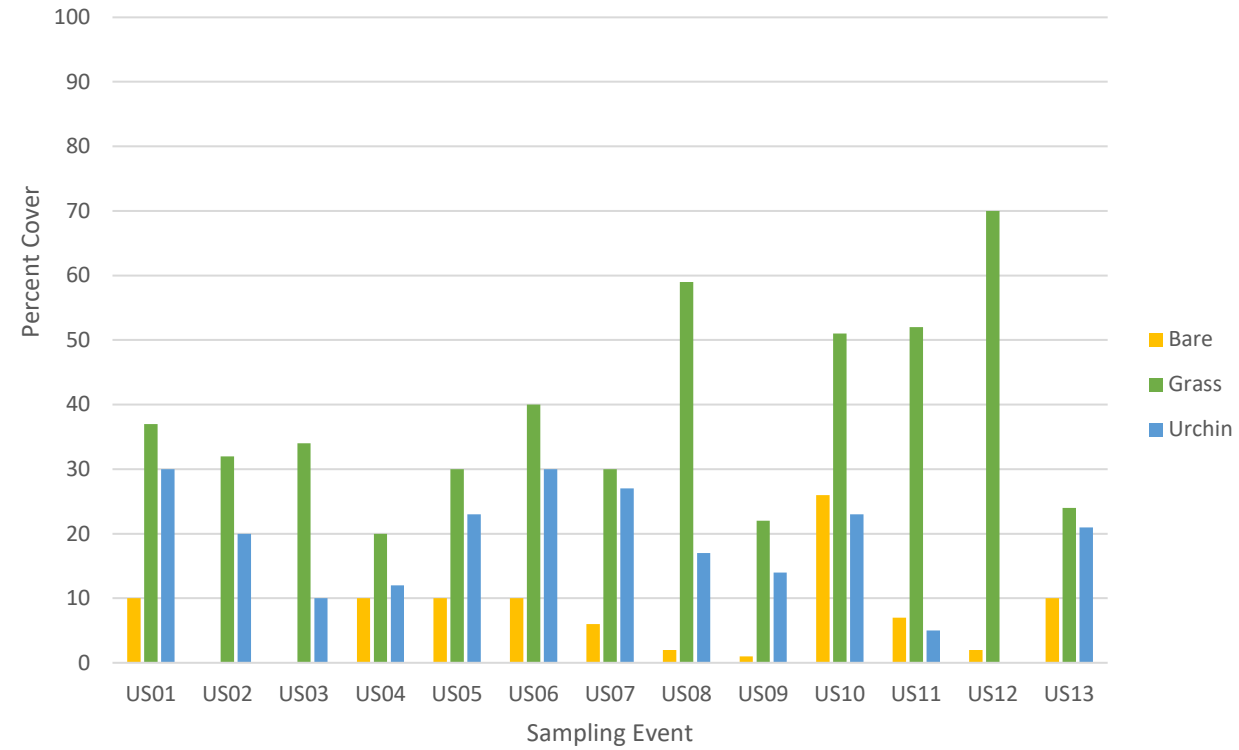


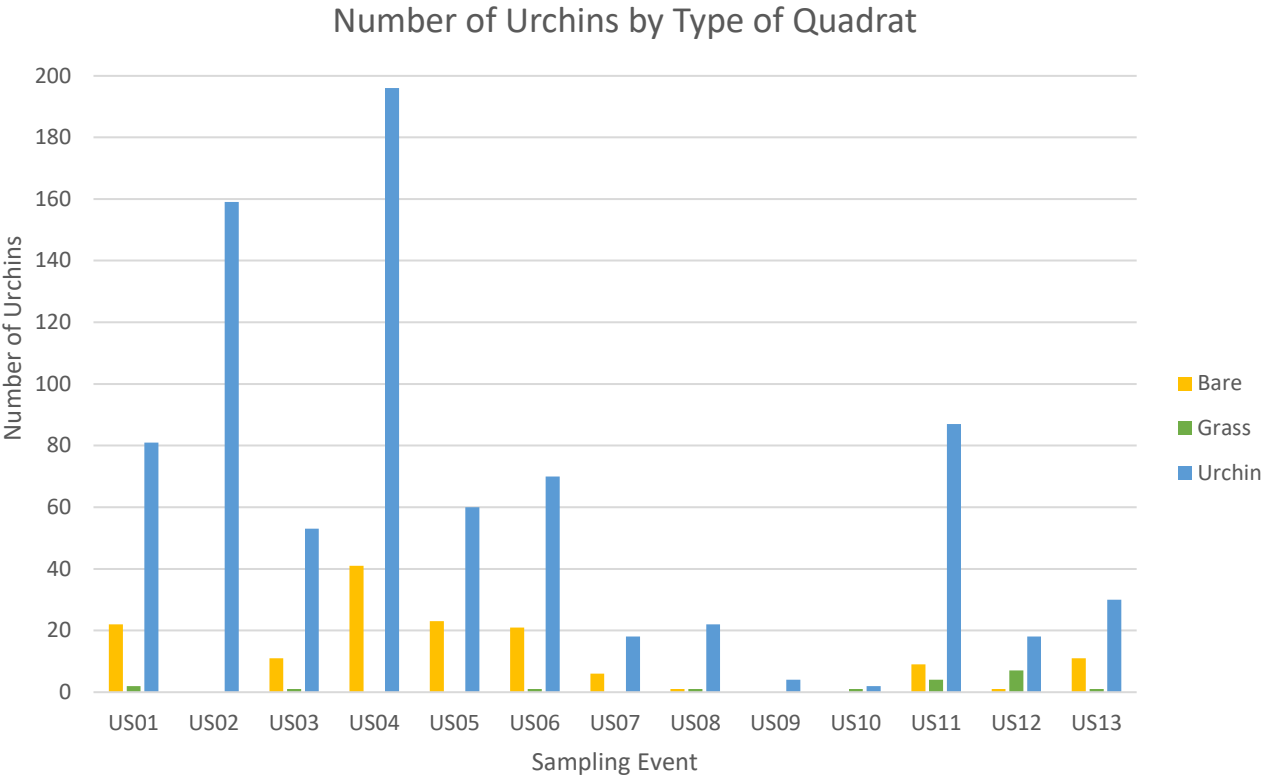
Figure 2. The total percent cover of all seagrass present in each quad.

Other Averages for All Sampling Events

Monthly density averages by type of quad

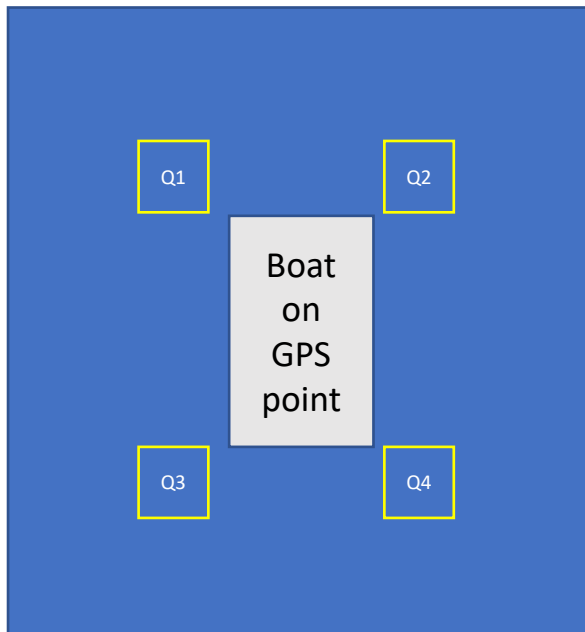
month	type	avg %	avg grass %
February	Bare	3.333333	3.333333
February	Grass	34.66667	34.33333
February	Urchin	20	20
March	Bare	10	10
March	Grass	30	30
March	Urchin	21.66667	21.66667
April	Bare	6	6
April	Grass	30	30
April	Urchin	28	27
May	Bare	9.666667	9.666667
May	Grass	44.66667	44
May	Urchin	18.33333	18
June	Bare	7	7
June	Grass	52	52
June	Urchin	5	5
July	Bare	6	6
July	Grass	47.5	47
July	Urchin	10.5	10.5

Note the average Braun-Blanquet density between 2017-2022 was 4.54 at DBKB14 and 4.42 at DBKB15. The surveys were conducted between DBKB 14 and DBKB15. The surveys of DBKB14 and DBKB15 on 8 February 2023 show that DBKB BB density as 1.25 for DBKB14 where the urchins have passed through already and 3.5 at DBKB15 where the urchins are headed. DBKB14 had a BB density of 3.5 and average total SAV % of 47.5% in 2022. DBKB15 had a BB density of 3.75 and total SAV % of 58% in 2022.



The following slides use a 1m² quadrat to reflect seagrass monitoring protocols followed by BBSAP. The following sites, DBKB14 and DBKB15, are established seagrass sites monitored yearly by BBSAP. SOP can be found on [SEACAR](#) under BBSAP Protocols. These sites were used to compare to historical seagrass monitoring data. Sites 14 and 15 are on either side of the seagrass front line, urchins have passed 14 and are heading in the direction of 15 currently.

Sample Design



Four quadrats thrown randomly around boat which sits atop the site GPS point.



Urchin Survey DBKB14 Quad 1

DBKB14 GPS:

Latitude

29.8067

Longitude

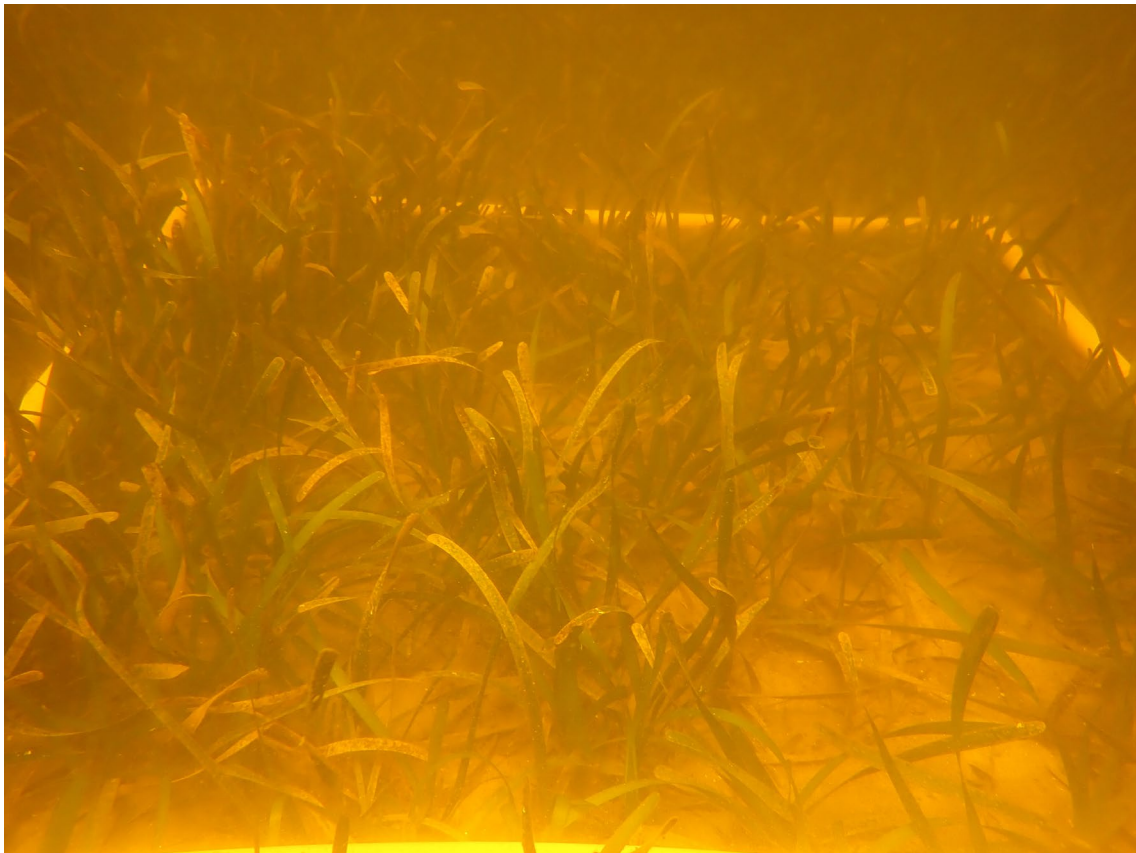
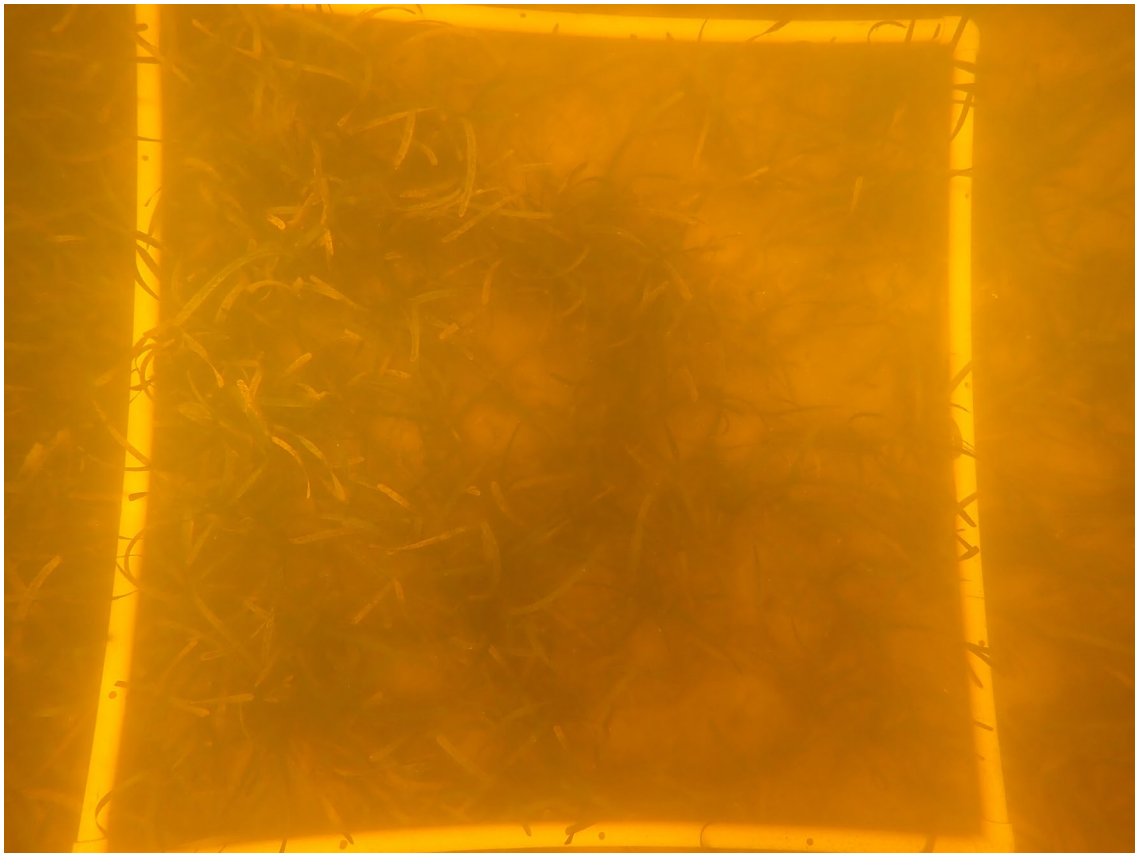
-83.6311

