Bag Seine Catch Data in Bays along the Texas Coast from 1982 to 2016

Website: https://www.bco-dmo.org/dataset/773137
Data Type: Other Field Results
Version: 1
Version Date: 2019-07-15

Project
» Effects of physical environmental conditions on the species distribution and composition of marine fish and invertebrates along the Texas coast (Texas Coastal Fish)

Contributors	Affiliation	Role
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Abstract
Data on vertebrates and invertebrates caught by bag seine in Sabine Lake, Galveston Bay, Matagorda Bay, San Antonio Bay, Aransas Bay, Corpus Christi Bay, Upper Laguna Madre, and Lower Laguna Madre. Data were collected monthly from 1982 to 2016 (except in Sabine Lake sampling begun in 1986). Environmental data include oxygen, salinity, temperature, and turbidity.

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Coverage

Spatial Extent: **N**:30.05556 **E**:-93.71972 **S**:26.01667 **W**:-97.74444
Temporal Extent: 1982-01 - 2016-12

Dataset Description

Vertebrates and invertebrates caught with bag seine in Sabine Lake, Galveston Bay, Matagorda Bay, San Antonio Bay, Aransas Bay, Corpus Christi Bay, Upper Laguna Madre, and Lower Laguna Madre. Data were collected monthly from 1982 to 2016 (except in Sabine Lake sampling begun in 1986).

Methods & Sampling

The data were sampled in Sabine Lake, Galveston Bay, Matagorda Bay, San Antonio Bay, Aransas Bay, Corpus Christi Bay, the upper Laguna Madre, and the lower Laguna Madre from January 1982 to December 2016 (except in Sabine Lake, where sampling begun in January 1986). The surveys were conducted bi-weekly using

bag seines (18.3 m long and 1.8 m deep with 19 mm stretched nylon mesh in wings and 13 mm stretched mesh in the bag), which were deployed along the shoreline. Bag seines were deployed multiple times during the first and second halves of the month in every bay system. The location of each sample was determined by randomly selecting one station from a predefined sampling universe and, once in the field, selecting a section of available shoreline within that station. At the selected sampling location, the bag seine was extended 12.2 m perpendicularly to the shoreline, then pulled parallel to the shoreline over 15.5 m. The offshore end was then retrieved to shore while keeping the onshore end stationary and maintaining the full extent (12.2 m) of the bag seine using a limit line. Organisms greater than 5 mm in total length were identified to the lowest taxonomic level. Further details of sampling protocols are described in the Marine Resource Monitoring Operations Manual (PDF).

Note: All station_id numbers are included at least once in this dataset (e.g. some organisms were observed at every station/sampling event).

Data Processing Description

BCO-DMO Processing:
- concatenated 1986-200 data with 2001-2016 from the two separate spreadsheets in file "TPWD Bag seine 82-16.xlsx";
- modified column names in species code list file, "TPWD Species Code.xlsx" (replaced spaces with underscores and removed parentheses);
- joined the bag seine data to the species code list based on species_code field;
- joined the bag seine data to the station list in file "TPWD Station Data 82-16.xlsx" based on the station_id (hydro_id) columns, retaining the Latitude and Longitude columns from the station file.

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Data Files

File
bag_seine.csv (Comma Separated Values (.csv), 32.97 MB) MD5:b2b28219589e3bf823043e2b2f0ea1f6 Primary data file for dataset ID 773137

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Supplemental Files

File
TPWD Marine Resource Monitoring Operations Manual filename: CF-Mar-Res-Mon-Ops-Manual-2015.pdf (Portable Document Format (.pdf), 2.71 MB) MD5:2c2819d359bb955d61b9ea286271d598 Texas Parks & Wildlife Dept Marine Resource Monitoring Operations Manual

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Related Publications

Fujiwara, M., Martinez-Andrade, F., Wells, R. J. D., Fisher, M., Pawluk, M., & Livernois, M. C. (2019). Climate-related factors cause changes in the diversity of fish and invertebrates in subtropical coast of the Gulf of Mexico. Communications Biology, 2(1). doi:10.1038/s42003-019-0650-9
Results

