Identification_Information:
Citation:
Citation_Information:
Originator: NOAA Fisheries Service
Publication_Date:
Title: Temperature and Salinity Effects on the Growth and Survival of Juvenile Penaeid Shrimps: Implications for the Influence of River Diversions on Production

Description:
Abstract: We used field experiments to measure growth and survival rates of juvenile white shrimp and juvenile brown shrimp held in varying salinity and water temperatures. Shrimp were caged at four locations along a salinity gradient (intermediate, brackish, and saline zones) and two water depths (depth below marsh surface: shallow=30 cm and deep=70 cm) in the Barataria Bay Estuary. A total of 12 enclosures were used at each location; eight placed in shallow water and four in deep water. One-half of the shallow water enclosures received daily supplements (0.78 g each) of food (Shrimp Production Formula 35, Rangen, Inc.). Benthic cores were collected at each cage site before an experiment was initiated to measure prey abundance. Environmental data were also collected during the course of these field experiments. Water depth, water temperature, and dissolved oxygen concentration were measured daily at each enclosure. Continuous monitoring of selected enclosures was accomplished using Onset Hobo® recorders to measure water temperature and Hydrolab® Datasonde 3 multi-parameter water quality loggers for water temperature, salinity, and dissolved oxygen. Changes in water level were monitored at one location using a tide gauge mounted in a plastic pipe. The results from these experiments will be used in the development of simulation models to predict the effects of temperature and salinity on shrimp growth and survival. These models can be linked to a hydrology-hydrodynamic model and used in conjunction with different river diversion scenarios to assist managers in minimizing the impacts of freshwater releases on shrimp production when restoring coastal systems.

Purpose: Identify and describe the relationships between growth and survival rates of shrimp and two environmental variables (water temperature and salinity) influenced by freshwater inflows from river diversions.
Time_Period_of_Content:
Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 20070505
Ending_Date: 20080930
Currentness_Reference:
Status:
Progress: ongoing
Maintenance_and_Update_Frequency: As necessary
Spatial_Domain:
Bounding_Coordinates:
West_Bounding_Coordinate: -90.18280
East_Bounding_Coordinate: -90.08400
North_Bounding_Coordinate: 29.58000
South_Bounding_Coordinate: 29.21100
Keywords:
Theme:
Theme_Keyword_Thesaurus:
Theme_Keyword: growth rate
Theme_Keyword: penaeid shrimp

Theme_Keyword: nursery areas
Theme_Keyword: field experiments
Theme_Keyword: growth experiments
Theme_Keyword: river diversion
Theme_Keyword: brown shrimp
Theme_Keyword: white shrimp
Theme_Keyword: Farfantepenaeus aztecus
Theme_Keyword: Litopenaeus setiferus
Theme_Keyword: nursery habitat
Theme_Keyword: salt marsh
Theme_Keyword: brackish marsh
Theme_Keyword: intermediate marsh
Theme_Keyword: invertebrates

Place:
Place_Keyword_Thesaurus: Barataria Bay
Place_Keyword: Louisiana
Place_Keyword: Gulf of Mexico
Access_Constraints:
Use_Constraints:
Data set is not for use in litigation. While efforts have been made to ensure that these data are accurate and reliable, NOAA cannot assume liability for any or damages misrepresentations caused by inaccuracies in these data, or as a result of these data being used on a particular system. NOAA makes no warranty, expressed or implied, nor does distribution constitute any such warranty.
Point_of_Contact:
Contact_Information:
Contact_Organization_Primary:
Contact_Organization:
NOAA Fisheries Service, formerly National Marine Fisheries Service, Fishery Ecology Branch.
Contact_Person: Dr. Jim Ditty
Contact_Address:
Address_Type: mailing and physical
Address: Galveston Laboratory, 4700 Avenue U
City: Galveston
State_or_Province: Texas
Postal_Code: 77551-5997
Country: Unites States of America
Contact_Voice_Telephone: 409-766-3500
Data_Quality_Information:
Attribute_Accuracy:
Attribute_Accuracy_Report:
Field data were entered into spreadsheets and checked against the raw data sheet to avoid entry errors.
Logical_Consistency_Report:
Completeness_Report:
Lineage:

Process_Step:
Process_Description:
Experimental Enclosures: The 1-m^2 enclosures were constructed by attaching a cylinder of 3-mm mesh nylon net (75-cm high walls, a top but no bottom) to two fiberglass hoops with fishing twine. A cylindrical port (11.2-cm diameter X 15 cm long) was sewn into the top of the enclosure for adding shrimp or food. The walls of the enclosure were held upright by attaching three sections of plastic pipe to the fiberglass hoops located at the top and bottom of the enclosure. Metal rods were inserted through the plastic pipes and into the substrate to hold the enclosures securely in place.

