Discrete hydrographic measurements - Effects of Hurricane Harvey on Estuarine Water Quality in the Lavaca-Colorado, Guadalupe and Nueces Estuaries between August 2017 and January 2018.

Website: https://www.bco-dmo.org/dataset/787316
Data Type: Cruise Results
Version: 1
Version Date: 2020-01-14

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

Contributors	Affiliation	Role
Wetz, Michael	Texas A&M, Corpus Christi (TAMU-CC)	Principal Investigator, Contact
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Abstract
Discrete hydrographic measurements of Lavaca-Colorado, Guadalupe and Nueces Estuaries on the Texas coast between August 2017 and January 2018.

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Coverage

Spatial Extent: **N**:28.68096 **E**:-96.01878 **S**:27.7128 **W**:-97.47358
Temporal Extent: 2017-08-16 - 2018-01-23

Dataset Description

Discrete hydrographic measurements of Lavaca-Colorado, Guadalupe and Nueces Estuaries on the Texas coast between August 2017 and January 2018 to test the effects of Hurricane Harvey on estuarine water quality.

Methods & Sampling

Multiple hydrographic measurements were made at the stations Lavaca-Colorado (LC), Guadalupe (GE) and Nueces Estuaries (NE) on the Texas coast, using a YSI Proplus multi-parameter instrument (The parameters were read from the digital display unit). Vertical profiles of Sal, Cond, DO, DOPct, pH and Temp were taken at

0.5 m intervals. Discrete samples were collected at 10 cm below the surface and for some variables at 10 cm above the bottom. Secchi disc was lowered until it could no longer be viewed.

Sampling trips/deployments were conducted from one of five small (≤25') outboard engine equipped boats: Guardian, Mango, Stinger, Gator, or Guppy. Each cruise was less than 12 hrs in duration.

Additional methodological details can be found in Wetz et al. 2016.

Data Processing Description

BCO-DMO processing notes:

- Combined LC, NE and GE stations into 1 dataset and added the Estuary name as additional column
- Adjusted column names to fit the database requirements
- Added ISO_DateTime column
- Converted format of Date column from dd-mm-yy to yyyy-mm-dd

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Data Files

File
discrete_combined.csv (Comma Separated Values (.csv), 67.02 KB) MD5:993c0925725c0dc87b2d2448890511fe Primary data file for dataset ID 787316

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Related Publications

Wetz, M. S., Hayes, K. C., Fisher, K. V. B., Price, L., & Sterba-Boatwright, B. (2016). Water quality dynamics in an urbanizing subtropical estuary(Oso Bay, Texas). Marine Pollution Bulletin, 104(1-2), 44–53. doi:10.1016/j.marpolbul.2016.02.013
Methods

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Parameters

Parameter	Description	Units
Date	Sample Date (mm/dd/YYYY) in Central Standard Time (CST)	unitless
Latitude	Latitude, south is negative	decimal degrees
Longitude	Longitude, west is negative	decimal degrees
Times	Time (HH:MM) in Central Standard Time (CST)	unitless
Site	Site	unitless

Replicate	Replicate A or B	unitless
Depth	Depth	meters (m)
Chlorophyll	Chlorophyll [detection limit = 0.03]	migrograms per liter (ug/L)
Conductivity	Conductivity [detection limit = 10]	mircosiemens per centimeter (µS/cm)
Salinity	Salinity [detection limit = 0.01]	unitless
DOPct	Dissolved Oxygen saturation [detection limit = 2.0]	percentage (%)
DO	Dissolved Oxygen concentration [detection limit = 0.2]	milligram per liter (mg/L)
pH	pH [detection limit = 0.01]	pH units
Temp	Water temperature [detection limit = 0.2]	degrees celcius (°C)
Secchi	Secchi depth	meter (m)
DOC	Dissolved organic carbon [detection limit = 13.3]	Micromoles per Liter (umol/L)
TDN	Total dissolved nitrogen [detection limit = 3.8]	Micromoles per Liter (umol/L)
TOC	Total organic carbon [detection limit = 13.3]	Micromoles per Liter (umol/L)
TN	Total nitrogen [detection limit = 3.8]	Micromoles per Liter (umol/L)
Ammonium	Ammonium [detection limit = 0.03]	Micromoles per Liter (umol/L)
N_N	Nitrate plus nitrite [detection limit = 0.02]	Micromoles per Liter (umol/L)
Nitrite	Nitrite [detection limit = 0.02]	Micromoles per Liter (umol/L)
ortho_P	Orthophosphate [detection limit = 0.01]	Micromoles per Liter (umol/L)
Silicate	Silicate [detection limit = 0.01]	Micromoles per Liter (umol/L)

Estuary	Sampling station: Lavaca-Colorado, Guadalupe or Nueces Estuaries	unitless
ISO_DateTime_UTC	ISO format (YYYY-mm-ddTHH:MMZ) of Date/Time in Coordinated Universal Time (UTC)	yyyy-MM-dd'T'HH:mm'Z'

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Instruments

Dataset-specific Instrument Name	YSI Proplus multi parameter
Generic Instrument Name	YSI Professional Plus Multi-Parameter Probe
Dataset-specific Description	Hydrographic measurements were made at each station with a YSI Proplus multi parameter instrument. The parameters were read from the digital display unit.
Generic Instrument Description	The YSI Professional Plus handheld multiparameter meter provides for the measurement of a variety of combinations for dissolved oxygen, conductivity, specific conductance, salinity, resistivity, total dissolved solids (TDS), pH, ORP, pH/ORP combination, ammonium (ammonia), nitrate, chloride and temperature. More information from the manufacturer.

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Deployments

Wetz_HurricaneHarveyTexasLagoons_discrete

Website	https://www.bco-dmo.org/deployment/805239
Platform	Small Boat
Description	Sampling trips/deployments were conducted from one of five small (≤25') outboard engine equipped boats: Guardian, Mango, Stinger, Gator, or Guppy. Each cruise was less than 12 hrs in duration. They are listed here: (Estuary, Sampling Date (YYYY-MM-DD), Lead Scientist, Vessel name). Lavaca-Colorado, 2017-10-11, Rick Kalke, Guardian Lavaca-Colorado, 2017-11-13, Terry Palmer, Guardian Lavaca-Colorado, 2017-11-16, Terry Palmer, Stinger Lavaca-Colorado, 2017-12-11, Terry Palmer, Guardian Lavaca-Colorado, 2018-01-22-23, Rick Kalke, Guardian Nueces, 2017-10-06, Rick Kalke, Guardian Nueces, 2017-11-07, Terry Palmer, Guardian Nueces, 2017-12-01, Terry Palmer, Guardian Nueces, 2017-01-05, Rick Kalke, Guardian Guadalupe, 2017-08-16, Rick Kalke, Guardian Guadalupe, 2017-08-23, Terry Palmer, Guardian Guadalupe, 2017-09-01, Terry Palmer, Mango Guadalupe, 2017-09-08, Terry Palmer, Mango Guadalupe, 2017-09-13, Terry Palmer, Mango Guadalupe, 2017-09-25, Terry Palmer, Mango? Guadalupe, 2017-10-09, Rick Kalke, Guardian Guadalupe, 2017-10-17, Lily Walker, Mango? Guadalupe, 2017-11-02, Lily Walker, Gator Guadalupe, 2017-11-13, Terry Palmer, Guardian, Guadalupe, 2017-11-28, Terry Palmer, Stinger Guadalupe, 2017-12-05, Terry Palmer, Guardian Guadalupe, 2018-01-09, Rick Kalke, 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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