



Shediac Bay Watershed Association

Eelgrass Monitoring & Restoration Report 2018

March, 2019

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1.0 Introduction

Eelgrass is an important ecosystem in Shediac Bay. They provide shelter and food to a myriad of aquatic species. Fish use eelgrass beds as nurseries to lay their eggs. The rhizomes of eelgrass also help stabilize sand and can lessen the impact of waves on the shoreline. These ecosystems are fragile and can be impacted by human activity, water quality or invasive species. The arrival of the green crab, an invasive species, in Shediac Bay has raised concern over the impact on eelgrass beds.

In order to measure the current state of eelgrass in Shediac Bay, the Shediac Bay Watershed Association (SBWA) has partnered with the Southern Gulf of St. Lawrence Coalition on Sustainability (Coalition-SGSL) in 2016 to implement a SeagrassNet site in the Shediac Bay. SeagrassNet is a worldwide monitoring program used to assess the health of, document data on, and determine predatorial impacts to seagrass communities.

The main purpose of this program is to evaluate the influence of green crab, on the health and density of eelgrass. In 2018, funding was received from the Wildlife Trust Fund and the NB Environmental Trust Fund in order to expand the project to a third site in the Shediac Bay and have a first experimental restoration project. The new monitoring site was established in the Pointe-du-Chêne area.

The green crab inventory was done with experimental fishing using traps once a month from June to September. The report on green crab is included in Annex A.

An experimental restoration parcel was done in the Shediac River in partnership with Homarus. The staff from SBWA and Homarus transplanted eelgrass from a site destined to be harmed by the construction of a bridge to a site. The report on this activity is also included in Annex B.

Data on eelgrass is also being collected by different agencies as part of the Atlantic Eelgrass Monitoring Consortium. The SBWA helped the Southern Gulf Coalition on Sustainability do sonar mapping of eelgrass beds in Shediac Bay. The results of this study were not yet available as this report is written but will be received in 2019.



Example of an eelgrass bed

2.0 SeagrassNet Monitoring

2.1 Purpose

SeagrassNet allows agencies (e.g. landowners, stakeholders, watershed groups, biologists) to share and compare data worldwide, monitor health of local seagrass populations, and take action to mitigate negative impacts to seagrass populations (e.g. pollution, contamination, predation by invasive species).

2.2 Methods

One 50 m transect is established perpendicular to the shoreline. Three cross-transects, which are to run parallel to the shoreline, are then determined using the following criteria:

- Shallow station (1 m into the bed from the onshore edge of the continuous meadow)
- Mid-depth station (between the deep and shallow stations or at an interesting transition between species)
- Deep station (1 m into the bed from the offshore edge of the continuous meadow)

All stations are marked with a permanent screw anchor, and GPS coordinates are taken for each station with the assumption that cross-transects are independent. For each of the three cross-transects, 12 quadrats are measured. The locations of the quadrats are selected based on the SeagrassNet protocol, using a 50-metre measuring tape. They are positioned on the beach side of the tape.

One photo of each quadrat is taken and sent to SeagrassNet. Herbarium sheets of each seagrass species are prepared for the International Seagrass Herbarium and sent to SeagrassNet for verification. Seagrass cover is estimated visually for the total cover and then cover by each species on a percent scale in each predetermined quadrat along the cross transects. Canopy height is measured ignoring the tallest 20% of leaves. Any evidence of grazing by predators is identified. Results are expressed as canopy height for the dominant species.



An eelgrass monitoring 1 m x 1 m quadrat

For small-to-medium seagrass species: The 35 cm² biomass core is placed over shoots selected at approximately 50 cm depth outside each quadrant, landward, at a depth of 10 cm. It is ensured that only leaves rooted in the core are on the inside of the core. The sample is then washed of sediment and then separated into leaves, stems, and root-plus-rhizomes. Leaves are scraped to remove epiphytes and then rinsed in a weak acid if calcareous epiphytes are present. Plant parts are rinsed in fresh water, dried at 60°C for 24 hours, and weighed. Biomass is calculated, recorded, and submitted to SeagrassNet. The number of leaf meristems occurring within the core sample is counted and recorded as the shoot count on the Biomass Form.

For large seagrass species: An individual shoot, including rhizome, is collected approximately 50 cm landward of each quadrat. Shoot weight is determined and multiplied by density to obtain biomass. A 25 cm square quadrat is placed on the transect line. All shoots of the large species in the quadrat area are counted and recorded on the Field Sampling Form.

Flowers, fruits, seeds, or flowering stems in a core are counted and recorded (flower/fruit/seed per area) for all seagrass species. GPS readings are taken at the left, center, and right of each cross-transect. Distance is measured from the two ends and the center of the offshore cross-transect (C) to the deepest edge and the deepest occurring strap-bladed seagrass shoot. Distance is then measured from the two ends and the center of the onshore cross-transect (A) to the shallowest occurring seagrass shoot. When the entire site is submerged, water depth is measured from the top of the substrate to the water surface at each of the nine cross-transect sites; the time of each measurement is recorded. Tidal information (type, range) is obtained from tide charts and recorded. It is also recorded whether the minimum depth of distribution is in the intertidal or subtidal zone. Water temperature, salinity, light level, and surface sediment characteristics quarterly at the center of the three cross-transects are measured and recorded (Short, McKenzie, Coles, Vidler, & Gaeckle, 2006).

This information can be found in further detail in the SeagrassNet Monitoring Manual on the SeagrassNet website:

http://www.seagrassnet.org/sites/default/files/SeagrassNet_Manual_2006_Worldwide.pdf.



