

Data Documentation

Dataset Information

Dataset Title:

NOAA RESTORE Science Program: Gulf-wide assessment of habitat use and habitat-specific production estimates of nekton in turtlegrass (*Thalassia testudinum*): Blue crab growth and mortality rates, 2018-05-14 to 2018-09-14

Description:

This dataset consists of blue crab growth and mortality data from caging and tethering experiments in turtlegrass-dominated seagrass beds of the northern Gulf of America, including Lower Laguna Madre, TX; Coastal Bend, TX; Chandeleur Islands, LA; St. George Sound, FL; Cedar Key, FL, and Charlotte Harbor, FL.

Purpose:

The overarching goal of this project is to conduct a management-driven, Gulf of America-wide assessment of the use of turtlegrass as habitat by nekton and to evaluate the support provided to blue crabs, a commercially valuable species, using habitat-specific production estimates. This project was a collaboration between The University of Southern Mississippi, Dauphin Island Sea Lab, University of Florida, and Florida Fish and Wildlife Research Institute.

This dataset is a result of research funded by the National Oceanic and Atmospheric Administration's RESTORE Science Program (ROR - <https://ror.org/0042xzm63>) under award NA17NOS4510093 to The University of Southern Mississippi.

Methods:

Study sites

Blue crab growth and mortality experiments were conducted at six sites spanning the range of turtle grass distribution in the Northern GOA: two sites in Texas (Lower Laguna Madre and the Texas Coastal Bend), one site in Louisiana (Chandeleur Islands), and three sites in Florida, (St. George Sound, Cedar Key, and Charlotte Harbor).

Growth experiments

To quantify relationships between blue crab growth and seagrass complexity, a field caging experiment was conducted. Sampling stations at each of the six sites were selected using a stratified random sampling method of hexagonal tessellation in which a grid of hexagons (500 or 750 m edge) was overlaid on the mapped areal extent of known seagrass cover at each site. At each site, 10–15 hexagons with > 50% turtle grass cover were randomly selected and a randomly generated station was chosen within each selected hexagon to conduct each experiment. In cases where no turtle grass was found at a station, or stations were inaccessible, alternative hexagons were chosen and new stations were randomly generated.

A single mesocosm was deployed at each station 24–48 hrs prior to the start of the experiment to reduce effects of disturbance. Mesocosms each consisted of a collapsible, bottomless cylinder (1.07 m in diameter and 0.76 m tall) with 3.2 mm nylon mesh around the circumference and top connected by two fiberglass rings, PVC pipe, and rebar. A small closable (11.4 cm diameter, 15

cm long) sleeve sewn in the top allowed access to inside the mesocosm. During deployment, rebar was driven into the three PVC pipes supporting the mesocosm frame to anchor it in place, and the bottom edge of the mesocosm was driven ~5 cm into the sediment using a rubber mallet. Care was taken to ensure there were no gaps between the cage and the sediment and that macroalgae was cleared from the experimental area to remove potential confounding variables. Prior to deployment, the mesocosm deployment area was swept with dip nets to remove potential predators or competitors, as this could bias experimental results.

Juvenile blue crabs 11–44 mm in carapace width were collected 24–96 hrs prior to the beginning of the experiment from seagrass habitat using trawl, benthic sled, throw trap, and dip net techniques, and transferred to the lab in aerated containers. Because of logistical constraints, all blue crabs used in both the growth and mortality experiments for CB, LM, and CH were collected at CB and then transported to their respective sites. To differentiate between individuals, crabs were tagged using visible implant elastomer (VIE) tags (Northwest Marine Technologies) injected into the basal segments of the right or left swimming leg, the abdomen, or the body; each crab had a unique combination of tag placement location and color to enable identification of individuals. After VIE implantation, all crabs were held overnight to monitor survival and tag retention prior to deployment.

Approximately 24 hrs after VIE tagging, the blue crabs were transferred in aerated buckets to mesocosms and eight individuals were randomly deployed to each mesocosm to start the experiment. During the experiment blue crabs were not fed, but instead relied on natural prey items within the mesocosm in order to assess natural growth rates. Mesocosms were deployed for approximately 30 days. Timing of mesocosm deployment was staggered across sites between 2 June and 19 July, 2018 and experiments were terminated between 27 June and 13 August, 2018.

