

Data Documentation

Dataset Information

NOAA RESTORE Science Program: Linking Community and Food-web Approaches to Restoration:
Carbon and nitrogen stable isotope values of organisms from created and natural marsh of Lake Hermitage, West Point a la Hache, and Bay Batiste, Louisiana, May 2018

Description:

This dataset contains bulk tissue carbon ($\delta^{13}\text{C}$) and nitrogen ($\delta^{15}\text{N}$) stable isotope values from sediment samples, marsh primary producers, marsh invertebrates, and marsh vertebrates collected at two created and four natural marsh sites in Plaquemines Parish, Louisiana near Lake Hermitage, West Point a la Hache, and Bay Batiste in May 2018. The data set also contains site location, species composition (determined to the lowest taxonomic level), body size, and elemental concentration information. Data are in spreadsheet format.

Purpose:

To examine and compare the trophic structure and food web dynamics between created and natural brackish marshes.

Little is known about how river diversions influence the ecological trajectory, food web structure, and function of natural versus created marshes. To address this gap, this project established sites in the West Point a la Hache (WPH) area (Barataria Bay, in Plaquemines Parish, Louisiana), near the WPH siphon which periodically shunts Mississippi River water into the local marshes. Sites were also established in nearby marshes that were restored as part of the Lake Hermitage (LH) Marsh Creation Project, representing an ideal model system to examine how seasonal and spatial shifts in salinity due to river diversions influence species composition and food web structure in both natural and different-aged created marshes. Objectives of the overall project included characterizing species compositions and abundances in multiple trophic levels (microbes to upper trophic level predators) and applying bulk (SIA) and compound-specific stable isotope analysis (CSIA) of amino acids (AA) in producer and consumer tissues to describe and compare the structure and complexity of food webs and reveal aspects of fish residency. Only carbon and nitrogen stable isotope related data are included in this dataset.

The data in this accession were funded by the NOAA RESTORE Science Program (ROR - <https://ror.org/0042xzm63>) under award NA17NOS4510091 to Louisiana State University.

Methods:

Brackish marsh organisms were collected in May 2018 using minnow traps, fyke nets, otter trawls, dip nets, and by hand from each site. Live plant leaves and surface soil organic matter (SOM) were collected along transects and benthic microalgae (BMA) was collected and extracted from surface sediment samples 1 m inland from the marsh edge at each site. Epiphytic algae were opportunistically sampled by hand from ponds and the marsh edge while phytoplankton/particulate organic matter (POM) was collected on GFF filters from triplicate water samples taken approximately 5 m offshore from each site. Samples were dissected, dried, and homogenized as appropriate, with muscle tissue being lipid extracted using 2:1 chloroform:methanol as appropriate, and then analyzed for carbon and nitrogen stable isotope values.

Associated Datasets:

- Rabalais, Nancy N.; Morrison, Wendy; Smith, Leslie; Woods, Gina (2024). NOAA RESTORE Science Program: Linking Community and Food-web Approaches to Restoration: Taxonomic data for marsh infauna associated with natural and restored marshes along a salinity gradient generated from a freshwater diversion at West Pointe a la Hache into eastern Barataria Bay, Louisiana, 2018-05-21 to 2021-05-25 (NCEI Accession 0296020). NOAA National Centers for Environmental Information. Dataset. <https://doi.org/10.25921/zb46-m126>.
- Rabalais, Nancy N.; Morrison, Wendy; Smith, Leslie M.; Woods, Gina (2024). NOAA RESTORE Science Program: Linking Community and Food-web Approaches to Restoration: Total organic carbon and sediment grain size at natural and restored marshes along a salinity gradient generated from a freshwater diversion at West Pointe a la Hache into eastern Barataria Bay, Louisiana, 2018-05-21 to 2021-05-25 (NCEI Accession 0296021). NOAA National Centers for Environmental Information. Dataset. <https://doi.org/10.25921/fk7x-v112>.
- Polito, Michael J.; O'Nuanain, Aine; Bennelli, Allison; Winston, Joseph; Lamb, Katelyn J.; López-Duarte, Paola C.; Roberts, Brian J. (2024). NOAA RESTORE Science Program: Linking Community and Food-web Approaches to Restoration: Organic matter decomposition in restored vs. natural Louisiana marshes near the West Pointe A La Hache siphon, 2018-05-21 to 2021-07-28. NOAA National Centers for Environmental Information. Dataset. (in prep)
- Lopez-Duarte, Paola (2024). NOAA RESTORE Science Program: Linking Community and Food-web Approaches to Restoration: On-marsh nekton community in restored vs. natural Louisiana marshes near the West Pointe A La Hache siphon, 2018-05-17 to 2019-05-20. NOAA National Centers for Environmental Information. Dataset. (in prep)
- Olin, Jill (2024). NOAA RESTORE Science Program: Linking Community and Food-web Approaches to Restoration: Bulk sulfur stable isotopes of on- and off-marsh fish species in restored vs. natural Louisiana marshes near the West Pointe A La Hache siphon, May 2018. NOAA National Centers for Environmental Information. Dataset. (in prep)

