

MARINE RESOURCE MONITORING OPERATIONS MANUAL

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TEXAS PARKS AND WILDLIFE DEPARTMENT
Coastal Fisheries Division

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INTRODUCTION

Effective management of finfish and shellfish resources must be based on scientifically sound knowledge of the life history, population dynamics and status of the resource. The Texas Parks and Wildlife Department, Coastal Fisheries Division's long-term Marine Resource Monitoring Program is based on probability sampling to assess changes in the relative abundance and size of organisms, their spatial and temporal distribution, species composition of the community and selected environmental parameters known to influence their distribution and abundance.

The importance of using standardized methods cannot be overemphasized, as consistency and reliability facilitates the comparison among and between bay systems and years. The success and utility of this program is dependent upon its comparability, reliability and, ultimately, its defensibility. This manual serves to provide documentation of all procedures, and in conjunction with the Quality Control Program, ensures and maintains consistency.

It is the Science Director's, Program Leader's and Regional Directors' responsibility to oversee, schedule, conduct and report on the Marine Resource Monitoring Program. It is the responsibility of each Ecosystem Leader, with the assistance of the biologists, to oversee, schedule, organize, conduct and report on the program in their respective bay system. It is the responsibility of each technician to assist in the collection of quality data. It is everyone's responsibility to insure that maintenance of all equipment and facilities, and recording and editing of data is completed as required in a timely manner. All employees are encouraged to make recommendations on increasing efficiency in data collection.

This manual is published annually and updated periodically by e-mail to provide full documentation of all procedures. Copies are sent to the following Coastal Fisheries personnel:

- Division Director
- Deputy Division Director
- Science and Policy Resources Branch Chief
- Science Director
- Regional Directors (3)
- Enhancement Program Director
- PRB Science Program Team Leader
- Program Leaders (5)
- Ecosystem Leaders (8)
- Ecosystem Resources Program Team Leaders (3)
- Artificial Reef Program Leader
- Policy and Education Program Team Leader

Sample Design

Coastal Fisheries resource monitoring data are collected as a stratified cluster sampling design; each bay system and Gulf area serves as non-overlapping strata with a fixed number of samples per month (or season for gill nets). A cluster sample is a type of probability sample where each sample unit is a collection, or cluster, of elements. Specifically, we sample *locations* and include every organism encountered at that location as part of the sample. Sample locations are drawn independently and without replacement for each combination of gear, stratum, and month (season). Some good general references on cluster sampling include Kish (1965), Mendenhall et al. (1971), Cochran (1977) and Thompson (1992). Other, more specific references that address marine resource surveys include Pennington (1986), Gunderson (1993) and Pennington (1994).

Sample Areas

The Coastal Fisheries Division samples ten major estuarine systems (Sabine Lake, Galveston Bay, Cedar Lakes, East Matagorda Bay, West Matagorda Bay, San Antonio Bay, Aransas Bay, Corpus Christi Bay, Upper Laguna Madre and Lower Laguna Madre) and five Gulf areas within the Texas Territorial Sea (shoreline to nine nautical miles offshore). A description of the waters included during routine monitoring for each bay system and Gulf area follows.

Sabine Lake System. All waters, including all saltwater bayous, bounded by a line behind the surfline from the north edge of Sabine Lake where the mouths of the Sabine and Neches Rivers enter the Lake to the bridge over the ICWW at High Island.

Galveston Bay System. All waters, including all saltwater bayous, bounded by a line behind the surfline from the bridge over the ICWW at High Island to the southwestern shoreline of Drum Bay and the north edge of Trinity Bay where the Trinity River enters the bay. On 21 November 1982, the area between the State Highway 146 bridge over the Houston Ship Channel and the junction of the San Jacinto River and the Houston Ship Channel was added to the Galveston Bay System.

Cedar Lake System. All waters behind the surfline from the southwestern shoreline of Drum Bay to Salt Bayou between Cedar Lakes and Caney Creek including the ICWW and all saltwater bayous entering the ICWW.

East Matagorda Bay System. All waters behind the surfline from Salt Bayou between Cedar Lakes and Caney Creek including the lower portion of Caney Creek to the western edge of East Matagorda Bay including the ICWW and all saltwater bayous entering the ICWW.

Matagorda Bay System. All waters, including all saltwater bayous, between the surfline from the eastern edge of the Lower Colorado River (below the ICWW) to the eastern edge of the Chain of Islands in Pass Cavallo and the lower portion of the Tres Palacios and Lavaca Rivers.

San Antonio Bay System. All waters, including all saltwater bayous, between the eastern edge of the Chain of Islands in Pass Cavallo to the Chain of Islands in the western edge of Ayres Bay and all waters from the mouth of the Guadalupe River including Mission Lake, Guadalupe Bay and the lower delta of the Guadalupe River.

Aransas Bay System. All waters, including all saltwater bayous in the bay system, behind the surfline from the eastern edge of Mesquite Bay to the causeway between Aransas Pass and Port Aransas, including the ICWW.

Corpus Christi Bay System. All waters, including all saltwater bayous, between the surfline from the western edge of the causeway between Aransas Pass and Port Aransas to the power line connecting Demit Island to Mustang Island, and the mouth of the Nueces River.

Upper Laguna Madre System. All waters, including all saltwater bayous, behind the surfline from the power line connecting Demit Island to Mustang Island to the land cut (middle ground to Rincon De San Jose), including Baffin Bay and its tributaries.

Lower Laguna Madre System. All waters behind the surfline, including all saltwater bayous, from Rincon De San Jose to the south edge of South Bay and including the Arroyo Colorado, Brazos Santiago Pass and Brownsville Ship Channel.

Gulf area off Sabine Lake. All waters located 13 nautical miles (15 statute miles) on either side of Sabine Pass from the gulf beach shoreline to 9 nautical miles (10 statute miles) offshore (includes Louisiana waters).

Gulf area off Galveston Bay. All waters located 13 nautical miles (15 statute miles) on either side of Bolivar Pass from the gulf beach shoreline to 9 nautical miles (10 statute miles) offshore.

Gulf area off Matagorda and San Antonio bays. All waters located 13 nautical miles (15 statute miles) on either side of Matagorda Ship Channel from the gulf beach shoreline to 9 nautical miles (10 statute miles) offshore.

Gulf area off Aransas and Corpus Christi bays. All waters located 13 nautical miles (15 statute miles) on either side of Aransas Pass from the gulf beach shoreline to 9 nautical miles (10 statute miles) offshore.

Gulf area off Lower Laguna Madre. All waters located 26 nautical miles (30 statute miles) north of the Texas-Mexico border from the gulf beach shoreline to 9 nautical miles (10 statute miles) offshore.

Sample Grids

Sample grids are one minute latitude by one minute longitude in size. They are sequentially numbered from west to east and north to south in each bay system and the Texas Territorial Sea. Each grid is identified by the latitude –longitude coordinates at the center. Grids to be sampled are randomly selected for each sampling gear by the Resource Program Specialist.

Sample Gridlets

Each sample grid is divided into 144 sample gridlets that are five seconds latitude by five seconds longitude in size. Gridlets are sequentially numbered from west to east and north to south such that gridlet 1 is located in the upper left corner of the grid; gridlet 12 is located in the upper right corner of the grid, and gridlet 144 is located in the lower right corner of the grid. Gridlets to be sampled are randomly selected by ecosystem staff for gill net, bag seine and oyster dredge sampling.

Sampling Gear

Gill nets, bag seines, trawls and oyster dredges are utilized to determine relative abundance, size, distribution and species composition of various life history stages of fish and invertebrates in Texas coastal waters. Gill nets are set perpendicular to the shoreline and sample subadult and adult fish. Bag seines are pulled along the shoreline and target juvenile fish and invertebrates. Trawls are used in open water and catch juvenile and subadult fish and invertebrates. Oyster dredges are pulled on oyster reefs for spat, juvenile and adult oysters. Special studies are conducted periodically as necessary and may include gears and techniques different than those employed during routine monitoring (Appendix C). Detailed descriptions of TPWD sampling gears are included in Appendix I.

Number of Samples

The number of samples collected with each gear in each sample area during each sample period and year is summarized in Tables 1 and 2.

Data Sheets

Hydrological and other data are recorded on the Meteorological and hydrological Data Sheet (Figure 1).

Catch data are recorded on the Resource Data Sheet (Figure 2).

Table 1. Number of Samples per Sample Period by Gear and Sample Area (Note: Sample period is seasonal for gill nets and monthly for other gear).

Area	Bag seine	Bay trawl (Zone 1)	Bay trawl (Zone 2)	Gulf trawl	Oyster dredge	Gill net
Sabine Lake	20	NA	10	16	10	45
Galveston Bay	20	10	10	16	30	45
Cedar Lakes	10	NA	NA	NA	NA	10
East Matagorda Bay	10	10	NA	NA	NA	20
West Matagorda Bay	20	10	10	NA	20	45
San Antonio Bay	20	10	10	16	20	45
Aransas Bay	20	10	10	NA	20	45
Corpus Christi Bay	20	10	10	16	NA	45
Upper Laguna Madre	20	NA	10	NA	NA	45
Lower Laguna Madre	20	NA	10	16	NA	45

Table 2. Number of Samples per Year, by Gear and Sample Area.

Area	Bag seine	Bay trawl	Gulf trawl	Oyster dredge	Gill net	Total
Sabine Lake	240	120	192	120	90	762
Galveston Bay	240	240	192	360	90	1,122
Cedar Lakes	120	NA	NA	NA	20	140
East Matagorda Bay	120	120	NA	NA	40	280
West Matagorda Bay	240	240	NA	240	90	810
San Antonio Bay	240	240	192	240	90	1,002
Aransas Bay	240	240	NA	240	90	810
Corpus Christi Bay	240	240	192	NA	90	762
Upper Laguna Madre	240	120	NA	NA	90	450
Lower Laguna Madre	240	120	192	NA	90	642
Coastwide	2,160	1,680	960	1,200	780	6,780

Figure 1. Meteorological and hydrological Data Sheet.

TEXAS PARKS AND WILDLIFE	
MARINE RESOURCE/HARVEST MONITORING — Meteorological and Hydrological Data	
MAJOR AREA: _____	MINOR BAY: _____ STATION: _____ Alt: _____
GEAR/STRATUM: _____	GEAR SIZE (m)/DAY TYPE: _____
COMPLETION DATE (mm-dd-yyyy): _____	COMPLETION TIME (hhmm): _____
Special Studies Code: _____	Surface Area (0.01 ha): _____
Common Gear/Stratum Codes (see operations manuals for additional codes): 1. Gill net 5. Shrimp trawl 7. Bag seine 16. Oyster dredge 82. Boat-access site	
CONDITIONS WHEN SAMPLING BEGAN:	
Start date (mm-dd-yyyy): _____	Start time (hhmm): _____
Start lighting condition: 1. Daylight 2. Night 3. Twilight	
Latitude (deg-min-sec): _____	Longitude (deg-min-sec): _____
Wind speed (mph): _____	Wind direction: 1. N 2. NE 3. E 4. SE 5. S 6. SW 7. W 8. NW
Cloud cover (%): 1. 0-9 2. 10-25 3. 26-50 4. 51-75 5. 76-90 6. 91-100	
Barometric pressure (00.01 Hg): _____	Precipitation: 1. Yes 2. No Fog: 1. Yes 2. No
Wave height (ft): 0. 0.1 1. 0.1-0.4 2. 0.4-1.2 3. 1.2-3.0 4. 3.0-5.0 5. 5.0-8.0 6. 8.0-12.0 7. 12.0-16.0	
Tide: observed: 1. Slack 2. Ebb 3. Flood published: 4. Slack 5. Ebb 6. Flood	
Shallow water depth (0.1 m): _____	Deep water depth (0.1 m): _____
Max. station water depth (0.1 m): _____	
Temperature (0.1 C): _____	Dissolved oxygen (0.1 ppm): _____ Salinity (0.1 ppt): _____
Turbidity (NTU): _____	
Bottom type (circle all types present): 1. Clay 2. Silt 3. Sand 4. Shell 5. Gravel 6. Rocks	
Personnel: _____	
Authority notified and date: _____	
Completion lighting condition: 1. Daylight 2. Night 3. Twilight	
CONDITIONS WHEN SAMPLING WAS COMPLETED (see operations manuals to determine when to complete):	
Latitude (deg-min-sec): _____	Longitude (deg-min-sec): _____
Wind speed (mph): _____	Wind direction: 1. N 2. NE 3. E 4. SE 5. S 6. SW 7. W 8. NW
Cloud cover (%): 1. 0-9 2. 10-25 3. 26-50 4. 51-75 5. 76-90 6. 91-100	
Barometric pressure (00.01 Hg): _____	Precipitation: 1. Yes 2. No Fog: 1. Yes 2. No
Wave height (ft): 0. 0.1 1. 0.1-0.4 2. 0.4-1.2 3. 1.2-3.0 4. 3.0-5.0 5. 5.0-8.0 6. 8.0-12.0 7. 12.0-16.0	
Tide: observed: 1. Slack 2. Ebb 3. Flood published: 4. Slack 5. Ebb 6. Flood	
Shallow water depth (0.1 m): _____	Deep water depth (0.1 m): _____
Max. station water depth (0.1 m): _____	
Temperature (0.1 C): _____	Dissolved oxygen (0.1 ppm): _____ Salinity (0.1 ppt): _____
Turbidity (NTU): _____	
Bottom type (circle all types present): 1. Clay 2. Silt 3. Sand 4. Shell 5. Gravel 6. Rocks	
Personnel: _____	
SAMPLE DISPOSITION: _____	
OF V3400-011 (3/02)	

Duties of Field Staff

All field staff must be thoroughly trained and closely observed in field sampling methodology, boat operation and safety before collecting field samples without supervision. Ecosystem Leaders are responsible for assuring this requirement is met.

Field staff must strive to project a professional image during field sample collection. Staff should present a neat appearance and wear approved Coastal Fisheries Division clothing and appropriate footwear.

Float plans must be posted at field station with adequate detail to locate sampling crews.

Field staff should wear approved floatation devices at all times unless 1) at anchor, 2) in the enclosed cabin of a research vessel or 3) conducting a shoreline sample.

Field staff operating outboard vessels must have the kill switch attached to their person when operating the vessel. Staff responsible for boat operation should ensure the safety and security of all staff and equipment onboard all TPWD vessels.

All equipment (vehicles, boats, trailers, sampling gear, etc.) should be fully operational, and in good repair prior to departure on any sampling trip. Each vessel shall have available the current version of the Marine Resource Operations Manual, NMFS's TED exemption letters, first aid kit, emergency signaling equipment, back-up equipment, repair supplies, sufficient supply of data sheets, pencils, appropriate sample schedule maps, GPS, organism keys, measuring boards, fish gloves and handling baskets, sun screen, fire extinguisher, flares, YSI's and other hydrologic equipment operational and calibrated.

FALSIFICATION OF DATA IS GROUNDS FOR IMMEDIATE DISMISSAL.

Data should be recorded legibly. Samples returned to lab for work-up should be labeled and placed on ice.

As much as practicable, all organisms captured in TPWD Coastal Fisheries Division sampling gear are identified, measured and released immediately after collection. Every effort should be made to expedite collection, quantification and release of organisms to minimize the impact of sampling on the resources. Shoreline areas, where samples are landed, should be disturbed as little as possible.

GILL NET

DEFINITIONS

- Sample day:** One hour before sunset (net set by sunset) to four hours after following sunrise. First gill net pick up should begin no sooner than sunrise and within the first hour after sunrise. Last gill net pick up should end within four hours after sunrise.
- Sample week:** One hour before sunset Sunday to four hours after sunrise the following Sunday.
- Sample periods:** Spring: Begins 2nd full week of April and extends for 10 consecutive weeks.
Fall: Begins 2nd full week of September and extends for 10 consecutive weeks.
- Equipment:** GPS device, grid map, gill nets, depth-measuring pole, measuring boards (long and standard lengths), hydrological sampling meter (YSI), turbidity bottles, data sheets, pencils, back-up hydrological sampling gear, appropriate knives, anchors, marking buoys, catch handling gloves and baskets, plastic bags for sample transport and special studies equipment.
- Gear Description:** Coastal Fisheries gill nets cover the water column from the bottom to as much as 1.2 m (4 ft) above the bottom, have a total length of 182.9 m (600 ft) and are constructed of four continuous 45.7 m (150 ft) long panels with stretched mesh monofilament webbing sizes of 152 mm (6 in), 127 mm (5 in), 102 mm (4 in) and 76 mm (3 in).

SAMPLE PROCEDURES

Gill nets are set perpendicular to shore at or near sunset, with the smallest mesh nearest the shore and retrieved as soon as possible following sunrise the next day. If equipment failures or other issues prevent final net retrieval within the allotted time, notify Ecosystem Leader, Regional Director and Science Director.

Any shoreline grid that is deemed not sampleable should be reported to Ecosystem Leader. Ecosystem Leader should report these grids to Science Director for removal from sample database.

Under no circumstances should samples scheduled for one sample period be collected before or after that sample period. Contact Ecosystem Leader, Regional Director and Science Director if discrepancy occurs.

GILL NET (Continued)

Do not set less than three or more than five nets each week. On no more than six nights, during the 10-week season, can three nets be set in one night.

Do not set more than one gill net in the same grid during a 10-week season.

Gill nets set on the same night must be at least 1 km apart (linear distance).

Gill net sample grids should include all grids with a minimum of 15.2 m (50 ft) of shoreline including islands and spoil.

At field station, divide each grid selected for gill net sampling into 5-second gridlets using a transparent overlay. Choose one shoreline gridlet at random. If more than one shoreline is available within selected grid, randomly select one shoreline.

In the field, locate gridlet with GPS, estimate the linear distance of shoreline within gridlet, divide estimate by 50 and pick one 15.2 m (50 ft) section of shoreline at random. If the randomly selected section cannot be sampled proceed to the nearest 15.2 m (50 ft) section that can be sampled. If no gridlets within the selected grid can be sampled, then choose an adjacent grid at random and proceed as above.

Do not alternate a gill net grid due to low tidal conditions, etc., if it can be sampled later during the season.

Shoreline can be considered the edge of emergent or packed dead vegetation if sampling near marsh. Heavily vegetated shorelines should not be excluded as sampling sites.

Review Appendix K before setting gill nets in areas considered sea turtle “hotspots” and Appendix L if bottlenose dolphins are present within the target grid. Additionally, when setting near nesting shorebirds, avoid disturbing them and stay at least 50 yards away from nests.

Set gill net perpendicular to shoreline with 76 mm (3 in) mesh nearest to shoreline. Collect GPS coordinates and water depth at shoreline. Consideration should be given to tidal conditions, location, etc., to prevent significant sections of the gill net from being left out of the water during extreme tidal conditions, etc. To alleviate this situation, it is acceptable to place shoreline anchor at water depths of up to 152 mm (6 in). See Appendix N for sets on eastern side of lower Laguna Madre.