Environmental characteristics that may affect blue crab growth were measured throughout the experiment. Water depth was measured to the nearest cm, and salinity, water temperature (°C), and dissolved oxygen (mg L⁻¹) were measured using a handheld meter (Pro 2030, YSI Inc., Yellow Springs, OH) at the beginning, middle, and end of the experiment.

At the end of the experiment, blue crabs were removed from the mesocosm using throw traps, bar seines, and dip nets and measured for carapace width (mm) in the field. After the conclusion of the experiment, turtle grass structural complexity was measured at all stations. Percent cover of seagrass by species and bare sediment were quantified in 1 m² PVC quadrats sectioned into 100 10-cm² squares placed directly over the area where the cage was located. The presence of drift and attached macroalgae was also noted within each quadrat. Species-specific seagrass shoot density was quantified in a randomly pre-selected cell within the quadrat, and total seagrass shoot density (# shoots m⁻²) was calculated by multiplying species-specific percent cover and shoot count then summing those values. If seagrass was not present in the pre-selected cell, shoot density was quantified in a second (or third, if needed) randomly pre-selected cell. In each quadrat, seagrass leaf length (mm) was also measured on three replicate plants of each species, and maximum canopy height was calculated as the maximum leaf length of all measured seagrass blades.

Additionally at the end of the experiment, a single core (15 cm diameter x 10 cm deep) was collected in an undisturbed area near the periphery of each cage. Cores were sieved in the field using either a 508 μm sieve or a 2.5 mm mesh bag, stored on ice and frozen for subsequent processing in the laboratory. Within each core, the number of seagrass shoots was counted for each species, leaves were scraped with a dull razor blade to remove epiphytes, and leaf lengths (mm) and widths (mm) were measured. Aboveground biomass (leaves) and belowground biomass (roots and rhizomes) were separated, and seagrass leaves, roots/rhizomes, and epiphytes were dried separately in a drying oven at 60°C for a minimum of 48 hours, after which they were weighed for dry weights (g). Leaf area index (LAI) was calculated as the total surface area of all leaves (length x width) in a seagrass core multiplied by two and divided by the total surface area of the core bottom (0.018 m^2); seagrass shoot density (# shoots m^{-2}) was calculated by adding the total number of shoots in a core and dividing by the core area; and epiphyte density ($\text{g g}^{-1} \text{m}^{-2}$) was calculated as total epiphyte biomass divided by total dried seagrass aboveground biomass per square meter. Seagrass canopy height was calculated as the maximum seagrass blade length in each core. All seagrass core morphology metrics were calculated separately for each seagrass species then combined for total seagrass complexity measurements.

Tethering experiments

To assess the role of turtle grass structural complexity on blue crab survival, a field experiment was conducted to assess mortality due to predation. Tethering experiments were conducted at a subset of 10 hexagons from the 10–15 hexagons used for the growth experiment, with 6–12 crabs tethered in each hexagon at each site for a total of 79–120 tethers at each site. All tethering experiments took place between 2 June and 20 July, 2018. Tethered crabs were spaced at least 20 m away from one other and from mesocosm experiments to ensure independence and minimize disturbance. Juvenile crabs 9.7–38.8 mm cw were collected in nearby adjacent seagrass habitats using the same collection methods as described for the mesocosm experiments, and a tether (75–100 cm long) of 20 lb test clear monofilament line was attached to each crab's carapace using a drop of cyanoacrylate glue. Prior to placement in the field, blue crabs were acclimated to tethers for at least 24 hrs in aerated seawater. The free end of the tether was tied to a small PVC stake (3.3 cm in diameter and 60 cm tall) that was inserted into the sediment with the turtle grass-dominated meadows at each station. Tethered blue crabs had the freedom to move anywhere within a ~1.0-m diameter area around the PVC stakes, but were limited to the assigned habitat. Blue crabs were tethered at each station for ~24 hrs and then retrieved by hand. On retrieval, crabs were categorized as live, missing, or molted (entire carapace remaining on line). Previous field and laboratory studies have indicated that crabs cannot easily escape from tethers so it was assumed that all crabs missing from tethers after 24 hrs were eaten.

Prior to blue crab tethering, turtle grass structural complexity was measured near each tethering pole using the same seagrass quadrat survey techniques described for the growth experiments, and at the conclusion of the experiment one seagrass core (15 cm diameter x 10 cm deep) was collected close to each tether location, which was processed using the same methods described above. Water temperature (°C), salinity, and dissolved oxygen (mg/L) were measured at the beginning of the experiment using a handheld meter (Pro 2030, YSI Inc., Yellow Springs, OH).