People & Projects

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Partners:

- Louisiana State University Wetland Biogeochemistry Analytical Services (WBAS) Laboratory

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- NOAA RESTORE Science Program (ROR - <https://ror.org/0042xzm63>) award NA17NOS4510091 to Louisiana State University

Associated Online Resources:

- National Centers for Coastal Ocean Science. 2023. RESTORE Sponsored Research Project: Linking Community and Food-web Approaches to Restoration. <https://www.fisheries.noaa.gov/inport/item/71399>
- RESTORE Project, Linking community and food-web approaches to restoration: An ecological assessment of created and natural marshes influenced by river diversions <https://restoreactscienceprogram.noaa.gov/projects/marshes>
- Project Webpage <https://restorefoodweb.lumcon.edu/>
- External source of salinity data in the same geographic region of this current study area (stations near the sampling sites in this dataset are: 0263, 3617, 0260, 0258, 3680, 0282, 0209, 4529, 0226, 0224) https://lacoast.gov/crms_viewer/Map/CRMSViewer
- Louisiana State University Wetland Biogeochemistry Analytical Services (WBAS) Laboratory. <https://www.lsu.edu/cce/research/labs/wbas.php>.

Data Documentation
RESTORE Louisiana Marshes: Carbon and nitrogen stable isotope analysis

Extents

Start Date: 2018-05-18

End Date: 2018-05-23

Note: The specimens analyzed for this dataset were obtained from other researchers during field efforts in May 2018. Individual collection dates are not available.

Northern Boundary: 29.5605

Southern Boundary: 29.4759

Western Boundary: -89.8543

Eastern Boundary: -89.8099

Keywords

Sea Areas, Water Bodies, Marine Protected Areas:

- Gulf of America (formerly Gulf of Mexico)
- West Pointe a la Hache (WPH), eastern Barataria Bay, Louisiana
- Lake Hermitage (LH), Louisiana
- Port Sulphur (PS), Louisiana

NCCOS Keywords:

- NCCOS Research Topic > Ecological and Biogeographic Assessments
- NCCOS Research Data Type > Field Observation
- NCCOS Research Location > Region > Gulf of America (formerly Gulf of Mexico)

File Information

Total File Size: 271 KB

Data File Format(s):

- Standard spreadsheet formats:
 - Excel (.xlsx)

Data Files:

- LA_Marsh_Carbon_Nitrogen_Stable_Isotope_2018.xlsx

Documentation Files:

- BrowseGraphic.JPG
- DataDocumentation.PDF

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RESTORE Louisiana Marshes: Carbon and nitrogen stable isotope analysis

Table 1: Data Dictionary

Column	Variable	Label	Definition	Units	Range
1	Sample identification	Sample ID	Identifier assigned to each sample	None	NR00001 to NR05127
2	Date	Date	Month-Year the samples were collected	MM-YYYY	May 2018
3	Season	Season	Season in which samples were collected	None	Spring
4	Year	Year	Year in which samples were collected	YYYY	2018
5	Area	Area	Descriptor for the geographical area where the samples were collected	None	N/A
6	Site	Site	Identifier for each sampling site	None	Restored = (LHA, LHB) Natural = (LHC, WPH1, WPH2, PS7)
7	Marsh Type	Marsh Type	Description of marsh type	None	Created or Reference
8	Habitat Location	Habitat Location	Habitat description where samples were collected	None	Channel, Creek, Edge, Pond, Transect or Plot #, distance into the marsh, Water sample #
9	Latitude	Latitude	Latitude location of plot	Decimal degrees	29.474614 to 29.56024
10	Longitude	Longitude	Longitude location of plot	Decimal degrees	-89.85844387 to -89.78797
11	Node Group	Node_Group	Refers to the functional group the species belongs to according to existing literature	None	N/A
12	Node Code	Node_Code	Short version of node group	None	N/A