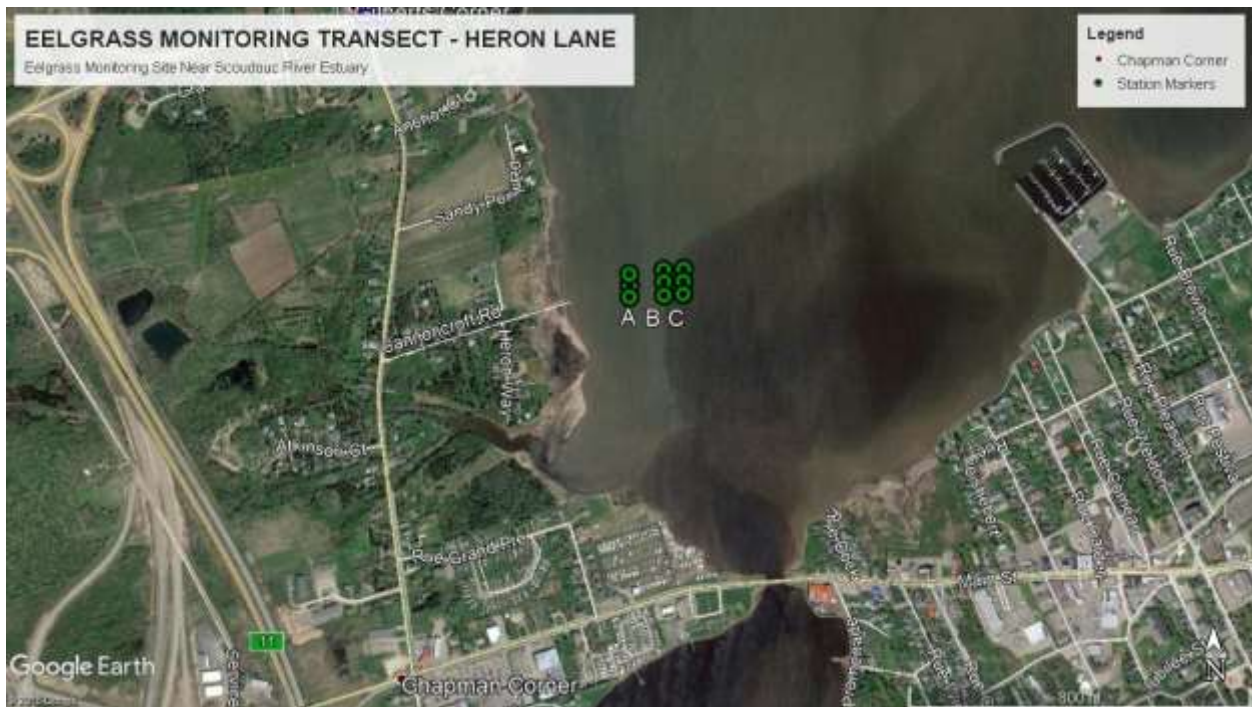
Photo of eelgrass survey in a healthy eelgrass bed surrounded by fish

2.3 Monitoring Sites

The Shediac Bay Watershed Association has established 3 monitoring sites in the Shediac Bay: at the mouth of the Scoudouc River estuary, near South Cove estuary, and in the Shediac River estuary.

2.3.1 Scoudouc River – Heron Lane

This eelgrass monitoring site is located in the estuary of the Scoudouc River, near the small private road Heron Lane (N46°13'32.3" W64°33'26.2"). The SBWA received permission from the property owners to use the road and park vehicles in a convenient location for easy access to the beach. This site was established and surveyed in 2016 and surveyed again in 2017. In 2018, the team spent a significant amount of time looking for the permanent station markers, using GPS and snorkelling gear to search the substrate for the anchors, but none were found. Due to a lack of time, this site was not surveyed in 2018. In 2019, the team will attempt to locate the anchors, and if they are not found, new anchors will be installed. Survey photos and field sheets can be found in Appendix A and B.



Google Earth satellite image of the Scoudouc River estuary and the location of each station markers in the site.

2.4 Shediac River

The Shediac River site is located east of the bridge on Route NB-134 (N46°16'16.54" W64°34'23.30"). This site was established and surveyed in August of 2017, and a second survey was performed in August 2018. Four station markers (screw anchors) had been torn out of the substrate over the winter 2017-2018, and were replaced using a GPS, compass bearings and triangulation. Survey photos and field sheets can be found in Appendix A and B.



Google Earth satellite image of the Shediac River estuary and the location of the eelgrass monitoring transect



Photo of the Shediac River site near the Route 134, Shediac Bridge.

2.5 Shediac Bay – Stead Street/South Cove

This eelgrass monitoring site is located in the Shediac Bay, near the mouth of the estuary of South Cove, near Pointe-du-Chêne (N46°13'53.7" W64°31'27.34"). This site was newly established in 2018, and its first survey was performed on August 7 & 8th. Survey photos and field sheets can be found in Appendix A and B.



Google Earth satellite image of the Shediac Bay near Pointe-du-Chêne/South Cove estuary, and the location of the Stead Street eelgrass monitoring transect



Collecting eelgrass sample for weighing

3.0 Restoration 2018

In partnership with the *Homarus Eco-Centre*, the SBWA participated in an eelgrass restoration pilot project in the Shediac River, during the summer of 2018. SBWA staff assisted the Homarus biologist in the installation and transplanting eelgrass into specially design quadrants meant to measure the efficacy of two different transplanting methods; freehand planting and planting using empty mollusk shells.

Due to the plans for a new bridge crossing the Shediac River, part of the twinning of Highway NB-11, eelgrass was collected in the construction zone of the new bridge. Since the eelgrass would be destroyed, it was the perfect opportunity to test the transplant methods on a greater scale than the quadrants.

Using simple snorkelling equipment, SBWA staff dove to collect thousands of eelgrass plants in the shallow waters of the bridge construction zone. Special floating crates were built by drilling holes into storage containers and fitting pool floaters for easy collection and transportation of the eelgrass. The plants were gently excavated from the soft substrate (mixture of sand and fine sediments) by digging with both hands and lifting from under the rhizome system, maintaining as much connected rhizomes as possible. Any eelgrass shoots with visible fish eggs were left alone.

Once collected, a portion of the plants were threaded through pre-drilled shells. The shells used were oyster and quahog shells, collected in other areas of the Shediac Bay and cleaned properly before use.



Figure 1: Eelgrass collection and photo of rhizomes



Threading eelgrass plants through pre-drilled shells

Transplanting eelgrass was done by first digging a hole approximately 5 cm into the substrate with an open hand, then inserting the shell or bare rhizomes at a 45 degree angle. Then, taking care of completely covering the rhizomes with sediment, firmly pressing down to compact as much substrate on top as possible.

In addition to shells, rocks with reasonable weight were collected along the shore to be used as anchors for some of the eelgrass that was lacking a shell. It is important to note that shell collection, cleaning and drilling can be a time-consuming process. In order to maximize the number of transplanted eelgrass from the construction impact zone to the new bed, on-site materials were used to increase the chances of survival of the plants. The Homarus report is included in Annex B.



Transplanting eelgrass using oyster shells

Eelgrass Restoration in the Shediac River



Eelgrass Restoration Map; Collection and Transplant Areas, 2018



SBWA Field Team with Homarus Eco-Centre Biologist

4.0 Mapping of Eelgrass beds

The Shediac Bay Watershed Association is part of the Atlantic Eelgrass Monitoring Consortium Atl-EMC organized by the Southern Gulf of Saint Lawrence Coalition on Sustainability (Coalition-SGSL). The consortium brings together governmental agencies, academics, First Nations and Environmental non-governmental organisations that do work on monitoring or restoring eelgrass.