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RESTORE Nekton in Turtlegrass: Blue Crab Growth and Mortality

Cited Publications:

Hayes, C. T., Alford, S. B., Belgrad, B. A., Correia, K. M., Darnell, M. Z., Furman, B. T., Hall, M. O., Martin, C.W., McDonald, A.M., Smee, D.L. & Darnell, K. M. (2022). Regional variation in seagrass complexity drives blue crab *Callinectes sapidus* mortality and growth across the northern Gulf of Mexico. *Marine Ecology Progress Series*, 693, 141-155. DOI: <https://doi.org/10.3354/meps14084>

Associated Datasets:

- NOAA RESTORE Science Program: Gulf-wide assessment of habitat use and habitat-specific production estimates of nekton in turtlegrass (*Thalassia testudinum*): Nekton abundance, size, biomass, and associated environmental parameters in turtle-grass dominated seagrass beds in the northern Gulf of America (formerly Gulf of Mexico), 2018-05-14-2019-09-06 (in prep)
- NOAA RESTORE Science Program: Gulf-wide assessment of habitat use and habitat-specific production estimates of nekton in turtlegrass (*Thalassia testudinum*): Nekton and primary producer stable isotopes in turtlegrass-dominated seagrass beds in the northern Gulf of America (formerly Gulf of Mexico), 2018-08-13 to 2018-10-3. NOAA National Centers for Environmental Information. Dataset. (in prep)

People & Projects

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Partners:

- The University of Southern Mississippi
- Dauphin Island Sea Lab
- University of South Alabama
- University of Florida
- Florida Fish and Wildlife Research Institute

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Funding:

- US DOC; NOAA; NOS; NCCOS; RESTORE Science Program (ROR - <https://ror.org/0042xzm63>)
- NOAA RESTORE Science Program (ROR - <https://ror.org/0042xzm63>) award NA17NOS4510093 to The University of Southern Mississippi.

Associated Online Resources:

- National Centers for Coastal Ocean Science. 2020. RESTORE Sponsored Research Project: Gulf-wide assessment of habitat use and habitat-specific production estimates of nekton in turtlegrass (*Thalassia testudinum*). <https://inport.nmfs.noaa.gov/inport/item/66730>
- RESTORE Project, Gulf-wide assessment of habitat use and habitat-specific production estimates of nekton in turtlegrass (*Thalassia testudinum*)
<https://restoreactscienceprogram.noaa.gov/projects/turtlegrass>
- Project website: <http://www.darnellseagrasssecologylab.com/turtlegrass>

Extents

Start Date: 2018-05-14

End Date: 2018-09-14

Northern Boundary: 31.0000

Southern Boundary: 26.0000

Western Boundary: -98.0000

Eastern Boundary: -82.0000

Keywords

Sea Areas, Water Bodies, Marine Protected Areas:

- Gulf of America (formally the Gulf of Mexico)
- Laguna Madre, Texas
- Redfish Bay, Texas
- Chandeleur Sound, Louisiana
- St. George Sound, Florida
- Charlotte Harbor, Florida
- Cedar Key, Florida
- Coastal Bend, Texas
- Breton National Wildlife Refuge

NCCOS Keywords:

- NCCOS Research Location > Region > Gulf of America (formally the Gulf of Mexico)
- NCCOS Research Data Type > Field Observation
- NCCOS Research Data Type > Experiment

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File Information

Total File Size: 3.44 MB total, 11 files in 1 folder (unzipped)

Data File Format(s):

- .CSV

Data Files:

- cage_master.csv
- cage_crab_master.csv
- cage_abiotic_master.csv
- cage_seagrass_master.csv
- cage_cores_morpho_master.csv
- cage_cores_weights_master.csv
- tethering_master.csv
- tether_cores_morpho_master.csv
- tether_cores_weights_master.csv

Documentation Files:

- BrowseGraphic.png
- DataDocumentation.PDF

Table 1: Data Dictionary: cage_master.csv. This file contains cage-level data, i.e., one row per cage from the growth experiment.

Column	Variable	Label	Definition	Units	Range
1	Cage ID	cage_id	A unique ID code for each cage	NA	NA
2	Site	site	Sampling site across the northern Gulf of America. Sites include Lower Laguna Madre (LM), Coastal Bend (CB), Chandeleur Islands (LA), St. George Sound (AP), Cedar Key (CK), and Charlotte Harbor (CH)	NA	NA
3	Station code	station	Sampling station ID code	NA	NA
4	Latitude	latitude	Cage latitude	decimal degrees	26.093639-29.94152
5	Longitude	longitude	Cage longitude	decimal degrees	-97.281194--82.05933203

Table 2: Data Dictionary: cage_crab_master.csv. This file contains crab-level data, i.e., one row per crab from the growth experiment.

