Species counts, site-level information and environmental context sampled near Port Fourchon, Louisiana from September 23 - 29, 2022.

Website: https://www.bco-dmo.org/dataset/947784
Data Type: Other Field Results
Version: 1
Version Date: 2025-01-02

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 Louisiana at Lafayette	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
This dataset provides species count data collected during the Fall 2022 drop sampling season at 52 sites near Port Fourchon, Louisiana. The sampling effort aimed to assess the abundance and composition of estuarine nekton species across a landscape experiencing significant climate-driven habitat change, including mangrove encroachment and marsh loss. Species counts were obtained using a drop sampler with a 1.2 m² area, deployed along the marsh edge at each site. Nekton within the sampler were captured using a suction pump and dipnets, sorted into taxonomic groups, and enumerated.The data are presented alongside site-level information, including approximate geolocation, date, and environmental context (e.g., habitat classification derived from drone and satellite imagery). The purpose of this dataset is to evaluate how species abundances respond to habitat structure at multiple spatial scales, particularly in relation to landscape metrics such as land-to-water ratio, edge area, and mangrove cover. This dataset is useful for ecologists, resource managers, and conservation scientists interested in habitat suitability, estuarine ecology, and the impacts of climate-driven habitat changes on coastal nekton communities. This dataset is part of a study exploring the effect of habitat scale on models linking species abundance to landscape metrics. This was collected by Herbert Leavitt, Dr. James Nelson, and Alex Thomas. Affiliation at time of sampling was University of Louisiana at Lafayette.

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Coverage

Location: Port Fourchon, Lousiana
Spatial Extent: **N**:29.16101 **E**:-90.1568 **S**:29.09944 **W**:-90.250725
Temporal Extent: 2022-09-23 - 2022-09-29

Methods & Sampling

Sites were selected using a spatially balanced random design. 20 sites were mixed (25%-75% marsh), marsh (>75% Marsh), and mangrove (>75% mangrove) for a total of sixty sites. Not all sites were able to be sampled during this season due to time constraints. Water depth was taken in the center of the drop sampler and had to be >10cm. Salinity and temperature were measured using a YSI probe. Model#: 30M-10 FT

Sampling was done in the daytime during high tide when water was on the marsh or mangrove platform, dropping a fiberglass ring encompassing 1.2 m2 of the habitat edge at each sampling site (methods from Zimmerman et al., 2000). A suction pump with a 1 mm mesh screen over the outflow was used to remove water within the ring while capturing small organisms. Remaining fauna were collected with dipnets or by hand. Collected samples were immediately pleaced on ice to be frozen until processing.

Data Processing Description

During processing, fauna from each site was identified, counted, and sorted into pre-weighed drying tins by taxonomic grouping. Samples dried at 50°C for at least 48 hours before recording the dry weight of the tins. From this measurement, the total dry biomass and mean individual biomass of all species at each site was calculated.

BCO-DMO Processing Description

* merge site data and species data into 1 dataset. Added separate files as supplemental data so can be used in processing code and model (dataset ....)
* Converted date to ISO format

Problem Description

Several sites were not sampled due to time restraints. Some variables have missing observations due to recording errors.

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Related Publications

Zimmerman, R. J., Minello, T. J., & Rozas, L. P. (n.d.). Salt Marsh Linkages to Productivity of Penaeid Shrimps and Blue Crabs in the Northern Gulf of Mexico. Concepts and Controversies in Tidal Marsh Ecology, 293–314. https://doi.org/10.1007/0-306-47534-0_14
Methods

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Parameters

Parameters for this dataset have not yet been identified

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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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