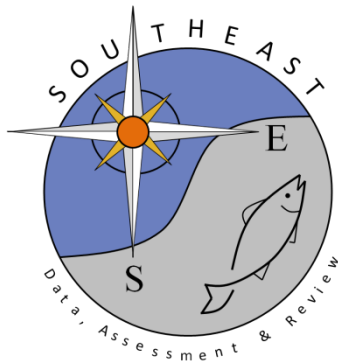


Fishery-Independent Sampling: Louisiana

SEDAR27-RD-06



Louisiana Department of Wildlife and Fisheries
Office of Fisheries
Marine Fisheries Section

Introduction

The fishery independent monitoring program within the Marine Fisheries Section is largely based upon methodology utilized during the Cooperative Gulf of Mexico Estuarine Inventory and Study (GMEI) (Perret et al. 1971). The project was conducted in cooperation with the Gulf States Marine Fisheries Commission (GSMFC), the states of Alabama and Mississippi, and the National Marine Fisheries Service (NMFS) laboratories at Galveston, Texas and St. Petersburg, Florida. Standardized sampling methods and procedures used in the GMEI were developed by the Technical Coordinating Committee of the GSMFC. Marine Fisheries Section's database of trawl sampling for shrimp dates back to 1965 for some areas in Louisiana, 1967 for most areas. The finfish sampling program began in 1985 and data are available since 1986. Sampling protocols outlined here reflect only the minimal sampling requirements, which may be exceeded periodically to obtain additional biological data for management decisions. Sampling frequency for most gear types changed as of October of 2010 and current sampling frequencies are outlined in this document. For sampling frequencies prior to October of 2010 see Appendix 1.

LDWF COASTAL STUDY AREAS

For monitoring purposes, the Louisiana coast is divided into seven Coastal Study Areas (CSA's). These CSA's were established in 1966, when federal funds through the Commercial Fisheries Research and Development Act became available and the GMEI study was begun. Geographic boundaries of the CSA's are as follows:

CSA 1-2 is bordered on the east by the Mississippi state line and on the south by South Pass of the Mississippi River.

CSA 3 includes Barataria and Caminada Bays and Little Lake. South Pass of the Mississippi River is the eastern boundary and Bayou Lafourche is the western boundary.

CSA 4-5 includes the Timbalier and Terrebonne Bay complex along with Lake Pelto. It is bounded on the east by Bayou Lafourche. It is defined by the Atchafalaya River/Point au Fer Island on the west. Major water bodies in this area are Caillou Bay, Caillou Lake, Lake Mechant, Lake Decade, and Four League Bay.

CSA 6 boundaries extend from Atchafalaya River on the east to Freshwater Bayou on the west. Large water bodies in this area include Vermilion Bay, West Cote Blanche Bay, East Cote Blanche Bay, and Atchafalaya Bay.

CSA 7 encompasses the region from Freshwater Bayou, located in Vermilion Parish, westward to the Louisiana/Texas state line. Estuaries located within CSA VII include the Rockefeller Wildlife Refuge complex, the Mermentau River Basin, Calcasieu Lake, Lake Charles, Prien Lake, and Sabine Lake.

GEAR TYPES/SAMPLE OBJECTIVES

All of the gear descriptions and usages described below are brief summaries. Complete specifications are available on request.

Trawl-16 foot

A 16 foot (ft.) flat otter trawl is used to sample penaeid shrimp, blue crabs, finfish (bottomfish), and other marine organisms in the larger inshore bays and seaward into Louisiana's outside territorial waters. The objectives are to determine relative abundance, size distribution, and seasonal/long-term trends. Data are used in the development of management recommendations for the spring and fall inshore shrimp seasons, season extensions, special seasons and seasons in the state's territorial seas.

Trawl-6 foot

A 6 ft. balloon otter trawl is used to sample juvenile penaeid shrimp populations in shallow edge habitats in the interior marshes (although little to none of this habitat is available to LDWF staff in CSA 7). Objectives are to characterize relative abundance, size distribution, and seasonal/long-term trends. Data are used in the development of management recommendations for the spring and fall inshore shrimp seasons, season extensions and special seasons. Species other than penaeid shrimp are typically not recorded from this gear, so it is not considered further for purposes of menhaden abundance evaluation.