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Parameters

Parameter	Description	Units
major_area	ID number for bays	unitless
Year	4-digit year	unitless
Month	1- or 2-digit month	unitless
station_id	Station ID number (from the bag seine data file)	unitless
catch	Number of individuals caught	unitless
species_code	Species code	unitless
Species_common_name	Common name of species	unitless
Species_latin_name	Latin name of species	unitless
Diss_Oxygen	Dissolved oxygen	parts per million (PPM)
Salinity	Salinity	PPT
Temperature	Temperature	degrees Celsius
Turbidity	Turbidity	NTU
Latitude	Latitude North. Formatted as degree-minutes-seconds without hyphens or separators. This is described in the manual and provided in this format to be consistent with other TPWD data.	degrees-minutes-seconds
Longitude	Longitude West. Formatted as degree-minutes-seconds without hyphens or separators. This is described in the manual and provided in this format to be consistent with other TPWD data. When converting to decimal degrees, add a minus sign to indicate the west direction).	degrees-minutes-seconds

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Instruments

Dataset-specific Instrument Name	Bag seine
Generic Instrument Name	Seine Net
Dataset-specific Description	Data were collected using a bag seine: 18.3 m long and 1.8 m deep with 19 mm stretched nylon mesh in wings and 13 mm stretched mesh in the bag.
Generic Instrument Description	A seine net is a very long net, with or without a bag in the centre, which is set either from the shore or from a boat for surrounding a certain area and is operated with two (long) ropes fixed to its ends (for hauling and herding the fish). Seine nets are operated both in inland and in marine waters. The surrounded and catching area depends on the length of the seine and of the hauling lines. (definition from: fao.org)

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Project Information

Effects of physical environmental conditions on the species distribution and composition of marine fish and invertebrates along the Texas coast (Texas Coastal Fish)

Coverage: coastal bays, Texas

NSF Award Abstract:
Understanding how changes in environmental conditions affect biota in the oceans is critically important for maintaining biodiversity and sustainable fisheries and projecting potential responses to future climate scenarios. The aims of this project are to determine how the distribution of fish and invertebrates has changed over time along the Texas coast and to assess the extent to which these changes are attributable to changes in local environmental conditions, such as sea surface temperature, coastal sea level, salinity, turbidity, and river discharge rate. Studies of biological systems in the Gulf of Mexico are lacking compared to coastal research in the Atlantic and Pacific oceans. Addressing these regional knowledge gaps is crucial because the Gulf of Mexico supports a wide diversity of temperate and tropical species that are ecologically and economically important. Poleward shifts in species distributions associated with increasing sea surface temperature have been observed along the Atlantic and Pacific coasts. In contrast, the northern edge of the Gulf of Mexico is bound by land that places biogeographic constraints on the potential responses of coastal organisms to changing environmental conditions. This project will use advanced statistical methods to analyze long-term species composition data for the northwestern Gulf of Mexico and characterize past relationships of species composition and local environmental conditions. These findings will help guide the development of predictive models to assess potential biological responses to projected environmental conditions. Research results will be shared with local and state resource agencies responsible for managing coastal fisheries. As an integral part of this project, a three-level (faculty-graduate-undergraduate) mentoring system will be established to promote diversity in science through undergraduate and graduate training. Undergraduate students will be recruited through the Texas A&M University Chapter of the Society for Advancement of Chicano and Native Americans in Science (SACNAS), for which the principal investigator is currently a faculty advisor. Both graduate and undergraduate students will work as a team on the project and develop quantitative data analysis and other general scientific skills. Finally, the research program will be used as a case study for establishing mentoring systems for promoting diversity in science.

The availability of long-term species composition data provides a unique opportunity to substantially improve knowledge toward understanding the effects of climate change on marine organisms in a low latitude system. This project will examine species composition data for eight bays distributed over approximately 650 km of the Texas coast; comprehensive data of this type are uncommon elsewhere. The biological data have been collected over 35-40 years as part of a long-term monitoring program and includes information on more than 1000 species of fish and invertebrates. This unique dataset will be analyzed using modern statistical approaches, including occupancy data analysis, co-integration method, and state-space vector autoregressive modeling. These methods overcome common difficulties in statistical analyses, including datasets having multi-collinearity among independent variables and those involving non-stationarity. Based on the results of the statistical analyses, models enabling the prediction of species composition under projected local environmental conditions will be developed. As part of this project, undergraduate and graduate students will acquire expertise in contemporary analytical methods, research findings will be broadly shared with both the academic and resource management communities, and computational code will be made publically available. This project will provide better understanding of the effects of environmental conditions on fish and invertebrate distribution and will provide valuable information for improved fishery management and conservation efforts under changing environmental conditions.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1656923

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