Total suspended solids of water samples obtained at sites in the Corpus Christi Bay and Mission-Aransas Bays, Texas, USA between November 2017 and December 2018

Website: https://www.bco-dmo.org/dataset/815323
Data Type: Other Field Results
Version: 1
Version Date: 2020-06-15

Project
» RAPID: Degradation and Resilience of Seagrass Ecosystem Structure and Function following a Direct Impact by Hurricane Harvey (Harvey Seagrass)

Contributors	Affiliation	Role
Yeager, Lauren	University of Texas - Marine Science Institute (UTMSI)	Principal Investigator, Contact
Dunton, Kenneth	University of Texas - Marine Science Institute (UTMSI)	Co-Principal Investigator
Soenen, Karen	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

Abstract
Total suspended solids of water samples obtained at sites in the Corpus Christi Bay and Mission-Aransas Bays, Texas, USA between November 2017 and December 2018

Table of Contents

Coverage

Spatial Extent: **N**:27.94371 **E**:-97.08205 **S**:27.75471 **W**:-97.15306
Temporal Extent: 2017-11-03 - 2018-12-01

Dataset Description

Total suspended solids of water samples obtained at sites in the Corpus Christi Bay and Mission-Aransas Bays, Texas, USA between November 2017 and December 2018

Methods & Sampling

Total suspended solids (TSS)

Two 1000mL water samples were obtained at each site prior to the deployment of benthic sampling equipment.

Laboratory Procedures:

1) Dry new filters at 60°C in the oven prior to use. 2) Weigh filter immediately before use. After weighing, handle the filter or crucible/filter with forceps or tongs only. 3) Place the glass fiber filter (i.e. Glass fiber filter discs, without organic binder, such as Millipore AP-40, Reeves Angel 934-AH, Gelman type A/E, or equivalent;

Our lab uses 47 mm GF/F 0.7 micron retention) on the membrane filter apparatus. NOTE: Because of the physical nature of glass fiber filters, the absolute pore size cannot be controlled or measured. Terms such as “pore size”, “collection efficiencies” and “effective retention” are used to define this property in glass fiber filters. 4) For a 47 mm diameter filter, filter 100 mL of sample. If weight of captured residue is less than 1.0 mg, the sample volume must be increased to provide at least 1.0 mg of residue. If other filter diameters are used, start with a sample volume equal to 7 mL/cm of filter area and collect at least a weight of residue proportional to the 1.0 mg state above. NOTE: If filtering clear pristine water, start with 1 L. If filtering turbid water start with 100 mL.

NOTE: If during filtration of this initial volume the filtration rate drops rapidly, or if filtration time exceeds 5 to 10 minutes, the following scheme is recommended: Use an unweighed glass fiber filter affixed in the filter assembly. Add a known volume of sample to the filter funnel and record the time elapsed after selected volumes have passed through the filter. Twenty-five mL increments for timing are suggested. Continue to record the time and volume increments until the filtration rate drops rapidly. Add additional sample if the filter funnel volume is inadequate to reach a reduced rate. Plot the observed time versus volume filtered. Select the proper filtration volume as that just short of the time a significant change in filtration rate occurred.

5) Assemble the filtering apparatus and begin suction.

6) Shake the sample vigorously and quantitatively transfer the predetermined sample volume selected to the filter using a graduated cylinder. Pour into funnel. 7) Remove all traces of water by continuing to apply vacuum after the sample has passed through. 8) With suction on, wash the graduated cylinder, filter, non-filterable residue and filter funnel wall with three portions of distilled water allowing complete drainage between washing. Remove all traces of water by continuing to apply vacuum after water has passed through.

NOTE: Total volume of distilled rinse water used should equal no less than 50 mLs following complete filtration of sample volume.

9) Carefully remove the filter from the filter support. 10) Dry at least one hour at 103-105°C. Overnight drying ensures accurate filter weight. 11) Cool in a desiccator and weigh. 12) Repeat the drying cycle until a constant weight is obtained (weight loss is less than 0.5 mg).

Calculations

TSS (mg/L) is calculated as follows: $1000 \times (A-B) \times (1000/C) = TSS$

where A = weight of filter (or filter and crucible) + residue (mg), B = weight of filter (or filter and crucible) (mg), and C = amount of sample filtered (mL).