No picture was taken

STATION	REPLICATE	SPECIES	PERCENT_COVER	BB_COVER AGE	Canopy_H T (mm)	Canopy_H T (mm)	Canopy_H T (mm)	URCHINS	SCALLOPS	GRASS_ALGAE	TOTAL_SAV_BB	TOTAL_GRASS_PERCENT	TOTAL_GRASS_BB	TOTAL_MACROALGAE_PERCENT	TOTAL_MACROALGAE_BB	EPIPHYTE_DENSITY	SEDIMENT_TYPE	COMMENTS
DBKB14	1	TTES	47	3	295	245	230	0	1	Grass	47	3	47	3	0	0	Clean Sand Mud Shell	no pictures taken

Urchin Survey DBKB14 Quad 2

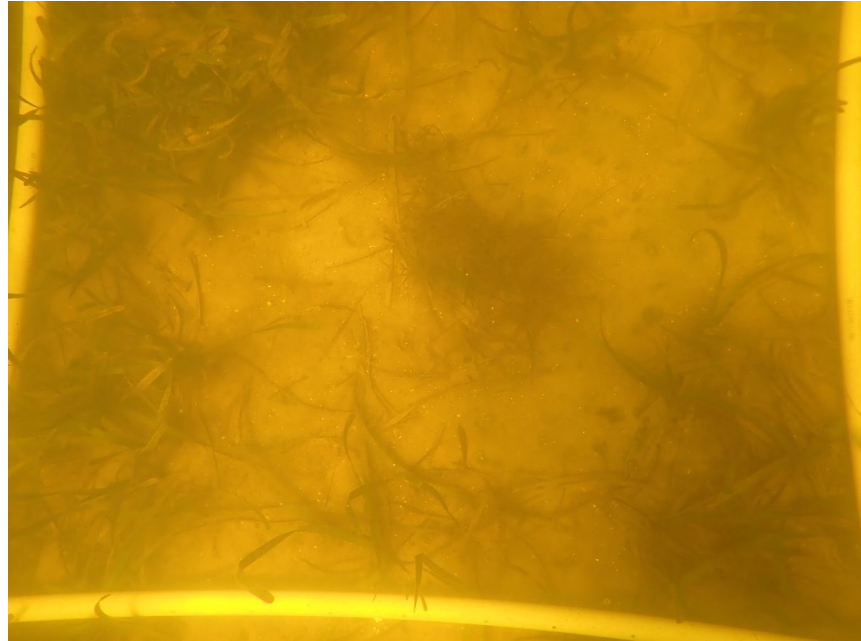
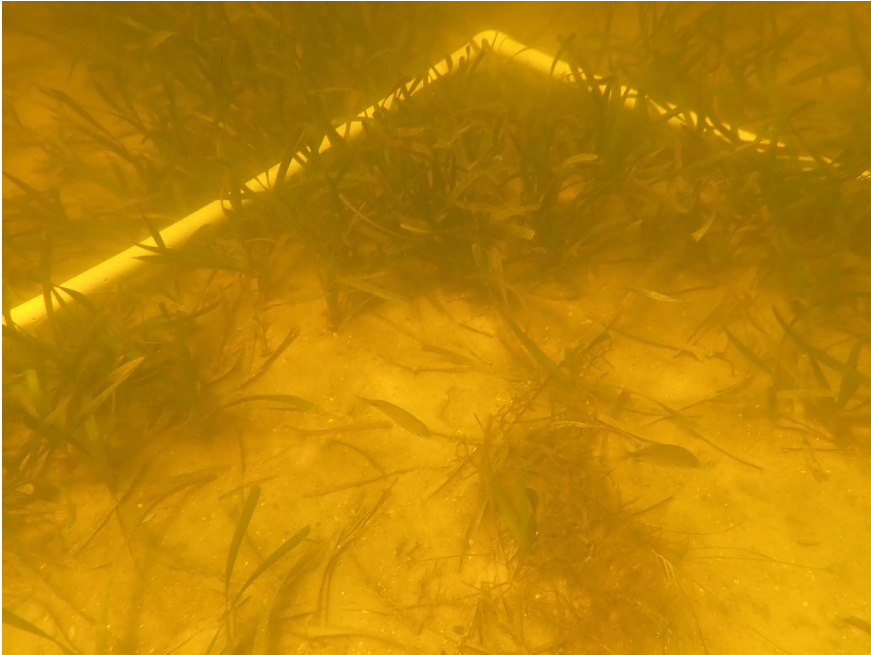
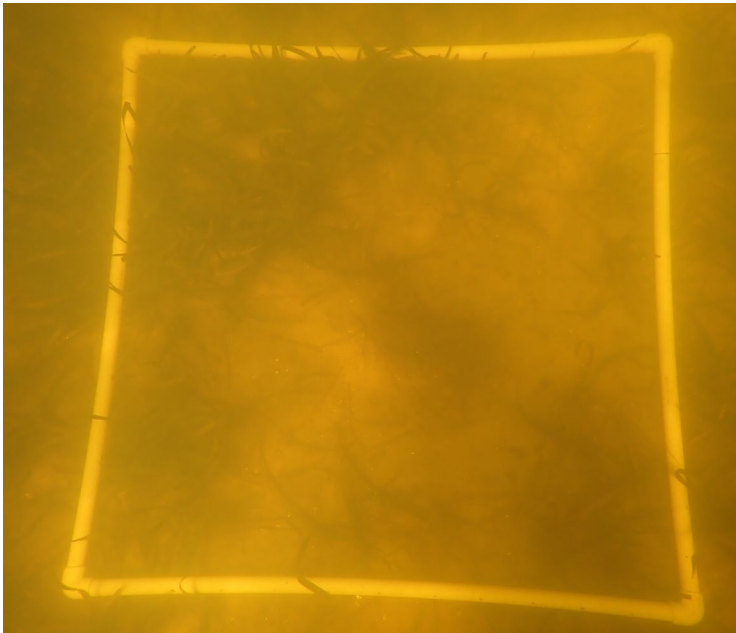
DBKB14 GPS: Latitude 29.8067
Longitude -83.6311



REPLICAT E	SPECIES	PERCENT _COVER	BB_COVE RAGE	Canopy_ HT (mm)	Canopy_ HT (mm)	Canopy_ HT (mm)	URCHINS	SCALLOPS	GRASS_A LGAE	TOTAL_S AV_PERC ENT_COV ER	TOTAL _SAV_BB	TOTAL_G RASS_PE RCENT	TOTAL_G RASS_BB	TOTAL_M ACROALG AE_PERC ENT	TOTAL_M ACROALG AE_BB	EPIPHYTE _DENSITY	SEDIMEN T_TYPE
2	TTES	55	4	295	230	110	1	0	Grass	55	4	55	4	0	0	Moderate	Sand Mud Shell

Urchin Survey DBKB14 Quad 3

DBKB14 GPS: Latitude 29.8067
Longitude -83.6311



REPLICAT E	SPECIES	PERCENT _COVER	BB_COVE RAGE	Canopy_ HT (mm)	Canopy_ HT (mm)	Canopy_ HT (mm)	URCHINS	SCALLOPS	GRASS_A LGAE	TOTAL_S AV_PERC ENT_COV ER	TOTAL _SAV_BB	TOTAL_G RASS_PE RCENT	TOTAL_G RASS_BB	TOTAL_M ACROALG AE_PERC ENT	TOTAL_M ACROALG AE_BB	EPIPHYTE _DENSITY	SEDIMEN T_TYPE
3	TTES	21	2	223	279	247	0	0	Grass	24	2	24	2	0	0	Light	Sand Mud Shell
3	HENG	3	1	16	15	24			Grass								

Urchin Survey DBKB14 Quad 4

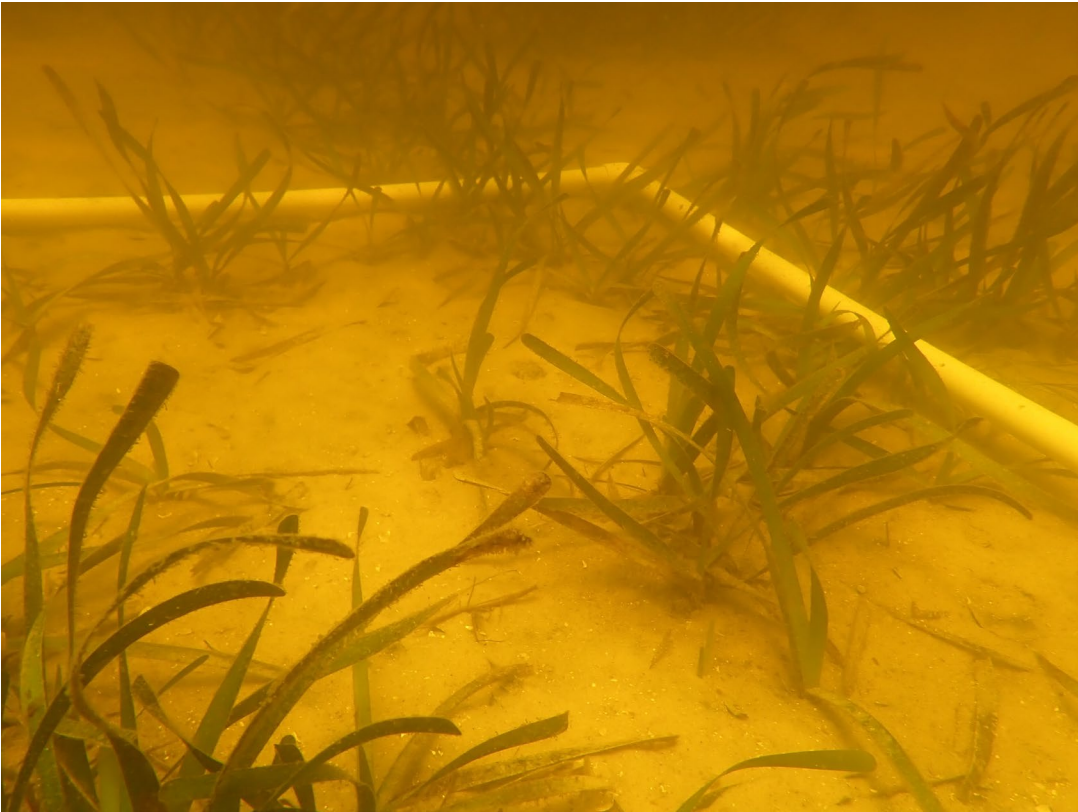
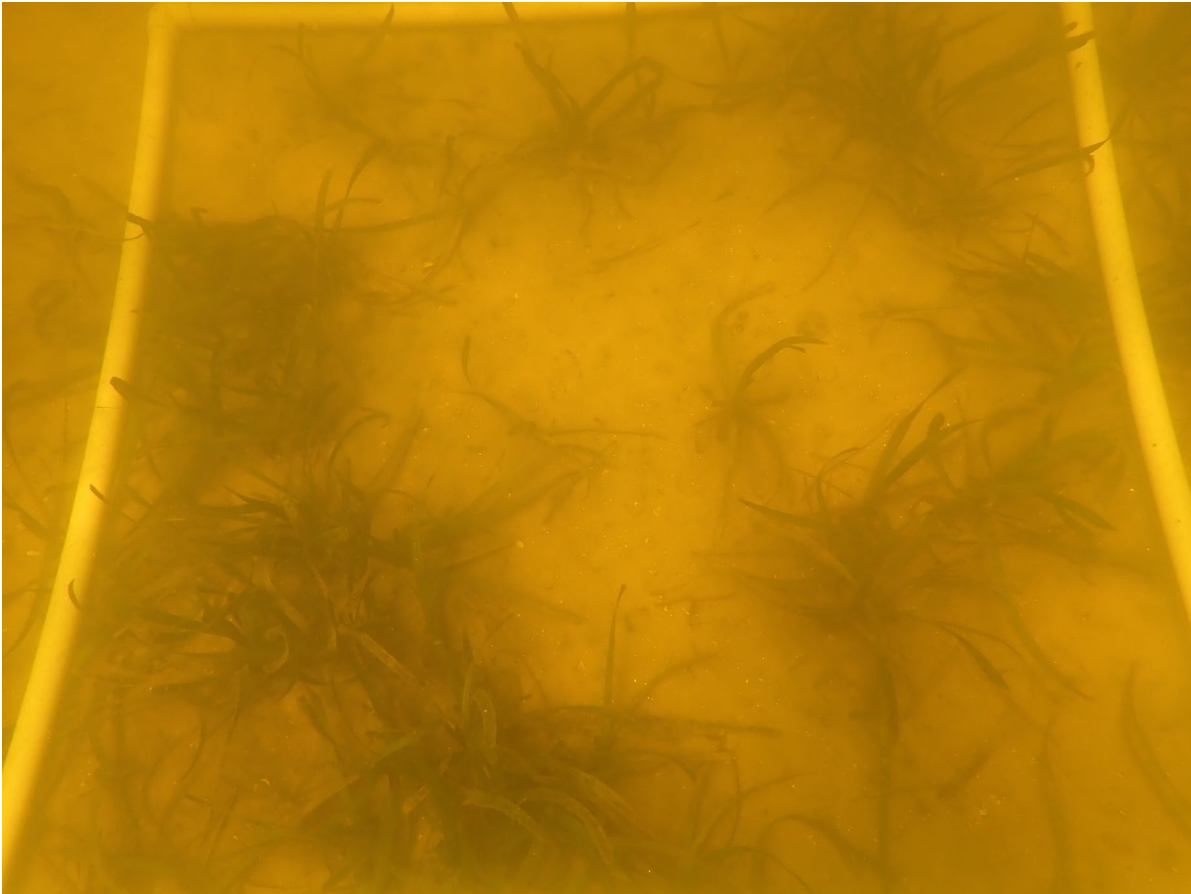
DBKB14 GPS:

Latitude

29.8067

Longitude

-83.6311

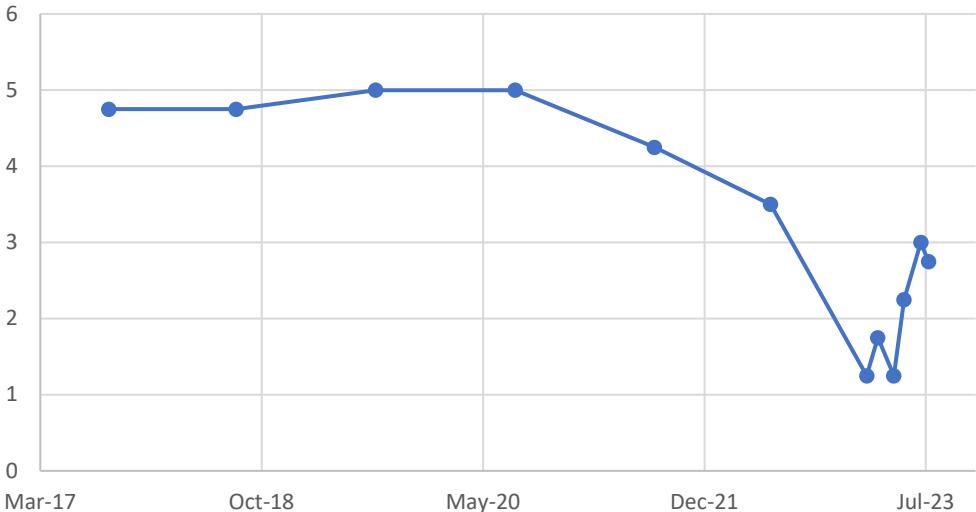


REPLICAT E	SPECIES	PERCENT_ COVER	BB_COVE RAGE	Canopy_H T (mm)	Canopy_H T (mm)	Canopy_H T (mm)	URCHINS	SCALLOPS	GRASS_AL GAE	TOTAL_SA V_PERCE R	TOTAL_ _SAV_BB	TOTAL_G RASS_PER CENT	TOTAL_G RASS_BB	TOTAL_M ACROALG AE_PERCE NT	TOTAL_M ACROALG AE_BB	EPIPHYTE _DENSITY	SEDIMEN T_TYPE
4	TTES	18	2	235	164	207	0	0	Grass	18	2	18	2	0	0	Light	Sand Mud Shell

Urchin Survey DBKB14 Visit

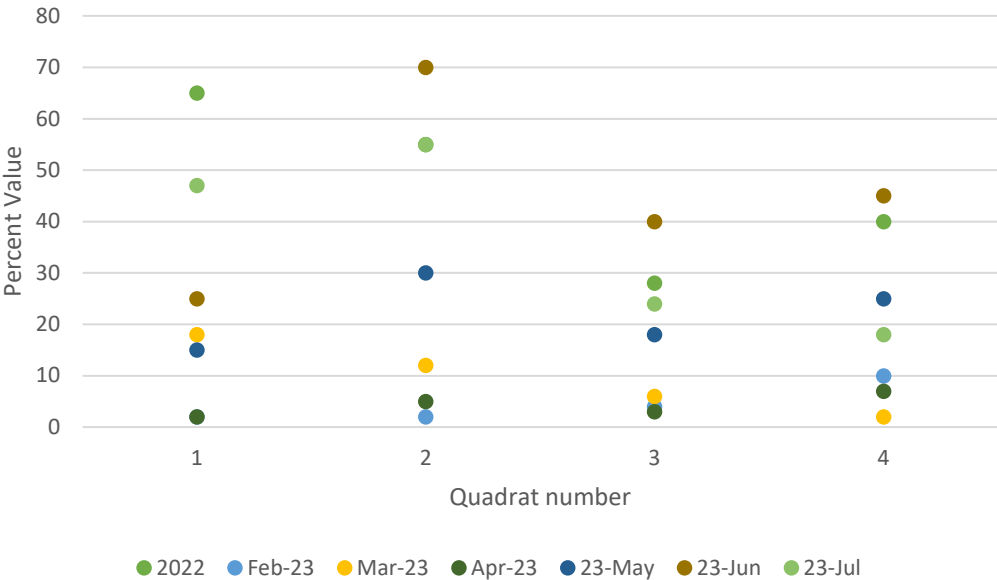
DBKB14 GPS: Latitude 29.8067
 Longitude -83.6311

DBKB14 Average BB Density



Year	Density
Sep-17	4.75
Aug-18	4.75
Aug-19	5
Aug-20	5
Aug-21	4.25
Jun-22	3.5
Feb-23	1.25
Mar-23	1.75
4/20/2023	1.25
5/17/2023	2.25
6/30/2023	3
07/20/2023	2.75

DBKB14 Percent Cover by Quad 2022-2023



Braun-Blanquet Score	2017	2018	2019	2020	2021	2022	Feb-23	Mar-23	4/20/2023	23-May	6/30/2023	7/20/2023
Quad 1	5	5	5	5	4	4	1	2	1	2	2	3
Quad 2	5	5	5	5	5	4	1	2	1	3	4	4
Quad 3	4	4	5	5	4	3	1	2	1	2	3	2
Quad 4	5	5	5	5	4	3	2	1	2	2	3	2

Percent Cover by QUadYear	2022	Feb-23	Mar-23	4/23/2023	17-May	23-Jun	7/20/2023
Quad 1	65	2	18	2	15	25	47
Quad 2	55	2	12	5	30	70	55
Quad 3	28	4	6	3	18	40	24
Quad 4	40	10	2	7	25	45	18

Note that only species of seagrass found in DBKB14 has been *T. testudium*, except once in 2022 when *H. engelmannii* was found in one replicate at 2%

Also note that GPS accuracy is to 9 meters and the quads are tossed at random around the coordinate so the quads will not land in the exact spot each time.

Urchin Survey DBKB15 Quad 1

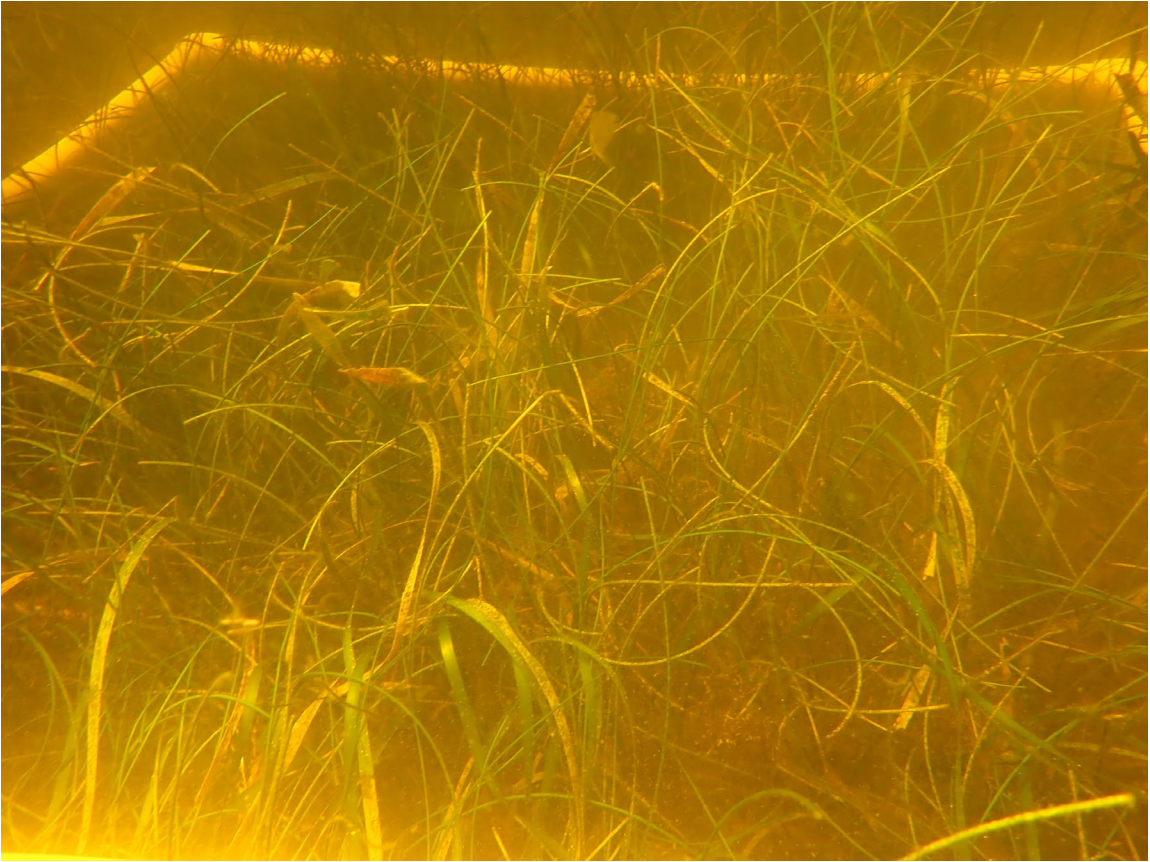
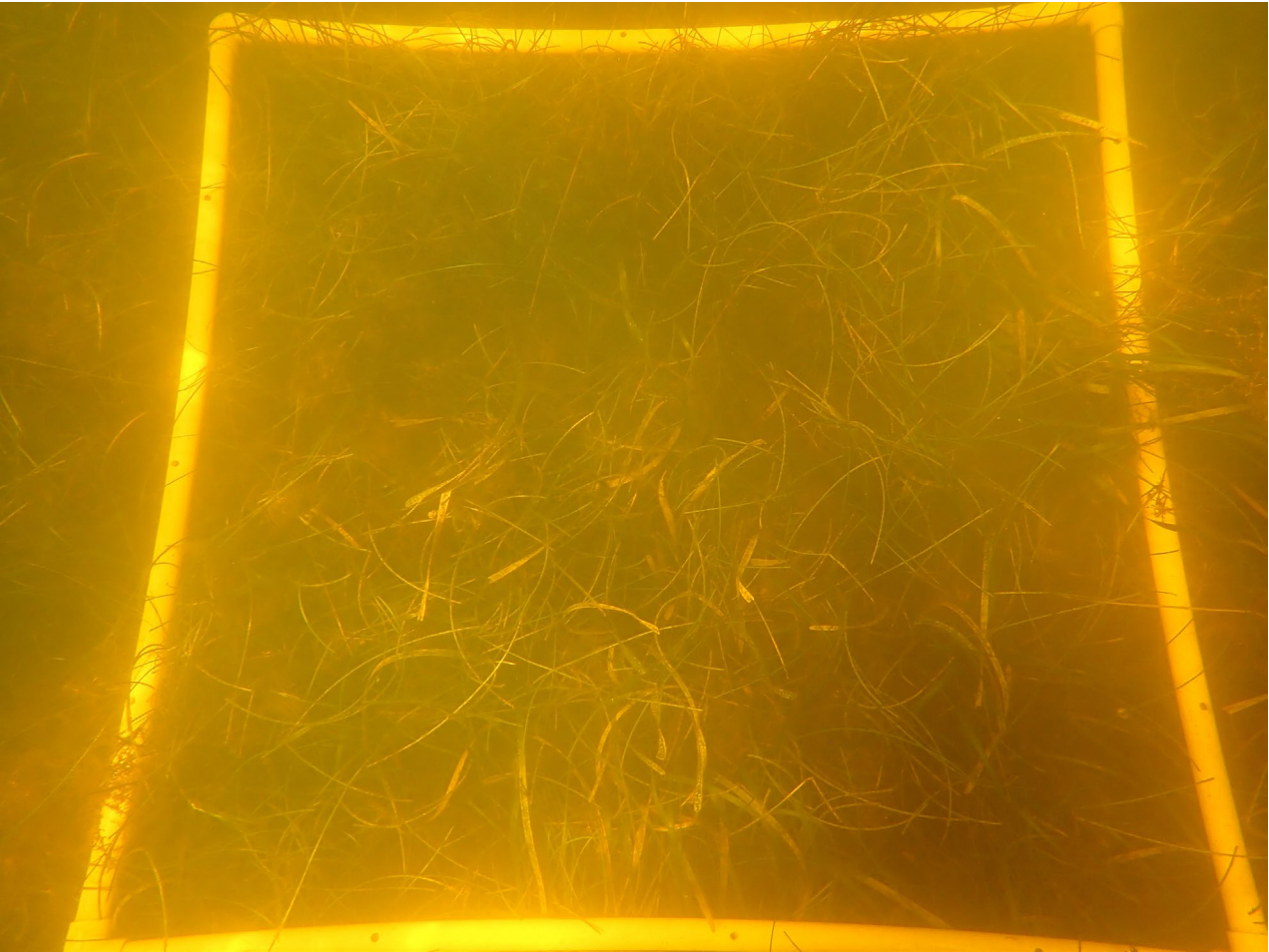
DBKB15 GPS:

Latitude

29.8015

Longitude

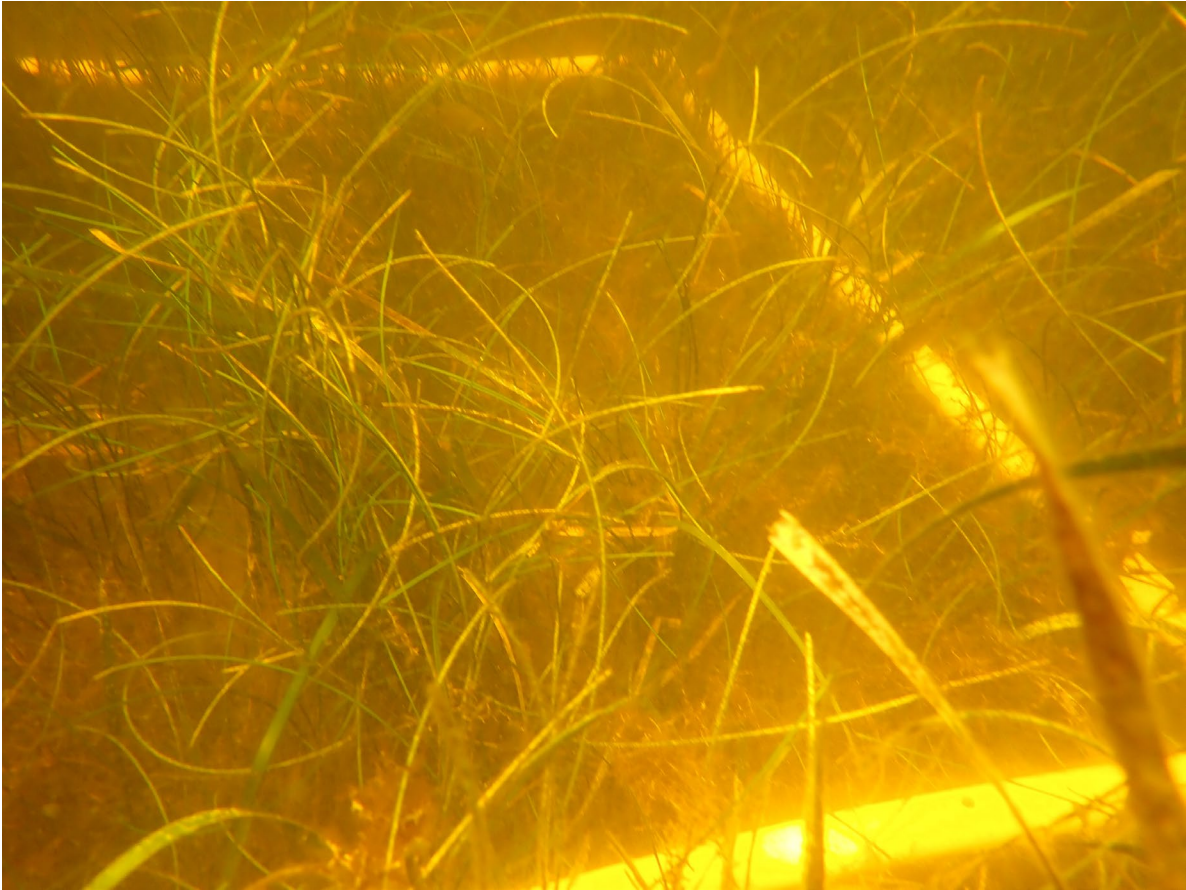
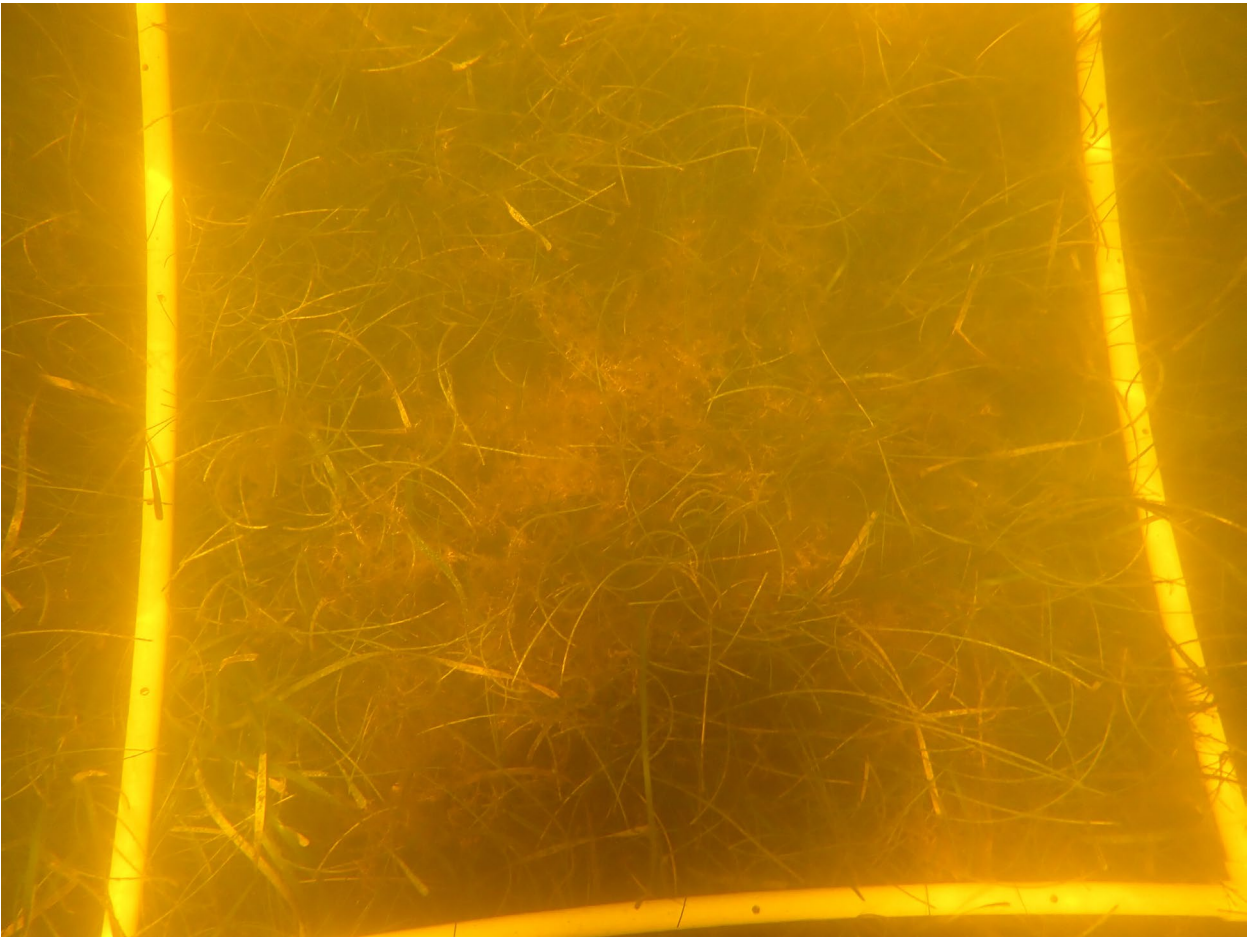
-83.6171



REPLICATE	SPECIES	PERCENT_COVER	BB_COVERAGE	Canopy_Height (mm)	Canopy_Height (mm)	Canopy_Height (mm)	URCHINS	SCALLOPS	GRASS_ALGAE	TOTAL_SAV_PERCENT_COVER	TOTAL_SAV_BB	TOTAL_GRASS_PERCENT	TOTAL_GRASS_BB	TOTAL_MACROALGAE_PERCENT	TOTAL_MACROALGAE_BB	EPIPHYTE_DENSITY	SEDIMENT_TYPE
1	TES	5	1	620	410	740	0	0	Grass	70	4	70	4	0	0	Light	Sand Mud Shell
1	SFIL	50	3	705	270	420			Grass								
1	HWRI	15	2	600	260	320			Grass								

Urchin Survey DBKB15 Quad 2

DBKB15 GPS: Latitude 29.8015
Longitude -83.6171



REPLICATE	SPECIES	PERCENT_COVER	BB_COVER AGE	Canopy_H T (mm)	Canopy_H T (mm)	Canopy_H T (mm)	URCHINS	SCALLOPS	GRASS_AL GAE	TOTAL_SA V_PERCENT T_COVER	TOTAL _SAV_BB	TOTAL_GR ASS_PERC ENT	TOTAL_GR ASS_BB	TOTAL_M ACROALG AE_PERCE NT	TOTAL_M ACROALG AE_BB	EPIPHYTE_ DENSITY	SEDIMENT_ _TYPE
2	TTES	5	1	340	600	760	0	0	Grass	65	4	65	4	0	0	Light	Sand Mud Shell
2	SFIL	60	4	540	230	510			Grass								

Urchin Survey DBKB15 Quad 3

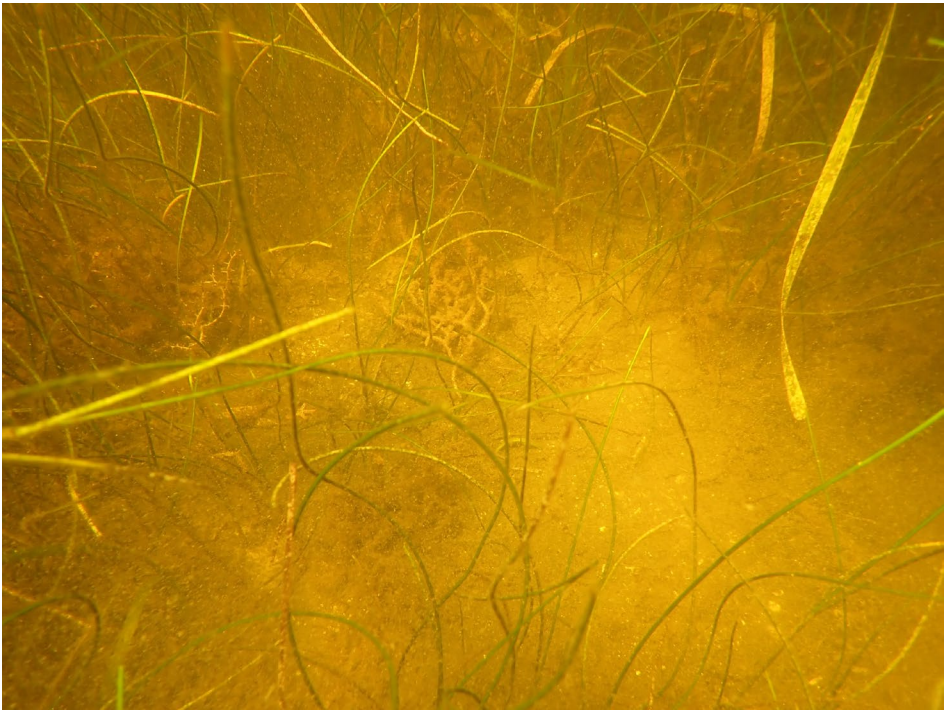
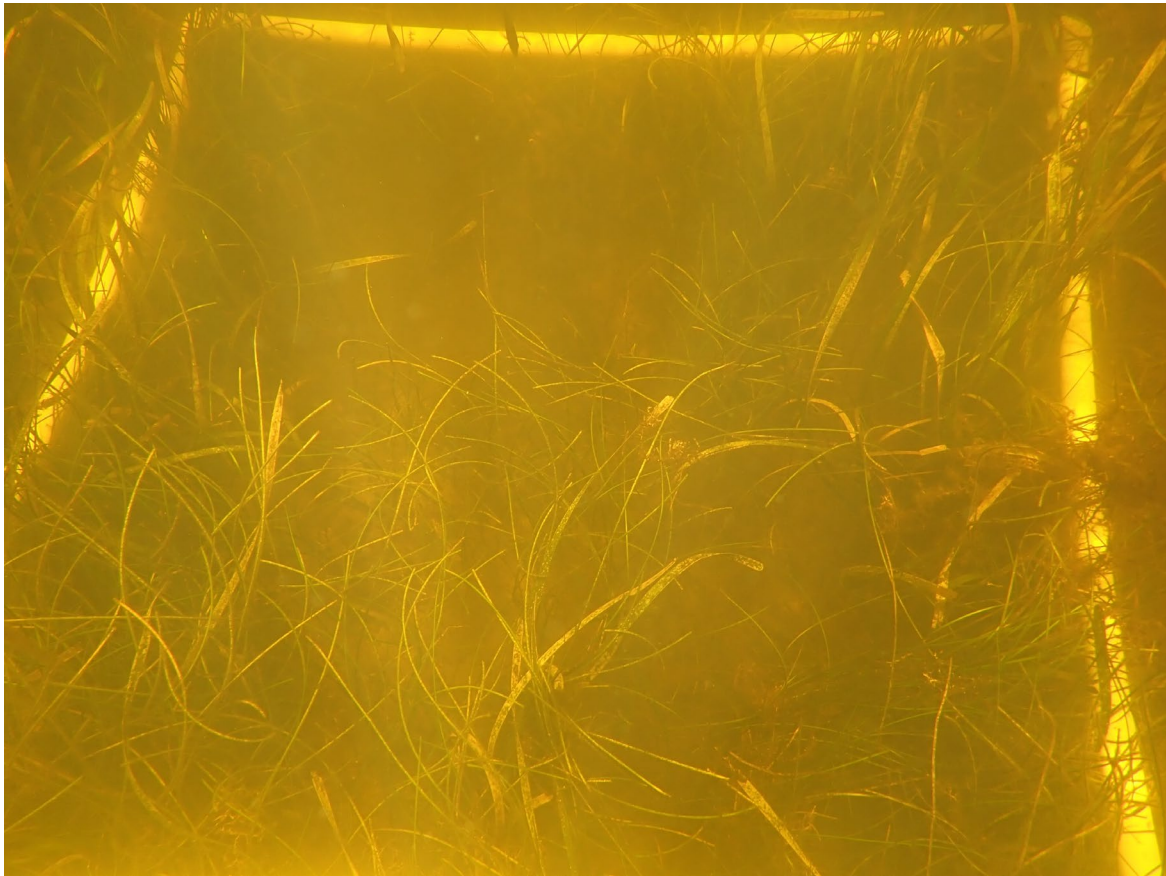
DBKB15 GPS:

Latitude

29.8015

Longitude

-83.6171



REPLICATE	SPECIES	PERCENT_COVER	BB_COVER AGE	Canopy_HT (mm)	Canopy_HT (mm)	Canopy_HT (mm)	URCHINS	SCALLOPS	GRASS_AL GAE	TOTAL_SA V_PERCEN T_COVER	TOTAL _SAV_BB	TOTAL_GR ASS_PERCE NT	TOTAL_GR ASS_BB	TOTAL_MA CROALGAE _PERCENT	TOTAL_MA CROALGAE _BB	EPIPHYTE_ DENSITY	SEDIMENT _TYPE
	3TTES	5	1	400	371	600	0	0	Grass	60	4	60	4	0	0	Light	Sand Mud Shell
	3SFIL	30	3	670	206	403			Grass								
	3HWRI	25	2	377	195	265			Grass								

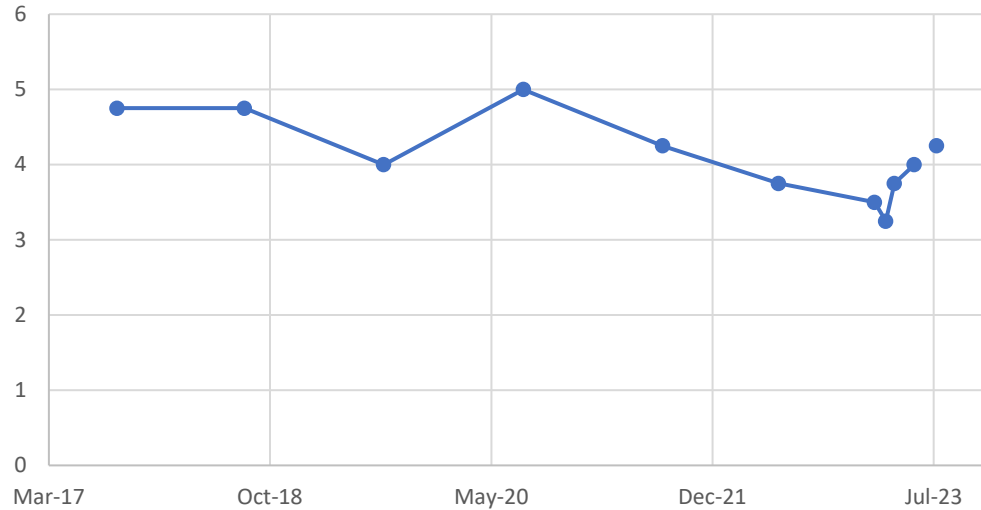
Urchin Survey DBKB15 Visit

DBKB15 GPS:

Latitude 29.8015

Longitude -83.6171

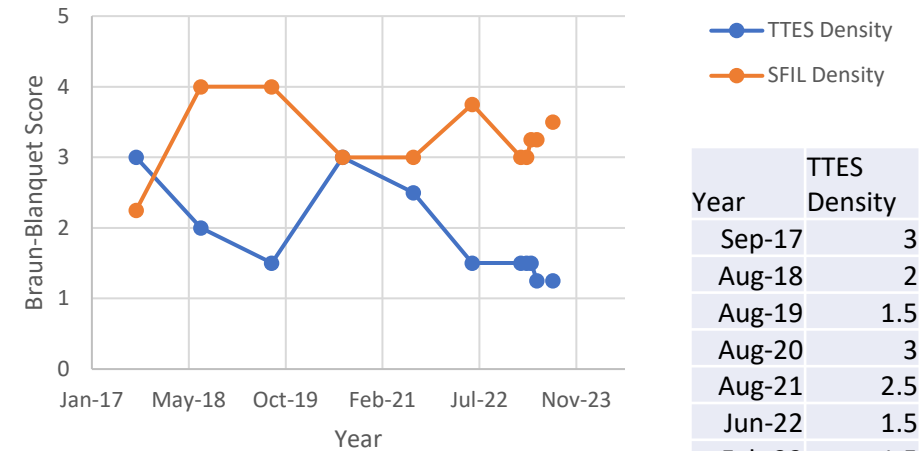
DBKB15 Total Seagrass Density



Year	BB Density
Sep-17	4.75
Aug-18	4.75
Aug-19	4
Aug-20	5
Aug-21	4.25
Jun-22	3.75
Feb-23	3.5
Mar-23	3.25
Apr-23	3.75
23-May	4
6/30/2023	
7/20/2023	4.25

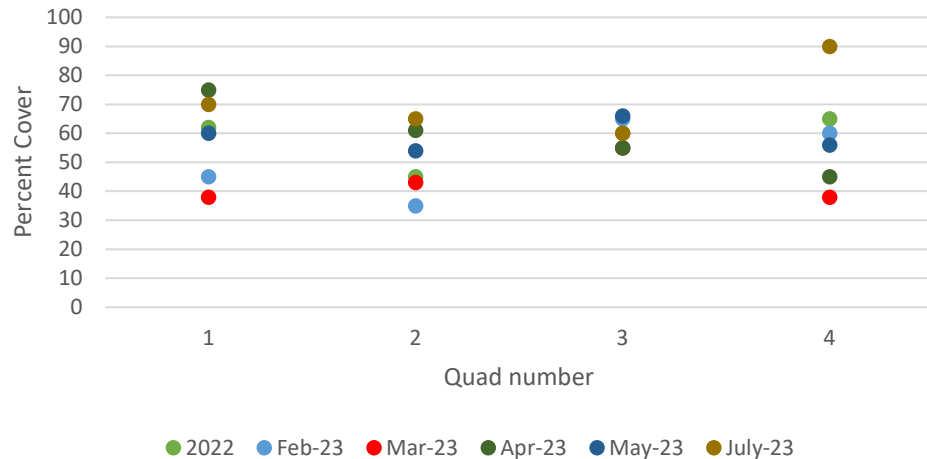
Inclement weather in the month of June limited field sampling time, DBKB15 was not visited in June.

DBKB15 TTES and SFIL Density



Year	TTES Density	SFIL Density
Sep-17	3	2.25
Aug-18	2	4
Aug-19	1.5	4
Aug-20	3	3
Aug-21	2.5	3
Jun-22	1.5	3.75
Feb-23	1.5	3
Mar-23	1.5	3
Apr-23	1.5	3.25
May-23	1.25	3.25
23-Jun		
23-Jul	1.25	3.5

DBKB15 Percent Cover by Quad 2022-2023



Percent Cover	2022	Feb-23	Mar-23	Apr-23	17-May	June	July
Quad 1	62	45	38	75	60		70
Quad 2	45	35	43	61	54		65
Quad 3	60	65	55	55	66		60
Quad 4	65	60	38	45	56		90

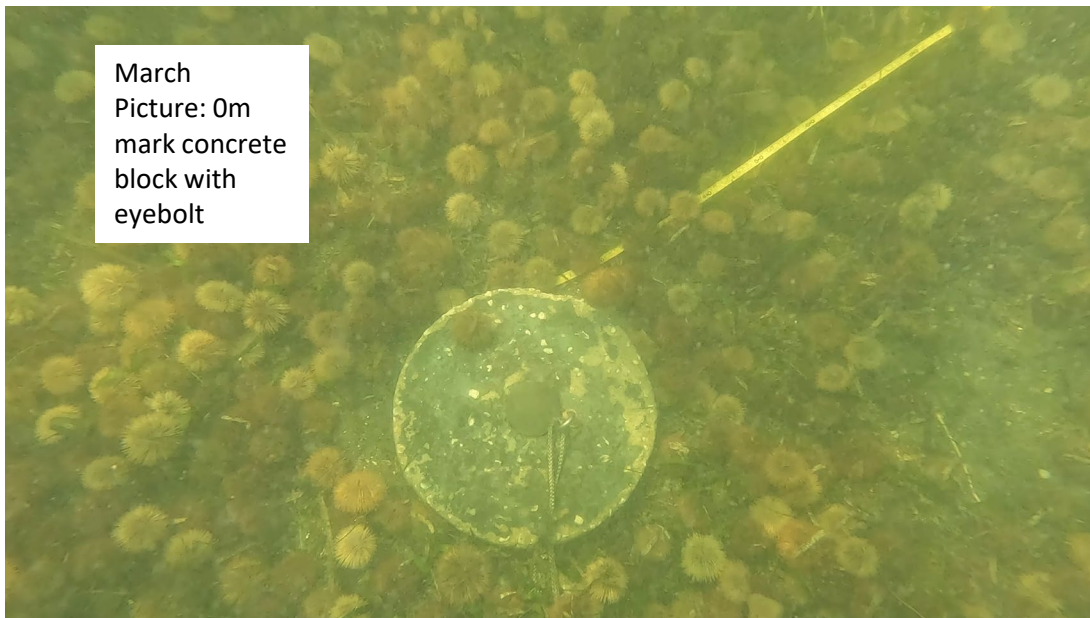
Established Transect for Shoot Counts

Addition of a 20m established transect starting in March. A cinderblock with and eyebolt was placed on the back edge of the urchin front and a transect of 20m was run from it toward the grazed area. At the 20m mark rebar was placed and flagged. GPS coordinates were taken at each end. Mini quadrats of 0.04 m^2 were placed every 2m starting at zero. Shoot heights of any living seagrass shoot were measured in millimeters using a ruler and recorded. The goal of this transect is to monitor any regrowth of seagrass following the grazing event. Pictures were taken at each quadrat and a video was taken of the entire line.

GPS:29.80332 -83.6267

HOBO
sensor

Broke on initial
deployment,
nothing to
report.