GILL NET (Continued)

Proceed in a straight line bayward deploying net, placing a minimum of five marker buoys evenly spaced along net. The last buoy should be placed at the end of the net. Use of larger buoys, additional buoys or other marking devices should be considered in areas of high boat traffic. All marker buoys must be brightly colored and prominently marked with a TPWD insignia or sticker. Marker buoys must not pull net off bottom in deep-water areas (i.e., water depth > 1.2 m)

Gill net start time is when net is fully deployed. Completion time is when crew starts picking up the net the following morning.

Collect water depth and hydrological data at end of gill net farthest from shore following set and again the next morning before net retrieval begins. Sample should be collected from surface water 0-15.2 cm (0-6 in) and bottle labeled appropriately for transport to field station.

Organisms greater than 5 mm total length, captured in net or stranded on boat deck should be identified to the lowest phylogenetic unit (genus and species is preferred) and record lengths. Randomly select 19 individuals of each species to be measured in each separate mesh per day. If less than 19, measure all; if more than 19, count the remainder. Determine sex (1 = male, 2 = female or 0 = unknown) for dead spotted seatrout found in sample, all sharks and rays, and blue crabs over 50 mm in carapace width. Determine maturity stage (0-4, 8 and 9) for female blue crabs over 50 mm in carapace width (Appendix H). If species are present that cannot be identified, place in a labeled plastic bag on ice and transport to field station.

All efforts should be made to minimize species mortality.

Each mesh size must include a vegetation code and a density code.

All edible fish should be saved and made available to local charities, needy organizations or needy individuals. Written records/receipts shall be maintained at each field station documenting each donation and the numbers and species of each fish donated.

Determine length based on the following:

Total length

Fish – tip of snout (mouth closed) to tip of longest caudal fin ray (caudal fin compressed)

Shrimp – tip of rostrum to tip of telson

GILL NET (Continued)

Crab – lateral spine width or trident width of body if no lateral spines present

Rays and skates – maximum wing span

Squid – posterior mantle margin to top of pen

Scallops – hinge to bill

Other bivalves – widest portion of shell

Whelks and snails – longest axis of shell

Starfish and sand dollars – maximum diameter

Octopod – from between eyes to end of mantle

Turtles – maximum curved carapace length

Standard length (used only if total length cannot be measured)

Fish – tip of snout (mouth closed) to base of caudal peduncle.

Fork length (used only if total length cannot be measured)

Fish – tip of snout (mouth closed) to center of fork on caudal fin.

Count but do not measure, oysters, sea pansies, selected jellyfishes (cabbagehead [9353], hydromedusa [9249], many-ribbed [9113], moon [9318], sea nettle [9312], sea wasp [9215], etc.), hermit crabs, sea cucumbers, nudibranchs, sea squirts, and sea anemones; record total number of these organisms. If a question exists regarding whether an organism should be measured, place in a labeled plastic bag on ice and return to field station for clarification.

Do not count or measure ctenophores (sea walnut [9343], phosphorus [9319] and comb jellyfish [9287]), hydroids [9208], bryozoans (bryozoa [9051], sauerkraut bryozoa [9068], spiral bryozoa [9116]), sponges [9206], soft corals [9285], sea pens, or colonial sessile tunicates [9314]. Instead, estimate number of individuals and record a density code (Appendix G).

Do not count or measure oyster spat or encrusting organisms.

Vegetation (dead or alive) should be identified and its density estimated. Density is estimated from the percent of gear covered or filled with vegetation and recorded with the corresponding density code (Appendix F).

If no organisms are present, record as NOCATCH (1800). If no vegetation is present, record as VEGNONE (4000).

GILL NET (Continued)

All dead tarpon, snook and striped bass should be placed on ice and transported to PRBMFRS. If any of these species are captured alive, the capture should be reported to Ecosystem Leader, Regional Director and Science Director.

All exotic species should be retained, placed on ice and transported to PRBMFRS. Notify Ecosystem Leader, Regional Director and Science Director upon returning to field station.

How to Complete the Meteorological and Hydrological Data Sheet for Gill Net Samples

Do not enter leading zeros except on time (e.g. 0700), latitude and longitude (e.g. 96-28-07 or 96-02-24).

Use dashes when recording dates (e.g. 6-10-2007), latitudes and longitudes.

Use an YSI meter or equivalent for water temperature, salinity and dissolved oxygen measurements. All readings should be recorded to the nearest 0.1 unit.

Use a HACH meter or equivalent for turbidity measurements. Readings should be taken immediately upon return to field station – failure to do so may affect accuracy of readings. Record turbidities as whole numbers (e.g., 24 rather than 24.0).

Table 3. How to complete the Meteorological and Hydrological Data Sheet for Gill Net Samples.

Step	Field	Action
1	Major Area	Enter major area code for sample location (Appendix A).
2	Minor Bay	Enter minor bay code for sample location (Appendix A).
3	Station	Enter grid number for sample location.
4	Alt.	Enter 2 only if an alternate grid was sampled; otherwise leave blank.
5	Gear	Enter 1.
6	Gear size	Enter 45.7 (45.7m is the length of one panel of the net).
7	Completion date	Enter date when net is retrieved as month (1-12), day (1-31) and year (four digits), using a dash to separate each (e.g., 6-10-2007).
8	Completion time	Enter time when gill net pick up begins using 24-hour time format (e.g., 0920, not 9:20).

GILL NET (Continued)**Table 3. (Continued)**

Step	Field	Action
9	Special Studies Code	Leave blank unless that sample is for a special study.
10	Surface area	Leave blank.
11	Start date	Enter date when gill net is set as month (1-12), day (1-31), and year (four digits), using a dash to separate each (e.g., 6-10-2007).
12	Start time	Enter time when gill net is fully deployed using 24-hour time format (e.g., 1915, not 7:15).
13	Start lighting condition	Leave blank.
14	Latitude	Enter latitude at shoreline end of gill net (degrees-minutes-seconds).
15	Longitude	Enter longitude at shoreline end of gill net (degrees-minutes-seconds).
16	Wind speed	Leave blank.
17	Wind direction	Leave blank.
18	Cloud cover	Leave blank.
19	Barometric pressure	Leave blank.
20	Precipitation	Leave blank.
21	Fog	Leave blank.
22	Wave height	Leave blank.
23	Tide	Leave blank.
24	Shallow water depth	Enter water depth at shoreline end of gill net to nearest 0.1 m (Depending on shoreline type, this depth can be greater than 0.0 m).
25	Deep water depth	Enter water depth at the offshore end of gill net at gill net set. Enter depth to nearest 0.1 m.
26	Maximum station water depth	Leave blank.
27	Temperature	Enter water temperature to nearest 0.1 °C collected from the surface (0-15 cm) at the offshore end of the gill net at set. NOTE – if other than YSI is used, note in comments.
28	Dissolved oxygen	Enter dissolved oxygen to nearest 0.1 ppm collected from the surface (0-15 cm) at the offshore end of the gill net at set. NOTE – if other than YSI is used, note in comments.

GILL NET (Continued)**Table 3. (Continued)**

Step	Field	Action
29	Salinity	Enter salinity to nearest 0.1 ppt collected from the surface (0-15cm) at the offshore end of the gill net at set. NOTE – if other than YSI is used, note in comments.
30	Turbidity	Enter turbidity to nearest 1 NTU after water sample is processed. Water sample is collected from the surface (0-15 cm) at the offshore end of the gill net at set.
31	Bottom type	Leave blank.
32	Personnel	Enter first initial and last name of each person present during gill net deployment.
33	Authority notified and date	Enter authority notified and date. TPWD Law Enforcement should be given location and date of each gill net sample.
34	Completion lighting condition	Leave blank.
35	Conditions when sampling was completed	Enter measurements taken during gill net retrieval for shallow water depth, deep water depth, temperature, dissolved oxygen, salinity and turbidity. Leave other completion fields blank.
36	Personnel	Enter first initial and last name of each person present during gill net retrieval.
37	Sample disposition	Provide comment on final disposition of sample (e.g. sample returned to lab, returned to bay, etc.).

How to Complete the Resource Data Sheet for Gill Net Samples

Use leading zeroes for time only.

When recording lengths greater than 999, do not use commas.

Use only accepted scientific names specified in current TPWD Species Code manual.

Ensure that Major Area, Minor Bay, Station, Completion Date, Completion Time, Gear Code and Gear Size are identical to those on corresponding Meteorological and Hydrological Data Sheet.

GILL NET (Continued)**Table 4. How to Complete the Marine Resource Monitoring Data Sheet for Gill Net Samples.**

Step	Field	Action
1	Major area	Enter major area code for sample location (Appendix A).
2	Minor bay	Enter minor bay code for the sample location (Appendix A).
3	Station	Enter grid number for sample location.
4	Completion date	Enter date when gill net was retrieved as month (01-12), day (01-31), and year (four digits), using a dash to separate each.
5	Completion time	Enter time when gill net pick up begins using 24-hour time format (e.g., 0920, not 9:20).
6	Gear code	Enter 1.
7	Gear size	Enter 45.7 (45.7 m is the length of one panel of the net).
8	Mesh size	Enter 76,102, 127, or 152.
9	Dgms	Leave blank.
10	Subsample	Leave blank.
11	User Def. Field	Leave blank.
12	Page	Enter page number. All pages must be numbered in sequence.
13	Total pages	Enter total number of pages in sample.
14	Special studies code	Leave blank.
15	Species name	Enter genus (first letter) and species (not common name) of each species captured.
16	Species code	Enter code of each species captured. Note: For each mesh size panel enter 1800 if no catch and 4000 if no vegetation present.
17	Number	Enter 1 on each line with a length, weight, sex, or maturity stage entry. Use a separate line to indicate remainder of each species not measured. Enter density code for vegetation (Appendix F).
18	Length	Enter length to nearest mm of up to 19 randomly selected individuals of each species per mesh per day. Total length is preferred. T = total length, S = standard length, F = fork length.
19	Weight	Leave blank.
20	Sex	Enter sex for sharks, rays, diamond-backed terrapins, blue crab > 50 mm, and <u>dead</u> spotted seatrout: 1 = male, 2 = female, 0 = unknown.

GILL NET (Continued)**Table 4. (Continued)**

Step	Field	Action
21	MS	Enter maturity stage for female blue crab > 50 mm only (Appendix H).
22	Tag number	If a tagged fish is caught and released (or new tag) enter R in small box and then tag number. If a tagged fish is caught and kept enter C and then tag number. Codes L, A, B or D are no longer in use.
23	User-defined field a	For all sea turtles enter 1 if released alive and 2 if dead. Leave blank for all other species.
24	User-defined fields b-n	Leave blank.
25	Comments	Enter any pertinent comments on the same line.

BAG SEINE

DEFINITIONS

Sample day: 1/2 hour before sunrise to 1/2 hour after sunset.

Sample week: 1/2 hour before sunrise Monday to 1/2 hour after sunset the following Sunday.

Sample periods: Each monthly bag seine sample allotment is divided in half with the first complement collected during the 1st through 15th of the month and the remainder collected during the 16th through the end of the month.

Equipment: GPS device, grid map, bag seine, measuring board or box, hydrological sampling meter (YSI), turbidity bottles, data sheets, pencils, back-up hydrological sampling gear, pre-measured rope for measuring shoreline distance, limit line used between seine poles, plastic bags for sample transport, special studies equipment and bucket to handle catch.

Gear Description: Coastal Fisheries bag seines are 18.3 m (60 ft) long and 1.8 m (6 ft) deep with 19 mm (0.75 in) stretched nylon mesh in wings and 13 mm (0.5 in) stretched nylon mesh in the bag. Each wing is 8.3 m (27 ft) long with a 1.8 m (6 ft) bag. A 12.2 m (40 ft) limit line is strung between the two poles to maintain a standardized width during sampling. Additionally, a 15.2 m (50 ft) rope is used to measure linear distance of each seine haul along the shoreline.

SAMPLE PROCEDURES

Bag seine samples grids should include all grids with a minimum of 15.2 m (50 ft) of shoreline.

Do not collect a bag seine sample in a grid within two weeks after the grid has been stocked with hatchery fish.

At field station, divide each grid selected for shoreline sampling into 5-second gridlets using a transparent overlay or other method approved by Science Director. Choose one shoreline gridlet at random. If more than one shoreline is available within selected gridlet, randomly select one shoreline.

In the field, locate gridlet with GPS, then estimate the linear distance of shoreline within gridlet, divide estimate by 50 and pick one 15.2 m (50 ft) section of shoreline at random. If the randomly selected site cannot be sampled proceed to the nearest 15.2 m (50 ft) section that can be

BAG SEINE (Continued)

sampled. If no gridlets within the selected grid can be sampled, then choose an adjacent grid at random and proceed as above.

For the purpose of pulling a bag seine, the shoreline is considered to be the edge of emergent or packed dead vegetation if vegetation extends out from shoreline. Heavily vegetated shorelines should not be excluded as sampling sites.

When pulling a bag seine near nesting shorebirds, avoid disturbing them and stay at least 50 yards away from nests.

Any shoreline grid that is deemed not sampleable should be reported to the Ecosystem Leader. Ecosystem Leaders should report these sites to Science Director for removal from the sample frame.

Under no circumstances should samples scheduled for one month be collected during another month. Contact Ecosystem Leader, Regional Director and Science Director if discrepancy occurs.

Do not bag seine in same grid more than once per month.

Collect hydrological data approximately 3.1 m (10 ft) from shore. Sample should be collected from surface water (0-15 cm). To prevent catch bias, hydrological samples should be collected immediately adjacent to area intended for seining and away from prop wash.

Record GPS coordinates on shoreline where seining begins. Lay pre-measured 15.2 m (50 ft) rope along shoreline to delineate seine distance. Attach the 12.2 m (40 ft) limit line to each pole.

Seine is deployed utilizing two people; one person remains on shore while the other pulls the seine bayward and perpendicular to shoreline to full extent of limit line making sure bag portion of seine is properly deployed. Both people proceed parallel to shoreline. The person on shore should allow for a 3 m (10 ft) lag behind the offshore person.

Bag seine start time is when net is fully deployed and pull begins. End time is when net is completely onshore.

Shallow water and deep water depths should be noted when seine is fully deployed.

BAG SEINE (Continued)

Upon reaching the 15.2 m (50 ft) distance, the person on shore remains stationary allowing the offshore person to proceed to shoreline maintaining the full extent of limit line while approaching shoreline.

Both people pull seine onto shoreline. Ensure that leadline remains on bay bottom while retrieving net.

Organisms greater than 5 mm total length, captured in seine or stranded on shore, should be identified to the lowest phylogenetic unit (genus and species is preferred). Randomly select 19 individuals of each species to be measured. If less than 19, measure all; if more than 19, count the remainder. Determine sex (1 = male, 2 = female or 0 = unknown) for blue crabs over 50 mm in carapace width. Determine maturity stage (0-4, 8 and 9) for female blue crabs over 50 mm in carapace width. If species are present that cannot be identified, place in a labeled plastic bag on ice and transport to field station.

Measure length based on the following:

Total length

Fish – tip of snout (mouth closed) to tip of longest caudal fin ray (caudal fin compressed)

Shrimp – tip of rostrum to tip of telson

Crab – lateral spine width or trident width of body if no lateral spines present

Rays and skates – maximum wing span

Squid – posterior mantle margin to top of pen

Scallops – hinge to bill

Other bivalves – widest portion of shell

Whelks and snails – longest axis of shell

Starfish and sand dollars – maximum diameter

Octopod – from between eyes to end of mantle

Turtles – maximum curved carapace length

Standard length (used only if total length cannot be measured)

Fish – tip of snout (mouth closed) to base of caudal peduncle

Fork length (used only if total length cannot be measured)

Fish – tip of snout (mouth closed) to center of fork on caudal fin

BAG SEINE (Continued)

Count but do not measure, oysters, sea pansies, selected jellyfishes (cabbagehead [9353], hydromedusa [9249], many-ribbed [9113], moon [9318], sea nettle [9312], sea wasp [9215], etc.), hermit crabs, sea cucumbers, nudibranchs, sea squirts, and sea anemones; record total number of these organisms. If a question exists regarding whether an organism should be measured, place in a labeled plastic bag on ice and return to field station for clarification.

Do not count or measure ctenophores (sea walnut [9343], phosphorus [9319] and comb jellyfish [9287]), hydroids [9208], bryozoans (bryozoa [9051], sauerkraut bryozoa [9068], spiral bryozoa [9116]), sponges [9206], soft corals [9285], sea pens, or colonial sessile tunicates [9314]. Instead, estimate number of individuals and record a density code (Appendix G).

Do not count or measure oyster spat or encrusting organisms.

Vegetation (dead or alive) should be identified and density estimated. Density is estimated from the percent of gear covered or filled with vegetation and recorded with the corresponding density code (Appendix F).

If no organisms are present, record as NOCATCH (1800). If no vegetation is present, record as VEGNONE (4000).

All dead tarpon, snook and striped bass should be placed on ice and transported to PRBMFRS. If any of these species are captured alive, the capture should be reported to Ecosystem Leader, Regional Director and Science Director.

All exotic species should be retained, placed on ice and transported to PRBMFRS. Notify Ecosystem Leader, Regional Director and Science Director upon returning to field station.

How to Complete the Meteorological and Hydrological Data Sheet for Bag Seine Samples

Do not enter leading zeros except on time (e.g. 0700), latitude and longitude (e.g. 96-28-07 or 96-02-24).

Use dashes when recording dates (e.g. 6-10-2007), latitudes and longitudes.

Use an YSI meter or equivalent for water temperature, salinity and dissolved oxygen measurements. All readings should be recorded to the

BAG SEINE (Continued)

nearest 0.1 unit when YSI meter used. If YSI meter not used, note on data sheet.

Use a HACH meter or equivalent for turbidity measurements. Readings should be taken immediately upon return to field station – failure to do so may affect accuracy of readings. Record turbidities as whole numbers (e.g. 24 rather than 24.0).

Table 5. How to Complete the Meteorological and Hydrological Data Sheet for Bag Seine Samples.

Step	Field	Action
1	Major Area	Enter major area code for sample location (Appendix A)
2	Minor Bay	Enter minor bay code for sample location (Appendix A)
3	Station	Enter grid number for sample location.
4	Alt.	Enter 2 only if an alternate grid was sampled; otherwise leave blank.
5	Gear code	Enter 7.
6	Gear size	Enter 18.3 (18.3 m is the length of the seine).
7	Completion date	Enter date of bag seine sample as month (1-12), day (1-31) and year (four digits), using a dash to separate each (e.g., 6-10-2007)
8	Completion time	Enter time when entire seine is on shore using 24-hour time format (e.g., 1320, not 1:20).
9	Special Studies Code	Leave blank.
10	Surface area	Enter 0.03 (0.03 hectares is the area swept by a standardized bag seine sample).
11	Start date	Enter date of bag seine sample as month (1-12), day (1-31), and year (four digits), using a dash to separate each (e.g., 6-10-2007).
12	Start time	Enter time when seine is fully extended using 24-hour time format (e.g., 1320, not 1:20).
13	Start lighting condition	Leave blank.
14	Latitude	Enter latitude where bag seine sample began. (degrees-minutes-seconds)
15	Longitude	Enter longitude where bag seine sample began (degrees-minutes-seconds).
16	Wind speed	Leave blank.
17	Wind direction	Leave blank.