Data Processing Description

BCO-DMO processing notes:

- Adjusted column names to comply with database requirements
- Added latitude and longitude of sites
- Converted date column to ISO format

[table of contents | back to top]

Data Files

File
tss.csv(Comma Separated Values (.csv), 4.76 KB) MD5:697052f1f5187a821ad772df2588a274 Primary data file for dataset ID 815323

[table of contents | back to top]

Related Publications

Congdon, V. M., Bonsell, C., Cuddy, M. R., & Dunton, K. H. (2019). In the wake of a major hurricane: Differential effects on early vs. late successional seagrass species. Limnology and Oceanography Letters, 4(5), 155–163. doi:10.1002/lol2.10112
Methods

Duffy, J. E., Ziegler, S. L., Campbell, J. E., Bippus, P. M., & Lefcheck, J. S. (2015). Squidpops: A Simple Tool to Crowdsource a Global Map of Marine Predation Intensity. PLOS ONE, 10(11), e0142994. doi:10.1371/journal.pone.0142994
Methods

[table of contents | back to top]

Parameters

Parameter	Description	Units
Site_ID	Site ID	unitless
Latitude_Site	Latitude of site, south is negative	decimal degrees
Longitude_Site	Longitude of site, west is negative	decimal degrees
Date	Date	unitless
TSS_Dry_Glass_Fiber	Dry weight of glass fiber filter before filtering	grams (gr)
TSS_Water_Filtered	Volume of water filtered for Total suspended solids	milliliters (ml)
TSS_Dry_Filter	Dry weight of filter plus filtrate	grams (gr)
TSS_Dry	Dry weight of total suspended solids	grams per liter (g/L)
Notes	Notes	unitless

[table of contents | back to top]

Project Information

RAPID: Degradation and Resilience of Seagrass Ecosystem Structure and Function following a Direct Impact by Hurricane Harvey (Harvey Seagrass)

Coverage: Corpus Christi Bay and Mission-Aransas Bays, Texas, USA

NSF Award Abstract:

Disturbance has long been recognized as a major organizing force in marine communities with the potential to shape biodiversity. Hurricanes provide a natural experiment to understand how acute physical disturbances (storm surge and wind energy) may interact with longer-term changes in environmental conditions (salinity or turbidity) to alter the structure and function of ecological communities. As models indicate that hurricane intensity and precipitation will increase with a warming climate, understanding the response and recovery of coastal ecosystems is of critical societal importance. Harvey made landfall as a Category Four hurricane on the Texas coast on August 25, 2017, bringing extreme rainfall as the storm stalled over the middle Texas coast. The heavy rainfall and freshwater run-off created a low salinity lens that continues to persist two months later. Seagrass ecosystems may be particularly vulnerable because they grow on shallow, soft-sediment bottoms (and thus are easily dislodged or buried) and because seagrasses are sensitive to changes in salinity and turbidity. The societal implications of seagrass loss are well recognized: seagrasses provide highly valuable ecosystem services of large economic value for estuarine and nearshore dependent fisheries, serve as nursery habitats, and sequester gigatons of carbon on a global scale. Using measurements of the health and function of the seagrass and of the community for which it is habitat, the PIs are assessing the impact of the hurricane and of the persistent freshwater lens. Context is provided by looking at non-impacted sites and by six prior years of data.

This project addresses the overarching question: How do intense physical disturbances in conjunction with chronic chemophysical perturbations affect loss and recovery of seagrass community structure and function, including local production, trophic linkages, and metazoan community diversity? To understand the impacts of Hurricane Harvey on seagrass ecosystems across the middle Texas coast, the investigators are (1) documenting losses in physical habitat structure, (2) teasing apart independent and interactive effects of multiple stressors associated with storm events on biodiversity and ecosystem function, and (3) identifying factors that promote resilience following disturbance. A state-wide seagrass monitoring program with six years of data from areas within Harvey's path and surrounding seagrass systems will provide invaluable context. The investigators are measuring seagrass structure, employing a Before-After-Control-Impact design at sites that experienced severe physical damage and appropriate reference sites. In situ loggers deployed after the storm track the evolution of the low salinity event together with seagrass physiological stress measurements (e.g. chlorophyll fluorescence, pigment loss, reduced growth). Changes in seagrass habitat function is assessed through measurements of faunal biodiversity within impacted and reference sites sampled via cores, benthic push nets, and seine nets. Tethering assays of seagrass blades and common invertebrate prey enables comparison trophic interactions across sites that vary in disturbance impact. These data are used to create models of ecosystem response to an extreme disturbance event and identify factors that best predict recovery of the physical structure of the habitat and of associated ecosystem functions.

[table of contents | back to top]

Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1807143

[table of contents | back to top]