Meteorological observations from NOAA station 8761724, Grande Isle, LA from September 20, 2022, to September 29, 2024.

Website: https://www.bco-dmo.org/dataset/953856
Data Type: Other Field Results
Version: 1
Version Date: 2025-02-19

Project
» CAREER: Integrating Seascapes and Energy Flow: learning and teaching about energy, biodiversity, and ecosystem function on the frontlines of climate change (Louisiana E-scapes)

Contributors	Affiliation	Role
Nelson, James	University of Georgia (UGA)	Principal Investigator
Leavitt, Herbert	University of Louisiana at Lafayette	Student, Contact
Thomas, Alexander	University of Louisiana at Lafayette	Student
Soenen, Karen	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

Abstract
Subset of the NOAA Tides and Currents NOAA webpage. It includes meteorological observations of wind speed and direction which, in conjunction with landscape data, are used as a rough calculation of fetch distance in this study. Ultimately, the fetch distance variable was not included in the final analysis.

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Coverage

Location: Station Located in Grande Isle, Louisiana.
Spatial Extent: **Lat**:29.26333 **Lon**:-89.95667
Temporal Extent: 2022-09-20 - 2022-09-29

Methods & Sampling

Data fron NOAA Station ID: 8761724. Station Located in Grande Isle, Louisiana.

Data Processing Description

Data was not cleaned or processed after donwloaded from NOAA portal.

Data used to approximate wind conditions in Port Fourchon, Louisiana.

This datafile gets read into both the satellite and drone variable analysis. Specifically, *satscale_preprocessing_241022.py* and *smallscale_permutations_241029.py*

BCO-DMO Processing Description

* Added lat/lon to dataset
* Added ISO_DateTime_UTC variable by merging date and time fields
* Adjusted file names to comply with database requirements

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Data Files

File
953856_v1_meteo.csv (Comma Separated Values (.csv), 188.21 KB) MD5:75b670f8b005f6f340315313c3072fdd Primary data file for dataset ID 953856, version 1

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Supplemental Files

File
CO-OPS_8761724_met.csv (Comma Separated Values (.csv), 150.70 KB) MD5:812bd98a6adb1dfca112741325217b3f Exact file needed for import into code (see related datasets).

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Related Datasets

IsSourceOf

Leavitt, H., Thomas, A., Nelson, J. (2025) **Habitat variables (mangrove, marsh, water) of Port Fourchon, LA dervied from drone imagery taken in spring 2023.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2025-01-08 http://lod.bco-dmo.org/id/dataset/948112 [view at BCO-DMO]

Leavitt, H., Thomas, A., Nelson, J. (2025) **Habitat variables (mangrove, marsh, water) of Port Fourchon, LA dervied from satellite imagery taken in fall 2022.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2025-01-06 http://lod.bco-dmo.org/id/dataset/947975 [view at BCO-DMO]

IsRelatedTo

Tides and Currents NOAA webpage, Station ID: 8761724, Grand Isle, LA
https://tidesandcurrents.noaa.gov/met.html?id=8761724

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Parameters

Parameter	Description	Units
Latitude	Sampling latitude	decimal degrees
Longitude	Sampling longitude	decimal degrees
Date	Sampling date in ISO format (yyyy-mm-dd)	unitless
Time_GMT	Sampling time (UTC time zone)	unitless
ISO_DateTime_UTC	Sampling date and time in ISO format (UTC time zone)	unitless
Wind_Speed_kn	Wind speed	knots
Wind_Dir_deg	Wind direction	degrees
Wind_Gust_kn	Wind gusts	knots
Air_Temp_F	Air temperature	Degrees Fahrenheit
Baro_mb	Barometric pressure	millibar
Humidity_perc	Humidity	percentage (%)
Visibility_nm	Visibility	nanometers

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Project Information

CAREER: Integrating Seascapes and Energy Flow: learning and teaching about energy, biodiversity, and ecosystem function on the frontlines of climate change (Louisiana E-scapes)

Website: http://www.nelsonecolab.net/career

Coverage: Saltmarsh ecosystem near Port Fourchon, LA

NSF Award Abstract:
Coastal marshes provide a suite of vital functions that support natural and human communities. Humans frequently take for granted and exploit these ecosystem services without fully understanding the ecological feedbacks, linkages, and interdependencies of these processes to the wider ecosystem. As demands on coastal ecosystem services have risen, marshes have experienced substantial loss due to direct and indirect impacts from human activity. The rapidly changing coastal ecosystems of Louisiana provide a natural experiment for understanding how coastal change alters ecosystem function. This project is developing new metrics and tools to assess food web variability and test hypotheses on biodiversity and ecosystem function in

coastal Louisiana. The research is determining how changing habitat configuration alters the distribution of energy across the seascape in a multitrophic system. This work is engaging students from the University of Louisiana Lafayette and Dillard University in placed-based learning by immersing them in the research and local restoration efforts to address land loss and preserve critical ecosystem services. Students are developing a deeper understanding of the complex issues facing coastal regions through formal course work, directed field work, and outreach. Students are interacting with stakeholders and managers who are currently battling coastal change. Their directed research projects are documenting changes in coastal habitat and coupling this knowledge with the consequences to ecosystems and the people who depend on them. By participating in the project students are emerging with knowledge and training that is making them into informed citizens and capable stewards of the future of our coastal ecosystems, while also preparing them for careers in STEM. The project is supporting two graduate students and a post-doc.

The transformation and movement of energy through a food web are key links between biodiversity and ecosystem function. A major hurdle to testing biodiversity ecosystem function theory is a limited ability to assess food web variability in space and time. This research is quantifying changing seascape structure, species diversity, and food web structure to better understand the relationship between biodiversity and energy flow through ecosystems. The project uses cutting edge tools and metrics to test hypotheses on how the distribution, abundance, and diversity of key species are altered by ecosystem change and how this affects function. The hypotheses driving the research are: 1) habitat is a more important indirect driver of trophic structure than a direct change to primary trophic pathways; and 2) horizontal and vertical diversity increases with habitat resource index. Stable isotope analysis is characterizing energy flow through the food web. Changes in horizontal and vertical diversity in a multitrophic system are being quantified using aerial surveys and field sampling. To assess the spatial and temporal change in food web resources, the project is combining results from stable isotope analysis and drone-based remote sensing technology to generate consumer specific energetic seascape maps (E-scapes) and trophic niche metrics. In combination these new metrics are providing insight into species' responses to changing food web function across the seascape and through time.

This project is jointly funded by Biological Oceanography and the Established Program to Stimulate Competitive Research (EPSCoR).

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.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-2418012

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