San Antonio Bay benthos species biomass and species richness before and after Hurricane Harvey, Feb. 2017 - July 2019

Website: https://www.bco-dmo.org/dataset/784759
Data Type: Cruise Results
Version: 1
Version Date: 2019-12-19

Project
» RAPID: Capturing the Signature of Hurricane Harvey on Texas Coastal Lagoons (Hurricane Harvey Texas Lagoons)

Contributors	Affiliation	Role
Montagna, Paul A.	Texas A&M, Corpus Christi (TAMU-CC)	Principal Investigator
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Abstract
The effects of Hurricane Harvey were studied. This dataset includes biomass, abundance, and species richness of identified benthic macrofauna from triplicate sediment core samples collected in San Antonio Bay, northwest Gulf of Mexico estuaries along the Texas coast. They were collected during eleven quarterly sampling trips on a small boat, Feb. 2017 - July 2019.

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Coverage

Spatial Extent: **N**:28.39352 **E**:-96.68435 **S**:28.24618 **W**:-96.7724
Temporal Extent: 2017-02-22 - 2019-07-09

Dataset Description

The effects of Hurricane Harvey were studied. This dataset includes biomass of benthic macrofauna from triplicate sediment core samples collected in San Antonio Bay, northwest Gulf of Mexico estuaries along the Texas coast. They were collected during eleven quarterly sampling trips on a small boat, Feb-July, 2019.

Acquisition Description

Sediment samples were collected using cores deployed from small boats (Montagna and Kalke 1992). Macrofauna were sampled with a 6.7-cm diameter core tube (35.4 cm2 area). The cores were sectioned at 0-3 cm and 3-10 cm depths to ease the samples sorting and identification process for macrofauna but summed for whole core analyses here. Three replicates were taken per station. Organisms were extracted on a 0.5 mm sieve and enumerated to the lowest taxonomic level possible. Biomass is determined for higher taxonomic groupings by drying at 55 °C for 24 hours, and summed per sample.

Processing Description

BCO-DMO Processing Notes:
- added conventional header with dataset name, PI name, version date
- renamed columns: DATE to date_local, REP to replicate, R to richmess, nm2 to abundance, gm2 to biomass, lnm2 to log_abundance and lgm2 to log_biomass
- reduced precision of biomass, log_abundance and log_biomass from from 7-9 decimal places to 4

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Related Publications

Montagna, P. A., & Kalke, R. D. (1992). The Effect of Freshwater Inflow on Meiofaunal and

Macrofaunal Populations in the Guadalupe and Nueces Estuaries, Texas. Estuaries, 15(3), 307. doi:10.2307/1352779

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Parameters

Parameter	Description	Units
Sta	Station Name	unitless
Latitude	Station latitude; north is positive	decimal degrees
Longitude	Station longitude; east is positive	decimal degrees
date_local	Date in Day-Month-Year format	unitless
replicate	Replicate number (1; 2; or 3)	unitless
richness	richness as number of species; core area is 35.4 cm^2	species/core
abundance	Abundance	number/meter^2
biomass	Biomass	grams/meter^2
log_abundance	natural logarithm Abundance	log(number/meter^2+1)
log_biomass	natural logarithm Biomass	log(grams/meter^2+1)

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Instruments

Dataset-specific Instrument Name	Mettler microbalance
Generic Instrument Name	Scale
Dataset-specific Description	Mettler microbalance with a precision of .01 micrograms was used to weigh macrofauna.
Generic Instrument Description	An instrument used to measure weight or mass.

Dataset-specific Instrument Name	
Generic Instrument Name	Push Corer
Dataset-specific Description	Used to collect sediment core samples.
Generic Instrument Description	Capable of being performed in numerous environments, push coring is just as it sounds. Push coring is simply pushing the core barrel (often an aluminum or polycarbonate tube) into the sediment by hand. A push core is useful in that it causes very little disturbance to the more delicate upper layers of a sub-aqueous sediment. Description obtained from: http://web.whoi.edu/coastal-group/about/how-we-work/field-methods/coring/

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Deployments

TAMUCC-HRI

Website	https://www.bco-dmo.org/deployment/784611
Platform	small boat: TAMUCC
Start Date	2019-02-22
End Date	2019-07-09
Description	Eleven quarterly sampling trips to study impact of Hurricane Harvey. The vessel was as 25' Guardian.

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Project Information

RAPID: Capturing the Signature of Hurricane Harvey on Texas Coastal Lagoons

(Hurricane Harvey Texas Lagoons)

Coverage: Northwest Gulf of Mexico estuaries on Texas Coast

NSF Award Abstract: Hurricane Harvey made landfall Friday 25 August 2017 about 30 miles northeast of Corpus Christi, Texas as a Category 4 hurricane with winds up to 130 mph. This is the strongest hurricane to hit the middle Texas coast since Carla in 1961. After the wind storm and storm surge, coastal flooding occurred due to the storm lingering over Texas for four more days, dumping as much as 50 inches of rain near Houston. This will produce one of the largest floods ever to hit the Texas coast, and it is estimated that the flood will be a one in a thousand year event. The Texas coast is characterized by lagoons behind barrier islands, and their ecology and biogeochemistry are strongly influenced by coastal hydrology. Because this coastline is dominated by open water systems and productivity is driven by the amount of freshwater inflow, Hurricane Harvey represents a massive inflow event that will likely cause tremendous changes to the coastal environments. Therefore, questions arise regarding how biogeochemical cycles of carbon, nutrients, and oxygen will be altered, whether massive phytoplankton blooms will occur, whether estuarine species will die when these systems turn into lakes, and how long recovery will take? The investigators are uniquely situated to mount this study not only because of their location, just south of the path of the storm, but most importantly because the lead investigator has conducted sampling of these bays regularly for the past thirty years, providing a tremendous context in which to interpret the new data gathered. The knowledge gained from this study will provide a broader understanding of the effects of similar high intensity rainfall events, which are expected to increase in frequency and/or intensity in the future. The primary research hypothesis is that: Increased inflows to estuaries will cause increased loads of inorganic and organic matter, which will in turn drive primary production and biological responses, and at the same time significantly enhance respiration of coastal blue carbon. A secondary hypothesis is that: The large change in salinity and dissolved oxygen deficits will kill or stress many estuarine and marine organisms. To test these hypotheses it is necessary to measure the temporal change in key indicators of biogeochemical processes, and biodiversity shifts. Thus, changes to the carbon, nitrogen and oxygen cycles, and the diversity of benthic organisms will be measured and compared to existing baselines. The PIs propose to sample the Lavaca-Colorado, Guadalupe, Nueces, and Laguna Madre estuaries as follows: 1) continuous sampling (via autonomous instruments) of salinity, temperature, pH, dissolved oxygen, and depth (i.e. tidal elevation); 2) bi-weekly to monthly sampling for dissolved and total organic carbon and organic nitrogen, carbonate system parameters, nutrients, and phytoplankton community composition; 3) quarterly measurements of sediment characteristics and benthic infauna. The project will support two graduate students. The PIs will communicate results to the public and to state agencies through existing collaborations.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1760006

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