

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: 2025-04-07

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, Contact
Leavitt, Herbert	University of Louisiana at Lafayette	Student
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, Louisiana
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 placed 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 (see related datasets).
- * 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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Data Files

File
947784_v1_dropsampling.csv (Comma Separated Values (.csv), 8.99 KB) MD5:cbc96ebcd5c4532eab86e4cbd73b13e0
Primary data file for dataset ID 947784, version 1

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Supplemental Files

File	
PtFouSept2022count_ns.csv	(Comma Separated Values (.csv), 6.02 KB) MD5:d89ab585bd0eefcf8d1854d1f2808071
Fall 2022 Drop Sampling Community Table. Rows correspond to sampling events (site_date_key) and columns correspond species. Values are counts of species collected at each site. A key to each species code is included in this dataset.	
species_list.csv	(Comma Separated Values (.csv), 7.20 KB) MD5:ca42e18a497acc0aa61050b453b0601b
Key tying species code (code) to common name (common_name) and scientific name (valid_name) along with the WoRMS AphiaID identification number (AphiaID)	

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Related Publications

Zimmerman, R. J., Minello, T. J., & Rozas, L. P. (2020). 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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Related Datasets

IsSourceOf

Leavitt, H., Thomas, A., Nelson, J. (2025) **Habitat scale model output of Port Fourchon, LA dervied from drone and satellite imagery taken in fall and spring 2023**. Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2025-01-08 doi:10.26008/1912/bco-dmo.948167.1 [[view at BCO-DMO](#)]

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 doi:10.26008/1912/bco-dmo.948112.1 [[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 doi:10.26008/1912/bco-dmo.947975.1 [[view at BCO-DMO](#)]

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Parameters

Parameter	Description	Units
site_date_key	unique hexadecimal identifier for each sampling event	unitless
site_number	unique numerical identifier for each sampling site	unitless
sample_date	date and time of sampling in LST format m/dd/yyyy hh:mm. Timezone is Central Daylight Time (UTC-5).	unitless

sample_trip	identifier for sampling season, format: yymm	unitless
water_depth	depth of water above the marsh platform. Taken from center of sampler	cm
temperature	water temperature at the sampling site	degrees Celcius (°C)
salinity	salinity of water at the sampling site	parts per thousand (ppt or ‰)
latitude	latitude of the sampling site (WGS1984)	decimal degrees
longitude	longitude of the sampling site (WGS1984)	decmlial degrees
CALSAP	counts of blue crab	unitless
CTEBOL	counts of darter goby	unitless
EVOLYR	counts of lyre goby	unitless
FUNGRA	counts of gulf killifish	unitless
PALSP	counts of grass shrimp	unitless
PENSET	counts of white shrimp	unitless
SCIOCE	counts of red drum	unitless
SYMPLA	counts of blackcheek tonguefish	unitless
CLIVIT	counts of thinstripe hermit	unitless
SCIOCEN	counts of red drum neonate	unitless
SOLCAN	counts of cancellate cantharus	unitless
ANCMIT	counts of bay anchovy	unitless
UNKCRU	counts of unknown crustacean	unitless

EUCMEL	counts of flagfin mojarra	unitless
MICUND	counts of atlantic croaker	unitless
PANSIM	counts of oystershell mud crab	unitless
PETARM	counts of green porcelain crab	unitless
UNKFSH	counts of unknown fish	unitless
CYPVAR	counts of Sheepshead Minnow	unitless
LITIRR	counts of saltmarsh periwinkle	unitless
MENBER	counts of inland silverside	unitless
PENAZTM	counts of brown shrimp medium	unitless
PENAZTS	counts of brown shrimp small	unitless
PROPAN	counts of shrimp parasite	unitless
FUNSIM	counts of Longnose Killifish	unitless
FUNXEN	counts of diamond killifish	unitless
MUGCEP	counts of striped mullet	unitless
ARMCIN	counts of squareback marsh crab	unitless
UNKPOL	counts of unknown polychete	unitless
ALPHET	counts of bigclaw snapping shrimp	unitless
BATSOP	counts of frillfin goby	unitless
MYRPUN	counts of speckled worm eel	unitless

PARLETJ	counts of southern flounder juvenile	unitless
UROCIN	counts of oyster drill	unitless
GOBOCE	counts of highfin goby	unitless
CYNNEB	counts of Spotted Seatrout	unitless
NEVDEL	counts of false shark eye	unitless
GOBBOS	counts of naked goby	unitless
PANOBE	counts of salt marsh mud crab	unitless
AMPSPP	counts of Amphipod	unitless
LAGRHO	counts of pinfish	unitless
PAGLON	counts of Long wrist crab	unitless
UNKART	counts of unknown arthropod	unitless
CRAVIR	counts of oyster	unitless
POELAT	counts of sailfin molly	unitless
FSHEGG	counts of fish eggs	unitless
BAGMAR	counts of gaftopsail sea catfish	unitless
TRIMAC	counts of hogchocker	unitless
UCASP	counts of fiddler crab	unitless

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Instruments

Dataset-specific Instrument Name	YSI probe. Model#: 30M-10 F
Generic Instrument Name	Water Quality Multiprobe
Dataset-specific Description	Salinity and temperature were measured using a YSI probe. Model#: 30M-10 FT
Generic Instrument Description	An instrument which measures multiple water quality parameters based on the sensor configuration.

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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 place-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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