Column	Variable	Label	Definition	Units	Range
1	Site	site	Sampling site across the northern Gulf of America (formally the Gulf of Mexico). Sites include Lower Laguna Madre (LM), Coastal Bend (CB), Chandeleur Islands (LA), St. George Sound (AP), Cedar Key (CK), and Charlotte Harbor (CH)	NA	NA
2	Station code	station	Sampling station ID code	NA	NA
3	Experiment start date	start_date	Date the crabs were placed in the cages	MM/DD/YYYY	6/2/18-7/20/18
4	Experiment start time	start_time	Time the crabs were placed in the cages (UTC)	HH:MM:SS	12:20:00-20:49:06
5	Tag color	tag_color	Color of the VIE material used for tagging	NA	NA
6	Tag location	tag_location	Location where VIE material was injected in crab	NA	NA
7	Initial carapace width	start_cw_mm	Carapace width at the start of the experiment	mm	11-44.2
8	Experiment end date	end_date	Date the crabs were removed from the cages	MM/DD/YYYY	6/27/18-8/14/18
9	Experiment end time	end_time	Time the crabs were removed from the cages (UTC). NA = time not recorded.	HH:MM:SS	12:00:00-22:30:00
10	Final carapace width	end_cw_mm	Carapace width at the conclusion of the experiment	mm	17.85-89.2
11	Were unmarked crabs present in cage?	unmarked_crabs	Were unmarked crabs present in cage at the conclusion of the experiment? Y/N	NA	NA
12	Notes	Notes	Notes recorded during sampling	NA	NA
13	Cage ID code	cage_id	A unique ID code for each cage	NA	NA

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Table 3: Data Dictionary: cage_abiotic_master.csv. This file contains abiotic data, one row per timepoint for abiotic measurements from the growth experiment.

Column	Variable	Label	Definition	Units	Range
1	Cage ID code	cage_id	A unique ID code for each cage	NA	NA
2	Cage/Date ID code	cage_date_id	A unique ID code for each cage/date combination	NA	NA
3	Site	site	Sampling site across the northern Gulf of America (formally the Gulf of Mexico). Sites include Lower Laguna Madre (LM), Coastal Bend (CB), Chandeleur Islands (LA), St. George Sound (AP), Cedar Key (CK), and Charlotte Harbor (CH)	NA	NA
4	Station code	station	Sampling station ID code	NA	NA
5	Sampling period	Experiment_stage	Time period when the measurements were made: beginning, middle, or end of the experiment.	NA	NA
6	Date	date	Date the measurements were made	MM/DD/YYYY	6/2/18-8/13/18
7	Time	time	Time the measurements were made (UTC)	HH:MM:SS	NA
8	Water depth	depth	Water depth	cm	35-160
9	Water temperature	temp	Water temperature	°C	24-34.6
10	Salinity	salinity	Salinity	psu	9.32-39.7
11	Dissolved Oxygen	do	Dissolved oxygen concentration	mg/L	1.87-15.3
12	Notes	notes	Notes recorded during sampling	NA	NA

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Table 4: Data Dictionary: cage_seagrass_master.csv. This file contains seagrass data, one row per cage from the growth experiment.

Column	Variable	Label	Definition	Units	Range
1	Site	site	Sampling site across the northern Gulf of America. Sites include Lower Laguna Madre (LM), Coastal Bend (CB), Chandeleur Islands (LA), St. George Sound (AP), Cedar Key (CK), and Charlotte Harbor (CH)	NA	NA
2	Station code	station	Sampling station ID code	NA	NA
3	Date	date	Date the seagrass was sampled	MM/DD/YYYY	6/27/18-8/13/18
4	seagrass percent cover	total_pcov	total percent cover of seagrass	%	17-100
5	turtle grass percent cover	tt_pcov	percent cover of Thalassia testudinum	%	17-100
6	shoal grass percent cover	hw_pcov	percent cover of Halodule wrightii	%	0-80
7	manatee grass percent cover	sf_pcov	percent cover of Syringodium filiforme	%	0-100
8	star grass percent cover	he_pcov	percent cover of Halophila engelmannii	%	0-0
9	paddle grass percent cover	hd_pcov	percent cover of Halophila decipiens	%	0-0
10	widgeon grass percent cover	rm_pcov	percent cover of Ruppia maritima	%	0-0
11	attached macroalgae percent cover	mac_pcov	percent cover of attached macroalgae	%	0-0
12	drift macroalgae percent cover	drift_pcov	percent cover of drift macroalgae	%	0-100
13	bare sediment percent cover	bare_pcov	percent cover of bare sediment	%	0-83
14	turtle grass shoot count	tt_sht	Thalassia testudinum shoot count (counted in 10 cm x 10 cm grid cell)	number of shoots	1-22