July Established Transect Data

Fig1 July Shoot Counts per Quadrat along Transect 1 with Urchin Counts

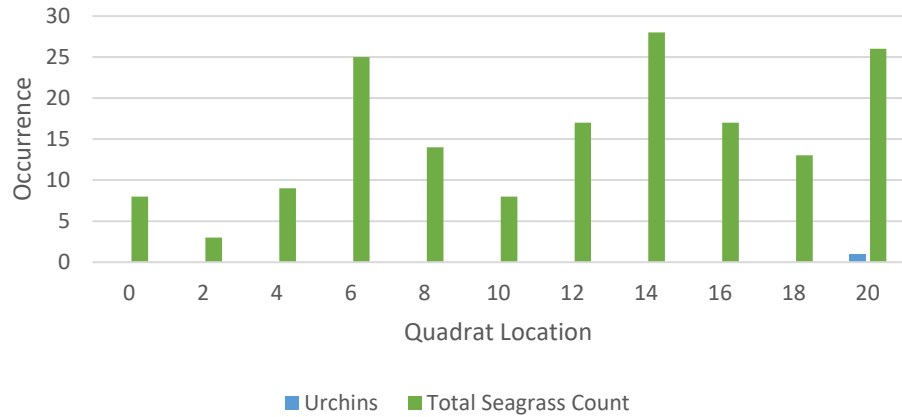


Fig2 July Average Shoot Height with Urchin Counts

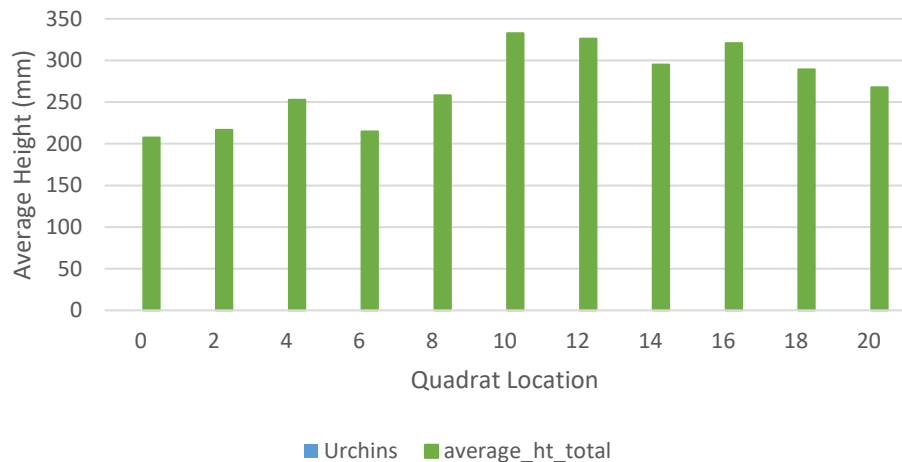


Fig3

July Average Shoot Height by Species

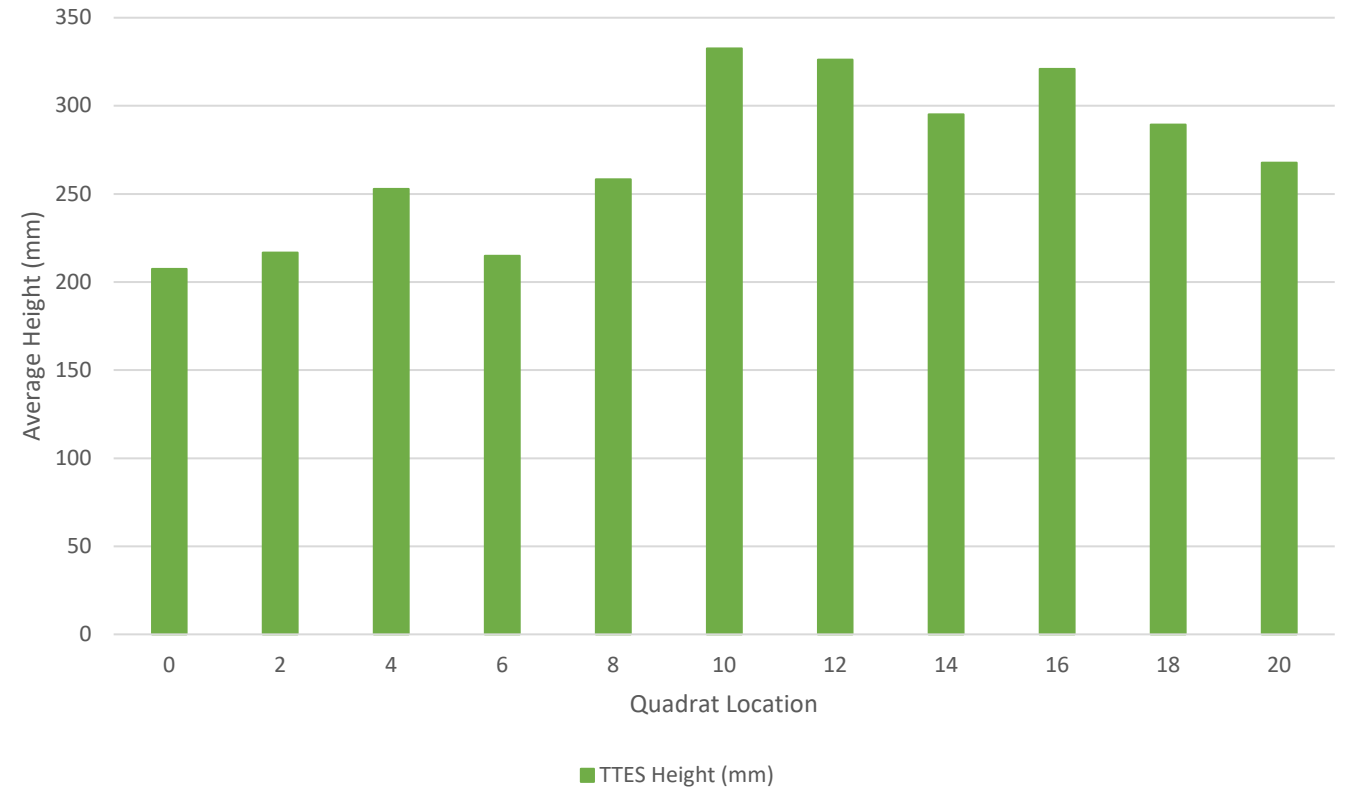


Figure 1. Number of individual shoots and number of urchins per quad. Figure 2. Average height in mm of all shoots in the quad and urchin count. Figure 3. Average height (mm) of each species shoot found in a quadrat, not all quads had all species present.

Ongoing Established Transect Data

Fig1

Monthly Transect Line Total Seagrass Occurrence

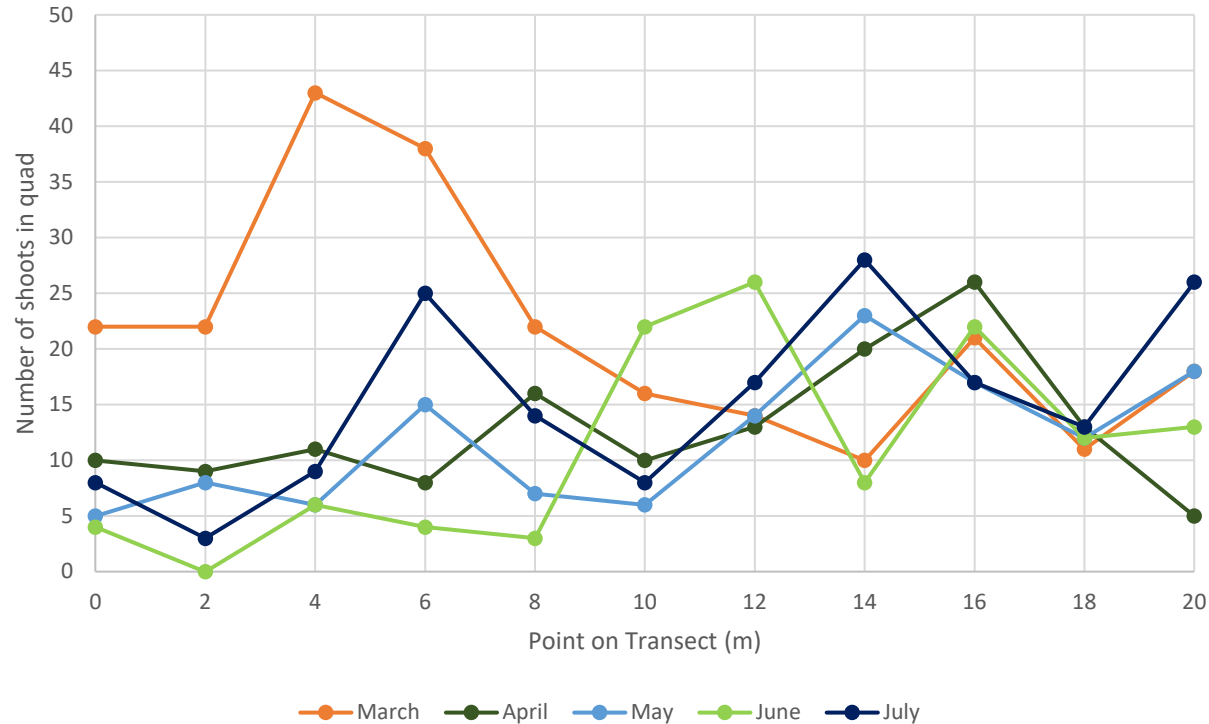


Figure 1. Total seagrass occurrence at each transect quadrat by month. Note that sites 0,2,and 4 had urchin line still on top of them in March, that line has since moved forward and/or dispersed.

Fig2

Monthly Transect Line Average Seagrass Shoot Height (mm)

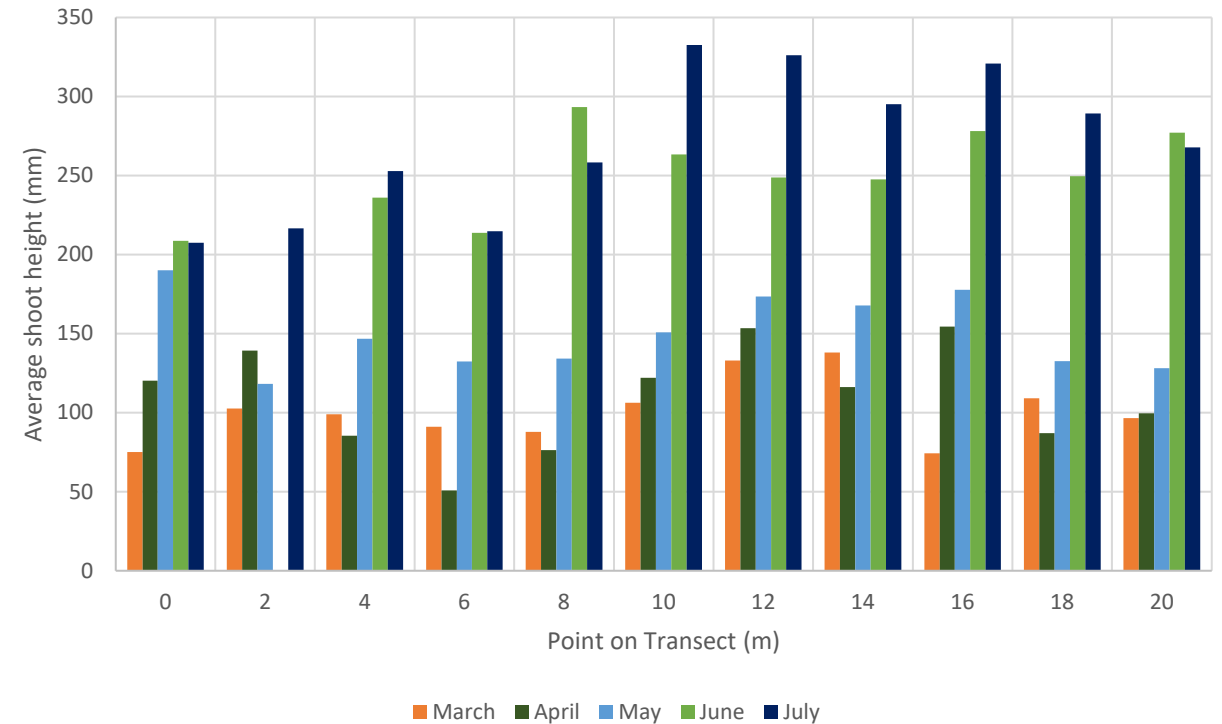


Figure 2. Average height in mm of all shoots in the quad by month. Note seagrass growing season begins in May.

Ongoing Established Transect Data

Fig1

Monthly Transect Line Total TTES Occurrence

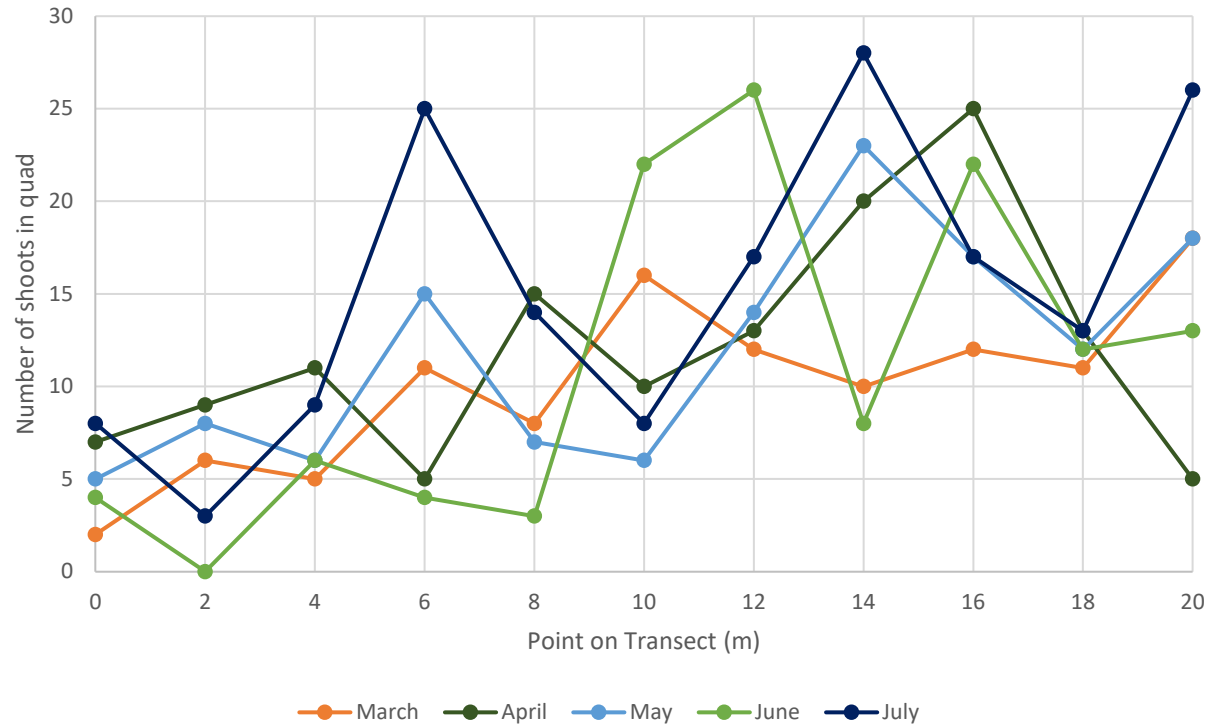


Figure 1. Total *Thalassia testudinum* (TTES) occurrence at each transect quadrat by month. Note that sites 0,2,and 4 had urchin line still on top of them in March, that line has since moved forward and/or dispersed.