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Column	Variable	Label	Definition	Units	Range
13	Species	Species	Lowest taxonomic unit to which the specimen could be identified	N/A	N/A
14	Common Name	Common Name	Species common name	N/A	N/A
15	Number	n	Number of individuals used for each isotope measurement	N/A	1-25
16	Size	Size	Size of individuals used for isotope measurements, where applicable	Millimeters	
17	Size Method	Size_Method	How each specimen was measured (total length, carapace width, disc width or NA for some types of organisms)	N/A	N/A
18	Tissue	Tissue	Tissue type or matrix that was analyzed	N/A	Benthic microalgae filter, muscle, sediment, suspended particulate organic matter filter, vegetation, whole body
19	SIA Laboratory	SIA Laboratory	Where the samples were analyzed	N/A	N/A
20	Sample Prep	Sample Prep	Description of how the sample was prepared for analysis		Lipid Extracted or Not Lipid Extracted
21	Stable carbon isotopes	d13C	stable carbon isotope values	per mil	-29.3 to -11.3
22	Percent Carbon	%C	Elemental carbon concentration	Percent	0.60 to 65.27

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Column	Variable	Label	Definition	Units	Range
23	Stable nitrogen isotopes	d15N	Stable nitrogen isotope values	per mil	-4.6 to 15.6
24	Percent Nitrogen	%N	Elemental nitrogen concentration	Percent	0.03 to 19.14
25	Carbon Nitrogen Ratio	CN_Ratio	Carbon to Nitrogen Ratio	Ratio	2.5 to 115.6
26	Notes	Notes	Sample notes which may include notes on the photosynthesis pathway for plant, specimen condition for organism, alternative sample numbers, additional location information, etc.	N/A	N/A

Parameter Description:

Parameters: Species Size measurements

Property Type: Measured

Units: Millimeters

Observation Category: laboratory analysis

Sampling Instrument:

Sampling and Analyzing Method:

See Methods section above

Data Quality Method: When more than one individual was pooled into one sample, size measurements are reported for each individual. NA is reported for vegetation, sediment, benthic microalgae, and phytoplankton.

Parameter Description:

Parameters: Stable carbon isotopes (d13C)

Property Type: Measured

Units: per mil

Observation Category: laboratory analysis

Sampling Instrument: Costech ECS4010 elemental analyzer coupled to a Thermo-Fisher Delta Plus XP or Delta V Advantage continuous-flow stable isotope ratio mass spectrometer.

Sampling and Analyzing Method: Stable isotope ratios are expressed in delta notation in per mil units (‰), according to the following equation: $\delta\text{-X} = [(R_{\text{sample}} / R_{\text{standard}}) - 1]$. Where X is 13C or 15N

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and R is the corresponding ratio $^{13}\text{C}/^{12}\text{C}$ or $^{15}\text{N}/^{14}\text{N}$. The R_{standard} values are referenced to the Vienna PeeDee Belemnite (VPDB) for delta- ^{13}C and atmospheric N₂ for delta- ^{15}N .

Data Quality Method: The analytical precision was 0.1‰ (based on standard deviations of repeated reference materials).

Parameter Description:

Parameters: Stable nitrogen isotopes (d ^{15}N)
Property Type: Measured
Units: per mil
Observation Category: laboratory analysis
Sampling Instrument: Costech ECS4010 elemental analyzer coupled to a Thermo-Fisher Delta Plus XP or Delta V Advantage continuous-flow stable isotope ratio mass spectrometer.
Sampling and Analyzing Method:
Stable isotope ratios are expressed in delta notation in per mil units (‰), according to the following equation: $\delta\text{-X} = [(\text{R}_{\text{sample}} / \text{R}_{\text{standard}}) - 1]$. Where X is ^{13}C or ^{15}N and R is the corresponding ratio $^{13}\text{C}/^{12}\text{C}$ or $^{15}\text{N}/^{14}\text{N}$. The R_{standard} values are referenced to the Vienna PeeDee Belemnite (VPDB) for delta- ^{13}C and atmospheric N₂ for delta- ^{15}N .
Data Quality Method: The analytical precision was 0.2‰ (based on standard deviations of repeated reference materials).

Parameter Description:

Parameters: Carbon to Nitrogen ratios (CN_Ratio)
Property Type: Calculated
Units: ratio
Observation Category: Calculated
Sampling Instrument:
Sampling and Analyzing Method: calculated as %C divided by %N
Data Quality Method: n/a

Document Information

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Comment: This data documentation describes data files archived as a NOAA NCEI data accession, and is intended to provide dataset-level metadata for the purposes of discovery, use, and understanding.
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