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15	shoal grass shoot count	hw_sht	Halodule wrightii shoot count (counted in 10 cm x 10 cm grid cell)	number of shoots	0-18
16	manatee grass shoot count	sf_sht	Syringodium filiforme shoot count (counted in 10 cm x 10 cm grid cell)	number of shoots	0-11
17	turtle grass canopy height 1	tt_can1	Thalassia testudinum canopy height measurement (4 per species)	cm	90-710
18	turtle grass canopy height 2	tt_can2	Thalassia testudinum canopy height measurement (4 per species)	cm	120-720
19	turtle grass canopy height 3	tt_can3	Thalassia testudinum canopy height measurement (4 per species)	cm	130-750
20	turtle grass canopy height 4	tt_can_4	Thalassia testudinum canopy height measurement (4 per species)	cm	100-770
21	shoal grass canopy height 1	hw_can1	Halodule wrightii canopy height measurement (4 per species)	cm	40-350
22	shoal grass canopy height 2	hw_can2	Halodule wrightii canopy height measurement (4 per species)	cm	40-480
23	shoal grass canopy height 3	hw_can3	Halodule wrightii canopy height measurement (4 per species)	cm	70-400
24	shoal grass canopy height 4	hw_can4	Halodule wrightii canopy height measurement (4 per species)	cm	100-460
25	manatee grass canopy height 1	sf_can1	Syringodium filiforme canopy height measurement (4 per species)	cm	210-630
26	manatee grass canopy height 2	sf_can2	Syringodium filiforme canopy height measurement (4 per species)	cm	150-590
27	manatee grass canopy height 3	sf_can3	Syringodium filiforme canopy height measurement (4 per species)	cm	290-580

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28	manatee grass canopy height 4	sf_can4	Syringodium filiforme canopy height measurement (4 per species)	cm	310-640
29	Notes	Notes	Notes recorded during sampling	NA	NA
38	Cage ID code	cage_id	A unique ID code for each cage	NA	NA
39	Cage/Date ID code	cage_date_id	A unique ID code for each cage/date combination	NA	NA

Table 5: Data Dictionary: cage_cores_morpho_master.csv. This file contains data on seagrass morphology from the growth experiment, with one row per seagrass species per core.

Column	Variable	Label	Definition	Units	Range
1	Cage ID	cage_id	A unique ID code for each cage	NA	NA
2	core/species ID code	coresp_id	unique ID code for each species within a specific core	NA	NA
3	sampling date	date	date sampled	MM/DD/YYYY	6/27/18- 8/21/18
4	site code	site	'AP' = Apalachicola, FL; 'CB' = Coastal Bend, TX; 'CH' = Charlotte Harbor, FL; 'CK' = Cedar Key, FL; 'LA' = Chandeleur Islands, LA; 'LM' = Lower Laguna Madre, TX	NA	NA
5	station code	station	sampling station ID code	NA	NA
6	seagrass species	spp	seagrass species: "tt" = Thalassia testudinum, "hw" = Halodule wrightii, "sf" = Syringodium filiforme, "he" = Halophila engelmannii, "hd" = Halophila decipiens	NA	NA
7	number of shoots	shoots	number of shoots of this species in the core	NA	2-61
8	shoot number	sht_num	sequential numbering of shoots measured for each species/core	NA	1-61
9	number of leaves	num_leaves	number of leaves on the shoot	NA	0-8
10	leaf length 1	leaf_l1	length of leaf 1	mm	6-713
11	leaf width 1	leaf_w1	width of leaf 1	mm	0.5-12
12	leaf length 2	leaf_l2	length of leaf 2	mm	6-615

