

Seagrass and macroalgae surveys of St. Andrew Bay and St. Joseph Bay, Florida from May to Jul 2023

Website: <https://www.bco-dmo.org/dataset/1006527>

Data Type: Other Field Results

Version: 1

Version Date: 2026-09-02

Project

» [RUI: The role of ecological memory in nearshore seagrass beds affected by multiple stressors](#) (EcoMem Project)

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Abstract

Seagrass beds are important coastal habitats, providing critical habitat for a wide-range of associated taxa, stabilizing shorelines, and acting as biogeochemical hotspots. Due to their location in shallow coastal systems, seagrasses are exposed to myriad anthropogenic threats leading to seagrass loss at a global scale. Two threats that seagrasses face are mechanical damage (e.g., propellor scarring) and overgrazing during population booms of herbivores. Here we surveyed seagrass systems in St. Andrew Bay and St. Joseph Bay, Florida to quantify seagrasses, propellor scars, and urchins throughout the system along the same 50m transect. St. Andrew bay was divided into 3 segments: North Bay, West Bay, St. Andrew Bay. Between May 4th and July 12th, 2023 we surveyed 95 randomly selected sites, 26 in St. Andrew Bay, 26 in North Bay, 19 in West Bay, and 24 in St. Joseph Bay. Sixteen sites were revisited to assess repeatability of sampling protocols. This data file includes surveys of seagrass canopy height, seagrass and macroalgae percent cover, and seagrass shoot density. Related data files for these surveys include urchin (*Lytechinus variegatus*) counts and size data, and propellor scar prevalence and size data. Water quality data may also be added at a later date. See the Related Datasets section for more information on currently available data.

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Coverage

Location: St. Andrew Bay (30N 85W depth < 2m) and St. Joseph Bay (29N 85W depth < 2m)

Spatial Extent: N:30.29058 E:-85.30953 S:29.68175 W:-85.79214

Temporal Extent: 2023-05-04 - 2023-07-12

Methods & Sampling

Survey Location

Survey sites were randomly selected from points generated in ArcGIS by overlaying a 300 x 300 m grid on the continuous seagrass shapefile obtained from Florida Department of Environmental Protection. Initially 30 sites per bay segment were randomly selected from the intersection of the grid. Due to safety concerns and logistical constraints some sites were not surveyed.

Seagrass and macroalgae percent cover

At each site seagrass and macroalgae were surveyed within a haphazardly placed 2m x 2m plot. Four 0.25m x 0.25m quadrats divided into 25 equally sized grid cells were haphazardly placed within the 2m x 2m quadrat. Within each smaller quadrat seagrass and macroalgae percent cover was assessed by counting the number of grid cells the taxa occupied.

Seagrass canopy height

Seagrass canopy height was measured four times within each smaller quadrat by holding a ruler perpendicularly to the sediment. Seagrass shoot density for each species present was counted within a 0.10m x 0.10m quadrat placed within each 0.25m x 0.25m quadrat.

Data Processing Description

Data was recorded on paper datasheets in the field and manually entered. A different person reviewed the data entry. Seagrass shoots were counted within 0.10 x 0.10 m quadrats in the field. These counts were converted to shoots per square meter by dividing the count by the quadrat area, or 0.01 m². To assess percent cover in the field, researchers counted the number of 5 cm x 5 cm grid cells within a 0.25 x 0.25 m quadrat occupied by the taxon. To obtain a percent cover this count was then divided by 25 (the total number of grid cells) and multiplied by 100.

BCO-DMO Curation Notes

This section documents curation actions performed prior to publication review with the submitter, and additional information relevant to understanding and reusing this dataset. It distinguishes changes made to the submitted (meta)data from unresolved issues and/or enhancements that improve future reuse and interoperability.

CURATION ACTIONS PERFORMED ON DATA

- Loaded survey_canopyheight.csv with header row 1; missing values set to "", "nd", "NA"
- Loaded survey_macroalgae_percentcover.csv with header row 1; missing values set to "", "nd"
- Loaded survey_seagrass_percentcover_shootdensity_updated.csv, with "" "nd" "NA" set as missing values
- Loaded survey_seagrass_percentcover_shootdensity.csv with header row 1; missing values set to "", "nd", "NA"
- Joined survey_seagrass_updated into survey_seagrass on row-number key ({#}) using inner mode, pulling in the quadrat column; source resource deleted after join
- Reordered survey_seagrass columns to ulD, date_time_UTC, date_time_local, local_timezone, siteID, latitude, longitude, general_location, quadrat, Taxa, Percent.cover, Shoot.density
- Renamed survey_macroalgae columns Taxa to taxa_macroalgae and Percent.cover to percent_cover_macroalgae to enable concatenation
- Renamed survey_seagrass columns Taxa to taxa_seagrass, Percent.cover to percent_cover_seagrass, and Shoot.density to shoot_density_seagrass to enable concatenation
- Concatenated survey_canopyheight, survey_macroalgae, and survey_seagrass tables into new table survey_combined, mapping canopy1-canopy4 to canopy_1_seagrass_ht through canopy_4_seagrass_ht and