Fig2

Monthly Transect Line Average TTES Shoot Height (mm)

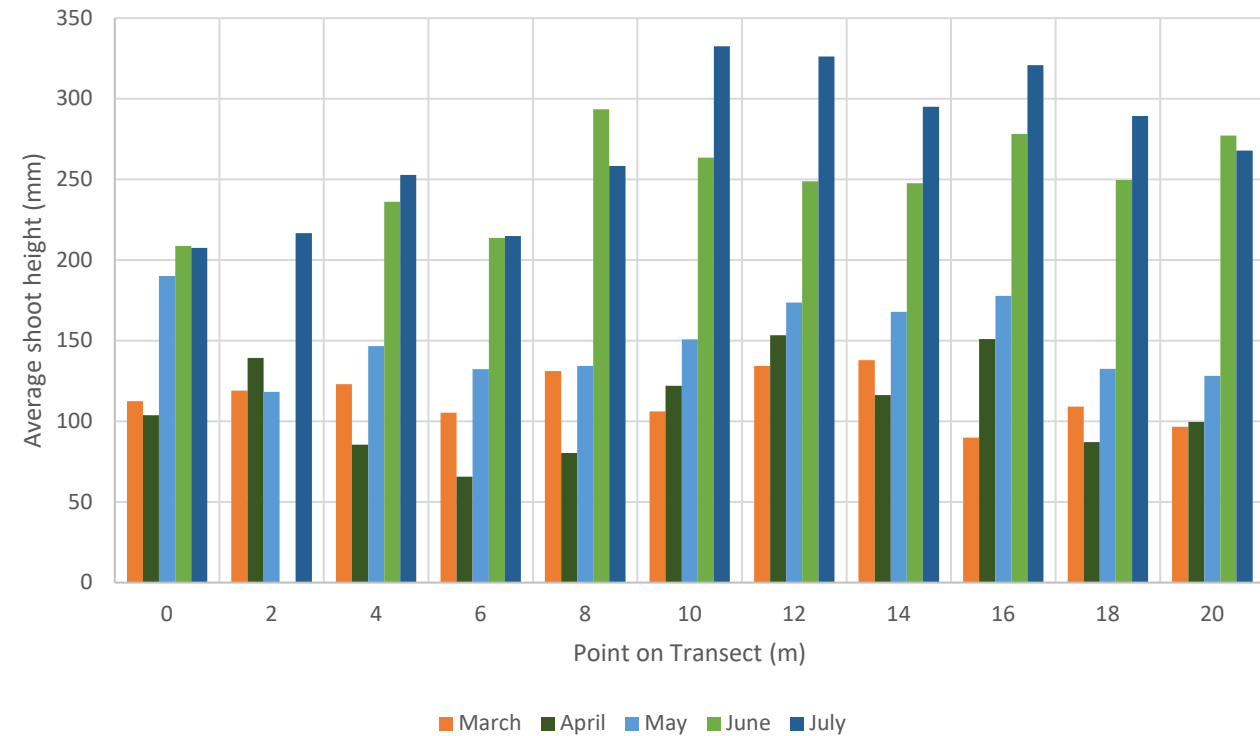


Figure 2. Average TTES height in mm of all shoots in the quad by month. Note seagrass growing season begins in May.

Ongoing Established Transect Data

Fig1

Monthly Transect Line Total SFIL Occurrence

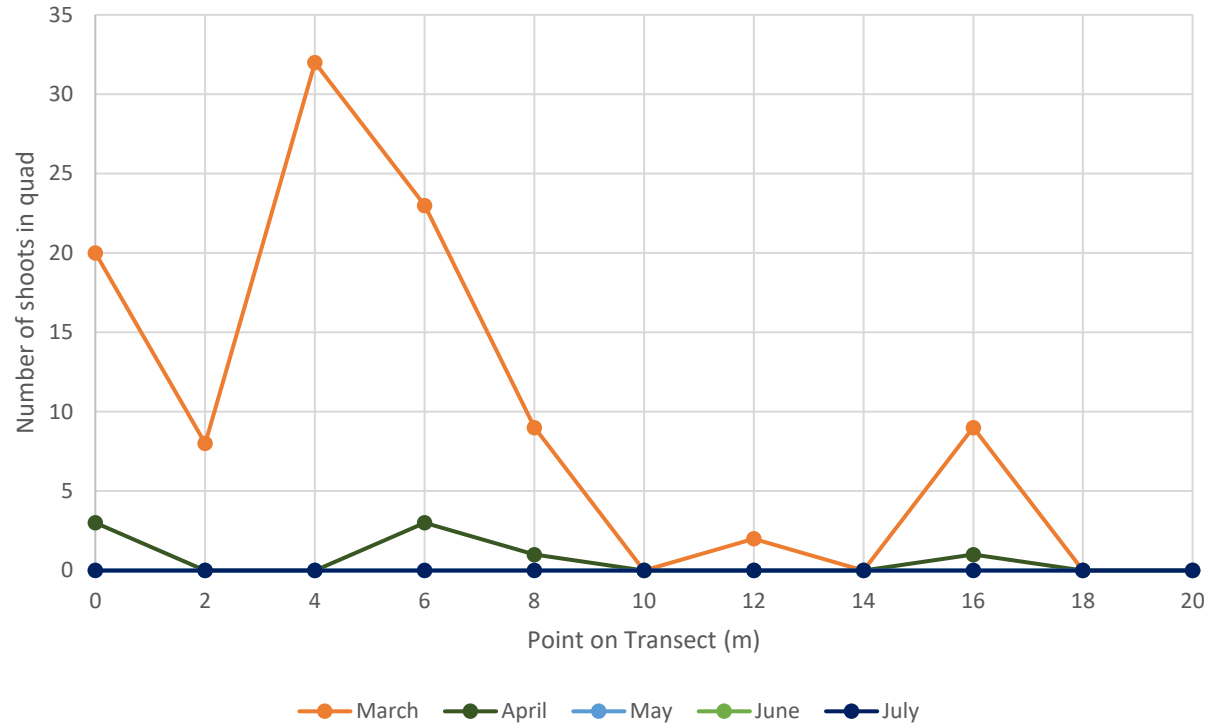


Figure 1. Total *Syringodium filiforme* (SFIL) occurrence at each transect quadrat by month. Note that SFIL was only found in 4 quads in April, no SFIL was found in any quad in May or June.

Fig2

Monthly Transect Line Average SFIL Shoot Height (mm)

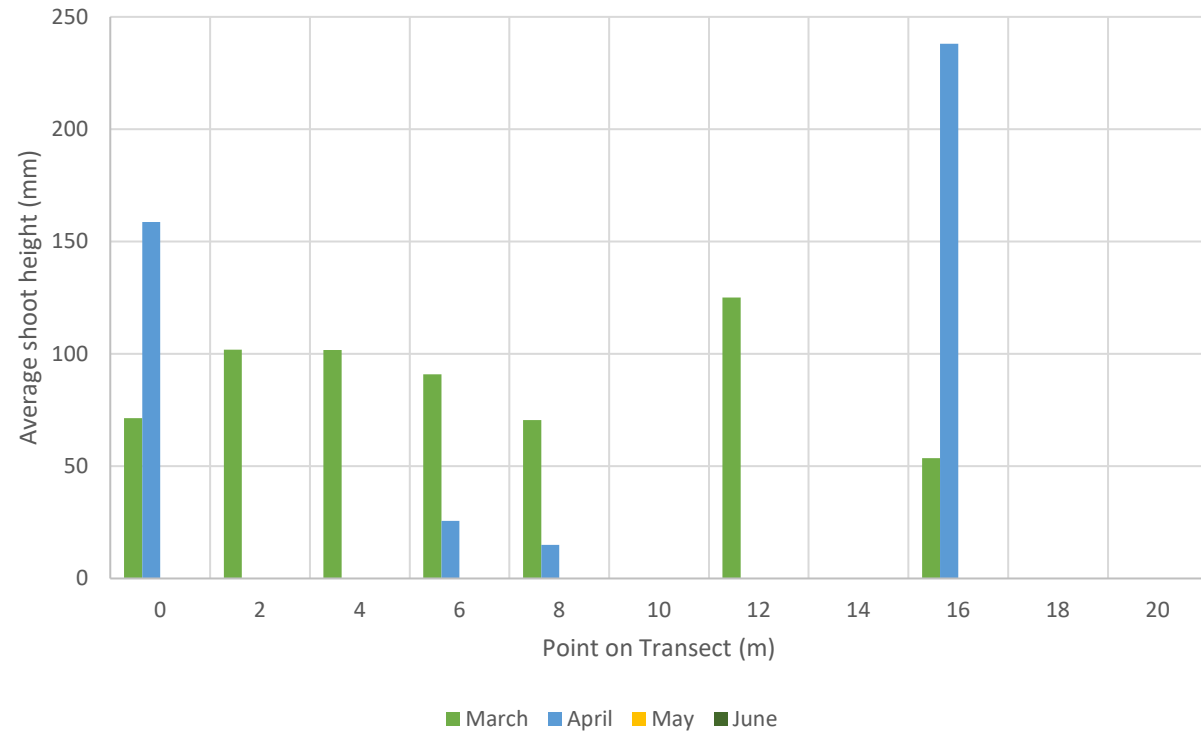
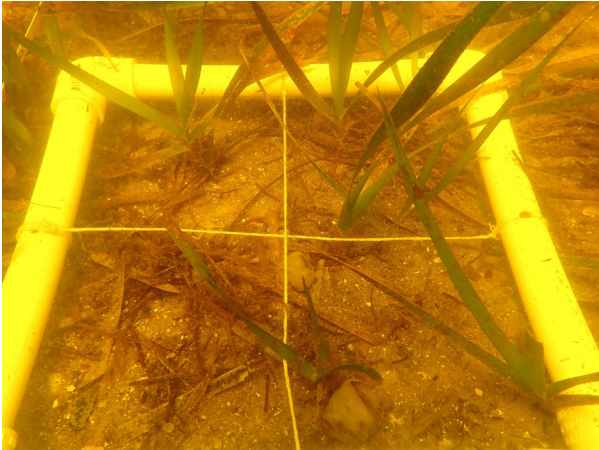
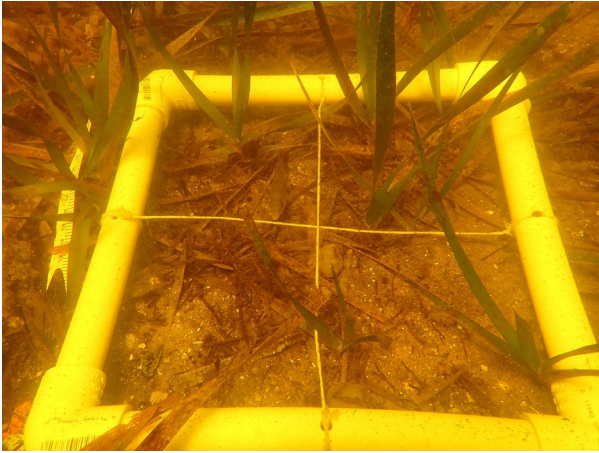


Figure 2. Average height in mm of all shoots in the quad by month. Note seagrass growing season begins in May. Note that SFIL was only found in 4 quads in April, no SFIL was found in any quad in May or June.

July Transect Pictures

Meter 0



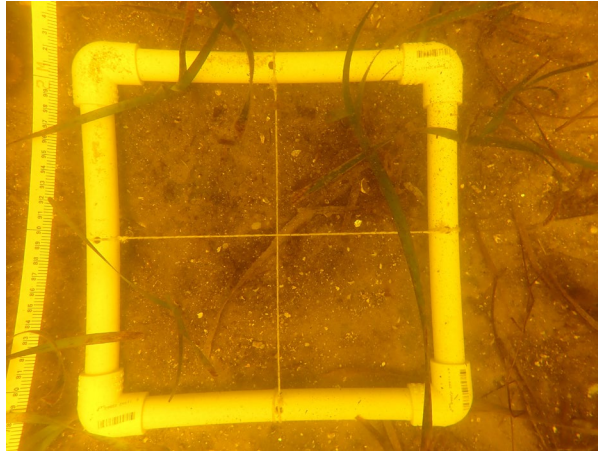
Meter 0 Data

Urchin Count: 0

Shoot count: 8

Average Height (mm): 207.5

Meter 2



Meter 2 Data

Urchin Count: 0

Shoot count: 3

Average Height (mm): 216.67

Meter 4



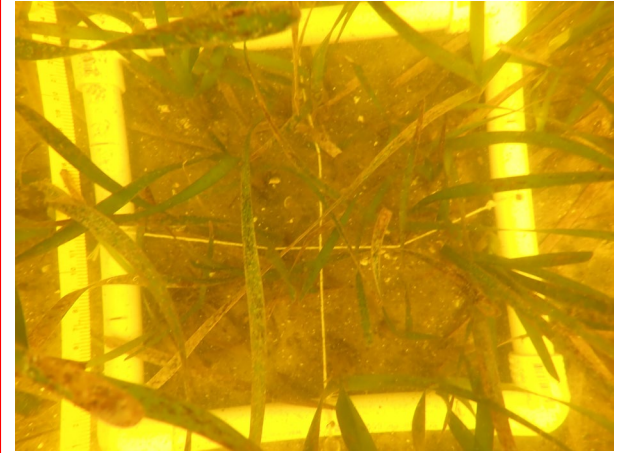
Meter 4 Data

Urchin Count: 0

Shoot count: 9

Average Height (mm): 252.78

Meter 6



Meter 6 Data

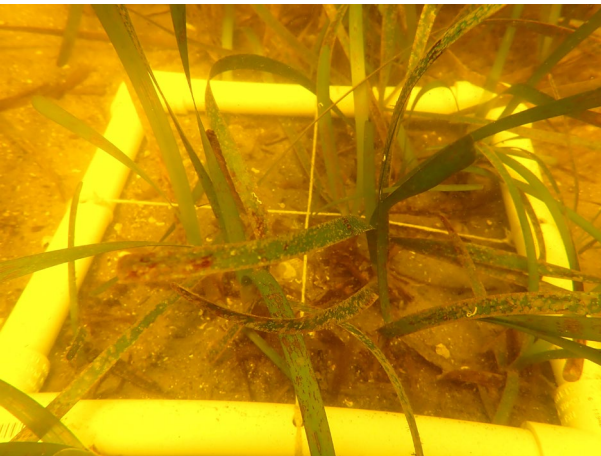
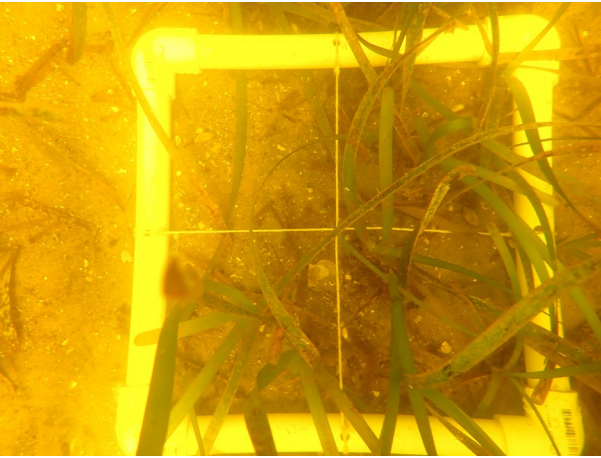
Urchin Count: 0