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13	leaf width 2	leaf_w2	width of leaf 2	mm	0.5-12
14	leaf length 3	leaf_l3	length of leaf 3	mm	7-560
15	leaf width 3	leaf_w3	width of leaf 3	mm	1-12
16	leaf length 4	leaf_l4	length of leaf 4	mm	5-548
17	leaf width 4	leaf_w4	width of leaf 4	mm	1-10
18	leaf length 5	leaf_l5	length of leaf 5	mm	15-398
19	leaf width 5	leaf_w5	width of leaf 5	mm	2-8
20	leaf length 6	leaf_l6	length of leaf 6	mm	27-341
21	leaf width 6	leaf_w6	width of leaf 6	mm	3-9
22	leaf length 7	leaf_l7	length of leaf 7	mm	16-77
23	leaf width 7	leaf_w7	width of leaf 7	mm	4-6
24	leaf length 8	leaf_l8	length of leaf 8	mm	41-41
25	leaf width 8	leaf_w8	width of leaf 8	mm	5-5
26	total area of detached leaves	detached_area	total surface area (length x width) of any seagrass leaves that were cut during core sampling and not associated with a shoot.	mm ²	760-227436
27	notes	notes	notes recorded during sampling or processing	NA	0-0

Table 6: Data Dictionary: cage_cores_weights_master.csv. This file contains data on seagrass biomass from the growth experiment, with one row per seagrass species per core.

Column	Variable	Label	Definition	Units	Range
1	Cage ID	cage_id	A unique ID code for each cage	NA	NA
2	core/species ID code	coresp_id	unique ID code for each species within a specific core	NA	NA
3	sampling date	date	date sampled	MM/DD/YY	6/27/18-8/14/18
4	site code	site	'AP' = Apalachicola, FL; 'CB' = Coastal Bend, TX; 'CH' = Charlotte Harbor, FL; 'CK' = Cedar Key, FL; 'LA' = Chandeleur Islands, LA; 'LM' = Lower Laguna Madre, TX	NA	NA
5	station code	station	sampling station ID code	NA	NA
6	seagrass species	spp	seagrass species: "tt" = <i>Thalassia testudinum</i> , "hw" = <i>Halodule wrightii</i> , "sf" = <i>Syringodium filiforme</i> , "he" = <i>Halophila engelmannii</i> , "hd" = <i>Halophila decipiens</i>	NA	NA

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7	aboveground biomass	above_wt	aboveground biomass of seagrass (dry weight)	g	0.0078-11.109
8	epiphyte weight	ep_wt	weight of epiphytes scraped off of seagrass shoots (dry weight)	g	0.0168-3.2106
9	belowground biomass	below_wt	belowground biomass of seagrass (dry weight)	g	0.1266-67.1367
10	notes	notes	notes recorded during sampling or processing	NA	NA

Table 7: Data Dictionary: tethering_master.csv. This file contains crab-level data, i.e., one row per tethered crab from the mortality experiment.

Column	Variable	Label	Definition	Units	Range
1	tether ID	tether_id	unique ID code for each tethered crab	NA	NA
2	site code	site	'AP' = Apalachicola, FL; 'CB' = Coastal Bend, TX; 'CH' = Charlotte Harbor, FL; 'CK' = Cedar Key, FL; 'LA' = Chandeleur Islands, LA; 'LM' = Lower Laguna Madre, TX	NA	NA
3	station code	station	sampling station ID code	NA	A
5	tether latitude	latitude	latitude of the tethering site	decimal degrees	26.092917 to 29.94098
6	tether longitude	longitude	longitude of the tethering site	decimal degrees	-97.28169 to -82.05918
7	water depth	depth	water depth at the tethering site	cm	28-190
8	seagrass percent cover	total_pcov	total percent cover of seagrass	%	22-100
9	turtle grass percent cover	tt_pcov	percent cover of <i>Thalassia testudinum</i>	%	0-100
10	manatee grass percent cover	sf_pcov	percent cover of <i>Syringodium filiforme</i>	%	0-100
11	shoal grass percent cover	hw_pcov	percent cover of <i>Halodule wrightii</i>	%	0-100
12	attached macroalgae percent cover	mac_pcov	percent cover of attached macroalgae	%	0-100
13	drift macroalgae percent cover	drift_pcov	percent cover of drift macroalgae	%	0-100
14	bare sediment percent cover	bare_pcov	percent cover of bare sediment	%	0-78
15	turtle grass canopy height 1	tt_can1	<i>Thalassia testudinum</i> canopy height measurement (4 per	mm	31-830