The SBWA participated in mapping of eelgrass beds using Sonar with the Coalition-SGSL during the summer of 2018. The surveys were completed on August 9th and 10th. The surveys will detect the presence of eelgrass beds and be used to help determine the efficiency of other remote sensing such as UAV images (drone) or satellite imagery. The data is currently being analyzed and mapped by the Department of Fisheries and Oceans and will only be available for the 2019-20 report.

The Atl-EMC had a meeting on February 22nd in Shediac. The partner organizations presented results from their latest work. The Shediac Bay Watershed Association presented on the eelgrass monitoring and restoration work that had been done in 2018.

The Nova Scotia Community College did some eelgrass mapping in Shediac Bay using bathymetric LIDAR. The results have not been published yet.

5.0 Conclusion and Recommendations

The results of the 2018 eelgrass surveys are still to be analyzed and results will be available in the coming year. The Seagrassnet data along with the different surveys that have been done in the Shediac Bay will be submitted to the Atl-EMC to discuss potential restoration or protection projects are needed in the area. It's crucial that eelgrass sites continue to be monitored in order to gain valuable information on how this ecosystem is being affected by the invasive green crab population. Long-term monitoring of both eelgrass and green crab populations in the Shediac Bay region will aid in determining future courses of action (e.g. green crab removal, eelgrass restoration).

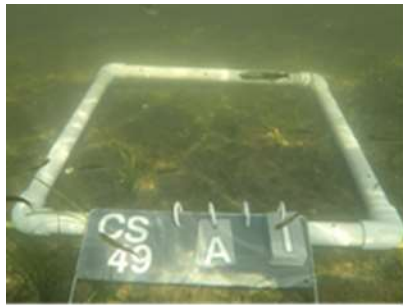
In 2019, if sufficient funding is received, a final Seagrass net monitoring site will be established on the northern side of the Shediac Bay in Grande-Digue to get a better representation from around the bay.

6.0 Bibliography

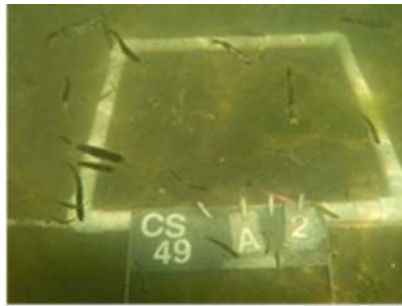
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Appendix A: Eelgrass Monitoring Transect Photos

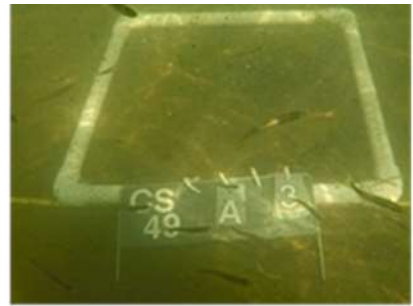
Eelgrass Monitoring Transect Photos: Stead St./South Cove