BAG SEINE (Continued)**Table 5. (Continued)**

Step	Field	Action
18	Cloud cover	Leave blank.
19	Barometric pressure	Leave blank.
20	Precipitation	Leave blank.
21	Fog	Leave blank.
22	Wave height	Leave blank.
23	Tide	Leave blank.
24	Shallow water depth	Enter water depth at shoreline end of bag seine to nearest 0.1 m.
25	Deep water depth	Enter water depth at offshore end of bag seine at full deployment (deepest depth encountered) to nearest 0.1m.
26	Maximum station water depth	Leave blank.
27	Temperature	Enter water temperature to nearest 0.1 °C collected from surface (0-15 cm) approximately 3.1 m from shoreline.
28	Dissolved oxygen	Enter dissolved oxygen to nearest 0.1 ppm collected from surface (0-15 cm) approximately 3.1 m from shoreline.
29	Salinity	Enter salinity to nearest 0.1 ppt collected from surface (0-15 cm) approximately 3.1 m from shoreline.
30	Turbidity	Enter turbidity to nearest 1 NTU.
31	Bottom type	Leave blank.
32	Personnel	Enter first initial and last name of each person present.
33	Authority notified and date	Enter authority notified and date if required.
34	Completion lighting condition	Leave blank.
35	Conditions when sampling was completed	Leave all completion conditions blank for bag seine samples.
36	Sample disposition	Provide comment on final disposition of sample – e.g. sample returned to lab, returned to bay, etc.

BAG SEINE (Continued)**How to Complete the Resource Data Sheet for Bag Seine Samples**

Use leading zeroes for time only.

When recording lengths greater than 999, do not use commas.

Use only accepted scientific names specified in current TPWD species code lists.

Ensure that Major Area, Minor Bay, Station, Completion Date, Completion Time, Gear Code and Gear Size are identical to those on corresponding Meteorological and Hydrological Data Sheet.

Table 6. How to Complete the Resource Data Sheet for Bag Seine Samples.

Step	Field	Action
1	Major area	Enter major area code for sample location (Appendix A).
2	Minor bay	Enter minor bay code for sample location (Appendix A).
3	Station	Enter grid number for sample location.
4	Completion date	Enter date of bag seine sample as month (1-12), day (1-31) and year (four digits), using a dash to separate each.
5	Completion time	Enter time when entire seine is on shore using 24-hour time format (e.g., 1320, not 1:20).
6	Gear code	Enter 7.
7	Gear size	Enter 18.3 (18.3m is the total length of the seine).
8	Mesh size	Enter 13.
9	Dgms	Enter 2 (Appendix D).
10	Subsample	Leave blank.
11	User Def. Field	Leave blank.
12	Page	Enter page number. All pages must be numbered in sequence.
13	Total pages	Enter total number of pages in sample.
14	Special studies code	Leave blank.
15	Species name	Enter genus (first letter) and species (not common name) of each species captured.
16	Species code	Enter code of each species captured. Note: Enter 1800 if no catch and 4000 if no vegetation present in sample.

BAG SEINE (Continued)**Table 6. (Continued)**

Step	Field	Action
17	Number	Enter 1 on each line with a length, weight, sex, or maturity stage entry. Use a separate line to indicate remainder of each species not measured. Enter a density code for vegetation (Appendix F) and colonial invertebrates (Appendix G).
18	Length	Enter lengths to nearest mm of up to 19 randomly selected individuals of each species. Total lengths preferred. Enter length type in small box to left of length (T = total length, S = standard length or F = fork length).
19	Weight	Leave blank. Whole weight to nearest 1 g may be entered under G (with D left blank) for uncommon or exotic species.
20	Sex	Enter sex for blue crab > 50 mm and diamond-backed terrapins: 1 = male, 2 = female, 0 = unknown.
21	MS	Enter maturity stage for female blue crab > 50 mm (Appendix H).
22	Tag number	If a tagged fish is caught and released (or new tag) enter R in small box and then tag number. If a tagged fish is caught and kept enter C and then tag number. Codes L, A, B or D are no longer in use.
23	User-defined field a	For all sea turtles enter 1 if released alive and 2 if dead. Leave blank for other species.
24	User-defined fields b-n	Leave blank.
25	Comments	Enter any pertinent comments on the same line.

BAY TRAWL**DEFINITIONS**

Sample day: 1/2 hour before sunrise to 1/2 hour after sunset.

Sample week: 1/2 hour before sunrise Monday to 1/2 hour after sunset the following Sunday.

Sample periods: Each monthly bay trawl sample allotment is divided in half with the first complement collected during the 1st through 15th of the month and the remainder collected during the 16th through the end of the month. This is to ensure temporal distribution of the samples.

Equipment: Trawl (with tail float attached), bridle, water sampler, GPS device, grid map, hydrological sampling meter (YSI), turbidity bottles, data sheets, pencils, back-up hydrological sampling gear, plastic bags for sample transport, special studies equipment, measuring board or box and bucket or basket to handle catch.

Gear Description: Coastal Fisheries trawls are 6.1 m (20 ft) wide otter trawls with 38 mm (1.5 in) stretched nylon multifilament mesh throughout. Trawl doors are 1.2 m (48 in) long and 0.5 m (20 in) wide, and constructed of 13 mm (0.5 in) plywood with angle iron framework and iron runners.

SAMPLE PROCEDURES:

A bay trawl sample grid is sampleable if 1/3 of grid is ≥ 1 m in depth at mean low tide and free of obstructions that may damage gear.

The larger bay systems (Galveston, West Matagorda, San Antonio, Aransas and Corpus Christi) are stratified into equal-sized upper and lower bay zones with half of monthly trawl samples collected in the upper zone and half in the lower zone. This is to ensure good spatial distribution of samples in the larger bay systems. Smaller bays (Sabine Lake, East Matagorda, upper Laguna Madre and lower Laguna Madre) are not stratified.

Under no circumstances should samples scheduled for one month be collected during another month. Contact Ecosystem Leader, Regional Director and Science Director if discrepancy occurs.

Do not trawl in same grid more than once per month.

Do not pull trawl in marked navigation channels.

BAY TRAWL (Continued)

In the field, locate center of selected trawl grid using GPS. If portion of grid is not sampleable, locate center of sampleable area instead. If selected grid is not sampleable, randomly choose an adjacent grid to collect sample.

Collect water sample and hydrological data 0.3 m (12 in) off bottom before trawling begins.

Deploy trawl using the prescribed amount of bridle and towline for water depth at site and secure towline. On R/V, lower block from A-frame as trawl is deployed. In depths less than 6.1 m (20 ft), deploy 30.5 m (100 ft) of bridle to a position just aft of stern. In depths greater than 6.1 m (20 ft), use a 5:1 cable length to water depth ratio (cable length includes bridle length) (e.g., if water depth is 7.6 m (25 ft), then deploy 38.1 m (125 ft) of cable. Cable should be visibly marked to aid in dispensing correct amount of cable.

Trawl time begins when all slack is removed from bridle and winch (if used) has been “locked down”.

Record GPS coordinates when trawling begins. Tow trawl at 3 mph for 10 minutes in a circular manner. After 5 minutes of trawl time have elapsed, again record GPS coordinates.

Organisms greater than 5 mm total length captured in trawl or stranded on boat deck, should be identified to the lowest phylogenetic unit (genus and species is preferred). Randomly select 19 individuals of each species to be measured. If less than 19, measure all; if more than 19, count the remainder. Measure 50 randomly selected shrimp of each commercial species (brown, white and pink); count the remainder. Measure and determine sex (1 = male, 2 = female or 0 = unknown) for 35 randomly selected blue crabs; count the remainder and determine maturity stage (0-4, 8 or 9) for measured females (Appendix H). If species are present that cannot be identified, place in a labeled bag on ice and transport to field station.

Measure length based on the following:

Total length

Fish – tip of snout (mouth closed) to tip of longest caudal fin ray (caudal fin compressed)

Shrimp – tip of rostrum to tip of telson

Crab – lateral spine width or trident width of body if no lateral spines present

BAY TRAWL (Continued)

Rays and skates – maximum wing span
 Squid – posterior mantle margin to top of pen
 Scallops – hinge to bill
 Other bivalves – widest portion of shell
 Whelks and snails – longest axis of shell
 Starfish and sand dollars – maximum diameter
 Octopod – from between eyes to end of mantle
 Turtles – maximum curved carapace length

Standard length (used only if total length cannot be measured)

Fish – tip of snout (mouth closed) to base of caudal peduncle

Fork length (used only if total length cannot be measured)

Fish – tip of snout (mouth closed) to center of fork on caudal fin

Count but do not measure, oysters, sea pansies, selected jellyfishes (cabbagehead [9353], hydromedusa [9249], many-ribbed [9113], moon [9318], sea nettle [9312], sea wasp [9215], etc.), hermit crabs, sea cucumbers, nudibranchs, sea squirts, and sea anemones; record total number of these organisms. If a question exists regarding whether an organism should be measured, place in a labeled plastic bag on ice and return to field station for clarification.

Do not count or measure ctenophores (sea walnut [9343], phosphorus [9319] and comb jellyfish [9287]), hydroids [9208], bryozoans (bryozoa [9051], sauerkraut bryozoa [9068], spiral bryozoa [9116]), sponges [9206], soft corals [9285] sea pens, or colonial sessile tunicates [9314]. Instead, estimate number of individuals and record a density code (Appendix G).

Do not count or measure oyster spat or encrusting organisms.

Vegetation (dead or alive) should be identified and its density estimated. Density is estimated from the percent of gear covered or filled with vegetation and recorded with the corresponding density code (Appendix F).

If no organisms are present, record as NOCATCH (1800). If no vegetation is present, record as VEGNONE (4000).

All dead tarpon, snook and striped bass should be placed on ice and transported to PRBMFRS. If any of these species are captured alive, the

BAY TRAWL (Continued)

capture should be reported to Ecosystem Leader, Regional Director and Science Director.

All exotic species should be retained, placed on ice and transported to PRBMFRS. Notify Ecosystem Leader, Regional Director and Science Director upon returning to field station.

How to Complete the Meteorological and Hydrological Data Sheet for Bay Trawl Samples

Do not enter leading zeros except on time (e.g. 0700) or latitude – longitude (e.g. 96-28-07 or 96-02-24).

Use dashes when recording dates (e.g. 6-10-2007)

Use an YSI meter or equivalent for water temperature, salinity and dissolved oxygen measurements. All readings should be recorded to the nearest 0.1 unit when YSI meter used. If YSI meter not used, note on data sheet.

Use a Kemmerer water sampler or equivalent to collect turbidity sample. Use a HACH meter or equivalent for turbidity measurements. Readings should be taken immediately upon return to field station – failure to do so may affect accuracy of readings. Record turbidities as whole numbers (e.g. 24 rather than 24.0).

Table 7. How to Complete the Meteorological and Hydrological Data Sheet for Bay Trawl Samples.

Step	Field	Action
1	Major Area	Enter major area code for sample location (Appendix A).
2	Minor Bay	Enter minor bay code for sample location (Appendix A).
3	Station	Enter grid number for sample location.
4	Alt.	Enter 2 only if an alternate grid was sampled. Otherwise leave blank.
5	Gear type	Enter 5.
6	Gear size	Enter 6.1 (6.1m is the door-to-door width of the trawl opening).
7	Completion date	Enter date of bay trawl sample as month (1-12), day (1-31), and year (four digits), using a dash to separate each (e.g., 6-10-2007).
8	Completion time	Enter time when sample is complete using 24-hour time format (e.g., 1320, not 1:20).

BAY TRAWL (Continued)
Table 7. (Continued)

Step	Field	Action
9	Special Studies Code	Leave blank unless that sample is for a special study.
10	Surface area	Leave blank for bay trawls.
11	Start date	Enter starting date of sampling as month (1-12), day (1-31), and year (four digit), using a dash to separate each (e.g., 6-10-2007).
12	Start time	Enter time when bridle is fully extended and the winch is locked down, using 24-hour time format (e.g., 0915, not 9:15).
13	Start lighting condition	Leave blank.
14	Latitude	Enter latitude where trawl sample began (degrees-minutes-seconds).
15	Longitude	Enter longitude where trawl sample began (degrees-minutes-seconds).
16	Wind speed	Leave blank.
17	Wind direction	Leave blank.
18	Cloud cover	Leave blank.
19	Barometric pressure	Leave blank.
20	Precipitation	Leave blank.
21	Fog	Leave blank.
22	Wave height	Leave blank.
23	Tide	Leave blank.
24	Shallow water depth	Enter shallowest water depth encountered. Enter depth to nearest 0.1 m.
25	Deep water depth	Enter deepest water depth encountered. Enter depth to nearest 0.1m.
26	Maximum station water depth	Leave blank.
27	Temperature	Using YSI or other approved equipment, enter water temperature (nearest 0.1 °C) collected 0.3m off the bottom.
28	Dissolved oxygen	Enter dissolved oxygen to nearest 0.1 ppm collected 0.3m off the bottom.
29	Salinity	Enter salinity to nearest 0.1 ppt collected 0.3 m off the bottom.
30	Turbidity	Enter turbidity to nearest 1 NTU.
31	Bottom type	Leave blank.
32	Personnel	Enter first initial and last names of all individuals present.

BAY TRAWL (Continued)
Table 7. (Continued)

Step	Field	Action
33	Authority notified and date	Enter authority (U.S. Coast Guard, TPWD Law Enforcement, etc.) and date when trawling during closed seasons.
34	Completion lighting condition	Leave blank.
35	Conditions when sampling was completed	Except for latitude and longitude, leave all other completion conditions blank for bay trawl samples.
36	Latitude	Enter latitude using GPS (degrees minutes seconds) midway through the trawl sample (i.e., 5 minutes after start time).
37	Longitude	Enter longitude using GPS (degrees minutes seconds) midway through the trawl sample (i.e., 5 minutes after start time).
38	Sample disposition	Provide comment on final disposition of sample – e.g. sample returned to lab, returned to bay, etc.

How to Complete the Resource Data Sheet for Bay Trawl Samples

Use leading zeroes for time only.

When recording lengths greater than 999, do not use commas.

Use only accepted scientific names specified in current TPWD species code lists.

Ensure that Major Area, Minor Bay, Station, Completion Date, Completion Time, Gear Code and Gear Size are identical to those on corresponding Meteorological and Hydrological Data Sheet.

Table 8. How to Complete the Resource Data Sheet for Bay Trawl Samples.

Step	Field	Action
1	Major area	Enter major area code for sample location (Appendix A).
2	Minor bay	Enter minor bay code for sample location (Appendix A).
3	Station	Enter grid number for sample location.

BAY TRAWL (Continued)
Table 8. (Continued)

Step	Field	Action
4	Completion date	Enter date of bay trawl sample collection as month (1-12), day (1-31), and year (four digits), using a dash to separate each.
5	Completion time	Enter time 10 minutes after lockdown using 24-hour time format (e.g., 1320, not 1:20).
6	Gear code	Enter 5.
7	Gear size	Enter 6.1 (6.1m is the door-to-door width of the trawl opening).
8	Mesh size	Enter 38.
9	Dgms	Enter 3 (Appendix D).
10	Subsample	Leave blank.
11	User Def. Field	Enter 1 for bay trawl zone 1 or 2 for bay trawl zone 2 (Appendix E).
12	Page	Enter page number. All pages must be numbered in sequence.
13	Total pages	Enter total number of pages in sample.
14	Special studies code	Leave blank.
15	Species name	Enter genus (first letter) and species (not common name) of each species captured.
16	Species code	Enter code of each species captured. Note: Enter 1800 if no catch and 4000 if no vegetation present in sample.
17	Number	Enter 1 on each line with a length, weight, sex, or maturity stage entry. Use a separate line to indicate the remainder of each species not measured. Enter a density code for vegetation (Appendix F) and colonial or gelatinous invertebrates (Appendix G).
18	Length	Enter lengths to nearest mm of up to 19 randomly selected individuals of each species, except measure 50 shrimp of each commercial species (brown, white and pink) and 35 blue crabs. Total lengths are preferred. Enter length type in small box to left of length (T = total length, S = standard length or F = fork length).
19	Weight	Leave blank. Whole weights to nearest 1 g may be entered under G (with D left blank) for uncommon or exotic species.

BAY TRAWL (Continued)
Table 8. (Continued)

Step	Field	Action
20	Sex	Enter sex for blue crab > 50 mm and diamond-backed terrapins: 1 = male, 2 = female, 0 = unknown.
21	MS	Enter maturity stage for female blue crab > 50 mm (Appendix H).
22	Tag number	If a tagged fish is caught and released (or new tag) enter R in small box and then tag number. If a tagged fish is caught and kept enter C and then tag number. Codes L, A, B or D are no longer in use.
23	User-defined field a	For all sea turtles enter 1 if released alive and 2 if dead. Leave blank for other species.
24	User-defined fields b-n	Leave blank.
25	Comments	Enter any pertinent comments on the same line.

GULF TRAWL

DEFINITIONS

Sample day: 1/2 hour before sunrise to 1/2 hour after sunset.

Sample week: 1/2 hour before sunrise Monday to 1/2 hour after sunset the following Sunday.

Sample periods: Each monthly gulf trawl sample allotment is divided in half with the first complement collected during the 1st through 15th of the month and the remainder collected during the 16th through the end of the month.

Equipment: Trawl (with tail float attached), bridle, water sampler, GPS device, grid map, hydrological sampling meter (YSI), turbidity bottles, data sheets, pencils, back-up hydrological sampling gear, plastic bags for sample transport, special studies equipment, measuring board and bucket or basket to handle catch.

Gear Description: Coastal Fisheries trawls are 6.1 m (20 ft) wide otter trawls with 38 mm (1.5 in) stretched nylon multifilament mesh throughout. Trawl doors are 1.2 m (48 in) long and 0.5 m (20 in) wide; and constructed of 13 mm (0.5 in) plywood with angle iron framework and iron runners.

SAMPLE PROCEDURES:

Monthly gulf trawl samples are randomly selected from available TPWD Coastal Fisheries Gulf of Mexico sample grids within 13 nautical miles (15 statute miles) on both sides of a major pass and within the Texas Territorial Sea. Exception: Due to the proximity of the Mexican border the area sampled around Brazos Santiago Pass extends from about 8 statute miles south of the pass to about 22 statute miles north of the pass.