unioning remaining columns; added source_file column recording originating table name; treated "", "nd", and "NA" as missing values so union-introduced blanks and sentinel values became nulls for later type casting

- Converted date_time_UTC from "M/D/YYYY H:MM" format to ISO 8601 UTC datetime string output
- Created date_time_CDT column as string copy of date_time_local only where local_timezone equals "America/Chicago", null otherwise
- Created date_time_EDT column as string copy of date_time_local only where local_timezone equals "America/New_York", null otherwise
- Converted date_time_CDT string values to ISO 8601 datetime type using "M/D/YYYY H:MM" format, skipping null rows
- Converted date_time_EDT string values to ISO 8601 datetime type using "M/D/YYYY H:MM" format, skipping null rows
- Deleted date_time_local and local_timezone columns
- Reordered columns to: uID, date_time_UTC, date_time_CDT, date_time_EDT, siteID, latitude, longitude, general_location, quadrat, taxa_macroalgae, taxa_seagrass, canopy_1_seagrass_ht through canopy_4_seagrass_ht, percent_cover_macroalgae, percent_cover_seagrass, shoot_density_seagrass, source_file
- Replaced periods with spaces in taxa_macroalgae values for readability
- Replaced periods with spaces in taxa_seagrass values for readability
- Replaced exact matches of "271" in siteID with "271.0" to match the uID site ID, as requested by submitter
- Output as 1006527_v1_seagrass_macroalgae_coverage_canopy.csv

CURATION ACTIONS PERFORMED ON METADATA

- BCO-DMO's standard metadata entry and text formatting steps were performed.

ISSUES POTENTIALLY IMPACTING REUSE

- N/A

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Data Files

File
1006527_v1_seagrass_macroalgae_coverage_canopy.csv (Comma Separated Values (.csv), 471.71 KB) MD5:9639ffc559da5f7f5098c9bdd0a8260b
Primary data file for dataset ID 1006527, version 1

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Supplemental Files

File

survey_canopyheight.csv

(Comma Separated Values (.csv), 51.03 KB)

MD5:bff67d92e9058eb1615a5b9f4507fdc9

Seagrass Canopy Height data included in primary dataset.

column name, description, units

date_time.UTC, date and time of the beginning of the survey in UTC, unitless

date_time.local, date and time of the beginning of the survey in the local time zone, unitless

local_timezone, the local time zone, unitless

siteID, a project-assigned site ID, unitless

latitude, "Latitude of the sampling location, south is negative. WGS84", decimal degrees

longitude, "Longitude of the sampling location, west is negative. WGS84", decimal degrees

general_location, The bay segment the site is located within, unitless

quadrat, An identifier to distinguish repeat 0.25 x 0.25 m quadrats surveyed within a single 2 x 2 m plot. There should be four unique quadrats per survey per site., unitless

canopy1, First measurement of canopy height of seagrasses within the 0.25 x 0.25 m quadrat, cm

canopy2, Second measurement of canopy height of seagrasses within the 0.25 x 0.25 m quadrat, cm

canopy3, Third measurement of canopy height of seagrasses within the 0.25 x 0.25 m quadrat, cm

canopy4, Fourth measurement of canopy height of seagrasses within the 0.25 x 0.25 m quadrat, cm

uID, A unique identifier that links survey occurrences across data sets and data tables. All data records that share a uID were recorded during the same survey of the site., unitless

survey_macroalgae.csv

filename: survey_macroalgae_percentcover.csv

(Comma Separated Values (.csv), 154.82 KB)

MD5:032032c1eb5a71db2249b98e33197c74

Macroalgae coverage data included in primary dataset.