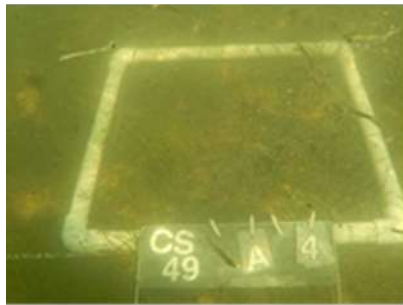
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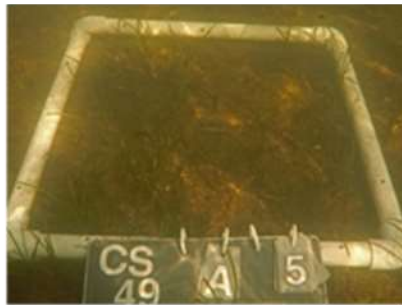
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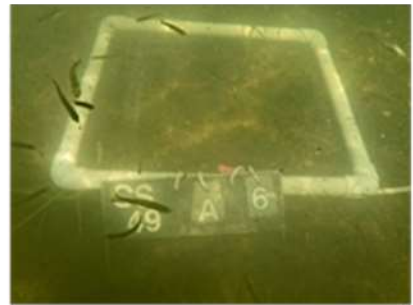
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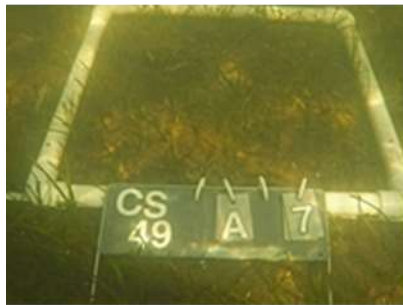
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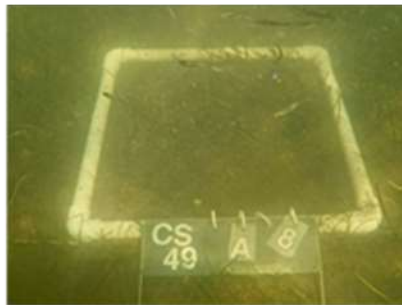
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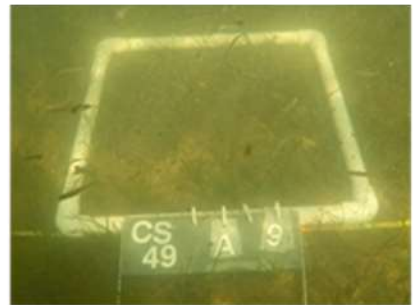
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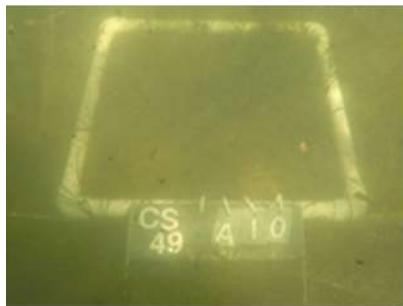
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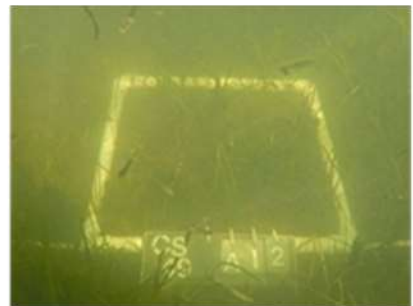
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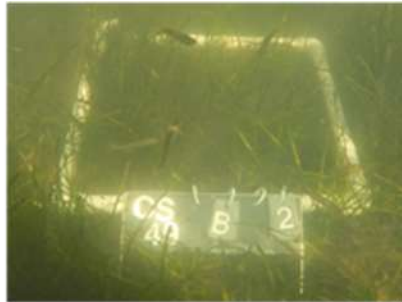
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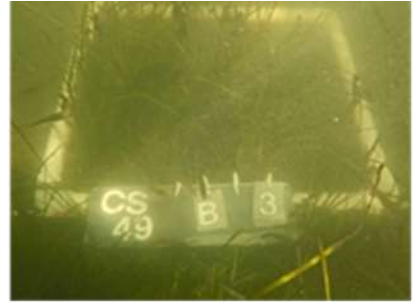
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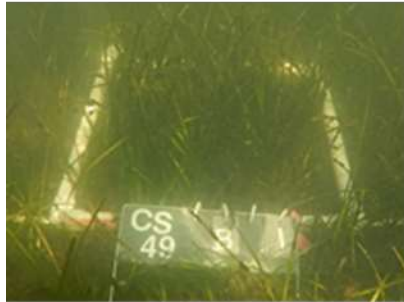
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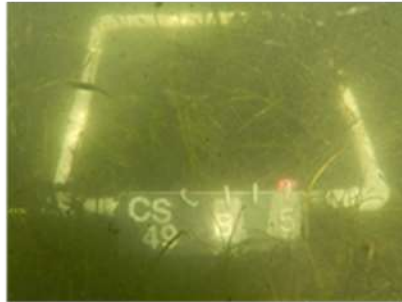
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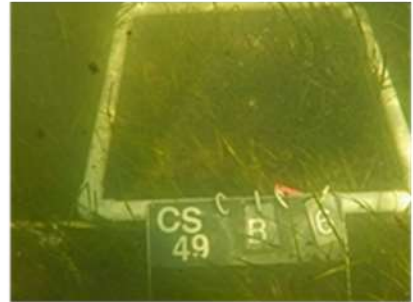
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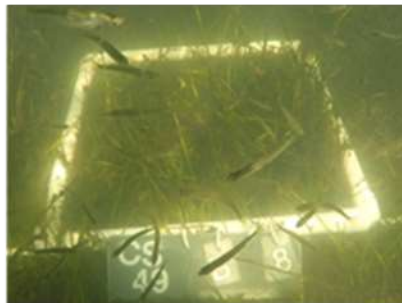
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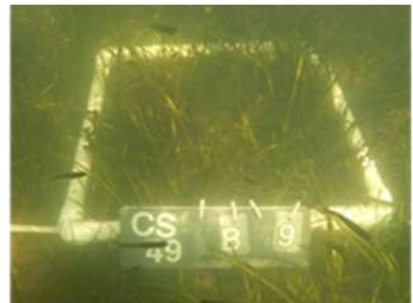
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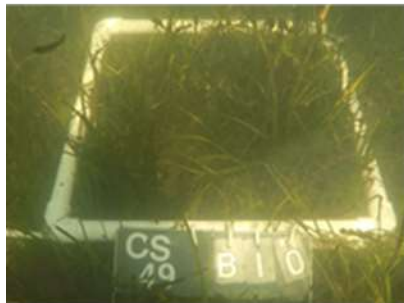
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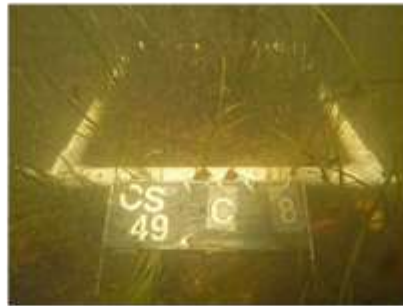
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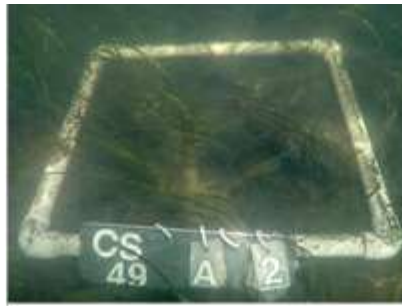


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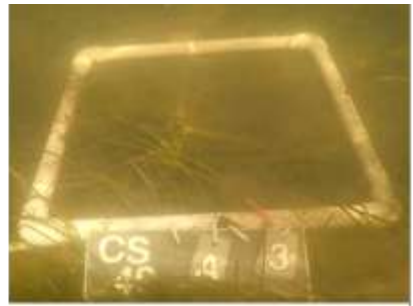
Eelgrass Monitoring Transect Photos: Shediac River