Under no circumstances should samples scheduled for one month be collected during another month. Contact Ecosystem Leader, Regional Director and Science Director if discrepancy occurs.

Do not trawl in same grid more than once per month.

Do not pull trawl in marked navigation channels.

Gulf trawl sample grids must meet the following criteria: 1/3 of grid is 1) within territorial sea, 2) ≥ 1.8 m (1 fathom) in depth and 3) free of obstructions that may damage gear or compromise safety.

GULF TRAWL (Continued)

If weather and/or sea conditions present safety concerns prior to or during a gulf trawl sampling trip, follow these guidelines:

- 1) If on the selected sample day, conditions allow collection of only a portion of sample allotment or preclude sampling altogether, staff should reschedule, rather than alternate sample sites, if time remains during the sampling period.
- 2) If conditions and scheduling preclude rescheduling and only a few samples need to be collected in alternate grids, alternate grids should be selected from the same depth profile as original grids. Alternate shallow water stations should not be exclusively collected near Gulf passes or jetties.
- 3) If all attempts to collect Gulf samples utilizing prescribed methodology fail, contact Ecosystem Leader, Regional Director and Science Director to discuss practicality and utility of alternating all grids versus canceling gulf sampling for the period.

In the field, locate center of selected trawl grid using GPS. If portion of grid is not sampleable, locate center of sampleable area instead. If selected grid is not sampleable, choose an adjacent grid to collect sample.

Collect water sample and hydrological data 0.3 m (12 in) off bottom before trawling begins.

Deploy trawl using the prescribed amount of bridle and towline for water depth at site and secure towline. Lower block from A-frame as trawl is deployed. In depths less than 6.1m deploy 30.5m of bridle to a position just aft of stern. In depths greater than 6.1 m (20 ft) use a 5:1 cable length to water depth ratio (cable length includes bridle length). Cable should be visibly marked to aid in dispensing correct amount of cable.

Trawl time begins when all slack is removed from bridle and winch has been “locked down”.

Record GPS coordinate at beginning of tow. Tow trawl at 3 mph for 10 minutes parallel to fathom curve. Randomly select direction of first trawl tow and alternate direction of subsequent trawl tows. When trawl sample is complete, again record GPS coordinates.

Organisms greater than 5 mm total length, captured in trawl or stranded on boat deck, should be identified to the lowest possible phylogenetic unit (genus and species preferred). Randomly select 19 individuals of each species to be measured. If less than 19, measure all; if more

GULF TRAWL (Continued)

than 19, count the remainder. Measure 50 randomly selected shrimp of each commercial species (brown, white and pink). Determine sex (1 = male and 2 = female) and female maturity stage (0 – 9) for 50 white shrimp. Measure and determine sex (1 = male, 2 = female and 0 = unknown or sacculinid infested) for 35 randomly selected blue crabs; count remainder and determine maturity stage (0 – 4, 8 and 9) for measured females (Appendix H). If species are present that cannot be identified, place in a labeled plastic bag on ice and transport to field station.

Determine length based on the following:

Total length

Fish – tip of snout (mouth closed) to tip of longest caudal fin ray (caudal fin compressed)

Shrimp – tip of rostrum to tip of telson

Crab – lateral spine width or trident width of body if no lateral spines present

Rays and skates – maximum wing span

Squid – posterior mantle margin to top of pen

Scallops – hinge to bill

Other bivalves – widest portion of shell

Whelks and snails – longest axis of shell

Starfish and sand dollars – maximum diameter

Octopod – from between eyes to end of mantle

Turtles – maximum curved carapace length

Standard length (used only if total length cannot be measured)

Fish – tip of snout (mouth closed) to base of caudal peduncle

Fork length (used only if total length cannot be measured)

Fish – tip of snout (mouth closed) to center of fork on caudal fin

Count but do not measure, oysters, sea pansies, selected jellyfishes (cabbagehead [9353], hydromedusa [9249], many-ribbed [9113], moon [9318], sea nettle [9312], sea wasp [9215], etc.), hermit crabs, sea cucumbers, nudibranchs, sea squirts, and sea anemones; record total number of these organisms. If a question exists regarding whether an organism should be measured, place in a labeled plastic bag on ice and return to field station for clarification.

GULF TRAWL (Continued)

Do not count or measure ctenophores (sea walnut [9343], phosphorus [9319] and comb jellyfish [9287]), hydroids [9208], bryozoans (bryozoa [9051], sauerkraut bryozoa [9068], spiral bryozoa [9116]), sponges [9206], soft corals [9285] sea pens, or colonial sessile tunicates [9314]. Instead, estimate number of individuals and record a density code (Appendix G).

Do not count or measure oyster spat or encrusting organisms.

Vegetation (dead or alive) should be identified and its density estimated. Density is estimated from the percent of gear covered or filled with vegetation and recorded with the corresponding density code (Appendix F).

If no organisms are present, record as NOCATCH (1800). If no vegetation is present, record as VEGNONE (4000).

All dead tarpon, snook and striped bass should be placed on ice and transported to PRBMFRS. If any of these species are captured alive, the capture should be reported to Ecosystem Leader, Regional Director and Science Director.

All exotic species should be retained if captured. Notify Ecosystem Leader, Regional Director and Science Director upon returning to field station.

How to Complete the Meteorological and Hydrological Data Sheet for Gulf Trawl Samples

Do not enter leading zeros except on time (e.g. 0700), latitude and longitude (e.g. 96-28-07 or 96-02-24).

Use dashes when recording dates (e.g. 6-10-2007), latitudes and longitudes.

Use a YSI meter or equivalent for water temperature, salinity and dissolved oxygen measurements. All readings should be recorded to the nearest 0.1 unit when YSI meter used. If YSI meter not used, note on data sheet.

Use a Kemmerer water sampler or equivalent to collect turbidity sample. Use a HACH meter or equivalent for turbidity measurement. Readings should be taken immediately upon return to field station – failure to do so may affect accuracy of readings. Record turbidities as whole numbers (e.g. 24 rather than 24.0).

GULF TRAWL (Continued)**Table 9. How to Complete the Meteorological and Hydrological Data Sheet for Gulf Trawl Samples.**

Step	Field	Action
1	Major Area	Enter major area code for sample location (Appendix A).
2	Minor Bay	Enter minor bay code for sample location (Appendix A).
3	Station	Enter grid number for sample location.
4	Alt.	Enter 2 only if an alternate grid was sampled. Otherwise leave blank.
5	Gear	Enter 5.
6	Gear size	Enter 6.1 (6.1m is the door-to-door width of the trawl opening).
7	Completion date	Enter date of gulf trawl sample as month (1-12), day (1-31), and year (four digits), using a dash to separate each (e.g., 6-10-2007).
8	Completion time	Enter time 10 minutes after lockdown using 24-hour time format (e.g., 1320, not 1:20).
9	Special Studies Code	Leave blank.
10	Surface area	Leave blank.
11	Start date	Enter date of gulf trawl sample as month (1-12), day (1-31), and year (four digits), using a dash to separate each (e.g., 6-10-2007).
12	Start time	Enter time when bridle is fully extended and winch is locked down using 24-hour time format (e.g., 0915, not 9:15).
13	Start lighting condition	Leave blank.
14	Latitude	Enter latitude where trawl sample began (degrees-minutes-seconds).
15	Longitude	Enter longitude where trawl sample began (degrees-minutes-seconds).
16	Wind speed	Leave blank.
17	Wind direction	Leave blank.
18	Cloud cover	Leave blank.
19	Barometric pressure	Leave blank.
20	Precipitation	Leave blank.
21	Fog	Leave blank.

GULF TRAWL (Continued)**Table 9. (Continued)**

Step	Field	Action
22	Wave height	Leave blank.
23	Tide	Leave blank.
24	Shallow water depth	Enter shallowest water depth encountered to nearest 0.1 m.
25	Deep water depth	Enter deepest water depth encountered to nearest 0.1 m.
26	Maximum station water depth	Leave blank.
27	Temperature	Enter water temperature to nearest 0.1 °C collected 0.3 m off the bottom.
28	Dissolved oxygen	Enter dissolved oxygen to nearest 0.1 ppm collected 0.3 m off the bottom.
29	Salinity	Enter salinity to nearest 0.1 ppt collected 0.3 m off the bottom.
30	Turbidity	Enter turbidity to nearest 1 NTU.
31	Bottom type	Leave blank.
32	Personnel	Enter first initial and last names of each person present.
33	Authority notified and date	Enter authority (U.S. Coast Guard, TPWD Law Enforcement, etc.) and date when trawling during closed seasons.
34	Completion lighting condition	Leave blank.
35	Conditions when sampling was completed	Except for latitude and longitude, leave all other completion fields blank.
36	Latitude	Enter latitude where gulf trawl sample ended (degrees-minutes-seconds).
37	Longitude	Enter longitude using GPS (degrees minutes seconds) at completion of the trawl sample.
38	Sample disposition	Provide comment on final disposition of sample (e.g. sample returned to lab, returned to bay, etc.).

GULF TRAWL (Continued)**How to Complete the Resource Data Sheet for Gulf Trawl Samples**

Use leading zeroes for time only.

When recording lengths greater than 999, do not use commas.

Use only accepted scientific names specified in current TPWD species code lists.

Ensure that Major area, Minor Bay, Station, Completion Date, Completion Time, Gear Code and Gear Size are identical to those on corresponding Meteorological and Hydrological Data Sheet.

Table 10. How to Complete the Resource Data Sheet for Gulf Trawl Samples.

Step	Field	Action
1	Major area	Enter major area code for sample location (Appendix A).
2	Minor bay	Enter minor bay code for sample location (Appendix A).
3	Station	Enter grid number for sample location.
4	Completion date	Enter date of gulf trawl sample as month (1-12), day (1-31), and year (four digits), using a dash to separate each.
5	Completion time	Enter time 10 minutes after lockdown using 24-hour time format (e.g., 1320, not 1:20).
6	Gear code	Enter 5.
7	Gear size	Enter 6.1 (6.1m is the door-to-door width of the trawl opening).
8	Mesh size	Enter 38.
9	Dgms	Enter 2 (Appendix D)
10	Subsample	Leave blank.
11	User Def. Field	Enter 4 (Appendix E).
12	Page	Enter page number. All pages must be numbered in sequence.
13	Total pages	Enter total number of pages in sample.
14	Special studies code	Leave blank.
15	Species name	Enter genus (first letter) and species (not common name) of each species captured.

GULF TRAWL (Continued)**Table 10. (Continued)**

Step	Field	Action
16	Species code	Enter code of each species. Note: Enter 1800 if no catch and 4000 if no vegetation present in sample.
17	Number	Enter 1 on each line with a length, weight, sex, or maturity stage entry. Use a separate line to indicate remainder of each species not measured. Enter a density code for vegetation (Appendix F) or colonial inverts (Appendix G).
18	Length	Enter lengths to nearest mm of up to 19 randomly selected individuals of each species, except measure 50 shrimp of each commercial species (brown, white and pink) and 35 blue crabs. Total length is preferred. Enter length type in small box to left of length (T = total length, S = standard length or F = fork length)
19	Weight	Leave blank <u>or</u> whole weights to nearest 1 g may be entered under G (with D left blank) for uncommon or exotic species.
20	Sex	Enter sex for blue crab > 50 mm and white shrimp: 1 = male, 2 = female, 0 = unknown.
21	MS	Enter maturity stage for female blue crab > 50 mm and white shrimp (Appendix H).
22	Tag number	If a tagged fish is caught and released (or new tag) enter R in small box and then tag number. If a tagged fish is caught and kept enter C and then tag number. Codes L, A, B or D are no longer in use.
23	User-defined field a	For all sea turtles enter 1 if released alive and 2 if dead. Leave blank for other species.
24	User-defined fields b-n	Leave blank.
25	Comments	Enter any pertinent comments on the same line.

OYSTER DREDGE

DEFINITIONS

- Sample day:** 1/2 hour before sunrise to 1/2 hour after sunset.
- Sample week:** 1/2 hour before sunrise Monday to 1/2 hour after sunset following Sunday.
- Sample periods:** Each monthly oyster dredge sample allotment is divided in half with the first component collected during the 1st through 15th of the month and the remainder collected during the 16th through the end of the month.
- Equipment:** Dredge with towline, water sampler, GPS device, grid map, hydrological sampling meter (YSI), turbidity bottles, data sheets, pencils, back-up hydrological sampling gear, plastic bags for sample transport, special studies equipment, gloves, measuring board, calipers, and bucket or basket to handle catch.
- Gear Description:** Coastal Fisheries oyster dredges consist of a frame and a bag. The frame, constructed with 13 mm (0.5 in) cold rolled steel rod is 0.5 m (19.5 in) wide, 0.24 m (9.5 in) high and 1 m (39 in) long. The bag, constructed with metal rings, metal s-hooks and nylon rope, is 0.36 m (14 in) deep with 76 mm stretched mesh braided nylon solid core webbing.

SAMPLE PROCEDURES:

Oyster dredge samples are collected from areas in which Eastern oysters form consolidated oyster reef/habitat and exhibit 1) ≥ 0.2 m (6 in) vertical relief from adjacent bay bottom for a continuous distance of at least 91.4 m (300 ft) in length by 0.5 m (1.5 ft) in width and 2) located in water depth of ≥ 1 m mean low tide on current nautical charts. All known mapped oyster reefs/habitats will be included as oyster habitat strata.

Under no circumstances should samples scheduled for one month be collected during another month. Contact Ecosystem Leader, Regional Director and Science Director if discrepancy occurs.

Do not dredge in same grid more than once per month.

Do not dredge in marked navigation channels or on private oyster leases.

At field station, divide each grid selected for oyster dredge sampling into 5-second gridlets using transparent overlay or other method

OYSTER DREDGE (Continued)

approved by Science Director. Randomly choose one gridlet containing oyster reef/habitat.

In the field, locate the gridlet utilizing GPS. If oyster reef/habitat is not found in gridlet, randomly choose an adjacent gridlet. Presence of oyster reef/habitat must be confirmed prior to sample being taken; at least three attempts should be made to determine presence or absence of oyster reef/habitat.

Collect water sample and hydrological data 0.3 m off bottom.

Deploy dredge using the prescribed amount of towline for water depth at site and secure dredge. On R/V, lower block from A-frame as dredge is deployed.

Dredge time begins when all slack is removed from towline and winch (if used) has been “locked down”. Record GPS coordinates and water depth at beginning of tow. Tow dredge at 3 mph for 30 seconds following the contour of the reef/habitat if possible.

Retrieve dredge and place on boat. Staff should wear gloves or exercise caution when handling oysters from dredge.

When enumerating oysters, measure and count live oysters greater than 25 mm, count dead oyster shells and fragments greater than 25 mm, and count oyster spat in the range of 5 – 25 mm.

If clustered shells of live and dead oysters can be separated or culled, count these individually; if not, count only attached live oysters. Do not count attached dead shells or spat.

If a cluster of dead shell cannot be separated, count as a single dead shell.

Measure 19 randomly selected live oysters and count remainder (if any).

Randomly select one side of the first five live oysters measured and count number of spat per shell.

Count dead shells and fragments.

Randomly select five dead shells and count number of spat on one randomly selected side of each shell.

OYSTER DREDGE (Continued)

Non-oyster organisms greater than 5 mm total length, captured in dredge or stranded on boat deck, should be identified to the lowest possible phylogenetic unit (genus and species preferred). For each non-oyster species, measure 19 randomly selected individuals and count the remainder (if any).

Determine length based on the following:

Total length

Fish – tip of snout (mouth closed) to tip of longest caudal fin ray (caudal fin compressed)

Shrimp – tip of rostrum to tip of telson

Crab – lateral spine width or trident width of body if no lateral spines present

Rays and skates – maximum wing span

Squid – posterior mantle margin to top of pen

Oysters and scallops – hinge to bill

Other bivalves – widest portion of shell

Whelks and snails – longest axis of shell

Starfish and sand dollars – maximum diameter

Octopod – from between eyes to end of mantle

Turtles – maximum curved carapace length

Standard length (used only if total length cannot be measured)

Fish – tip of snout (mouth closed) to base of caudal peduncle

Fork length (used only if total length cannot be measured)

Fish – tip of snout (mouth closed) to center of fork on caudal fin

Count but do not measure, sea pansies, selected jellyfishes (cabbagehead [9353], hydromedusa [9249], many-ribbed [9113], moon [9318], sea nettle [9312], sea wasp [9215], etc.), hermit crabs, sea cucumbers, nudibranchs, sea squirts, and sea anemones; record total number of these organisms. If a question exists regarding whether an organism should be measured, place in a labeled plastic bag on ice and return to field station for clarification.

Do not count or measure ctenophores (sea walnut [9343], phosphorus [9319] and comb jellyfish [9287]), hydroids [9208], bryozoans (bryozoa [9051], sauerkraut bryozoa [9068], spiral bryozoa [9116]), sponges [9206], soft corals [9285] sea pens, or colonial sessile tunicates [9314].

OYSTER DREDGE (Continued)

Instead, estimate number of individuals and record a density code (Appendix G).

Vegetation (dead or alive) should be identified and its density estimated. Density is estimated from the percent of gear covered or filled with vegetation and recorded with the corresponding density code (Appendix F).

If no organisms are present, record as NOCATCH (1800). If no vegetation is present, record as VEGNONE (4000).

All exotic species should be retained, placed on ice and transported to PRBMFRS. Notify Ecosystem Leader, Regional Director and Science Director upon returning to field station.

How to Complete the Meteorological and Hydrological Data Sheet for Oyster Dredge Samples

Do not enter leading zeros except on time (e.g. 0700), latitude and longitude (e.g. 96-28-07 or 96-02-24).

Use dashes when recording dates (e.g. 6-10-2007), latitudes and longitudes.

Use a YSI meter or equivalent for water temperature, salinity and dissolved oxygen measurements. All readings should be recorded to the nearest 0.1 unit when YSI meter used. If YSI meter not used, note on data sheet.

Use a Kemmerer water sampler or equivalent to collect turbidity sample. Use a HACH meter or equivalent for turbidity measurements. Readings should be taken immediately upon return to field station – failure to do so may affect accuracy of readings. Record turbidities as whole numbers (e.g., 24 rather than 24.0).

Table 11. How to Complete the Meteorological and Hydrological Data Sheet for Oyster Dredge Samples.

Step	Field	Action
1	Major Area	Enter major area code for sample location (Appendix A).
2	Minor Bay	Enter minor bay code for sample location (Appendix A).
3	Station	Enter grid number for sample location.