Shoot count: 25

Average Height (mm): 214.8

July Transect Pictures

Meter 8



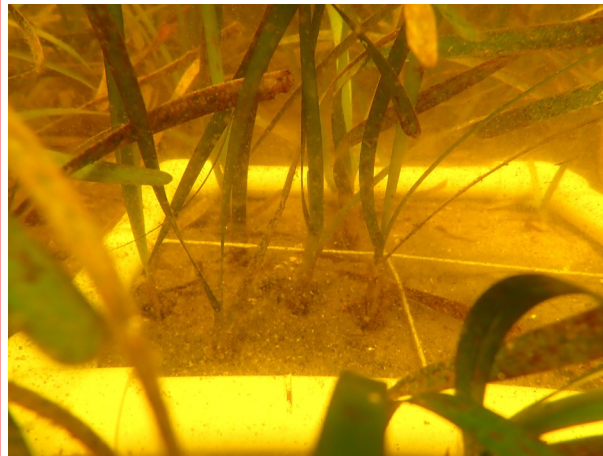
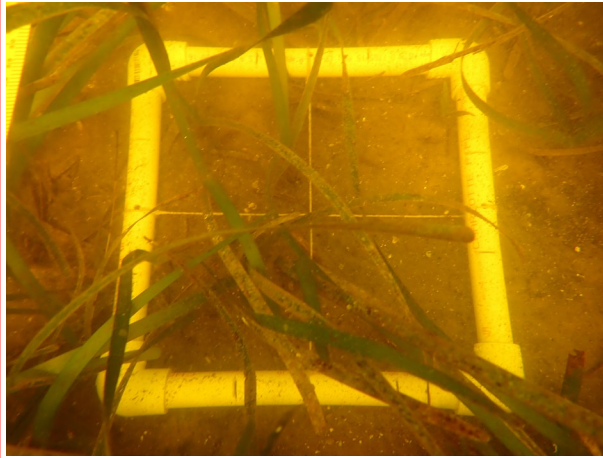
Meter 8 Data

Urchin Count: 0

Shoot count: 14

Average Height (mm): 258.21

Meter
10



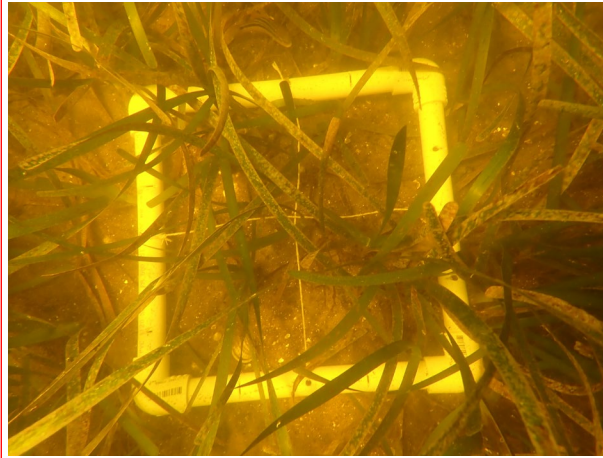
Meter 10 Data

Urchin Count: 0

Shoot count: 8

Average Height (mm): 332.5

Meter
12



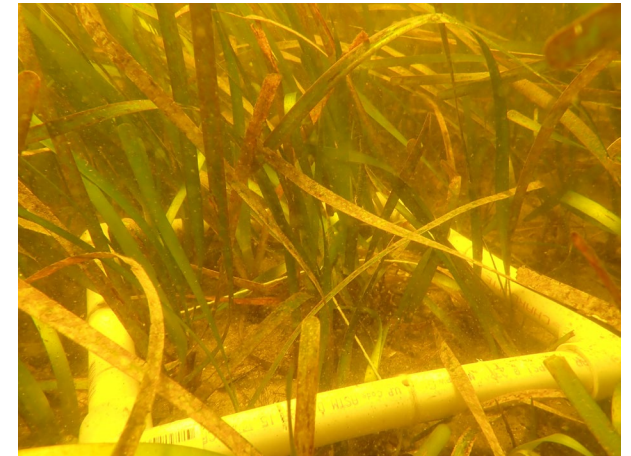
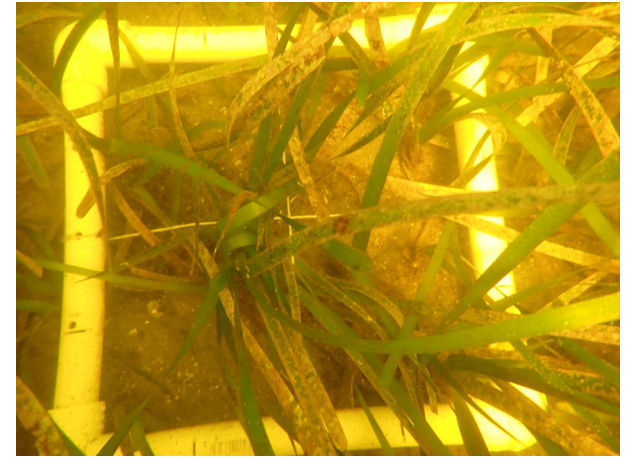
Meter 12 Data

Urchin Count: 0

Shoot count: 17

Average Height (mm): 326.12

Meter
14



Meter 14 Data

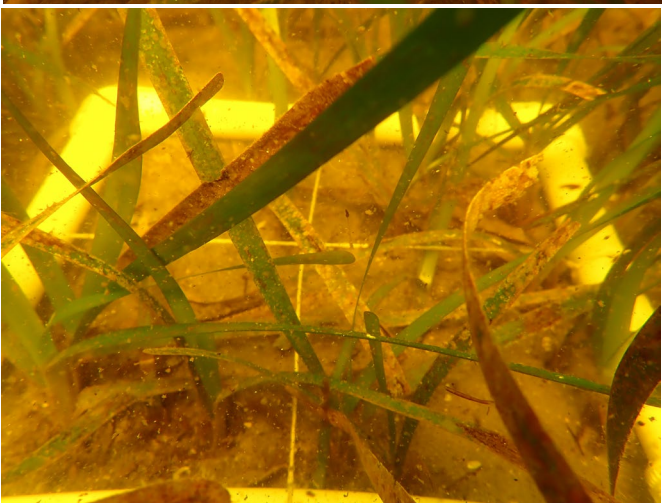
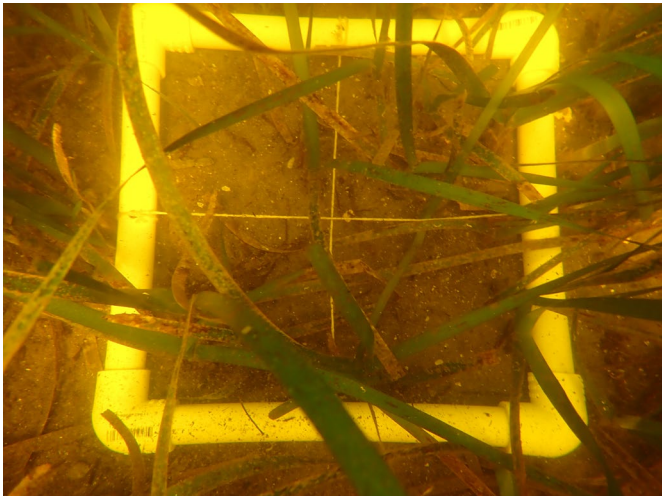
Urchin Count: 0

Shoot count: 28

Average Height (mm): 295.07

July Transect Pictures

Meter
16



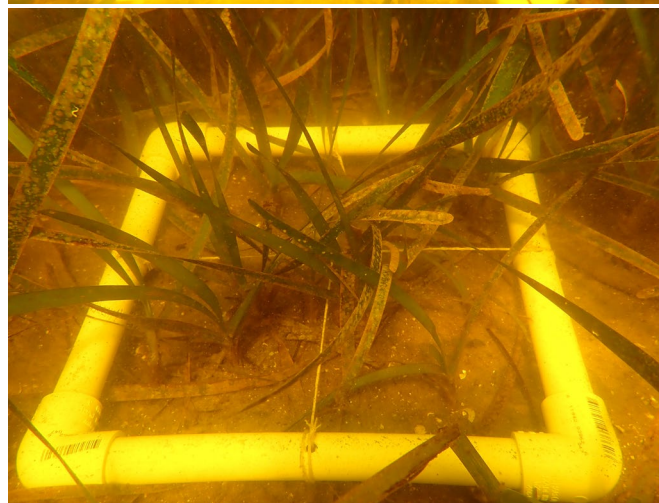
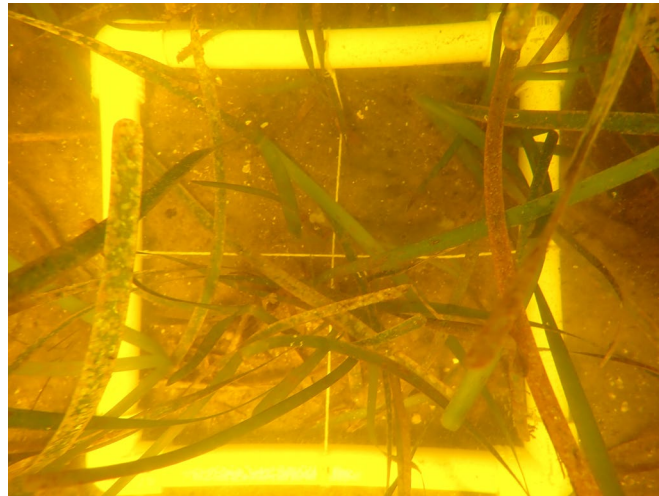
Meter 16 Data

Urchin Count: 0

Shoot count: 17

Average Height (mm): 320.88

Meter
18



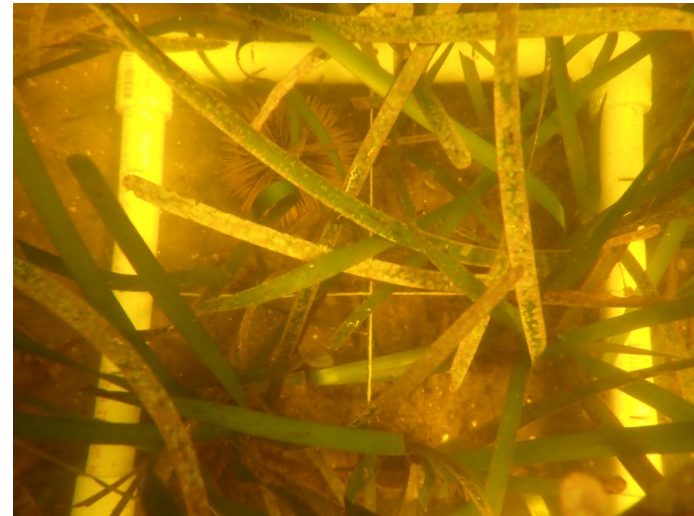
Meter 18 Data

Urchin Count: 0

Shoot count: 13

Average Height (mm): 289.23

Meter
20



Meter 20 Data

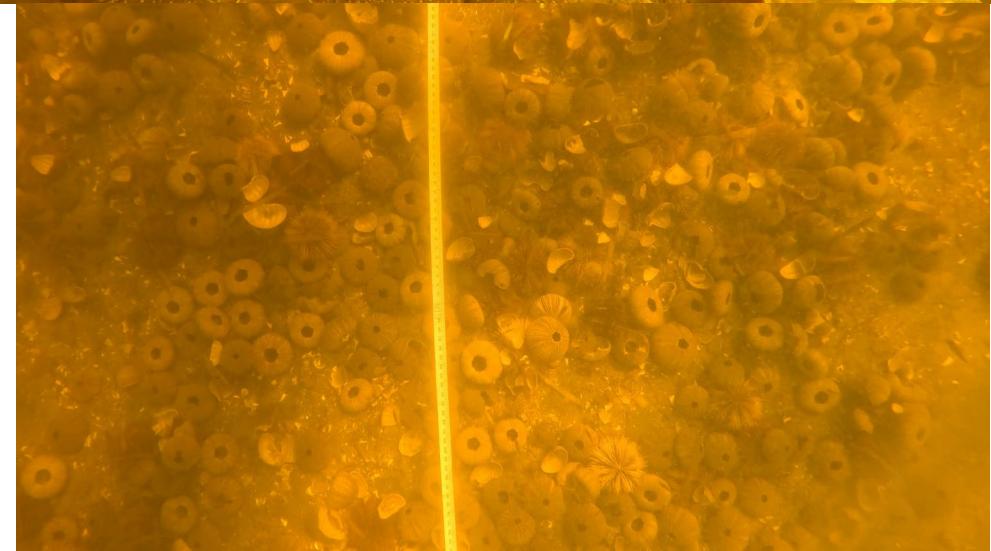
Urchin Count: 1

Shoot count: 26

Average Height (mm): 267.73

Other notes from the field:

The mass urchin die off around US11/ US12 is very interesting, especially since the numbers of dead urchins in US13 were significantly lower despite being less than 15 meters away. It will be interesting to return to this area in August and see if it has continued to progress. Hoping that the water won't be as tannic, so we will be able to see if there are any other urchin pockets/ lines around. The grass around the pocket seemed healthy and despite being grazed, the bare area seems to have healthy rhizomes. It is slightly concerning that within the bare spots, where there are shoots sticking out from the sediment a lot of them were dead. That is something we will continue to monitor especially as growing season nears its end.





Next urchin surveys will occur in August.
Still working on getting aerial imagery to map the extent of damage.



Data collected by Big Bend Seagrasses Aquatic Preserves.
Please contact Kate Suchanec at Katherine.Suchanec@floridadep.gov with any questions, comments, or requests for further data & pictures.
Special thanks to Cheryl Clark, DEP central office, for assisting with urchin measurements in February and March.