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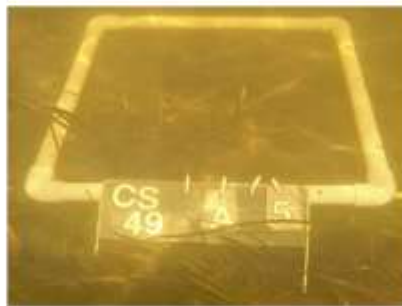
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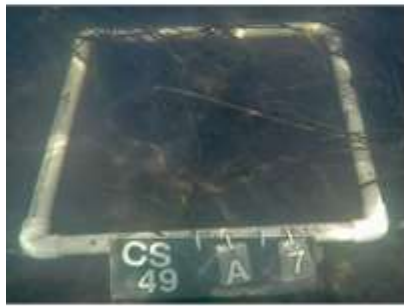
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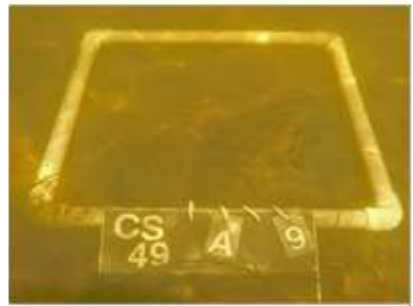
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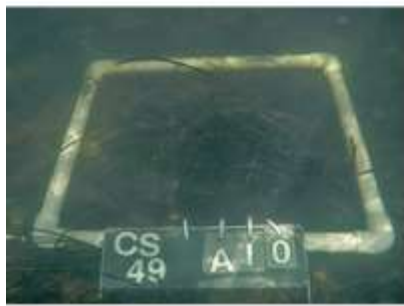
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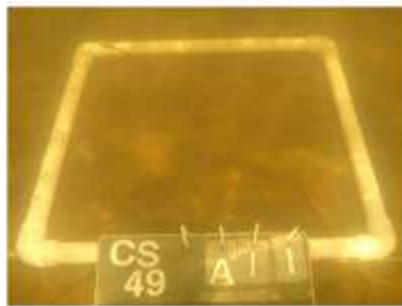
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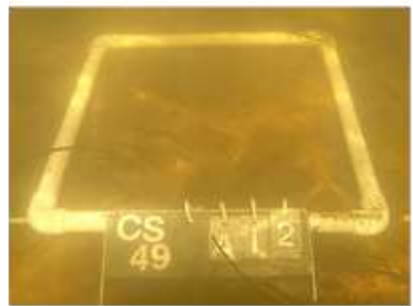
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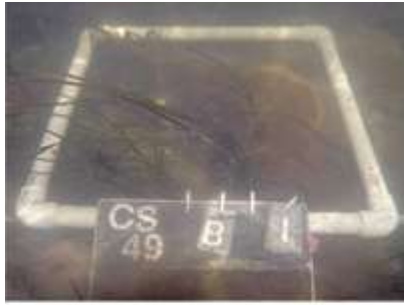
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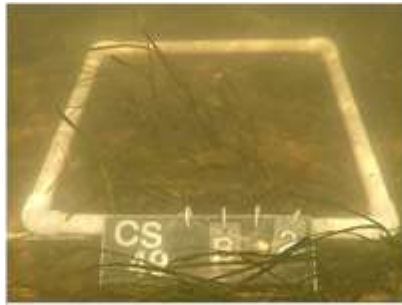
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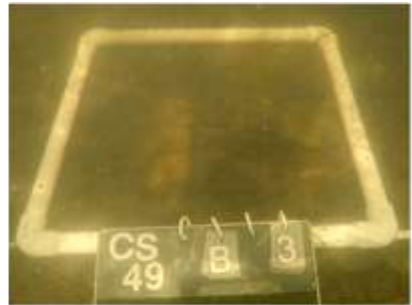
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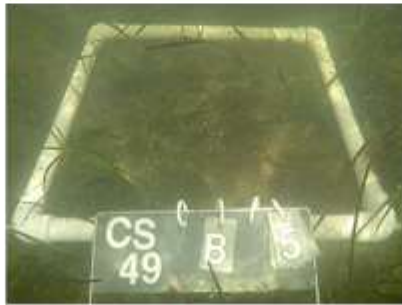
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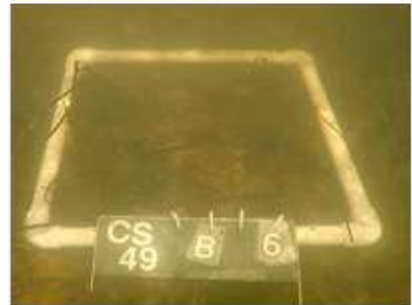
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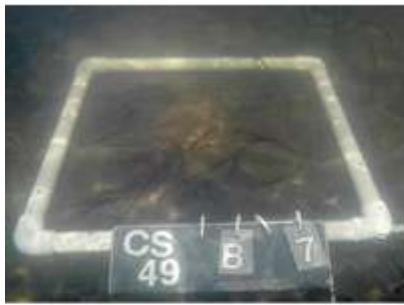
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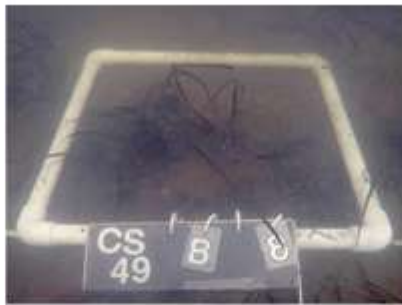
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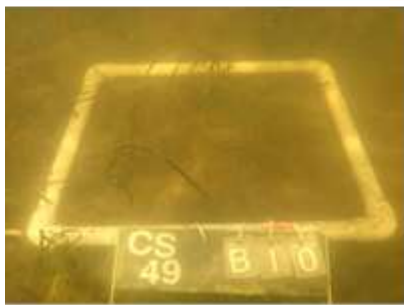
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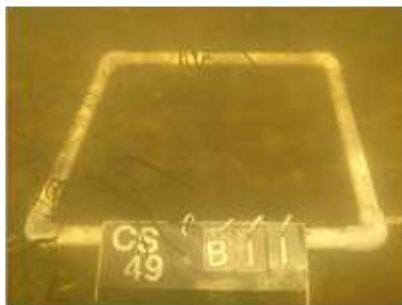
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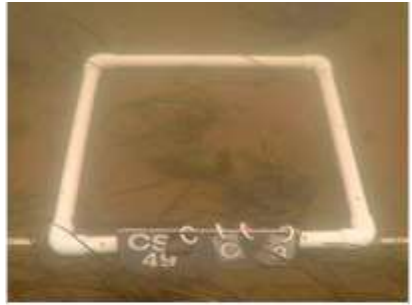
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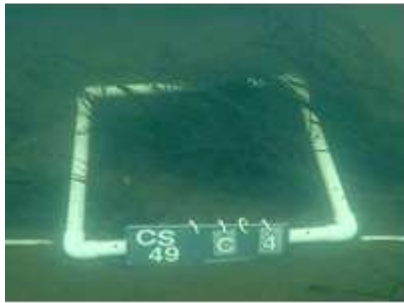
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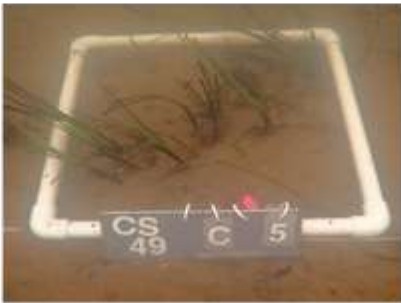
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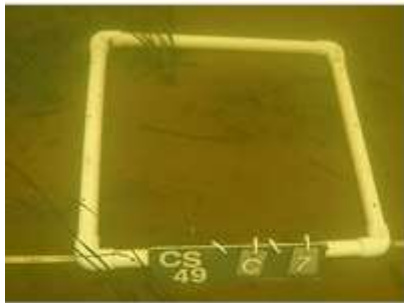
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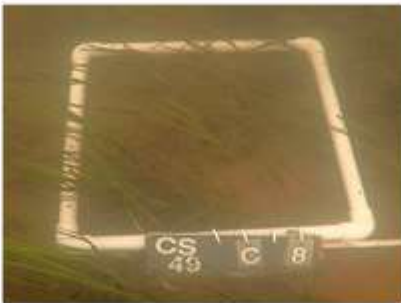
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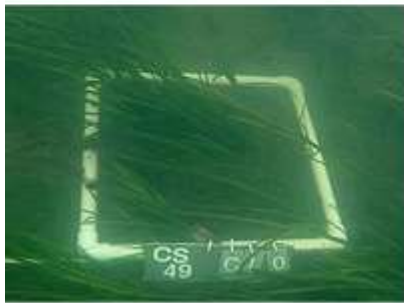
C7