OYSTER DREDGE (Continued)**Table 11. (Continued)**

Step	Field	Action
4	Alt.	Enter 2 only if an alternate grid was sampled; otherwise leave blank.
5	Gear	Enter 16.
6	Gear size	Enter 0.5 (0.5 m is the width of the dredge opening).
7	Completion date	Enter date of oyster dredge sample as month (1-12), day (1-31), and year (four digits), using a dash to separate each (e.g., 6-10-2007).
8	Completion time	Enter time as 1 minute after start time. Using 24-hour time format (e.g., 1320, not 1:20).
9	Special Studies Code	Leave blank.
10	Surface area	Leave blank.
11	Start date	Enter date of oyster dredge sample as month (1-12), day (1-31), and year (four digits), using a dash to separate each (e.g., 6-10-2007).
12	Start time	Enter time when towline is fully extended and the winch is locked down using 24-hour time format (e.g., 0915, not 9:15).
13	Start lighting condition	Leave blank.
14	Latitude	Enter latitude where dredge sample began (degrees-minutes-seconds).
15	Longitude	Enter longitude where dredge sample began (degrees-minutes-seconds).
16	Wind speed	Leave blank.
17	Wind direction	Leave blank.
18	Cloud cover	Leave blank.
19	Barometric pressure	Leave blank.
20	Precipitation	Leave blank.
21	Fog	Leave blank.
22	Wave height	Leave blank.
23	Tide	Leave blank.
24	Shallow water depth	Enter water depth at start of dredge sample to nearest 0.1m.
25	Deep water depth	Leave blank.

OYSTER DREDGE (Continued)**Table 11. (Continued)**

Step	Field	Action
26	Maximum station water depth	Leave blank.
27	Temperature	Enter water temperature to nearest 0.1 °C collected 0.3 m off the bottom.
28	Dissolved oxygen	Enter dissolved oxygen to nearest 0.1 ppm collected 0.3 m off the bottom.
29	Salinity	Enter salinity to nearest 0.1 ppt collected 0.3 m off the bottom.
30	Turbidity	Enter turbidity to nearest 1 NTU.
31	Bottom type	Leave blank.
32	Personnel	Enter first initial and last names of all individuals present.
33	Authority notified and date	Leave blank.
34	Completion lighting condition	Leave blank.
35	Conditions when sampling was completed	Leave all completion fields blank.
36	Sample disposition	Provide comment on final disposition of sample (e.g. sample returned to lab, returned to bay, etc.).

How to Complete the Resource Data Sheet for Oyster Dredge Samples

Use leading zeroes for time only.

When recording lengths greater than 999, do not use commas.

Use only accepted scientific names specified in current TPWD species code lists.

Ensure that Major Area, Minor Bay, Station, Completion Date, Completion Time, Gear Code, and Gear Size are identical to those on corresponding Meteorological and Hydrological Data Sheet.

OYSTER DREDGE (Continued)**Table 12. How to Complete the Resource Data Sheet for Oyster Dredge Samples.**

Step	Field	Action
1	Major area	Enter major area code for sample location (Appendix A).
2	Minor bay	Enter minor bay code for sample location (Appendix A).
3	Station	Enter number for sample location grid.
4	Completion date	Enter date of oyster dredge sample as month (1-12), day (1-31), and year (four digits), using a dash to separate each.
5	Completion time	Enter time as 1 minute after start time using 24-hour time format (e.g., 1320, not 1:20).
6	Gear code	Enter 16.
7	Gear size	Enter 0.5 (0.5 m is the width of the dredge opening).
8	Mesh size	Enter 76.
9	Dgms	Leave blank.
10	Subsample	Leave blank.
11	User Def. Field	Enter 11 for open reefs and 12 for closed reefs.
12	Page	Enter page number. All pages must be numbered in sequence.
13	Total pages	Enter total number of pages in sample.
14	Special studies code	Leave blank.
15	Species name	Enter genus (first letter) and species (not common name) of each species captured.
16	Species code	Enter code of each species captured. Note: Enter 1800 if no catch and 4000 if no vegetation present in sample.
17	Number	Enter a 1 on each line with a length, weight or spat entry. Use a separate line to indicate the remainder of each species not measured. Enter a density code for vegetation (Appendix F) and colonial or gelatinous invertebrates (Appendix G).

OYSTER DREDGE (Continued)**Table 12. (Continued)**

Step	Field	Action
18	Length	Enter lengths to nearest mm of up to 19 randomly selected individuals of each species. Total lengths are preferred. Enter length type in small box to left of length (T = total length, S = standard length or F = fork length). Only live oysters > 25 mm are to be measured, not dead shell.
19	Weight	Leave blank. Whole weights to nearest 1 g may be entered under G (with D left blank) for uncommon or exotic species.
20	Sex	Enter sex for blue crab > 50 mm and diamond-backed terrapins: 1 = male, 2 = female, 0 = unknown.
21	MS	Enter maturity stage for female blue crab > 50 mm (Appendix H).
22	Tag number	If a tagged fish is caught and released again or a new tag enter R and then tag number. If a tagged fish is caught and kept enter C and then tag number. Codes L, A, B or D are no longer in use.
23	User-defined field a	Enter 1 for live eastern oysters, 2 for dead eastern oysters and 3 for black shell. Leave blank for other species.
24	User-defined fields b-d	Enter the number of spat counted (e.g., if 123 spat were counted, enter 1 in b, 2 in c and 3 in d; if 5 were counted, enter 5 in d; if no spat, enter 0 in d).
25	User-defined fields e-n	Leave blank.
26	Comments	Enter any pertinent comments on the same line.

DATA SHEET SUBMISSION AND EDITING

Duties of Coastal Fisheries Personnel	Step	Personnel	Action
	<hr/>		
	1	Ecosystem Staff	Record sample results on data sheets and edit sheets for errors. Submit to Ecosystem Leader by end of month.
	2	Ecosystem Leader	<p>Edit data sheets for errant entries, omissions and non-matching key fields.</p> <p>Compile a summary sheet for each gear (weekly for gill nets and monthly for other gears.</p> <p>Retain copy of data sheets and forward original data sheets to appropriate Regional Editor within 10 days after end of month. Make appropriate entries in Field Resource Log on N drive. Place a copy of each gear summary sheet on the N-drive.</p>
	3	Regional Editor	<p>Edit data for sheets for errant entries, omissions and non-matching key fields. Prepare lists of detected errors and distributes to Ecosystem Staff and Regional Director.</p> <p>Sort data sheets by gear and create a separate batch for each gear. Complete data transmittal sheet for each batch. Send original data sheets and data transmittal sheets to designated data entry personnel by 20th of the month following month of collection. Make appropriate entries in Field Resource Log on N-drive.</p> <p>Enter batch name and page counts for number of Hydro sheets and Resource sheets on database Batch Entry Record.</p>

DATA SHEET SUBMISSION AND EDITING (Continued)

Duties of
Coastal
Fisheries
Personnel
(Continued)

Step	Personnel	Action														
		<p>Batch Numbers:</p> <ul style="list-style-type: none"> Example for April 2009 Resource data. <table data-bbox="941 588 1445 850"> <tr><td>Bag Seine</td><td>RR1 BS042009</td></tr> <tr><td>Bay Trawl</td><td>RR1 BT042009</td></tr> <tr><td>Gulf Trawl</td><td>RR1 GT042009</td></tr> <tr><td>Oyster Dredge</td><td>RR1 OD042009</td></tr> <tr><td>Gill Net (weekly)</td><td>RR1GNS2009W1</td></tr> <tr><td>Gill Net (monthly)</td><td>RR2 GN042009</td></tr> <tr><td>Special Study 51</td><td>RR1 SS51042009</td></tr> </table> First three digits indicate Resource data and Region. <p>RR1 = Resource data Region 1 and RR2 = Resource data Region 2.</p> Next digits indicate gear for regular samples or SS for special study. Numbers after gear are for month and year (use leading zeroes on one-digit months). SS51 is Special Study 51. For other Batch Number formats contact Science Director. 	Bag Seine	RR1 BS042009	Bay Trawl	RR1 BT042009	Gulf Trawl	RR1 GT042009	Oyster Dredge	RR1 OD042009	Gill Net (weekly)	RR1GNS2009W1	Gill Net (monthly)	RR2 GN042009	Special Study 51	RR1 SS51042009
Bag Seine	RR1 BS042009															
Bay Trawl	RR1 BT042009															
Gulf Trawl	RR1 GT042009															
Oyster Dredge	RR1 OD042009															
Gill Net (weekly)	RR1GNS2009W1															
Gill Net (monthly)	RR2 GN042009															
Special Study 51	RR1 SS51042009															
4	Designated Data Entry Personnel	<p>Key data into database holding file. Print computer edit listings.</p> <p>Return data sheets and computer edit listings, by specified deadline to Regional Editor.</p>														

DATA SHEET SUBMISSION AND EDITING (Continued)

Duties of
Coastal
Fisheries
Personnel
(Continued)

Step	Personnel	Action
5	Regional Editor	Sort data sheets and edit listings by major area and distribute to Ecosystem Staff for editing. Make appropriate entries in Field Resource Log.
6	Ecosystem Staff	<p>Check all entries on edit listings against original data sheets. Check all highlighted (flagged) data fields on edit listings for errors.</p> <p>Compare species names rather than species codes when editing species coding. If species names do not match, the code is incorrect.</p> <p>Attempt to resolve extra or atypical Hydro and Resource edit listing pages caused by non-matching key fields. These pages occur when key fields on the Hydro page do not match key fields on all or a portion of the Resource pages. Unresolved pages should be marked for Regional Editor review.</p> <p>Make corrections to edit listing using red ink. If a line of data is missing from an edit listing, then enter the line on edit listing. Make sure all edit listings for a specific sample remain together. Place a paper clip on each edit listing page that contains a detected error.</p> <p>Return original data sheets and edit listings to Regional Editor by specified deadline.</p>
7	Regional Editor	Scan printouts for key field and other errors. Make on-screen corrections in Holding File based on marked edit listings. After all corrections have been made, run a Batch Transfer Report to insure all detected errors have been corrected in batch. Compare the number of data sheets sent to data entry with the number of data sheets entered. If a discrepancy is found, find the problem and correct the Batch Entry Record.

DATA SHEET SUBMISSION AND EDITING (Continued)

Duties of
Coastal
Fisheries
Personnel
(Continued)

Step	Personnel	Action
		Notify Science Director when all detected errors are corrected and batches are ready for transfer to Master File (e.g., all detected errors have been corrected and page counts match). Make appropriate entries in Field Resource Log.
8	Science Director	<p>Ensure each data batch in Holding File is ready for transfer to Master File.</p> <p>Transfer data batches from Holding File to Master File.</p> <p>Note: For a detailed account of Regional Editor procedures, see the Regional Editor Guidelines document (N:\QC\RE Guidelines\).</p>

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Appendix A. Major Area and Minor Bay Codes.

MAJOR AREA	MAJOR AREA CODE	MINOR BAY	MINOR BAY CODE
GULF OF MEXICO			
	17	Off Sabine Lake less than or = 10 miles	998
	17	Off Sabine Lake greater than 10 miles	999
	18	Off Galveston-Freeport less than or = 10 miles	990
	18	Off Galveston-Freeport greater than 10 miles	991
	19	Off Matagorda-San Antonio less than or = 10 miles	992
	19	Off Matagorda-San Antonio greater than 10 miles	993
	20	Off Aransas-Corpus Christi-upper Laguna Madre less than or = 10 miles	994
	20	Off Aransas-Corpus Christi-upper Laguna Madre greater than 10 miles	995
	21	Off lower Laguna Madre less than or = 10 miles	996
	21	Off lower Laguna Madre greater than 10 miles	997
SABINE LAKE	1		
		Sabine Lake (includes Neches and Sabine Rivers downstream from bridges on IH 10)	700
		Keith Lake	701
		Johnson Lake	702
		Salt Lake	703
		Fence Lake	704
		Knight Lake	705
		Lost Lake	706
		Cabin Lake	707
		Clam Lake	708
		Star Lake	709

Appendix A. (Continued)

MAJOR AREA	MAJOR AREA CODE	MINOR BAY	MINOR BAY CODE
SABINE LAKE (Continued)	1	Sabine Pass (area between bridge on Hwy. 82 to end of jetties)	710
		Willow Lake	711
		Barnett Lake	712
		Mud Lake (High Island area)	713
		Sabine Lake area (includes saltwater areas behind the surfline from junction of Taylor Bayou Outfall Canal and ICWW to Hwy 124 bridge over ICWW at High Island)	714
		Shell Lake	715
		Mud Lake (Sabine Pass area)	716
		Peters Lake	717
GALVESTON BAY	2		
		Alligator Lake	11
		Ash Lake	12
		Bastrop Bay (includes Bastrop Bayou downstream from junction with Austin Bayou)	50
		Burnett Bay	53
		Black Duck Bay	54
		Carancahua Lake	61
		Cotton Lake	63
		Crystal Bay	64
		Bolivar Roads (area east of a line between the ferry landing on Port Bolivar to range marker at the Coast Guard station at Fort Point to the end of the jetties)	91
		Chocolate Bay	100
		Christmas Bay	110

Appendix A. (Continued)

MAJOR AREA	MAJOR AREA CODE	MINOR BAY	MINOR BAY CODE
GALVESTON BAY (Continued)	2	Clear Lake (includes Clear Creek downstream from the bridge on Hwy. 3)	111
		Crab Lake	123
		Cox Lake	131
		Dickinson Bay (includes Dickinson Bayou downstream from bridge on ST 146)	141
		Dollar Bay	142
		Drum Bay	144
		East Bay (also includes all waters from bridge over ICWW at High Island to junction of ICWW and East Bay)	150
		Galveston Bay	180
		Green's Lake	181
		Hall's Lake (includes Hall's Bayou downstream from the bridge on Hwy. 2004)	191
		Horseshoe Lake	192
		Jones Lake (includes Highland Bayou downstream from the railroad bridge that connects Texas City with the GC&SF railroad)	201
		Lake Como	214
		Lost Lake	222
		Lost Bay	225
		Moses Lake	241
		Mud Lake	245
		Nicks Lake	253
		Oyster Lake (near Bastrop Bay)	261
		Oyster Lake (Bolivar Peninsula)	267
		Rollover Bay	286

Appendix A. (Continued)

MAJOR AREA	MAJOR AREA CODE	MINOR BAY	MINOR BAY CODE
GALVESTON BAY (Continued)	2	Salt Lake	291
		Swan Lake	311
		Tabb's Bay	312
		San Jacinto Bay	318
		Scott Bay	319
		Taylor Lake	321
		Sweetwater Lake	324
		Trinity Bay (includes Trinity River Delta south of Big Hog Bayou)	330
		West Bay	350
		Rollover Pass (area between junction with Rollover Bay and surfline)	500
		San Luis Pass (area 1/2 mile bayward and 1/2 mile Gulfward off Vacek Bridge)	530
MATAGORDA BAY	3		
		Carancahua Bay (downstream from where the Carancahua River enters the bay)	60
		Matagorda Ship Channel (area from Marker 13 southeast to end of jetties)	98
		Chocolate Bay	112
		Crab Lake	121
		Coon Island Bay	122
		Cox Bay	140
		Freshwater Lake	171
		Keller Bay	210

Appendix A. (Continued)

MAJOR AREA	MAJOR AREA CODE	MINOR BAY	MINOR BAY CODE
MATAGORDA BAY (Continued)	3	Lavaca Bay (includes Lavaca River below the junction of Redfish Bayou and the Lavaca River)	220
		Mad Island Lake	243
		Oyster Lake	264
		Powderhorn Lake	271
		Redfish Lake (Carancahua Bay only)	281
		Redfish Lake (Lavaca River area)	283
		Robbins Lake	287
		Salt Lake	292
		Swan Lake	316
		Tres Palacios Bay (includes Tres Palacios River downstream from bridge on F.M. 521)	320
		Turtle Bay	340
		Matagorda Bay	360
		Venado Lake	371
		Colorado River (includes all waters downstream from Selkirk Island to the junction with the Gulf)	590
		Pass Cavallo (area south of a line between Decros Pt. and Saluria Bayou to a line drawn between Marker 13 and the Matagorda Light on Matagorda Island)	620
SAN ANTONIO BAY	4		
		Ayres Bay	30
		Barroom Bay	52
		Espiritu Santo Bay	170
		Guadalupe Bay	190
		Hynes Bay	200
		Long Lake (Matagorda Island)	212

Appendix A. (Continued)

MAJOR AREA	MAJOR AREA CODE	MINOR BAY	MINOR BAY CODE
SAN ANTONIO BAY (Continued)	4	Lucas Lake	213
		Long Lake (Guadalupe River delta)	215
		Mustang Lake	251
		Mission Lake	252
		Pringle Lake	272
		San Antonio Bay	300
		Shoalwater Bay	301
		Southpass Lake	302
		Contee Lake	303
		Long Lake (Aransas Wildlife Refuge)	304
		Pats Bay	305
		Power Lake	306
		Twin Lakes	307
		Cedar Lake	308
		Panther Point Lake	309
		Swan Lake (Guadalupe River delta)	322
		Swan Lake (Matagorda Island)	323
ARANSAS BAY	5		
		Allyns Bight	13
		Aransas Bay	20
		Big Brundrett Lake	43
		Little Brundrett Lake	44
		Carlos Bay	70

Appendix A. (Continued)

MAJOR AREA	MAJOR AREA CODE	MINOR BAY	MINOR BAY CODE
ARANSAS BAY (Continued)	5	Cedar Bayou (area between a line drawn from Cedar Pt. southeast to the point of land on Matagorda Island to the surfline including Vincents Bayou)	90
		Lydia Ann Channel (north of a line between Aransas Channel Marker 2 to Range Light on San Jose Island and south of a line between ICWW Marker 84 at north end of Lydia Ann Island)	94
		Aransas Channel (area between Marker 4 in the Aransas Channel southeast to a line drawn between the Radio Beacon Tower and the range marker on San Jose Island)	95
		Copano Bay (includes Aransas River downstream from the earthen dam)	120
		Dunham Bay	143
		Long Lake	226
		Little Bay	227
		Mission Bay (includes Mission River downstream from bridge on Hwy. 2678)	240
		Mesquite Bay	250
		Port Bay	270
		Redfish Bay (Aransas Bay system)	280
		South Bay (all waters inside of a line drawn from where Stedman Island and the low bridge connect, along the channel by Hog Island to Corpus Christi Bayou thence the Quarantine Shore to where the Aransas Shrimp Channel and Lydia Ann Channel meet thence along the west shore of the Aransas Shrimp Channel to Marker 4 thence along the East Shore of the Shrimp Channel and then to the point of Stedman Island and the low bridge)	285
		Salt Lake	293
		St. Charles Bay	310

Appendix A. (Continued)