Process_Date: unknown
Process_Step:
Process_Description:
Measuring Environmental Variables:
Water depth, water temperature, and dissolved oxygen concentration were measured daily at each enclosure using a meter stick and YSI hand held meter. Continuous monitoring of selected enclosures was accomplished using Onset Hobo® recorders to measure water temperature and Hydrolab® Datasonde 3 multiparameter water quality loggers for water temperature, salinity, and dissolved oxygen.
Process_Date: unknown
Process_Step:
Process_Description:
Set up experiment:
An experiment was set up at two of the four locations on one day and the remaining two locations on the next day. Upon arriving at a location, each enclosure was assembled in the boat as needed. An enclosure site was slowly approached; once a site was reached, the enclosure was taken by someone standing alongside the boat and placed as far as possible away from the boat to avoid disturbing the site prior to pushing the enclosure through the water and into the mud bottom. The bottom hoop of the enclosure was sunk approximately 15 cm, or as deep as possible, into the substrate to prevent escape of enclosed animals. Enclosures were held in place by inserting metal rods through the three plastic posts around an enclosure and pushing these rods into the substrate. Deep enclosure sites were marked using floats. The location of each enclosure was recorded by writing the cage number of each site on the field data sheets. Once an enclosure was in place, three benthic cores (2.5-cm deep X 5-cm diameter) were collected around the enclosure perimeter and pooled. The pooled sample was washed through a 0.5-mm mesh sieve, and the material retained on the sieve was preserved in formalin, labeled with a waterproof tag, and stored in plastic bags. The crew in a second boat installed meters to continuously measure environmental data at selected enclosures.

Process_Date: unknown
Process_Step:
Process_Description:
Initiating Experiment:
An experiment was initiated on the third day by collecting shrimp with seines and dip nets and immediately placing these animals in aerated containers. When enough shrimp had been collected for two locations, they were sorted into five size classes (e.g., 36-40 mm, 41-45 mm, 46-50 mm, 51-55 mm, 56-60 mm). Shrimp were individually marked with visible implant elastomer, measured, and then assigned (one individual from each size class) randomly to an enclosure. To avoid potential handling effects on experimental animals, their initial weights were estimated using a length-weight relationship determined by collecting, weighing, and measuring additional animals (75-100) at the beginning of an experiment.
Process_Date: unknown

Process_Step:
Process_Description:
During an Experiment:
Each day during the experimental period enclosures at the four locations were inspected. Environmental variables were measured at each enclosure, recorded on field data sheets, and food was added to the cages designated to receive this treatment.
Process_Date: unknown
Process_Step:
Process_Description:
Terminating an Experiment:
Experiments were terminated after 7 d using two boats with teams of four persons in each boat. Marked shrimp and other animals were removed from each enclosure by placing a modified drop sampler over the enclosure, lifting the enclosure, and removing the water with a trash pump. As the water inside the drop sampler was removed, the experimental shrimp and other animals were collected, and placed on ice in coolers. Enclosures and meters were taken down and removed from the field. Marked shrimp from each enclosure were measured and weighed daily, and this information was recorded on data sheets.

Process_Date: unknown
Process_Step:
Process_Description:
Initial Processing of Field Data and Samples:
After returning from the field, the environmental data were downloaded from all instruments (tide gauge, Datasondes, Hobos) and entered into an electronic database and the database was sent to the primary investigator. Field data sheets were entered into an electronic database or a database manager, checked, and a printout given to the laboratory supervisor and primary investigator for review.
Process_Date: unknown
Process_Step:
Process_Description:
SPECIES IDENTIFICATION and MEASUREMENT:
Unmarked nekton collected from each enclosure were identified and the species name was recorded on the appropriate identification sheet.
Organisms were measured to the nearest millimeter total length (TL) and standard length (SL) for fish, TL for shrimp, and carapace width (CW) for crabs. TL in shrimp was from the tip of the rostrum to the tip of telson. If the rostrum of shrimp was broken, "broken rostrum" was recorded on the data sheet, and CW rather than TL was measured. Carapace width (CW) of crabs was measured across the widest part of the carapace (from tip to tip of the lateral spines, if present). If lateral spines were broken, "broken lateral spines" was recorded on the data sheet for that individual and CW was not measured.
Process_Date: unknown
Process_Step:
Process_Description:
Preservation and Storage of Fish and Invertebrates:
After sorting and identification, organisms were preserved in 70 percent ETOH (i.e., mixture of 7.4 parts of 95 percent ETOH and 2.6 parts water) and

samples were kept for at least 5 years. Selected marked shrimp were kept frozen and sent to LSU for stable isotope analysis.

Process_Date: unknown
Process_Step:
Process_Description:
Benthic Cores:
Benthic samples were sorted in the laboratory following the Standard Operating Procedures for processing of benthic core samples. Animals were separated into major taxa (annelids, crustaceans, mollusks)and miscellaneous others (e.g., fish eggs, unidentified organic material). Annelids and crustaceans were blotted and weighed to determine wet weights. These taxa were then placed into pre-weighed pans and a drying oven at 60°C for 24 hr and weighed again to determine dry weight. Mollusks were counted but not weighed.

Process_Step:
Process_Description:
Organism Data Entry and Validation:
Laboratory and field data were entered into the computer using a database manager. A text file was created that described these data and any abbreviated variables. Data were printed out, checked against ID sheets and corrections were made at that time. A species ID code was assigned to each individual using the Fishery Ecology Branch revised species code list. A species not found on the code list was assigned a new code, which was added to the master list.

Process_Date: unknown
Metadata_Reference_Information:
Metadata_Date: 20080213
Metadata_Contact:
Contact_Information:
Contact_Organization_Primary:
Contact_Organization:
NOAA Fisheries Service, formerly National Marine Fisheries Service, Fishery Ecology Branch, Galveston, Texas
Contact_Person: Dr. Jim Ditty
Contact_Address:
Address_Type: mailing and physical
Address: Galveston Laboratory, 4700 Avenue U
City: Galveston
State_or_Province: Texas
Postal_Code: 77551-5997
Country: Unites States of America
Contact_Voice_Telephone: 409-766-3500
Metadata_Standard_Name:
FGDC Content Standard
for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001.1-1999