Seine

A 50 ft. bag seine of ¼" bar mesh is used to sample juvenile finfish, shellfish, and other marine organisms to monitor relative abundance, size distribution, seasonal/long-term trends and community structure.

Gill Net

A 750 ft. experimental monofilament gill net is used to sample finfish to obtain indices of abundance, size distribution, and ancillary life history information on selected species. The net is composed of 5 panels, each 150' long, of 2.0, 2.5, 3.0, 3.5, and 4.0 inch stretch mesh, 8 feet in depth. Complete specifications are available on request

Trammel Net

A 750 ft. trammel net is used to sample finfish to obtain indices of abundance, size distribution, and ancillary life history information on selected species.

SAMPLING FREQUENCY

Sampling frequency by gear type and time period is listed below:

Gear Type	Periodicity	Time Period
6' Trawl (Hydrology – top)	Weekly	April through the first or second week in May, then 2 nd and 3 rd weeks of June
16' Trawl (Inshore) (Hydrology – top & bottom)	Weekly	April through the setting of the Fall Inshore Shrimp Season (usually August)
	Semi-monthly	From the setting of the Fall Inshore Shrimp Season (usually August) through March
16' Trawl (Offshore) (Hydrology – top & bottom)	Weekly	Mid-November through the closure of state outside waters (territorial sea; usually December)
	Monthly	From the closure of state outside waters (territorial sea) through March
	Semi-monthly	April through August
	Monthly	September to mid-November
Gill Net (Hydrology – top & bottom)	Monthly	October through March
	Semi-monthly	April through September
Trammel Net (Hydrology – top & bottom)	Monthly	October through March
Seine (Hydrology – top)	Quarterly	Once during winter (Jan-Mar), spring (Apr-Jun), summer (Jul-Sep), and fall (Oct-Dec) months

ENVIRONMENTAL/INCIDENTAL OBSERVATIONS

Note: Use of brand names does not indicate product endorsement.

Hydrological and climatic measurements are taken in conjunction with all biological samples. These parameters consist of air and water temperature (°C), turbidity (ft.), conductivity

(millimhos/centimeter², cm²), dissolved oxygen and salinity (ppt). Temperature is measured with a dry mercury thermometer or with an electronic meter (e.g., YSI sonde or RS-5 optical meter), and readings are recorded in degrees Celsius (°C) to the nearest 0.1 degree. Turbidity is measured with a 30 cm, Secchi disk suspended from a staff or line. The Secchi disk is lowered into the water to the point at which it is no longer visible. The disk is then gradually raised up to the point at which it barely becomes visible below the surface; distance is then measured to the nearest 0.1 ft. Conductivity, salinity, and water temperature are measured to the nearest tenth in millimhos/cm², ppt, and °C, respectively, using a YSI or equivalent instrument. All instruments are calibrated as described in the instrument manual, or by standard EPA or APHA Standard Methods. A calibration log is maintained that includes notes of any problems with the meter, repairs, deviations from standard, etc.

Hydrological readings one foot beneath the surface and one foot above the bottom are taken at gulf 16 ft. trawl, and gill and trammel net stations. Readings one foot beneath the surface are taken in conjunction with all remaining gear types.

GEAR DEPLOYMENT/ANALYSIS OF SAMPLES

Trawl-16 ft.

The 16 ft. trawl is attached to a 1/2 in. diameter nylon rope or stainless steel tow line and bridle. The length of the bridle is 2-3 times the trawl width. Tow line length is normally at least 4-5 times the maximum depth of water. The trawl is towed for ten minutes (timed from when the trawl first begins to move forward to when it stops forward movement) at a constant speed and in a weaving or circular track to allow the prop wash to pass on either side of the trawl. All organisms are identified by species, counted, and up to 50 of each species measured in 5 millimeter (mm) intervals. Size measurements are taken as follows: shrimp - anterior tip of rostrum to posterior tip of telson; crabs - carapace width; squid - mantle length; medusoid jellyfish - diameter; stingray - disc width; and other finfish - total length (tip of snout to tip of longest lobe of compressed caudal fin). Blue crabs larger than 55 mm (CW) are sexed and all females staged (i.e. immature, mature or gravid). The presence of the external parasite Loxothylacus texanus and eggs as well as molt phase (i.e soft) are noted under species specific observation codes.