MAJOR AREA	MAJOR AREA CODE	MINOR BAY	MINOR BAY CODE
ARANSAS BAY (Continued)	5	Sundown Bay	315
		Swan Lake (Aransas Bay system)	317
CORPUS CHRISTI BAY	6		
		Port Aransas Pass (area between a line drawn from the range marker on San Jose Island to the Radio Beacon Tower to the end of the jetties)	93
		Corpus Christi Channel (area west of a line between Fina Docks and Radio Beacon Tower to Marker 14 on Corpus Christi Channel)	96
		Corpus Christi Bay	130
		Nueces Bay	260
		Oso Bay	263
		Redfish Bay (an area north of a line running from the ICWW at the southwest end of the Dagger Island chain, along Dagger Island to the southeast tip of South Ransom Island, then due East to Harbor Island)	284
		Sunset Lake	314
		Water Exchange Channel (area between junction with Corpus Christi Bay and Gulf of Mexico surfline)	680
UPPER LAGUNA MADRE	7		
		Alazan Bay	10
		Baffin Bay	40
		Cayo Del Grulla	80
		Laguna Salada	211
		Upper Laguna Madre	370

Appendix A. (Continued)

MAJOR AREA	MAJOR AREA CODE	MINOR BAY	MINOR BAY CODE
UPPER LAGUNA MADRE (Continued)	7	Packery Channel Pass (area between State Highway 361 bridge and end of jetties)	670
		Corpus Christi Pass (area between junction with Upper Laguna Madre and Gulf of Mexico surfline)	690
LOWER LAGUNA MADRE	8		
		Brownsville Ship Channel (area from Marker 30 to Port Brownsville Turning Basin)	41
		Port Mansfield Channel (area between Marker 12 and end of jetties)	97
		Brazos Santiago Channel (area between a line drawn from the Radio Beacon due south to Brazos to the end of the jetties)	99
		El Realito Bay	151
		Lower Laguna Madre	230
		Arroyo Colorado (includes all waters downstream from Port Harlingen to the junction with the ICWW)	262
		Redfish Bay (includes all water between the Port Mansfield Channel and the Land Cut)	282
		San Martin Lake	294
		South Bay (lower Laguna Madre)	313
		Rio Grande (includes all water in Texas downstream from the International Toll Bridge in Brownsville to the junction with the Gulf)	691
EAST MATAGORDA BAY	9		
		Boggy Lake	51
		East Matagorda Bay (includes Caney Creek downstream from Sargent and also the ICWW from Salt Bayou to Caney Creek)	160

Appendix A. (Continued)

MAJOR AREA	MAJOR AREA CODE	MINOR BAY	MINOR BAY CODE
EAST MATAGORDA BAY (Continued)	9	Gottschalk Lake	182
		Kilbride Lake	202
		Lake Austin	223
		Live Oak Bay	224
		McNabb Lake	242
		Pelton Lake	273
		Brown Cedar Cut (area between the two land masses southeast to the surfline)	580
CEDAR LAKES	11		
		Bryan Lake	42
		Cedar Lakes	62
		Quintana Channel	92
		Choctaw Lake	101
		Cow Trap Lakes	145
		Freeport Bay area	172
		Jones Lake (Freeport area)	203
		McNeal Lake	244
		Oyster Creek	265
		Old Brazos River	266
		Pelican Lake	268
		Swan Lake (Freeport area)	269
		San Bernard River	560
		Brazos River	570

Appendix B. Gear Codes

GEAR CODE	SAMPLE GEAR	DATE CODE WAS ASSIGNED
1	Gill net	10/77
2	Trammel net	10/77
3	Plankton net	10/77
4	Rotenone	10/77
5	Shrimp trawl	10/77
6	Fish trawl	10/77
7	Bag seine	10/77
8	Push-net	10/77
9	Cast-net	10/77
10	Oyster spat collector	09/90
11 – 12	Not used	
13	Bar seine	02/79
14	Marsh net	02/79
15	Benthic dredge	09/78
16	Oyster dredge	09/78
17	Crab trap	09/78
18	Hauling rig	09/78
19	Trotline	09/78
20	Drag seine (Beach seine)	09/78
21	Rod and reel	09/78
22	Gig	09/78
23	Hand line	09/78
24	Fish trap	09/78
25	Electroshocking	03/86
26	20-ft. trawl	12/81
27	Oyster tongs	08/82

Appendix B. (Continued)

GEAR CODE	SAMPLE GEAR	DATE CODE WAS ASSIGNED
28	TED equipped 40-ft. trawl	06/87
29	Longline (bottom)	08/89
32	2,400-ft trammel net	10/76
33	Hoop net	
34	Vertical Line	08/15
50	Stocking	05/83
51	Fish kill counts	01/84
52	Lake Texana hydros	08/84
78	Fish house interviews	01/93
81	Headboats	02/83
82	Boat ramps	02/83
83	Wade/bank	02/83
84	Bay/commercial piers	02/83
85	Gulf piers and jetties	02/83
86	Private piers	02/83
87	Shrimp intercepts	05/96
88	Seafood/bait dealer shoreline sites	04/87
89	Recreational boat access shoreline sites (known and unknown)	04/87
90	Commercial vessel docking structure shoreline sites	04/87

Appendix C. Special Studies Codes.

SPECIAL STUDIES CODE	NAME
	Standard sample
1	Open water gill nets
2	Open water trammel nets
3	Reverse gill nets
4	2" gill nets
5	4-square gill nets
6	Tagged fish introduced into rotenone
7	Extra tagging - other than standard tagging
8	Rod and reel tagging - spotted seatrout
9	Gulf research trawl comparison
10	St. Charles sampling (boat ramps)
11	Extra boat ramps
12	Fall Gulf pier Red Drum fishery (Gulf piers and jetties)
13	Fall daytime wade/bank flounder fishery (wade/banks)
14	Spring black drum fishery (boat ramps)
15	Winter spotted seatrout fishery (wade/banks)
16	Lower Laguna Madre light plant fishery (boat ramps)
17	Docked boats
18	Gulf pier and jetty fishery
19	Red Drum tagging - HL&P, Baytown (04/83)
20	Gulf beach seines (drag seines)
21	Stocked fish seining study
22	Zero-code data - tag returns
23	Stocking
24	Shrimp trawl tow rope testing
25	Texas closure/SEAMAP

Appendix C. (Continued)

SPECIAL STUDIES CODE	NAME
26	Fish kill assessment (12/83 – 01/84 freeze)
27	Off-season weekly gill net samples (01/29- 04/15 1984)
28	Extra shrimp tagging effort (04/84)
29	Bought shrimp for tagging (04/84)
30	Surreptitious shrimp tagging (04/84)
31	Lake Texana flush (08/84)
32	Trotline study (01/85 - 02/86)
33	Fish kill procedures (09/84)
34	Trotline study (01/85 - 02/86)
35	Commercial trotline survey - same day as TPWD (01/85)
36	Commercial trotline survey - bay system counts (01/85)
37	Trotline mortality study (01/85)
38	Red Drum mortality study (01/85)
39	Verification of age determination based on scales
40	Recreational fish lengths (< 05/83) (03/85)
41	Commercial fish lengths - creel survey
42	Shrimp tag returns - bay study 1984-85 (03/85)
43	Gulf of Mexico - charterboat study (04/85)
44	Striped bass tagging in freshwater (02/86)
45	Historic charterboat survey (< 05/83)
46	King Mackerel tagging with NMFS-MARFIN (04/86)
47	St. Charles Red Drum stocking-resource monitoring (06/87)
48	Special oyster dredge tow time study (11/87) - TEDS Study
49	Oyster boat counts (12/87)
50	Hooking mortality (06/98)
51	Gulf Red Drum longline study (06/89)

Appendix C. (Continued)

SPECIAL STUDIES CODE	NAME
52	Clam shell spat set (09/89)
53	Brown shrimp sampling within shallow water off Galveston (12/89)
54	Resource day/night shrimp study in the ULM (04/90)
55	Commercial day/night shrimp study in the ULM (04/90)
56	Galveston bay oil spill assessment (08/90)
57	Oyster spat study (11/90)
58	White shrimp bycatch 75-77 (04/91)
59	Creel flounder gig estimates (06/91)
60	Oxytetracycline red drum study (11/91)
61	Salt Bayou monitoring study (11/91)
62	Rio Grande River study (11/91)
63	<u>P. vannamei</u> study: Arroyo Colorado and Brownsville ship channel (01/92)
64	SEAMAP trap video (01/95)
65	Lower Colorado River study (04/93)
66	Bay commercial shrimp trawler bycatch study (05/93)
67	Commercial fish length study (09/92)
68	Pink shrimp fishery study (02/94)
69	Commercial shrimp intercept study (05/94)
70	Shrimp trawl mesh size comparative tow study (05/94)
71	Artificial reef boat ramp study - harvest (05/94)
72	Recreational bycatch study (05/93)
73	Red snapper tagging - artificial reefs (05/95)
74	Blue crab trap biodegradable panel study (05/95)
75	Cedar Lakes special project (01/95)
76	Crab trap aerial study (09/96)
77	Bait dealer survey (09/96)

Appendix C. (Continued)

SPECIAL STUDIES CODE	NAME
78	Tarpon field sampling (on database) and scoping questionnaire (not on database) (09/96)
79	Seabob special study (12/96)
80	Bycatch reduction device (BRD) comparison study (05/97, 99, 00)
81	Shrimp virus monitoring study (09/97)
82	Sportfishing value study (04/96)
83	Blue crab trap degradable panel wire tie study
84	Blue crab trap degradable panel loop tie study
85	Predator size - prey size feeding characteristic for red drum (09/97)
86	Experimental 20ft trawl Gulf samples (1984)
87	R/V Western Gulf shrimp monitoring samples (< 1983)
88	Red tide monitoring in Texas Territorial Sea (11/98)
89	Live mollusk harvest (09/99)
90	San Martin Lake finfish study (03/00)
91	Redfish Bay / 9-mile Hole seagrass survey (11/00)
92	Arroyo Colorado study (01/01)
93	Gulf charterboat survey
94	Gill net sampling on oyster reefs
95	Seagrass transect monitoring of propeller scars
96	Extra oyster dredge sampling for Dermo analysis
97	Extra Sabine Lake trawl sampling around oyster reefs
98	Extra Galveston Bay gill net sampling
99	Extra Sabine Lake gill net sampling
100	Colorado River study (07/08-07/09)
101	Extra Red Snapper creel surveys
102	Vertical Line sampling

Appendix D. DGMS Codes

CODE	DIRECTION OF GEAR MOVEMENT
1	Towed perpendicular to bottom contour
2	Towed parallel to bottom contour
3	Towed in circular motion
4	Towed linear gulfward
5	Towed linear bayward

Appendix E. Zone Codes for Trawls

CODE	ZONE
1	Upper portion of bay near mouth of river or bayou
2	Lower portion of bay farthest from mouth of river or bayou
3	Gulf passes
4	Gulf
5	ICWW

Appendix F. Vegetation Density Codes

CODE	GEAR COVERED OR FILLED
1	1-25%
2	26-50%
3	51-75%
4	76-100%

Appendix G. Colonial Invertebrates Density Codes

CODE	ESTIMATED NUMBER OF ORGANISMS
5	1-10
50	11-100
500	101-999
1000	≥1000

Appendix H. Maturity Stage Codes

SEXUAL MATURITY STAGE DESCRIPTION FOR FEMALE BLUE CRAB CALLINECTES SAPIDUS

STAGE		NORMAL FIELD WORK	DETAILED FIELD WORK
0	no gonads apparent		
1	virgin	Immature female, has not molted for last time. Triangular shaped abdomen.	Same
2	maturing	Broad semicircular abdomen. (Stage precedes ovulation and egg mass formation)	Same Also: no egg case remnants on the swimmerets. Ovary maturing and is bright orange. Parasitic worm <u>Carcinonemertes carcinophilia</u> may be attached to the gills of the crab, but is immature, small and very light in color (almost white).
3	developing	Egg mass has been spent from ovary and bright yellow-orange eggs are attached to swimmerets hairs forming an egg mass or sponge.	Same Also: Eggs can still be found in ovary, which is light orange and is developing for second spawn. Worm same as in Stage 2.
4	developed	Egg mass has changed to dark brown to black as larvae develop and absorb yolk during two-week period before hatching.	Same Also: Ovary continuing to develop. Mature bright reddish nemertean worm found in egg mass, not in gills.

Appendix H. (Continued)

**SEXUAL MATURITY STAGE DESCRIPTION FOR
FEMALE BLUE CRAB (CALLINECTES SAPIDUS) (Continued)**

STAGE		NORMAL FIELD WORK	DETAILED FIELD WORK
5	gravid	not used	Period between first and second spawn. Eggs of first sponge have hatched and remnants are attached to swimmerets. Ovary becoming bright orange. Large red mature stage of worm found in the gills of the crab.
6	spawning	not used	Second mass of eggs forms new bright yellow-orange sponge as in Stage 3. Ovaries are collapsed and are gray or brown. Nemertean is as in Stage 4 and 5.
7	spent	not used	Eggs of second sponge are dark brown to black as in Stage 4 and are about ready to hatch. Other characteristics as in Stage 6.
8	resting	Egg mass has hatched. Sponge or egg case remnants present.	Same Also: Ovary is still collapsed and not developing. Nemertean as in Stages 4-7.
9	abnormality	Sacculinid infected crabs.	

Appendix H. (Continued)

**SEXUAL MATURITY STAGE DESCRIPTION FOR
FEMALE PENAEID SHRIMPS**

STAGE		BROWN SHRIMP (F. AZTECUS)	WHITE SHRIMP (L. SETIFERUS)	PINK SHRIMP (F. DUORARUM)
0	no gonads apparent			
1	virgin	Ovary is not visible externally. Ovary is small, translucent, invisible through the exoskeleton and somewhat flaccid.	Same	Same
2	maturing virgin	not used	not used	not used
3	developing	Ovaries opaque, white to yellowish with some scattered melanophores with pink to red color.	Ovaries larger, opaque or milky to yellowish, with some scattered gray green melanophores on ovary surface.	Ovaries larger but still a little flaccid. White to pale olive buff.
4	developed	Ovaries larger and yellowish/brown to green with more distinct reddish melanophores.	Ovaries larger and yellow to yellowish orange with green melanophores.	Ovaries large and glaucous, blueish green to a little darker green.

Appendix H. (Continued)

**SEXUAL MATURITY STAGE DESCRIPTION FOR
FEMALE PENAEID SHRIMPS (Continued)**

STAGE		BROWN SHRIMP (P. AZTECUS)	WHITE SHRIMP (P. SETIFERUS)	PINK SHRIMP (P. DUORARUM)
5	gravid	Ovaries reach maximum size and occupy all available space among other organs. Anterior and posterior lobes are broad and dark in color and are easily seen through the cephalothoracic carapace and the pleurons covering the abdomen. Dark yellow green to olive green.	Same Dark olive brown.	Same Dark grayish green.
6	spawning	not used	not used	not used
7	spent	Ovaries greatly reduced in size and are flaccid. Color fades, becoming milky as they regress to Stage 3.	Same	Same
8	resting	not used	not used	not used
9	abnormality			

Appendix H. (Continued)

**SEXUAL MATURITY STAGE DESCRIPTION
FOR FINFISH**

STAGE		DESCRIPTION
0	no gonads apparent	
1	virgin	Very small sexual organs close under vertebral column. Testis and ovary transparent, colorless to gray. Eggs invisible to naked eye.
2	maturing virgin or recovering spent	Testis and ovary translucent, grey-red. Length is half or slightly more than half the length of ventral cavity. Single eggs visible with a magnifying glass.
3	developing	Testis and ovaries opaque, reddish with blood capillaries. Occupy about half of ventral cavity. Eggs visible to the naked eye and are whitish granular.
4	developed	Testis reddish-white. No milt drops under pressure. Ovary orange-reddish. Eggs clearly discernible; opaque. Testis and ovaries occupy about two-thirds of central cavity.
5	gravid	Sexual organs fill ventral cavity. Testis white, drops of milt fall under pressure. Eggs completely round, some already translucent and ripe.
6	spawning	Roe and milt run with slight pressure. Most eggs translucent with few opaque eggs left.
7	spent	Not yet fully empty. No opaque eggs left in ovary.
8	resting	Testis and ovary empty and red. A few eggs in the state of reabsorption.
9	abnormality	

Appendix H. (Continued)**SEXUAL MATURITY STAGES - SUMMARY**

STAGE	USED FOR				
		SHRIMP	CRABS		FINFISH
			NORMAL	DETAILED	
0	no gonads apparent	X	X		X
1	virgin	X	X	X	X
2	maturing virgin		X	X	X or developing spent
3	developing	X	X	X first spawn	X
4	develop	X	X	X first spawn	X
5	gravid	X		X midspawning	X
6	spawning			X developing second spawn	X
7	spent	X		X developing second spawn	X
8	resting		X	X	X
9	abnormality	X	X	X	X

For more details and references see Proposed Maturity Stages for Shrimp, Finfish and Blue Crabs, by Billy Fuls, August 24, 1982.

APPENDIX I. Gear Description

GILL NETS 182.9 m (600 ft) long, 1.2 m (4 ft) deep, with 45.7 m (150 ft) sections of 76 mm (3 in), 102 mm (4 in), 127 mm (5 in) and 152 mm (6 in) stretched monofilament mesh. Use #12 monofilament thread (30 lb) to tie 76 mm and 102 mm meshes together; use #18 monofilament thread (44 lb) to tie 102 mm, 127 mm and 152 mm meshes together.

- o **Monofilament Thread Size:**
 - o #12: 76 and 102 mm meshes
 - o #18: 127 and 152 mm meshes
- o **Hanging:**
 - o 76 mm mesh: 4 meshes each 152 mm
 - o 102 mm mesh: 4 meshes each 203 mm
 - o 127 mm mesh: 3 meshes each 190 mm
 - o 152 mm mesh: 2 meshes each 152 mm
- o **Floatline:**
 - o 9.5 mm (3/8 in) green polypropylene; tensile strength: 816.5 kg (1,800 lb)
- o **Floats:**
 - o Hard plastic 44.45 mm (1.75 in) in diameter, 127 mm (5 in) in length with 9.5 mm diameter hole.
 - o Number and placement of floats:
 - o 76 mm mesh: There will be 38 floats in the 76 mm mesh section of the net by placing a float in the first 152 mm hanging on the net, followed by seven 152 mm hangings (1,064 mm total), followed by one hanging with a float, etc.
 - o 102 mm mesh: There will be 38 floats in the 102 mm mesh section of the net by placing a float in one 203 mm (8 in) hanging at the beginning of the section, followed by five 203 mm hangings (1,015 mm total), followed by one hanging with a float, etc.

APPENDIX I. (Continued)**GILL NETS (Continued)**

- o 127 mm mesh: There will be 35 floats in the 127 mm mesh section of the net by placing a float in one 190 mm (7.5 in.) hanging at the beginning of the section, followed by six 190 mm hangings (1,140 mm total), followed by one hanging with a float, etc.

 - o 152 mm mesh: There will be 38 floats in the 152 mm mesh section of the net by placing a float in one 152 mm hanging at the beginning of the section, followed by seven 152 mm hangings (1,064 mm total), followed by one hanging with a float, etc.

 - o **Leadline:**
 - o Solid core with braided covering; 22.7 kg (50 lb) per 182.9 m (600 ft).