column name, description, units

date_time.UTC, date and time of the beginning of the survey in UTC, unitless

date_time.local, date and time of the beginning of the survey in the local time zone, unitless

local_timezone, the local time zone, unitless

siteID, a project-assigned site ID, unitless

latitude, "Latitude of the sampling location, south is negative. WGS84", decimal degrees

longitude, "Longitude of the sampling location, west is negative. WGS84", decimal degrees

general_location, The bay segment the site is located within, unitless

quadrat, An identifier to distinguish repeat 0.25 x 0.25 m quadrats surveyed within a single 2 x 2 m plot. There should be four unique quadrats per survey per site., unitless

Taxa, The general type of macroalgae identified, unitless

Percent.cover, Percent of 5 cm x 5 cm grid cells within a 0.25 x 0.25 m quadrat occupied by the taxon., percent (%)

uID, A unique identifier that links survey occurrences across data sets and data tables. All data records that share a uID were recorded during the same survey of the site., unitless

File	
survey_seagrass.csv	(Comma Separated Values (.csv), 225.14 KB) MD5:342a27f239fd0a9f3b9dbc9e59146399
Seagrass coverage data included in primary dataset.	
column name, description, units	
date_time.UTC, date and time of the beginning of the survey in UTC, unitless	
date_time.local, date and time of the beginning of the survey in the local time zone, unitless	
local_timezone, the local time zone, unitless	
siteID, a project-assigned site ID, unitless	
latitude, "Latitude of the sampling location, south is negative. WGS84", decimal degrees	
longitude, "Longitude of the sampling location, west is negative. WGS84", decimal degrees	
general_location, The bay segment the site is located within, unitless	
quadrat, An identifier to distinguish repeat 0.25 x 0.25 m quadrats surveyed within a single 2 x 2 m plot. There should be four unique quadrats per survey per site., unitless	
Taxa, The species of seagrass observed, unitless	
Percent.cover, Percent of 5 cm x 5 cm grid cells within a 0.25 x 0.25 m quadrat occupied by the taxon., percent (%)	
Shoot.density, The count of seagrass short shoots in a 0.10 m x 0.10 m quadrat, short shoots per square meter	
uID, A unique identifier that links survey occurrences across data sets and data tables. All data records that share a uID were recorded during the same survey of the site., unitless	

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Related Datasets

IsRelatedTo

Archer, S. K., Stoner, E., Whitman, E. R., Johnson, E., Schlachter, K., McPherson, B. (2026) **Propeller scar damage recorded in seagrass bed surveys in St. Andrew Bay and St. Joseph Bay, Florida from May to Jul 2023**. Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2026-08-31 doi:10.26008/1912/bco-dmo.1006664.1 [[view at BCO-DMO](#)]
Relationship Description: Data collected during the same surveys

Archer, S. K., Stoner, E., Whitman, E. R., Johnson, E., Schlachter, K., McPherson, B. (2026) **Urchin count and size surveys in St. Andrew Bay and St. Joseph Bay, Florida from May to Jul 2023**. Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2026-08-28 doi:10.26008/1912/bco-dmo.1006613.1 [[view at BCO-DMO](#)]
Relationship Description: Data collected during the same surveys

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Parameters

Parameter	Description	Units

uID	A unique identifier that links survey occurrences across data sets and data tables. All data records that share a uID were recorded during the same survey of the site.	unitless
date_time_UTC	Date and time of the beginning of the survey in UTC	unitless
date_time_CDT	Date and time of the beginning of the survey in the local time zone, Central Daylight Saving Time	unitless
date_time_EDT	Date and time of the beginning of the survey in the local time zone, Eastern Daylight Time	unitless
siteID	Project-assigned site ID	unitless
latitude	Latitude of the sampling location, North is positive. WGS84	decimal degrees
longitude	Longitude of the sampling location, West is negative. WGS84	decimal degrees
general_location	The bay segment the site is located within	unitless
quadrat	An identifier to distinguish repeat 0.25 x 0.25 m quadrats surveyed within a single 2 x 2 m plot. There should be four unique quadrats per survey per site.	unitless
taxa_macroalgae	The general type of macroalgae identified	unitless
taxa_seagrass	The species of seagrass observed	unitless
canopy_1_seagrass_ht	First measurement of canopy height of seagrasses within the 0.25 x 0.25 m quadrat	cm
canopy_2_seagrass_ht	Second measurement of canopy height of seagrasses within the 0.25 x 0.25 m quadrat	cm
canopy_3_seagrass_ht	Third measurement of canopy height of seagrasses within the 0.25 x 0.25 m quadrat	cm
canopy_4_seagrass_ht	Fourth measurement of canopy height of seagrasses within the 0.25 x 0.25 m quadrat	cm
percent_cover_macroalgae	Percent of 5 cm x 5 cm grid cells within a 0.25 x 0.25 m quadrat occupied by the taxon.	percent (%)

percent_cover_seagrass	Percent of 5 cm × 5 cm grid cells within a 0.25 × 0.25 m quadrat occupied by the taxon.	percent (%)
shoot_density_seagrass	The count of seagrass short shoots in a 0.10 m x 0.10 m quadrat	short shoots per square meter
source_file	Supplemental file name; data divided by collection type	unitless