Seine

The ends of the seine are held open with 6 ft. poles which are attached to the float and lead lines. Seine sampling techniques can be subdivided into two general types - soft bottom and hard bottom. Sampling methodology utilized at each station is identified. Seine samples collected over soft bottom areas are accomplished by attaching 100 ft. lengths of 1/2 in. diameter nylon or polydac rope to each seine pole bridle. The line is anchored to the shoreline by tying the end to a push-pole, paddle, anchor or other structure. The boat is quietly reversed until the line is fully extended. At this point the boat is turned 90° astern (parallel to the shoreline) and the seine is fed out over the

boat's bow while making sure the cork line and bag are not tangled. As the end of the seine is placed overboard, the boat proceeds shoreward and is anchored or tied to the bank. The seine is hauled in by the two tow lines, with care being taken to keep the lead line on the bottom. The catch in the wings of the net is shaken down to the bag, and removed.

Seine samples collected over hard-bottom areas are taken in a more conventional manner. The seine is stretched out and pulled parallel to the shoreline for a distance of 75-100 ft. The outside end is then swept in toward the shoreline and the net is drawn ashore. Contents are then removed using methods described earlier.

All organisms collected in seine samples are identified to species and counted. Size, as described under 16 ft. trawl samples, of up to 30 randomly selected individuals of species listed in Table 1 are measured to the nearest mm. More specimens are measured if measurement of 30 (or general inspection of the sample) indicates that there may be more than one mode of length. Blue crabs greater than 75 mm. in carapace width are counted, measured, and released in the field. Species not listed in Table 1 are counted, and the total weight of the species recorded.

Gill Net

Large floats and anchor weights are attached to the ends of the float line and lead line, respectively. Gill net deployment begins with the 1 in. bar mesh end. After the float and weight are tossed overboard adjacent to or on a shoreline or reef, the gill net is deployed over the transom of the net well. Net configuration or distance from shoreline or reef varies because of water depth, presence of obstructions, or physical space limitations. The net may be set parallel to the shoreline or reef or in a crescent shape. Enough room is left on one side of the net to allow the net skiff to enter and then maneuver within the net. Fish are forced to strike the net by running the net skiff around both the inside and outside of the net a minimum of two or three times in gradually tightening circles. The net is then retrieved and pulled aboard from the down-wind or down-current end.

All organisms are removed and placed in baskets corresponding to each mesh size or panel of the net. Organisms are noted as gilled or tangled (ie., those fish which have not penetrated individual meshes to the back of the operculum). Up to 30 individuals of the species listed in Table 1 are individually measured (total length in mm); remaining individuals of these species are counted. Other species are counted and weighed in aggregate.

Additional information is obtained from selected species. Sex and gonadal condition (Table 3) are recorded for up to 30 individuals per mesh panel of red drum ($\geq 500\text{mm}$), spotted seatrout ($\geq 225\text{mm}$), striped mullet ($\geq 250\text{mm}$), black drum ($\geq 600\text{mm}$), southern flounder ($\geq 170\text{mm}$), sheepshead ($\geq 250\text{mm}$). If otoliths are removed from a fish for aging, then that fish is weighed individually, and the sex noted. Stomach contents, if recorded, are listed in order of biomass present. Stomach contents are recorded consistently for a species at a station; that is, they are recorded for all mesh codes, and for up to 30 randomly selected specimens in each mesh code. Species and species groups found in stomach analyses are coded using the 4-digit taxonomic codes. Certain partially digested, unidentifiable remains have been assigned a separate series of 3-digit codes.

Trammel Net

Floats and weights are attached to the ends of the float line and lead line, respectively. The float

and weight are thrown out adjacent to or on a shoreline or reef, and the net slowly deployed while at idle speed. Net configuration or distance from shoreline or reef varies because of water depth, presence of obstructions, or physical space limitations; therefore, the net may be set parallel to the reef or shoreline or in a half-moon shape. Enough room is left on one side of the net to allow the net skiff to enter and then maneuver within the net.

Fish are forced to strike the net by running the net skiff around both the inside and outside of the net at least two or three times in gradually tightening circles. The net is then retrieved from the down-wind or down-current end.

Fish are processed in the same manner as described earlier for gill net samples, except that there are no mesh or tangled/gilled code designations, and that more specimens of the species listed in Table 4 are individually measured if measurement of 30 (or general inspection of the sample) indicates that there may be more than one mode of length. Up to 50 red drum, spotted seatrout and black drum are individually measured and sexed, since these have special requirements, and may have bimodal distributions in the gear.

