Gill Net Catch Data in Bays along Texas Coast from 1986 to 2018

Website: https://www.bco-dmo.org/dataset/828794
Data Type: Other Field Results
Version: 1
Version Date: 2020-12-07

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
Vertebrate caught with gill net in Sabine Lake, Galveston Bay, Matagorda Bay, San Antonio Bay, Aransas Bay, Corpus Christi Bay, Upper Laguna Madre, and Lower Laguna Madre from 1986 to 2018 (except in Sabine Lake sampling begun in 1986).

Table of Contents

Coverage

Spatial Extent: **N**:30.0542 **E**:-93.75361 **S**:26.0153 **W**:-97.73778
Temporal Extent: 1982 - 2019

Methods & Sampling

Data consist of samples collected from Sabine Lake, Galveston Bay, Matagorda Bay, San Antonio Bay, Aransas Bay, Corpus Christi Bay, Upper Laguna Madre, and Lower Laguna Madre. Sampling was conducted twice each year during a spring sampling season (April - June) and a fall sampling season (September-November). A total of 45 gillnet samples were collected for each bay in all sampling seasons.

The gillnets used in sampling consisted of four equal length (45.7 m) panels of differing mesh sizes (76 mm, 102 mm, 127 mm, and 152 mm).

Each sampling area was divided into a one-minute latitude by a one-minute longitude sample grid, with each grid square divided into 144 gridlets of five-second latitude by five-second longitude. Sampling was conducted following a stratified cluster sampling protocol, whereby grid locations were randomly selected without

replacement from the predefined sample grid within each bay, and locations within each grid randomly selected for net placement. Nets were set perpendicular to the shoreline, with the smallest mesh size nearest to the shore, and allowed to soak from sunset to sunrise for an average of 13.5 hours 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.

Data Processing Description

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.

BCO-DMO Processing notes:

- Joined the gill net data to the species code list based on species_code field
- Adjusted column names to comply with database requiremets (added underscores & changed capitals)
- Changed , to ; in common and latin name columns
- Added latitude and longitude in decimal degrees, rounded to 4 and 5 digits respectively

[table of contents | back to top]

Data Files

File
gill_net_data.csv (Comma Separated Values (.csv), 24.85 MB) MD5:560b6d948eebbb7ae3af89571faeba16 Primary data file for dataset ID 828794

[table of contents | back to top]

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

[table of contents | back to top]

Related Publications

Pawluk, M., Fujiwara, M., & Martinez-Andrade, F. (2021). Climate effects on fish diversity in the subtropical bays of Texas. Estuarine, Coastal and Shelf Science, 249, 107121. doi:10.1016/j.ecss.2020.107121
Results

[table of contents | back to top]

Parameters

Parameter	Description	Units
Major_Area	ID for bays	unitless
Year	Year	unitless
Month	Month	unitless
Sample_ID	Station ID	unitless
Temperature	Temperature	degrees Celcius (°C)
Salinity	Salinity	PPT
Dissolved_Oxygen	Dissolved Oxygen	parts per million (PPM)
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
Catch	Number of individuals caught	unitless
Species_Code	Species Code	unitless
Species_Common_Name	Scientific name, Latin	unitless
Species_Latin_Name	Common name, English	unitless
Latitude_convert	Latitude, south is negative	decimal degrees
Longitude_convert	Longitude, west is negative	decimal degrees

[table of contents | back to top]

Instruments

Dataset-specific Instrument Name	Gillnet
Generic Instrument Name	Gillnet
Dataset-specific Description	The gillnets used in sampling consisted of four equal length (45.7 m) panels of differing mesh sizes (76 mm, 102 mm, 127 mm, and 152 mm).
Generic Instrument Description	Gillnetting uses curtains of netting that are suspended by a system of floats and weights; they can be anchored to the sea floor or allowed to float at the surface. A gillnet catches fish by their gills because the twine of the netting is very thin, and either the fish does not see the net or the net is set so that it traps the fish.

[table of contents | back to top]

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.

[table of contents | back to top]

Funding

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

[table of contents | back to top]