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			species). Blank cells indicate this species was not present.		
16	turtle grass canopy height 2	tt_can2	Thalassia testudinum canopy height measurement (4 per species). Blank cells indicate this species was not present.	mm	60-860
17	turtle grass canopy height 3	tt_can3	Thalassia testudinum canopy height measurement (4 per species). Blank cells indicate this species was not present.	mm	100-790
18	turtle grass canopy height 4	tt_can4	Thalassia testudinum canopy height measurement (4 per species). Blank cells indicate this species was not present.	mm	80-840
19	manatee grass canopy height 1	sf_can1	Syringodium filiforme canopy height measurement (4 per species). Blank cells indicate this species was not present.	mm	100-860
20	manatee grass canopy height 2	sf_can2	Syringodium filiforme canopy height measurement (4 per species). Blank cells indicate this species was not present.	mm	140-770
21	manatee grass canopy height 3	sf_can3	Syringodium filiforme canopy height measurement (4 per species). Blank cells indicate this species was not present.	mm	170-680
22	manatee grass canopy height 4	sf_can4	Syringodium filiforme canopy height measurement (4 per species). Blank cells indicate this species was not present.	mm	120-810
23	shoal grass canopy height 1	hw_can1	Halodule wrightii canopy height measurement (4 per species). Blank cells indicate this species was not present.	mm	60-370
24	shoal grass canopy height 2	hw_can2	Halodule wrightii canopy height measurement (4 per species). Blank cells indicate this species was not present.	mm	100-340
25	shoal grass canopy height 3	hw_can3	Halodule wrightii canopy height measurement (4 per species). Blank cells indicate this species was not present.	mm	110-400

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26	shoal grass canopy height 4	hw_can4	Halodule wrightii canopy height measurement (4 per species). Blank cells indicate this species was not present.	mm	90-380
27	turtle grass shoot count	tt_sht_num	Thalassia testudinum shoot count (counted in 10 cm x 10 cm grid cell)	number of shoots	0-23
28	manatee grass shoot count	sf_sht_num	Syringodium filiforme shoot count (counted in 10 cm x 10 cm grid cell)	number of shoots	0-19
29	shoal grass shoot count	hw_sht_num	Halodule wrightii shoot count (counted in 10 cm x 10 cm grid cell)	number of shoots	0-61
30	date of YSI measurements	ysi_date	date that YSI measurements were taken	MM/DD/YY	6/6/18-8/30/18
31	time of YSI measurements	ysi_time	time that YSI measurements were taken (UTC)	HH:MM:SS	12:57-23:30
32	Water temperature	temp	Water temperature	°C	27.1-39.4
33	Salinity	sal	Salinity	psu	10.53-40.1
34	Dissolved Oxygen	do	Dissolved oxygen concentration	mg/L	2.5-14.5
35	Experiment start date	start_date	Date the tethered crab was deployed	MM/DD/YY	6/6/18-8/30/18
36	Experiment start time	start_time	Time the tethered crab was deployed (UTC)	HH:MM:SS	12:57-23:30
37	Experiment end date	end_date	Date the tethered crab was retrieved	MM/DD/YY	6/7/18-8/31/18
38	Experiment end time	end_time	Time the tethered crab was retrieved (UTC)	HH:MM:SS	12:23-23:30
39	crab status upon retrieval	crab_status	Status of the crab upon retrieval. missing: crab was completely missing from the end of the tether; parts: some parts of the crab remained attached to the end of the tether; present: intact crab remained attached to end of tether; cut: tether appeared to be cut or broken.	NA	NA
40	crab status notes	status_notes	Notes concerning the status of the crab	NA	NA

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41	crab carapace width	cw_mm	carapace width of the tethered crab	mm	9.7-38.8
42	Comments	comments	Comments	NA	NA

Table 8: Data Dictionary: tether_cores_morpho_master.csv. This file contains data on seagrass morphology from the mortality experiment, with one row per seagrass species per core.