Specifications of gear utilized in Marine Fisheries Section.

Note: Use of brand names does not indicate product endorsement.

Trawl-16 Foot

The webbing, size of individual sections, and other specifications for a 16 ft. flat otter trawl are depicted in the attached drawing. The body is constructed of 3/4 in. bar mesh No. 9 nylon mesh while the tail is constructed of 1/4 in. bar mesh knotted 35-lb. tensile strength nylon and is 54-60 in. long. The trawl is hung on 3/8 in. PDP rope with four 3 in. by 1 1/2 in. spongex floats on the corkline and with a minimum of 3 1/2 ft. extra rope on the corkline and leadline. The trawl has 16 ft. and 20 ft. of webbing along the cork and lead lines, respectively. The bottom chain (1/8 long link) is hung along the entire lead line in 20 links per loop intervals. Trawls are dipped in green plastic nylon net dip. The trawl boards are constructed of 3/4 in. marine plywood and measure 24 in. across the top, 14 in. at the back, and 10 in. at the front with a 4 in. rounded corner. The bridle is constructed of four lengths of galvanized 3/16 in. chain while the bottom slide consists of a 3/8 in. by 2 in. flat iron bar.

Seine

The seine is 50 ft in. length, 6 ft in. depth and has a 6 ft. by 6 ft. bag in the middle of the net. The nylon, tarred ace webbing has a mesh size of 1/4 in. bar. A lead and float line runs the entire length of the seine.

Gill Net

The experimental gill nets are 750 ft. long, 8 ft. deep, and comprised of five 150 ft. panels of 1 in., 1-1/4 in., 1-1/2 in., 13/4 in., and 2 in. bar mesh. Minimum twine size is #139 for the 1 in. bar

mesh and #208 for remaining mesh sizes. All panels are sewn together with high visibility twine in a continuous fashion and attached to the lead and cork lines using the one-half hanging ratio and double selvage. All junctions of the five panels are marked with high visibility twine. The float line is 3/8 in. diameter hollow braided polypropylene and the lead line is #60-75 lead core, 5/16 in. diameter lead core line. Tapered sponges floats (2 in. diameter and 3-1/2 in. long) are spaced every 4 ft. along the float line.

Trammel Net

The trammel nets are 750 ft. in length and 6 ft. in depth, consists of 3 walls, and are constructed of treated nylon. The inner wall has 1 5/8 in. bar mesh, a #6 twine meshes deep. The two outer walls have 6 in. bar black net dip. size and is 35 mesh, #9 twine size, and measures 7 meshes deep. The lead line is composed of #60-75 lead core. The float line is 3/8 in. diameter hollow braided polypropylene. Tapered sponges floats (2 in. diameter and 3-1/2 in. long) are spaced every 3 ft. along the float line. Webbing is hung along both the lead and cork line using the one-half hanging ratio and double selvage.

Table 1. Species list for individual measurements in seine, trammel, and gill net samples.

Individual measurements should be collected for the following list of species in gill and trammel net samples:

white shrimp	red drum*
all shark species	black drum*
alligator garfish	Atlantic croaker
gulf menhaden	southern kingfish
gafftopsail catfish	gulf kingfish
largemouth bass and	spot
all other centrarchids	bluefish
striped mullet	sheepshead*
striped bass	Spanish mackerel
spotted seatrout*	Florida pompano
sand seatrout	southern flounder

* species will have a minimum of 50 measured in trammel nets, as these have special requirements, and may have bi-modal distributions in that gear.

The same species will also be measured from seine samples, along with:

brown shrimp
white shrimp

any other penaeid shrimp
blue crab (all sizes)

Again, this list is a minimum, and should not preclude any species from measurements. For some dataset uses, measurement of all species may be important.

Appendix 1. Sampling Frequency prior to October of 2010.

<u>Gear Type</u>	<u>Periodicity</u>	<u>Time Period</u>
Gill Net	Monthly Twice Monthly	October - March April- September
Trammel Net	Monthly	October - March
Seine	Monthly Twice Monthly	January - August September - December
16 ft. Trawl (inshore)	Every other week Weekly	November - February March - October
16 ft. Trawl (offshore)	Every other week Monthly	November - March April - October
6 ft. Trawl (regular)	Weekly	April - Closing of Spring Season