 - o **Multifilament twine:**
 - o #18 for hanging floatline
 - o #24 for hanging leadline
-

APPENDIX I. (Continued)

BAG SEINE 18.3 m (60 ft) long, 1.8 m (6 ft) deep, with 19 mm (0.75 in) stretched nylon #5 multifilament mesh in wings and 13 mm (0.50 in) stretched nylon #5 multifilament mesh in bag. Wings: 8.3 m long; bag: 1.8 m long. A 12.2 m (40 ft) rope is hung between the two pull poles.

- o **Floatline:**
 - o 9.5 mm green polypropylene; tensile strength: 816.5 kg (1,800 lb).
- o **Floats:**
 - o 24 floats per bag seine.
 - o Floats should have a buoyancy of no less than 4.4 oz and no more than 5.0 oz. Examples of floats which meet these specifications are:
 - o Hard plastic 127 mm in length, 44.45 mm in diameter with 9.95 mm diameter hole or
 - o PVC sponge 38.1 mm in length, 63.5 mm outside diameter and 12.7 mm diameter hole.
- o **Leadline:**
 - o Solid core with braided covering; 38.6 kg (85 lb) per 182.9 m.
- o **Poles:**
 - o Poles are 1.8 m (6 ft) long. **Note:** Current poles measure between 1.5 m (5 ft) and 1.98 m (6 ft 7 in), there is no need to replace these poles.

APPENDIX I. (Continued)**BAG SEINE (Continued)**o **Construction of bag:**

Step	Action
1	Count 864 meshes and cut off unneeded webbing. As you count, be sure to mark the points along the back (Figure3).
2	Count meshes and mark the front (Figure 3).
3	Lay webbing on floor and put nails at points indicated in Figure 1.
4	Count meshes from back toward center to delineate portion to be cut out.
5	Cut webbing as indicated in Figure 3.
6	Take end that has been cut off the nails and lay other end out and repeat steps 4 and 5.
7	Take both ends and sew together using #12 twine as illustrated in Figure 4.
8	Sew back portion together as illustrated in Figure 4.

APPENDIX I. (Continued)**BAG SEINE (Continued)**

- o Hanging:

Step	Action
------	--------

-
- 1 Floatline:
 - o Wings: Use #12 twine. Hang wings on 127 m hangings with 10 meshes/hanging. There should be 650 meshes in each wing (12.3 m of stretched webbing); 65 hangings/wing. Begin hanging at pole end of floatline with five 127 mm hangings, followed by one 127 mm hanging with a float, followed by five 127 mm hangings, etc. You will end up with five 127 mm hangings after last float placement. After attaching bag (as outlined below) begin hanging second wing section with one 127 mm hanging with a float, followed by five 127 mm hanging, etc. You will end up with only four 127 mm hangings at pole end of second wing section.
 - o Bag: Hang bag on 102 mm hangings with 12 meshes/hanging. There should be 216 meshes; 18 hangings/bag. On first 102 mm hanging of bag (where it will be attached to the wing) place a float, followed by five 102 mm hangings, followed by one 102 mm hanging (which includes a float), followed by five 102 mm hangings, followed by one 102 mm hanging (includes a float), followed by four 102 mm hangings and the fifth one (which includes a float), at which point it will be attached to the other wing.

After attaching bag (as outlined above) begin hanging second wing section with five 127 mm hangings, followed by one 127 mm hanging with a float, followed by five 127 mm hanging, etc. You will end up with five 127 mm hanging after last float placement.
 2. Leadline: Use #18 twine. Hang wings on 127 mm hangings with 10 meshes/hanging except the last 9 outer hangings, put 11 meshes/hanging. Hang bag on 102mm hangings with 12 meshes/hanging.
 3. Weave wings and bag together with #12 twine. When weaving bag and wing together, pick up 1 bag mesh and wing mesh

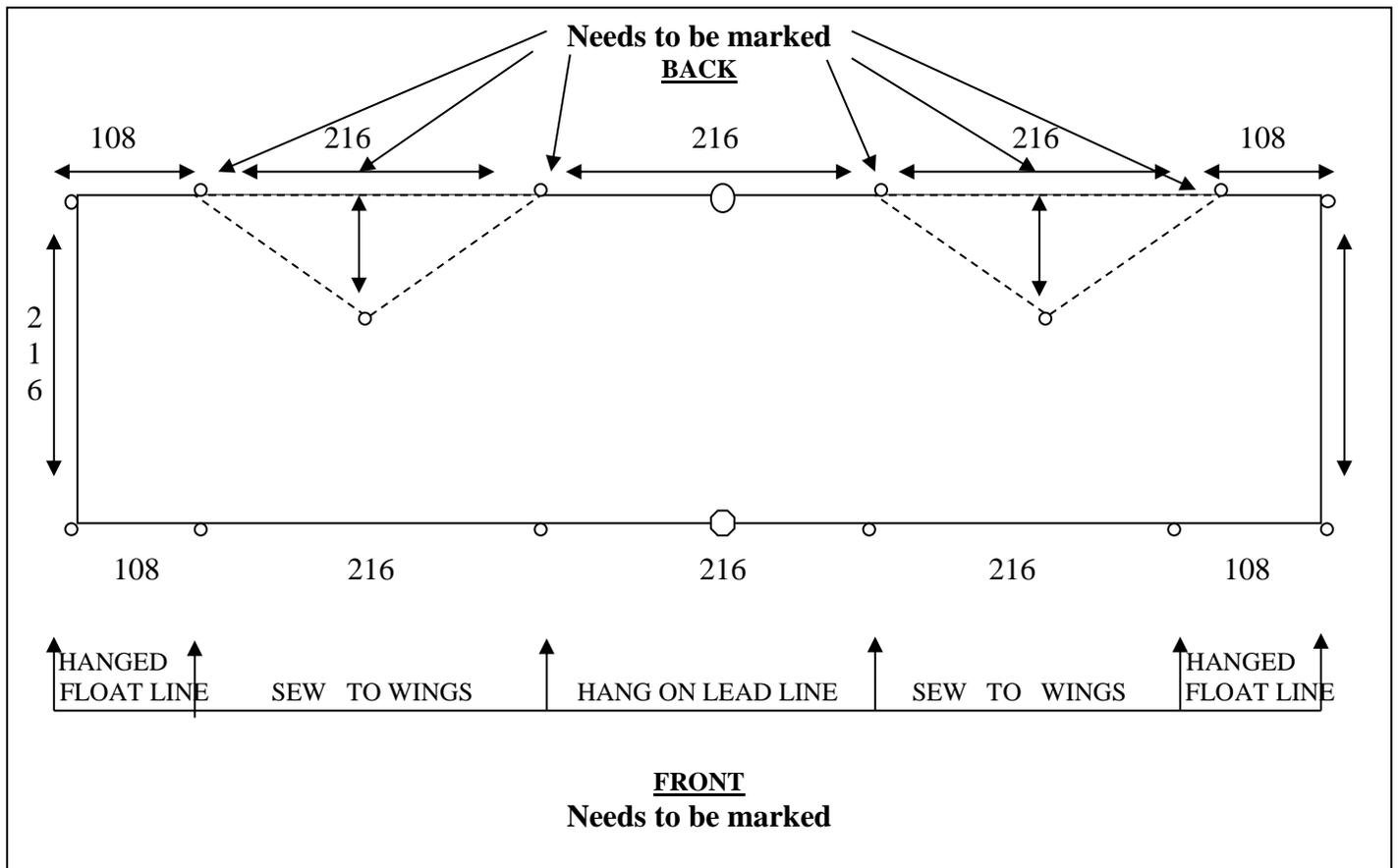
APPENDIX I. (Continued)

BAG SEINE (Continued)

then 2 bag meshes and 1 wing mesh. This yields 3 bag meshes to every 2 wing meshes.

4. Tie floatline to lead line with 3 mm (1/8 in) line at each end of seine.

Figure 3. How to Cut Bag Material for Bag Seines:

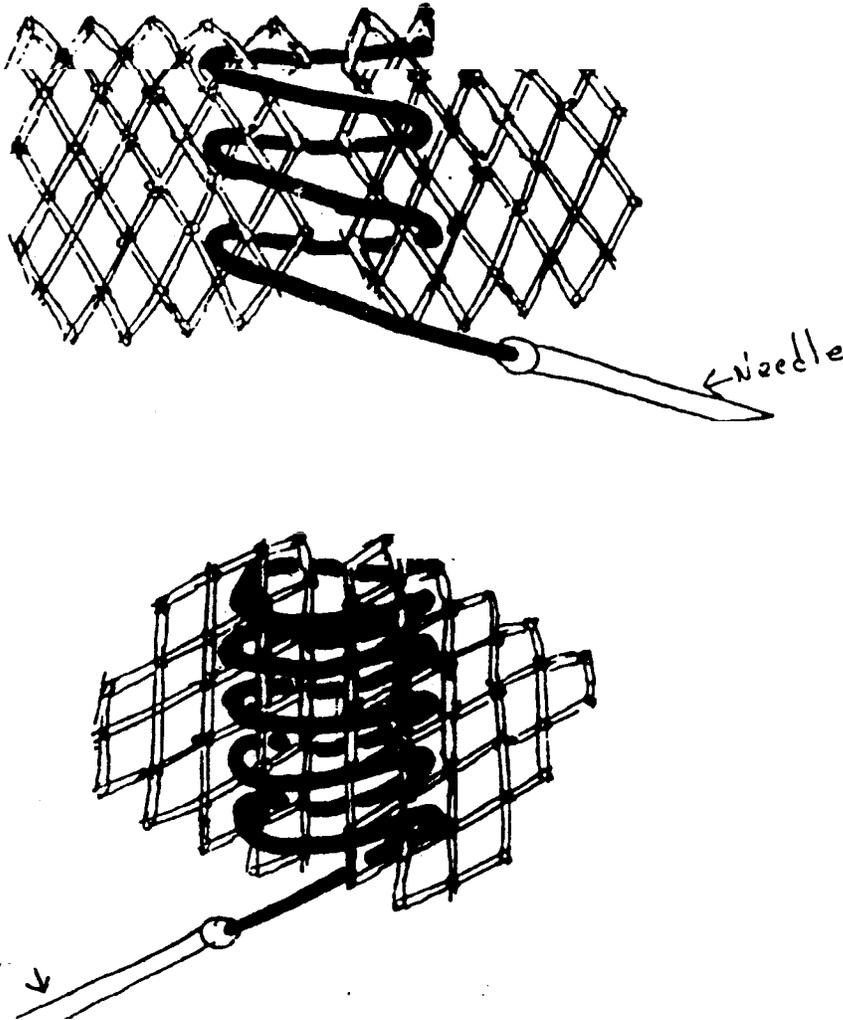


Note: Measurements indicate number of meshes. Circles indicate nails. Dashed lines indicate cuts.

APPENDIX I. (Continued)

BAG SEINE (Continued)

Figure 4. How to Sew Bag Material for Bag Seines:



For detailed instructions on how a damaged net should be repaired please refer to Gebhards, 1967. Electronic copies of this publication are available from the Science Director or Resource Program Specialist.

APPENDIX I. (Continued)**TRAWLS**

Standard trawl size is 5.7 m (18 ft 8 in (18 ft 6 in to 18 ft 10 in)) wide (headrope; outside hanging to outside hanging) at mouth with 38 mm (1.5 in) stretched nylon multifilament mesh throughout; footrope being 7.0 m (23 ft (22 ft 10 in to 23 ft 2 in)) wide from outside hanging to outside hanging.

- o Standard TPWD trawl pattern. Master kept by lower coast Region Director.
- o Thread Size: #9 in wings and body, and #15 in cod end of trawl.
- o **Headrope**
 - o 13 mm polydacron (1/2 in)
 - o 508-533 mm (20-21 in) leglines from inside of last hanging on each side.
 - o Hangings
69 hangings, 3 meshes per hanging, with 82 mm (3.25 in) centers.
 - o Floats: three 76x95 mm (3in x 3.75 in) floats; one centered with one additional float spaced 20 hangings on each side of center float.
- o **Footrope**
 - o 13 mm polydacron (1/2 in)
 - o Weights: thirty six 57 g (2 oz) split lead weights; one on each of the first six outside hangings, then one on every third hanging to the center.
 - o 508-533 mm (20-21 in) leglines from inside of last hanging on each side.
 - o Hangings
85 hangings, 3 meshes per hanging, with 82 mm (3.25 in) centers.

APPENDIX I. (Continued)**TRAWLS (Continued)**

- o **Net Dip**
 - o Industry standard green net guard - equal to Green Guard by Western Trawl Company.
- o **Cable and Bridle**
 - o 5.6 mm (7/32 in)
 - o Bridle 30.5 m (100 ft) long.
- o **Doors**
 - o 1.2 m (48 in) long, 0.5 m (20 in) high

Step	Action
------	--------

- o Trawl door adjustment:

1. Check chains on trawl doors.

Chains (3/16 in) on trawl doors are pre-set at the maintenance shop and should not need adjustment. Standard chain attachment is as follows:

- o Bottom front chain - 20 total links; 1st link attached to shackle/swivel, 16th link attached to nail on back of trawl door.
- o Bottom rear chain - 33 total links; 1st link attached to shackle/swivel, 29th link attached to nail on back of trawl door.
- o Top front chain - 23 total links; 1st link attached to shackle/swivel, 19th link attached to nail on back of trawl door.
- o Top rear chain - 35 total links; 1st link attached to shackle/swivel, 31st link attached to nail on back of trawl door.

APPENDIX I. (Continued)**TRAWLS (Continued)**

2. The basic adjustment to trawl doors to ensure the doors travels along the bay or Gulf bottom evenly is to lengthen or shorten the bottom leglines which attach to the doors; this should be done while trawling over hard shell or sand, bay or Gulf substrate. To ensure the standardization of the gear, any modification of the standardize trawl door or trawl should be approved by Resource Program Leader.
 3. If after adjustments made in 1 and 2 above, it is observed that the doors are not working properly, then check to ensure doors have been constructed properly. If additional adjustment is needed, document adjustment in writing to Ecosystem Leader, Regional Director and Resource Program Leader.
-

OYSTER DREDGE

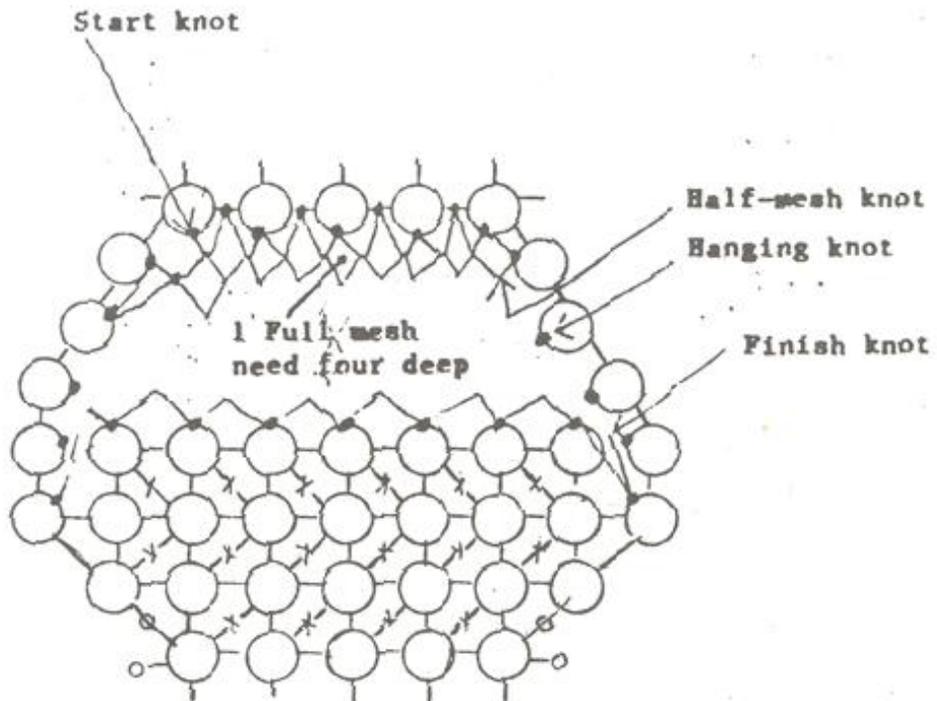
- o **Frame:**
 - o 13 mm diameter cold roll steel rod 495 mm (19.5 in) wide 241 mm (9.5in) high.
- o **Teeth:**
 - o 127 mm long: 9 spaced on 51 mm (2 in) centers
- o **Bag:**
 - o 356 mm (14 in) deep with 4 bottom rows and 1 top row of 51 mm diameter metal rings 6.3 mm (0.25 in) thick joined by 45 mm I.D. (1.75 in) No. 84 and 31.8 mm I.D. (1.25 in) No. 62 "S" hooks. The top row and bottom rows are joined by 4 full meshes of 76 mm mesh braided nylon solid core webbing of 8 mm (5/16 in) rope (Figure 5).

APPENDIX I. (Continued)

OYSTER DREDGE (Continued)

Figure 5. Oyster Dredge Bag

- 1 - No. 84 "S" hook
- - 2 - No. 62 "S" hook
- 1 - No. 62 "S" hook
- Location of hanging knot



APPENDIX J. History of Major Sampling Programs by Gear and Bay

GEAR	SABINE	GALVESTON	EAST MATAGORDA	MATAGORDA	SAN ANTONIO	ARANSAS	CORPUS CHRISTI	UPPER LAGUNA	LOWER LAGUNA
GILL NET	April 1986- Present	Nov. 1975- Present	Oct. 1976- Present	Nov. 1975- Present					
GULF TRAWL	Jul. 1986- Present	Aug. 1985- Present	Not used.	Not used.	Aug. 1985- Present	Not used.	Feb. 1985- Present	Not used.	Aug. 1985- Present
BAY TRAWL	Jan. 1986- Present	Jan. 1982- Present	April 1987- Present	May 1982- Present	Jan. 1982- Present	Jan. 1982- Present	May 1982- Present	May 1982- Present	May 1982- Present
ICWW TRAWL	Jan. 1992- Dec. 1995								
BEACH SEINE	Oct. 1987- Nov. 1995	Oct. 1987- Nov. 1995	Oct. 1987- Nov. 1995	Not used.	Oct. 1987- Nov. 1995	Oct. 1987- Nov. 1991	Not used.	Oct. 1987- Nov. 1995	Oct. 1987- Nov. 1995
BEACH BAG SEINE	Oct. 1987- Nov. 1995	Oct. 1987- Nov. 1995	Oct. 1987- Nov. 1995	Not used.	Oct. 1987- Nov. 1995	Oct. 1987- Nov. 1991	Not used.	Oct. 1987- Nov. 1995	Oct. 1987- Nov. 1995
BAY BAG SEINE	Jan. 1986- Present	Oct. 1977- Present	Feb. 1983- Present	Oct. 1977- Present					
OYSTER REEF DREDGE	Jan. 1986- Dec. 1991	Oct. 1984- Present	Jan. 1986- Dec. 1991	Jan. 1986- Present	Jan. 1986- Present	Jan. 1986- Present	Jan. 1986- 1991	Not used.	Jan. 1986- 1991
NON-REEF DREDGE	Jan. 1986- Dec. 1989	Jan. 1985- Dec. 1989	Jan. 1986- Dec. 1989						

APPENDIX K. Special Instructions for Handling Sea Turtles

I. Reporting Sea Turtles Caught in TPWD Gear

Any species of sea turtle caught incidentally when sampling must be reported within 24 hours by e-mail and/or phone to Zack Thomas (512) 389-8448. Complete the spreadsheet located at **N:_Turtle & Dolphin Reports to Feds\Coastwide Dolphin & Sea Turtle Encounter Report Tables.xlsx** (Table 1) and attach to e-mail with copy to Lance Robinson and Mark Lingo. Subsequent to receiving notification, Zack Thomas will forward the e-mail and spreadsheet to the following individuals/organizations:

- Biological Opinion Number**F/SER/2013/11106**
- Kelly Oliver-Amy (FWS).....kelly_oliver-amy@fws.gov
- Donna Shaver (NPS)donna_shaver@nps.gov
- Elizabeth Yarbrough (NOAA)elizabeth.yarbrough@noaa.gov
- Joseph Cavanaugh (NOAA)joseph.cavanaugh@noaa.gov
- NOAA Take Turtle Report.....takereport.nmfsser@noaa.gov
- Tammy Brooks (TPWD)tammy.brooks@tpwd.texas.gov
- Tom Shearer (FWS)tom_shearer@fws.gov

Table 1. Spreadsheet for reporting details of sea turtle encounters in TPWD sampling gear.