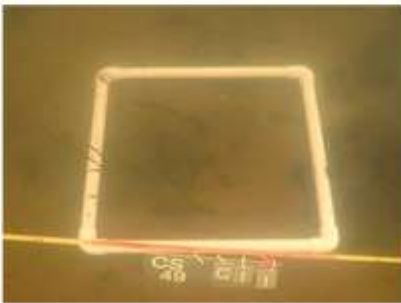
C8



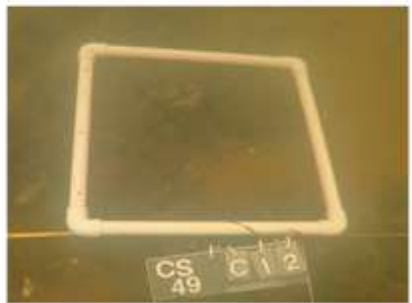
C9



C10



C11



C12

Appendix B: Eelgrass Monitoring Field Sheets

Eelgrass Monitoring Field Sheets: Stead St./South Cove

SeagrassNet Field Sampling Form (one sheet per station) SeagrassNet = Seagrass Monitoring Network AV. Caribbean Region

Location: Stead Station (circle one): A Researchers: Sampling date and time: 7 Aug 2018 10:55 1400 hrs

State/Country: Nearshore: A B. Middle C. Offshore Comments: Cross-transect: 26-50 m

PARAMETERS	Cross-transect: 0-25 m				Cross-transect: 26-50 m				
	1	2	3	4	5	6	7	8	9
Quadrat Measures <small>(see adjacent random distances)</small>	Quadrat	Quadrat	Quadrat	Quadrat	Quadrat	Quadrat	Quadrat	Quadrat	Quadrat
Photograph (1 per quadrat)	✓								
Voucher Specimen (1 of each species/Station)	✓								
All Species									
Total % Cover	60								
Species = St									
Species =									
Species =									
Species =									
Species =									
Species =									
Species = <u>ZE 2cm</u>	30	12							
<small>By distance: (see 2.5 x 2.5m quadrat)</small>									
Canopy Height (cm) <small>(Grazing Evidence?)</small>	20	7	12	N	15	N	16	Y	25
(y/n)									
Flower/Fruit Count by species:									
Leaf Biomass Core:									
Size (m ²)									
Pre-selected Random Distances for 0-25m	2	7	8	16	16	16	25	25	25
A. Between									
B. Middle	9	10	15	17	22	25	28	31	35
C. Drifters	5	7	10	18	19	22	26	34	38
Pre-selected Random Distances for 26-50m									
A. Between									
B. Middle									
C. Drifters									

Cross-transect Measures

GPS: Latitude Dist. to edge (m) Right:

Longitude Dist. to last (m) Center:

Water Depth (m) at time (hrs) Time of day: Left:

Surface sediment observation / sample: Time: Right:

Station Measures

Light -- Hobo (day in - day out) 0 hrs - 50 min Un - Unknown

Water temp. logger (day out) 50 min Un - Unknown

Salinity (ppt) 25% Un - Unknown

Tidal Stage (high or low / spring or neap) low spring Un - Unknown

Region IV species

Region I species	Region II species	Region III species	Region IV species
RI - <i>Halodule wrightii</i>	RII - <i>Halodule wrightii</i>	RIII - <i>Halodule wrightii</i>	RIIV - <i>Halodule wrightii</i>
RI - <i>Ruppia maritima</i>	RII - <i>Ruppia maritima</i>	RIII - <i>Ruppia maritima</i>	RIIV - <i>Ruppia maritima</i>
RI - <i>Sargassum aliforme</i>	RII - <i>Sargassum aliforme</i>	RIII - <i>Sargassum aliforme</i>	RIIV - <i>Sargassum aliforme</i>
RI - <i>Thalassia testudinum</i>	RII - <i>Thalassia testudinum</i>	RIII - <i>Thalassia testudinum</i>	RIIV - <i>Thalassia testudinum</i>

SeagrassNet Field Sampling Form (one sheet per station) - SeagrassNet = Seagrass Monitoring Network - W. Caribbean Region

Location: Stead Transect code & no.: B Station (circle one): A. Nearshore B. Middle C. Off-shore

State/Country: St. Vincent and the Grenadines Researchers: W. Stead Sampling date and time: 8 August 2018 10:00 1400 hrs

Comments:

PARAMETERS	Cross-transect 0-25 m				Cross-transect 20-50 m			
	Quadrat	Quadrat	Quadrat	Quadrat	Quadrat	Quadrat	Quadrat	Quadrat
Quadrat Measures <small>(pre-selected random distances)</small>	✓	✓	✓	✓	✓	✓	✓	✓
Photograph (1 per quadrat)	✓	✓	✓	✓	✓	✓	✓	✓
Voucher Specimens (1 of each species/Station)	✓	✓	✓	✓	✓	✓	✓	✓
All Species Cover	60	65	60	40	65	75	50	65
Species =S1								
Species =								
Species =								
Species =								
Species = <small>2.5m</small> % Cover Density	20	15	25	25	25	25	25	25
Species = <small>2.5m</small> % Cover Density	20	15	25	25	25	25	25	25
Canopy Height (cm) <small>(randomly selected 25-25 cm quadrat)</small>	20	15	25	25	25	25	25	25
Canopy Height (cm) <small>(randomly selected 25-25 cm quadrat)</small>	20	15	25	25	25	25	25	25
Flower/Fruit Count by species	11							
Leaf Biomass Core	0.5							
Size (m ²)	0.0015							

Pre-selected Random Distances for 0-25m	Center				Right			
	1	2	3	4	5	6	7	8
A. Nearshore	18	18	18	18	26	26	26	26
B. Middle	17	17	17	17	28	28	28	28
C. Offshore	14	14	14	14	26	26	26	26

Cross-transect Measures

GPS Latitude: 11.2 Dist. to edge (m): 8.0

Longitude: 133.4 Dist. to last (m): 11.2

Water Depth (m) at time (hrs): 10:00 TSS @ 10:00: 0.90m at 10:00

Surface sediment observation / sample: low sand / yes

Station Measures

Light -- Hobs (day in - day out): 0.00m at 10:00

Water temp. logger (day out): 24.7

Salinity (ppt): 26.76

Tidal Stage (high or low / spring or neap): low spring

Region IV species	HW - <i>Halodule wrightii</i>	U.A. - Unknown
HW - <i>Halodule wrightii</i>		
HW - <i>Halodule wrightii</i>		
HW - <i>Halodule wrightii</i>		
HW - <i>Halodule wrightii</i>		