Column	Variable	Label	Definition	Units	Range
1	tether ID	tether_id	unique ID code for each tethered crab	NA	NA
2	core/species ID code	coresp_id	unique ID code for each species within a specific core	NA	NA
3	sampling date	date	date sampled	MM/DD/YYYY	5/4/18-9/14/18
4	site code	site	'AP' = Apalachicola, FL; 'CB' = Coastal Bend, TX; 'CH' = Charlotte Harbor, FL; 'CK' = Cedar Key, FL; 'LA' = Chandeleur Islands, LA; 'LM' = Lower Laguna Madre, TX	NA	NA
5	station code	station	sampling station ID code	NA	NA
6	seagrass species	spp	seagrass species: "tt" = <i>Thalassia testudinum</i> , "hw" = <i>Halodule wrightii</i> , "sf" = <i>Syringodium filiforme</i> , "he" = <i>Halophila engelmannii</i> , "hd" = <i>Halophila decipiens</i>	NA	NA
7	number of shoots	shoots	number of shoots of this species in the core	NA	1-211
8	shoot number	sht_num	sequential numbering of shoots measured for each species/core	NA	1-211
9	number of leaves	num_leaves	number of leaves on the shoot	NA	0-10
10	leaf length 1	leaf_l1	length of leaf 1	mm	3-676
11	leaf width 1	leaf_w1	width of leaf 1	mm	1-10
12	leaf length 2	leaf_l2	length of leaf 2	mm	2-711
13	leaf width 2	leaf_w2	width of leaf 2	mm	1-10
14	leaf length 3	leaf_l3	length of leaf 3	mm	2-747
15	leaf width 3	leaf_w3	width of leaf 3	mm	1-10
16	leaf length 4	leaf_l4	length of leaf 4	mm	3-704
17	leaf width 4	leaf_w4	width of leaf 4	mm	1-10
18	leaf length 5	leaf_l5	length of leaf 5	mm	4-559
19	leaf width 5	leaf_w5	width of leaf 5	mm	1-10

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20	leaf length 6	leaf_l6	length of leaf 6	mm	14-410
21	leaf width 6	leaf_w6	width of leaf 6	mm	1-10
22	leaf length 7	leaf_l7	length of leaf 7	mm	11-540
23	leaf width 7	leaf_w7	width of leaf 7	mm	1-10
24	leaf length 8	leaf_l8	length of leaf 8	mm	33-436
25	leaf width 8	leaf_w8	width of leaf 8	mm	1-8
26	leaf length 9	leaf_l9	length of leaf 9	mm	24-109
27	leaf width 9	leaf_w9	width of leaf 9	mm	1-4
28	leaf length 10	leaf_l10	length of leaf 10	mm	117-117
29	leaf width 10	leaf_w10	width of leaf 10	mm	5-5
30	total area of detached leaves	detached_area	total surface area (length x width) of any seagrass leaves that were cut during core sampling and not associated with a shoot.	mm ²	0-180824
31	notes	notes	notes recorded during sampling or processing	NA	0-0

Table 9: Data Dictionary: tether_cores_weights_master.csv. This file contains data on seagrass biomass from the mortality experiment, with one row per seagrass species per core.

Column	Variable	Label	Definition	Units	Range
1	tether ID	tether_id	unique ID code for each tethered crab	NA	NA
2	core/species ID code	coresp_id	unique ID code for each species within a specific core	NA	NA
3	sampling date	date	date sampled	MM/DD/YYYY	6/7/18-9/14/18
4	site code	site	'AP' = Apalachicola, FL; 'CB' = Coastal Bend, TX; 'CH' = Charlotte Harbor, FL; 'CK' = Cedar Key, FL; 'LA' = Chandeleur Islands, LA; 'LM' = Lower Laguna Madre, TX	NA	NA
5	station code	station	sampling station ID code	NA	NA
6	seagrass species	spp	seagrass species: "tt" = <i>Thalassia testudinum</i> , "hw" = <i>Halodule wrightii</i> , "sf" = <i>Syringodium filiforme</i> , "he" = <i>Halophila engelmannii</i> , "hd" = <i>Halophila decipiens</i>	NA	NA
7	aboveground biomass	above_wt	aboveground biomass of seagrass (dry weight)	g	0.0059-20.701

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8	epiphyte weight	ep_wt	weight of epiphytes scraped off of seagrass shoots (dry weight)	g	0.001-3.2643
9	belowground biomass	below_wt	belowground biomass of seagrass (dry weight)	g	0.0588-50.6804
10	notes	notes	notes recorded during sampling or processing	NA	NA

Document Information

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Resource Provider: NCCOS Data Manager, nccos.data@noaa.gov, US DOC; NOAA; NOS; National Centers for Coastal Ocean Science (NCCOS)

Comment: This data documentation describes data files archived as a NOAA NCEI data accession, and is intended to provide dataset-level metadata for the purposes of discovery, use, and understanding.

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