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Instruments

Dataset-specific Instrument Name	
Generic Instrument Name	Manual Biota Sampler
Dataset-specific Description	Within each smaller quadrat seagrass and macroalgae percent cover was assessed by counting the number of grid cells the taxa occupied. Seagrass canopy height was measured four times within each smaller quadrat by holding a ruler perpendicularly to the sediment. Seagrass shoot density for each species present was counted within a 0.10m x 0.10m quadrat placed within each 0.25m x 0.25m quadrat. Data was recorded on paper datasheets in the field and manually entered.
Generic Instrument Description	"Manual Biota Sampler" indicates that a sample was collected in situ by a person, possibly using a hand-held collection device such as a jar, a net, or their hands. This term could also refer to a simple tool like a hammer, saw, or other hand-held tool.

Dataset-specific Instrument Name	ruler
Generic Instrument Name	ruler
Dataset-specific Description	Seagrass canopy height was measured four times within each smaller quadrat by holding a ruler perpendicularly to the sediment.
Generic Instrument Description	A device used for measuring or for drawing straight lines, consisting of an elongated piece of rigid or semi-rigid material marked with units for measurement. Device that allows one or more physical dimensions of a sample or specimen to be determined by visible comparison against marked graduations in units of measurement of dimension length.

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Project Information

RUI: The role of ecological memory in nearshore seagrass beds affected by multiple stressors (EcoMem Project)

NSF Award Abstract:

This project seeks to determine how ecological memory, shaped by an extreme disturbance, informs the response of coastal ecosystems to multiple stressors at population, community, and ecosystem levels. Seagrass ecosystems are among the most highly productive ecosystems on earth, yet are vulnerable to disturbance by both human activity and natural processes. Hurricane Dorian was a Category 5 hurricane that hit the Bahamas in 2019. By comparing seagrass communities in the direct path of the storm with neighboring areas that were less impacted, this project is evaluating how ecological memory might affect responses of seagrass ecosystems to common human-caused and natural stressors. The investigators are early-career scientists, and results from this study are likely to inform conservation, management, and restoration of seagrass ecosystems. They are providing substantial educational opportunities for students in the United States and in the Bahamas, including virtual and hands-on field research experiences for undergraduate students, some from groups traditionally underrepresented in science. Facilitated by Friends of the Environment, a local NGO on Abaco Island, virtual reality videos and curricula will also enhance STEM educational opportunities for Bahamian high school students

Seagrass ecosystems, a widespread and ecologically important nearshore system, may be shaped by the ecological memory of past disturbances. These legacies may influence how seagrass ecosystems respond to environmental change. The investigators will conduct new research that complements seven years of existing data in a study system in the path of Hurricane Dorian in the Bahamas to assess how ecological memory shapes the response of coastal seagrass beds at multiple levels of biological organization. They are using a combination of modeling, field observations, field experiments, and laboratory analyses to compare highly and minimally hurricane-impacted sites to determine: the distribution and relative abundance of three seagrass species; the relative abundance and species diversity of naturally occurring invertebrate and vertebrate grazers; overall species richness, functional diversity, and habitat complexity of each field site; seagrass growth rates and primary productivity; and abiotic environmental characteristics — irradiance, temperature, and nutrient content— of ambient seawater. They will sample twenty plots per site each quarter—including unaltered controls and experimental plots simulating mechanical damage, increased grazing pressure, and both mechanical damage and grazing. The goal is to provide a better understanding of how ecological memory drives the outcome of current ecological processes, which in turn will inform conservation and restoration efforts as seagrasses continue to decline globally.

This award reflects NSF's statutory mission and has been deemed worthy of support through evaluation using the Foundation's intellectual merit and broader impacts review criteria.

This award is funded in whole or in part under the American Rescue Plan Act of 2021 (Public Law 117-2).

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-2045212

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