SeagrassNet Field Sampling Form (one sheet per station) **SeagrassNet - Seagrass Monitoring Network** 4V. Caribbean Region

Location: PTAsted Fracture code & no.: C Sampling date and time: 8 August 2018 11:50 hrs
 State/Country: St. Vincent and the Grenadines Researchers: A. Nearshore, B. Middle, C. Offshore
 Station (circle one): C. Offshore Comments: WC wild oyster patch

PARAMETERS

PARAMETERS	Cross-Transsect 0-25 m												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Quadrat Measures <small>4 x 4 m sub-area random distances</small>	Quadrat	Quadrat	Quadrat	Quadrat	Quadrat	Quadrat	Quadrat	Quadrat	Quadrat	Quadrat	Quadrat	Quadrat	Quadrat
Photography (1 per quadrat)	✓												
Voucher Specimen (1 of each species/Station)	✓												
All Species	30	20	25	25	30	20	20	25	30	35	35	15	65
Cover	40												
Species =													
Species =													
Species =													
Species =													
Species = 1													
<small>In density per 25 x 25 cm quadrat</small>	20	32											
Canopy Height (cm) Grazing Evidence?	20	✓											
(Y/N)													
Flower/Fruit Count by species	4	11											
Leaf Biomass Core	6.51												
Size (m ²)	✓ 10.0035												

Pre-selected random distances for 0-25m	Pre-selected Random Distances for 26-50m												
	1	2	3	4	5	6	7	8	9	10	11	12	13
A. Nearshore	2	7	10	15	17	18	22	25	25	31	35	37	40
B. Middle	5	10	15	17	18	19	22	25	28	31	35	37	40
C. Offshore	5	7	10	10	14	19	22	22	26	34	35	39	44

Cross-Transsect Measures

GPS: Latitude 8.2 Dist. to edge (m) 112
 Longitude 112 Dist. to last (m) 2359 1554
 Water Depth (m) at time (hrs) 0.75 m at 11:30
 Surface sediment observation / sample fine sand / yes

Station Measures

Station Measures	Region I species				Region IV species			
	IA - <i>Halodule wrightii</i>	IB - <i>Halodule wrightii</i>	IC - <i>Halodule wrightii</i>	ID - <i>Halodule wrightii</i>	IV - <i>Halodule wrightii</i>	IVa - <i>Halodule wrightii</i>	IVb - <i>Halodule wrightii</i>	IVc - <i>Halodule wrightii</i>
Light -- Hobo (day in - day out)								
Water temp. (day in)								
Salinity (ppt)								
Total Stage (high or low / spring or neap)								

Eelgrass Monitoring Field Sheets: Shediac River

SeagrassNet Field Sampling Form (one sheet per station) **SeagrassNet = Seagrass Monitoring Network** **IV. Caribbean Region**

Location: Shediac River 10 August 2018 9:25

Station (letter, code & no.): A Sampling date and time: 10 August 2018 9:25

State/Country: A Comments: 10 August 2018

Researcher: A 10 August 2018

PARAMETERS

Quadrat Measures (population, cover, biomass, etc.)

	Cross-transect (0-25 m)					Cross-transect 26-50 m				
	1	2	3	4	5	6	7	8	9	10
Photograph (1 per quadrat)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Voucher Specimen (1 of each species/Station)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
All Species Cover	0	0	0	0	0	0	0	0	0	0
Species =S1	5	7	20	3	2	1	15	5	1	0.5
Species =										
Species =										
Species =										
Species =S2	1m ²	1m ²	25m ²	1m ²	1m ²	1m ²	1m ²	1m ²	1m ²	1m ²
Species =S3	5'12"	7'10"	3'12"	2'7"	1'2"	1'2"	15'0"	5'18"	1'2"	10'0"
Canopy Height (cm) (Meaning Evidence?) (y/n)	0.9 Y	0.8 Y	0.5 N	0.5 N	0.4 Y	0.6 Y	0.8 Y	0.7 Y	0.5 Y	0.7 Y
Flower/Fruit Count by species										
Leaf Biomass Core										

Cross-transect Measures

GPS: Latitude 18° 10' 00" Dist. to edge (m) 10.2

Longitude 72° 55' 00" Dist. to last (m) 10.2

Water Depth (m) at time (hrs) 1.21m at 9:25

Surface sediment observation / sample 1.21m at 9:25

Station Measures

Light = Hobby (day in / day out) 60% 20:00

Water temp, logger (day out) 24.3

Salinity (ppt) 28.8

Tidal Stage (high or low / spring or neap) low spring

Region IV species

Region IV species	Count
H1 - <i>Halodule wrightii</i>	0
H2 - <i>Halodule wrightii</i>	0
H3 - <i>Halodule wrightii</i>	0
H4 - <i>Halodule wrightii</i>	0
H5 - <i>Halodule wrightii</i>	0
H6 - <i>Halodule wrightii</i>	0
H7 - <i>Halodule wrightii</i>	0
H8 - <i>Halodule wrightii</i>	0
H9 - <i>Halodule wrightii</i>	0
H10 - <i>Halodule wrightii</i>	0
H11 - <i>Halodule wrightii</i>	0
H12 - <i>Halodule wrightii</i>	0
H13 - <i>Halodule wrightii</i>	0
H14 - <i>Halodule wrightii</i>	0
H15 - <i>Halodule wrightii</i>	0
H16 - <i>Halodule wrightii</i>	0
H17 - <i>Halodule wrightii</i>	0
H18 - <i>Halodule wrightii</i>	0
H19 - <i>Halodule wrightii</i>	0
H20 - <i>Halodule wrightii</i>	0
H21 - <i>Halodule wrightii</i>	0
H22 - <i>Halodule wrightii</i>	0
H23 - <i>Halodule wrightii</i>	0
H24 - <i>Halodule wrightii</i>	0
H25 - <i>Halodule wrightii</i>	0
H26 - <i>Halodule wrightii</i>	0
H27 - <i>Halodule wrightii</i>	0
H28 - <i>Halodule wrightii</i>	0
H29 - <i>Halodule wrightii</i>	0
H30 - <i>Halodule wrightii</i>	0
H31 - <i>Halodule wrightii</i>	0
H32 - <i>Halodule wrightii</i>	0
H33 - <i>Halodule wrightii</i>	0
H34 - <i>Halodule wrightii</i>	0
H35 - <i>Halodule wrightii</i>	0
H36 - <i>Halodule wrightii</i>	0
H37 - <i>Halodule wrightii</i>	0
H38 - <i>Halodule wrightii</i>	0
H39 - <i>Halodule wrightii</i>	0
H40 - <i>Halodule wrightii</i>	0
H41 - <i>Halodule wrightii</i>	0
H42 - <i>Halodule wrightii</i>	0
H43 - <i>Halodule wrightii</i>	0
H44 - <i>Halodule wrightii</i>	0
H45 - <i>Halodule wrightii</i>	0
H46 - <i>Halodule wrightii</i>	0
H47 - <i>Halodule wrightii</i>	0
H48 - <i>Halodule wrightii</i>	0
H49 - <i>Halodule wrightii</i>	0
H50 - <i>Halodule wrightii</i>	0

SeagrassNet Field Sampling Form (one sheet per station) - SeagrassNet = Seagrass Monitoring Network - IV. Caribbean Region

Location: Snediacob Station (circle one): B Sampling date and time: August 10 2015 1400 hrs

State/Country: _____ Researchers: _____

Station (circle one): A. Nearshore, B. Middle, C. Offshore Comments: _____

PARAMETERS	Cross-Transsect 0-25 m					Cross-Transsect 26-50 m						
	1	2	3	4	5	6	7	8	9	10	11	12
Quadrat Measures	Quadrat	Quadrat	Quadrat	Quadrat	Quadrat	Quadrat	Quadrat	Quadrat	Quadrat	Quadrat	Quadrat	Quadrat
Photograph (1 per quadrat)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Voucher Specimen (1 of each species/Station)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
All Species	5	5	5	5	5	5	5	5	5	5	5	5
Cover	5	5	5	5	5	5	5	5	5	5	5	5
Species =												
Species =												
Species =												
Species =												
Species = <u>2m</u> % Cover Density	1m ²	1m ²	1m ²	1m ²	1m ²	1m ²	1m ²	1m ²	1m ²	1m ²	1m ²	1m ²
Canopy Height (cm) Grazing Evidence?	515	510	510	510	510	510	510	510	510	510	510	510
(Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Flower/Fruit Count by species												
Leaf Biomass Core												

Pre-selected Random Distances for 0-25m	Center (m)					Right (m)						
	1	2	3	4	5	6	7	8	9	10	11	12
A. Nearshore	2	4	6	8	10	12	14	16	18	20	22	24
B. Middle	3	6	9	12	15	18	21	24	27	30	33	36
C. Offshore	5	10	15	20	25	30	35	40	45	50	55	60

Cross-Transsect Measures

GPS: Latitude _____ Dist. to edge (m) _____

Longitude _____ Dist. to last (m) _____

Water Depth (m) at time (hrs) _____

Surface sediment observation / sample (no-sed) Yes

Station Measures

Light -- Hoeks (day in - day out) _____

Water temp. logger (day out) _____

Salinity (ppt) _____

Total Stage (high or low / spring or neap) low grazing

Region IV species

Region IV species	W - <i>Halodule wrightii</i>	Un - Unknown
W - <i>Halodule wrightii</i>		
Un - <i>Halodule wrightii</i>		
W - <i>Halodule wrightii</i>		
W - <i>Halodule wrightii</i>		
W - <i>Halodule wrightii</i>		

SeagrassNet Field Sampling Form (one sheet per station) **SeagrassNet - Seagrass Monitoring Network** IV. Caribbean Region

Location: St. Ignace R. C August 14 2018 1:10 PM
 State/Country: St. Ignace R. 14 2018 1:10 PM
 Sampling date and time: August 14 2018 1:10 PM
 Station (circle one): C. Offshore
 Researchers: C
 Comments:

PARAMETERS	Cross-Transsect 0-25m					Cross-Transsect 25-50m						
	1	2	3	4	5	6	7	8	9	10	11	12
Quadrat Measures <small>(1 per quadrat/1 quadrat distance)</small>	Quadrat	Quadrat	Quadrat	Quadrat	Quadrat	Quadrat	Quadrat	Quadrat	Quadrat	Quadrat	Quadrat	Quadrat
Photograph (1 per quadrat)	V											
Voucher Specimen (1 of each species/Station)	V											
All Species	10	20	1	15	8	5	0.5	15	25	30	6	0
Cover												
Species =												
Species =												
Species =												
Species = f) <small>(Density per 25x25 quadrat)</small>	10	23	20	39	1	6	8	17	5	10	5	12
Canopy Height (cm) <small>(Density per 25x25 quadrat)</small>	55	52	34	Y	53	Y	42	Y	52	Y	66	Y
Flower/Fruit Count by species												
Leaf Biomass Core												

Pre-selected Random Distances for 0-25m	Center 0-25m					Pre-selected Random Distances for 26-50m				
	2	7	8	16	18	25	26	33	38	45
A. Nearshore	9	10	15	17	22	25	28	31	35	37
B. Middle	5	7	10	18	19	22	26	34	35	38
C. Offshore										

Cross-transsect Measures

GPS: Latitude 18° 08' 00" N Dist. to edge (m) 11.7
 Longitude 79° 50' 00" W Dist. to base (m) 11.7
 Water Depth (m) at time (hrs) 2:55 PM 1824
 Surface sediment observation / sample at functional / yes

Station Measures

Light -- Hobo (day in - day out) 6:00 - 5:00 am
 Water temp. logger (day out) 302am
 Salinity (ppt) 25.8
 Total Stage: (high or low / spring or neap) low spring

Region IV species

HT - <i>Heterostichia decipiens</i>	HTa - <i>Heterostichia irregularis</i>	Va - <i>Ulva</i>
HT - <i>Heterostichia irregularis</i>	HTa - <i>Ruppia maritima</i>	
HT - <i>Heterostichia irregularis</i>	HTa - <i>Syringodium filiforme</i>	
HT - <i>Heterostichia irregularis</i>	HTa - <i>Thalassia testudinum</i>	

Annex A - Shediac Bay Watershed Green Crab (*Carcinus maenas*) Survey in Coastal Waters of the southeast Gulf of St. Lawrence: Shediac Bay

1

Shediac Bay Watershed Green Crab (*Carcinus maenas*) Survey in Coastal Waters of the southeast Gulf of St. Lawrence: Shediac Bay 2013-2018

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Annex B - Research and development project on manual eelgrass transplantation in the Shediac river

Research and development project on manual eelgrass transplantation in the Shediac river

(2018)

Final Report



HOMARUS

November 2018

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