Encounter Number	Major Bay System	Date	Gear Code ¹	Mesh Size ² (in)	GN Set Start Time (h:min)	GN Set End Time (h:min)	Total Soak Time ³ (h)	Start Temp (°C)	End Temp ⁴ (°C)	TPWD Station ⁵ (X-YYY-ZZZ)	Latitude (N XX-YY-ZZ)	Longitude (W XX-YY-ZZ)	Species Name	Length ⁶ (mm)	Condition (RA=Released Alive); (D=Dead)
	(from drop-down list)														
EXAMPLES=>	Aransas	06/30/11	1	6	18:25	6:03	11.63	25.0	18.0	XYYYZZZ	XXYYZZ	XXYYZZ	Species Name	XXX	RA
1	Galveston	10/31/2012	1	4	17:53	8:23	14.50	21.1	18.9	2-144-727	29-00-58	95-12-39	Green	312	RA
2							0.00								
3							0.00								
4							0.00								
5							0.00								
6							0.00								
7							0.00								
8							0.00								
9							0.00								
10							0.00								
ENTER ANY ADDITIONAL INFORMATION REGARDING EACH ENCOUNTER															
Encounter Number	EXAMPLE=>Turtle sent to Padre Island National Seashore for analysis; Turtle had old tag on left front flipper number=xxxxxx;														
1	Released alive without injury turtle had two tags on the right and left front flippers TTN193, TTN194														
2															
3															
4															
5															
6															
7															
8															
9															
10															
HEADER EXPLANATIONS															
¹ GEAR CODE:	1 = GILL NET; 5 = SHRIMP TRAWL; 7 = BAG SEINE; 29 = LONGLINE														
² MESH SIZE:	NOT REPORTED FOR SHRIMP TRAWLS, BAG SEINES & LONG LINES														
³ SOAK TIMES:	NOT REPORTED FOR SHRIMP TRAWL AND BAG SEINE SAMPLES														
⁴ END TEMP:	NOT REPORTED FOR SHRIMP TRAWL AND BAG SEINE SAMPLES														
⁵ TPWD STATION:	RECORDED AS MAJOR BAY-MINOR BAY-GRID														
⁶ LENGTH:	TURTLES = CURVED CARAPACE LENGTH;														

II. Guidelines for Gill Net Sampling in Hotspots

Hotspots are sample grids in which two or more sea turtles have been captured. In order to reduce the probability of encounter in these hotspots only, modify the sampling protocol as follows:

1. Set no more than one net in identified hotspot grids per night per bay system throughout the gill net season.
2. Minimize soak time by:
 - a. Utilizing the “last out/first in” strategy for a gill net set in an identified hotspot, so that this net set is deployed last (at or after sunset) and retrieved first (at or before sunrise).
 - b. Reduce soak time by approximately two hours and/or
 - c. Set gill net within one hour of sunset and pick up within one hour of sunrise.
3. Prior to gill net pick up, motor the full length of the net to determine if a sea turtle is present. If found, the net will be hauled up immediately and sea turtle release and assessment of condition will be prioritized over fishery data collection. If a sea turtle is unresponsive or comatose, efforts will be made to resuscitate these individuals following 50 CFR 223.206(d)(1) guidelines (below).
4. Scan each sea turtle encountered for a Passive Integrated Transponder (PIT) and tag each live sea turtle (if no PIT is found), to evaluate post-release mortality, as described below. Contact Dr. Donna Shaver, Chief of the Division of Sea Turtle Science and Recovery at Padre Island National Seashore, National Park Service, to train staff in the proper handling and tagging procedures to minimize stress to the animals during this process.

III. Tagging Sea Turtles Caught in TPWD Gear

Application Protocol (from Padre Island National Seashore, National Parks Service)

SCANNING FOR PIT TAGS

1. Test PIT tag scanner by pressing the on/off button. Ensure digital display reads properly by passing the scanner over the test PIT tag while continually depressing the on/off button. The display reads “WORKING...” while in use. If you do not see this display, replace batteries and retest the unit.
2. Scan both front flippers & neck for the presence of PIT tags. Keep the PIT tag scanner as close to the flipper as possible. Starting directly behind the head of the turtle, depress the button and trace the scanner past the shoulder and to the tip of the flipper.*
3. Rescan the same flipper for accuracy and change sides.
4. Repeat the same procedure for the other flipper.

5. If a tag is found, record number on the nesting or stranding form.
6. If no tag is found, complete steps 7 – 16.

LIVE TURTLE PIT TAG APPLICATION

7. Test the PIT tag to be implanted by scanning the tag through the sterile envelope to ensure functionality and verify the identification code displayed is identical to the number listed on the attached adhesive labels.
8. Locate the injection site (Figure 1) by identifying the projecting bones near the axilla and one-third of the way down the flipper. The muscle mass between these bones is the desired implantation site.
9. Brush sand off the left front flipper and clean the site with a swab soaked in a solution of 10% povidone-iodine (e.g. Betadine[®]).
10. Lock the needle into the applicator and remove the plastic sheath.
11. Place the applicator and needle as close to parallel with the turtle's flipper as possible at the implantation site.
12. Insert the needle between the scales, into the flipper, and squeeze the applicator injector to insert the PIT tag.
13. Pull the needle out gently and place the plastic sheath back on the needle.
14. Discard the needle in your sharps container.
15. Apply antibiotic ointment (e.g. Neosporin[®]) to the area of the flipper where the tag was implanted. Apply pressure if bleeding occurs.
16. After bleeding has stopped, scan the flipper for the PIT tag to ensure that it is functioning in the turtle.
17. Allow the turtle to return to the water.

**Note: State and local PIT tag application protocols vary across the nation. Different projects have injected PIT tags in either left or right flippers, directly into the flipper or into the neck muscle. To ensure that each turtle is adequately tested for a PIT tag, scanning must be completed as directed above.*



Figure 1. PIT Tag injection site.

Photo courtesy of the National Park Service

IV. Handling Non-Responsive Sea Turtles

1. If a sea turtle is non-responsive, follow “Sea Turtle Handling and Resuscitation Guidelines” on next page.
2. Sea turtles can remain comatose for up to 12-24 hours, so they should be set aside and observed for several hours whenever possible.
3. The National Marine Fisheries Service requires that of copy of the “Sea Turtle Handling and Resuscitation Guidelines” be onboard all vessels.

V. Sea Turtle Handling and Resuscitation Guidelines

Any sea turtles taken incidentally during the course of fishing or scientific research activities must be handled with due care to prevent injury to live specimens, observed for activity, and returned to the water according to the following procedures:

- A. Sea turtles that are actively moving or determined to be dead, as described in paragraph (B)(4), must be released over the stem of the boat. In addition, they must be released only when fishing or scientific collection gear is not in use, when the engine gears are in neutral position, and in areas where they are unlikely to be recaptured or injured by vessels.
- B. Resuscitation must be attempted on sea turtles that are comatose or inactive by:
 - 1. Placing the turtle on its bottom shell (plastron) so that the turtle is right side up and elevating its hind quarters at least 6 inches (15.2 cm) for a period of 4 to 24 hours. The amount of elevation depends on the size of the turtle; greater elevations are needed for larger turtles. Periodically, rock the turtle gently left to right and right to left by holding the outer edge of the shell (carapace) and lifting one side about 3 inches (7.6 cm) then alternate to the other side. Gently touch the eye and pinch the tail (reflex test) periodically to see if there is a response.
 - 2. Sea turtles being resuscitated must be shaded and kept damp or moist but under no circumstance be placed into a container holding water. A water soaked towel placed over the head, carapace, and flippers is the most effective method in keeping a turtle moist.
 - 3. Sea turtles that revive and become active must be released over the stem of the boat only when fishing or scientific collection gear is not in use, when the engine gears are in neutral position, and in areas where they are unlikely to be recaptured or injured by vessels. Sea turtles that fail to respond to the reflex test or fail to move within 4 hours (up to 24, if possible) must be returned to the water in the same manner as that for actively moving turtles.

4. A turtle is determined to be dead if the muscles are stiff (rigor mortis) and/or the flesh has begun to rot; otherwise, the turtle is determined to be comatose or inactive and resuscitation attempts are necessary.

Any sea turtle so taken must not be consumed, sold, landed, offloaded, transshipped, or kept below deck.

These requirements are excerpted from 50 CFR 223.206(d)(1). Failure to follow these procedures is therefore a punishable offense under the Endangered Species Act.

VI. Sea Turtle Nests

In the event that a sea turtle nest is discovered, phone 1-866-TURTLE-5 (1-866-887-8535) or the Texas area contact nearest you:

Bolivar Peninsula, Galveston Island, Galveston Bay

NOAA Fisheries (Galveston Lab)

Shanna Kethan

Tel. (409) 766-3523

E-mail: shanna.baker@noaa.gov

<http://www.galvestonlab.sefsc.noaa.gov/seaturtles/index.html>

Matagorda Peninsula, Sergeant Beach

San Bernard National Wildlife Refuge

Jennifer Sanchez or Keith Ramos

Tel. (979) 964-3639

E-mail: jennifer_sanchez@fws.gov

Corpus Christi Bay, Upper Laguna Madre

Padre Island National Seashore

Donna Shaver

Tel. (361) 949-8173 ext. 226

Fax (361) 949-9134

E-mail: donna_shaver@nps.gov

APPENDIX L. Special Instructions for Handling Bottlenose Dolphins

I. Reporting Bottlenose Dolphins Caught In TPWD Gear

Any bottlenose dolphin caught incidentally when sampling must be reported within 24 hours by e-mail and/or telephone to Zack Thomas (512) 389-8448. Complete the spreadsheet located at **N:_Turtle & Dolphin Reports to Feds\Coastwide Dolphin & Sea Turtle Encounter Report Tables.xlsx** (Table 1) and attach to e-mail with copy to Lance Robinson and Mark Lingo. Subsequent to receiving notification, Zack Thomas will call the Marine Mammal Stranding Network 1-877-942-5343 and forward the e-mail and spreadsheet to the following individuals/organizations:

- Blair Mase (NOAA)blair.mase@noaa.gov
- Kelly Oliver-Amy (FWS).....kelly_oliver-amy@fws.gov
- Heidi Whitehead (MMSN).....hwhitehead@tmmsn.org
- Tammy Brooks (TPWD).....tammy.brooks@tpwd.state.tx.us
- Stacey Horstman (NOAA)stacey.horstman@noaa.gov

Table 1. Spreadsheet for reporting details of bottlenose dolphin encounters in TPWD sampling gear.

Encounter Number	Major Bay System <small>(from drop-down list)</small>	Date	Gear Code ¹	Mesh Size ² (in)	Depth where found (ft)	Time taken to Release (min)	Photos Taken (Y or N)	GN Set Start Time (h:min)	GN Set End Time (h:min)	Total Soak Time ³ (h) <small>Field Auto-Calculates</small>	Start Temp (°C)	End Temp ⁴ (°C)	TPWD Station ⁵ (X-YYY-ZZZ) <small>NOTE: Fields will Auto-Format--do not enter dashes or letters</small>	Latitude (N XX-YY-ZZ)	Longitude (W XX-YY-ZZ)	Species Name <small>(from drop-down list)</small>	Length ⁶ (mm)	Condition (RA=Released Alive); (D=Dead)
1										0.00								
2										0.00								
3										0.00								
4										0.00								
5										0.00								
6										0.00								
7										0.00								
8										0.00								
9										0.00								
10										0.00								
ENTER ANY ADDITIONAL INFORMATION REGARDING EACH ENCOUNTER																		
Encounter Number	EXAMPLE=>Dolphin active; no noticable injuries; released unharmed; swam away without noticable disorientation or hesitation.																	
1																		
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		
HEADER EXPLANATIONS																		
¹ GEAR CODE:	1 = GILL NET; 5 = SHRIMP TRAWL; 7 = BAG SEINE; 29 = LONGLINE																	
² MESH SIZE:	NOT REPORTED FOR SHRIMP TRAWLS, BAG SEINES & LONG LINES																	
³ SOAK TIMES:	NOT REPORTED FOR SHRIMP TRAWL AND BAG SEINE SAMPLES																	
⁴ END TEMP:	NOT REPORTED FOR SHRIMP TRAWL AND BAG SEINE SAMPLES																	
⁵ TPWD STATION:	RECORDED AS MAJOR BAY-MINOR BAY-GRID--- (NOTE: Minor bay and grid code numbers MUST be 3 digits; if not, precede with zeros to make 3 digits)																	
⁶ LENGTH:	DOLPHINS = STANDARD LENGTH (STRAIGHT-LINE FROM NOSE TO NOTCH IN TAIL FLUKES)																	

II. Prior to Setting Gill Nets

- A. Scan 360 degrees around the sample site to determine if marine mammals are within view of the proposed site. If present, deployment of sampling gear should not occur until the animal(s) are verified to be clear of the area.
- B. If marine mammals are present when setting the net, use techniques to encourage the animals to leave the site (e.g. raise and lower net leadline).
- C. If marine mammals are still within view of sample site, haul the net back onto the vessel and select an alternate site.

III. In the Event of a Marine Mammal Entanglement

- A. Report any entanglement within 24 hours as indicated above.
- B. For a live entanglement:
 1. For human safety, do not try to stop or prevent the animal from further wrapping in the gear nor jump in the water to attempt disentangling the animal(s).
 2. Work from the vessel as quickly and carefully as possible to pull the marine mammal(s) toward the vessel while cradling the animal(s) in the net. This can keep the net under the animal(s).
 3. Ensure the dolphin's blowhole is kept at the surface when the net is pulled alongside the vessel to ensure it can continue to breathe while disentangling.
 4. Marine mammals should remain in the water as much as possible while working to disentangle them, as this increases chances of survival and ensures human safety.
 5. Training on marine mammal disentanglement techniques may be provided upon request to ensure safety of crew and animals.
 6. Entangled animals:
 - a. While continuing to cradle the animal(s), work to cut the net away from the animal. Ensure all net is cut away from the animal(s) before release.
 - b. Mother/calf pairs of dolphins will often hit a net and become entangled together making the disentanglement quite difficult.
 7. Once the animal is free from gear, prior to its release:
 - a. Photograph the animal if possible.

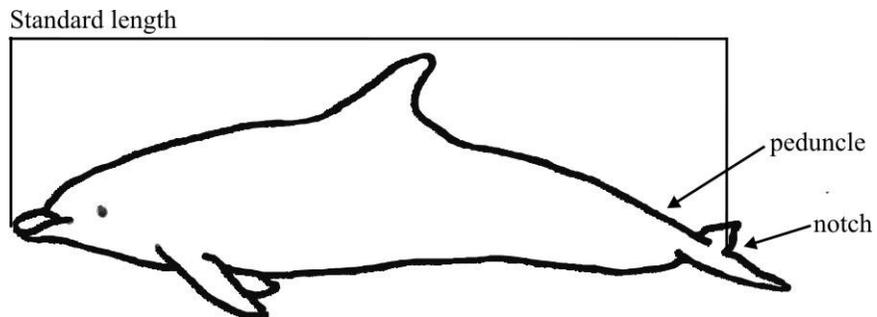
- b. Note condition upon release and any injuries (i.e. swam away vigorously with no obvious injuries, did not swim away vigorously, surfaced to breathe, etc.) and
- c. Pertinent details on the nature of the entanglement, such as, but not limited to, gear characteristics, where in the net the animal was entangled, disentanglement quite difficult, etc.

IV. In the Event of a Marine Mammal Mortality

- A. The animal should be hauled aboard the vessel and retained for pickup by a marine mammal stranding network member. Call the marine mammal stranding network at 1-877-942-5343 for guidance on what to do with the carcass (i.e. where to bring for necropsy, etc.).
- B. Photos, measurements, and entanglement information should also be documented and follow the “NMFS Protocol for Dead Entangled Small Cetaceans” (below).

V. NMFS Protocol for Dead Entangled Small Cetaceans

- A. In the event of a small cetacean mortality that is incidentally captured, please document the following items:
 1. Latitude and longitude of entanglement.
 2. Photograph entire animal before removing from gear (with a scale bar if possible).
 3. Photograph lateral view of dorsal fin (for photo-identification) with no gear (with a scale bar if possible).
 4. Measure standard length from tip of upper jaw to notch in the tail (see picture below).



5. Photograph ventrum, including genital slits so sex can be determined (with a scale bar if possible).

6. After removal of gear, photograph any obvious signs of net impressions/lacerations or rope wounds (With a scale bar if possible).
7. Document where in the gear the animal was entangled/caught and how gear was wrapped around animal.
8. Document reason dolphin could not be hauled aboard the vessel.

Send information to:
Stacey Horstman
NOAA NMFS
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701

Compiled by: Barbie L. Byrd, NNFS/SEFSC, Beaufort, NC and Stacey Horstman, NMFS/SERO, St. Petersburg, FL

APPENDIX M. Species Codes

VEGETATION SPECIES LIST (2015)
(Scientific Name Order)

CODE NO.	REF.	COMMON NAME	SCIENTIFIC NAME
4023	20	Mermaid's wine cup	<u>Acetabularia crenulata</u>
4005		Algae - unidentified	ALGAE
4055	16	Alligatorweed	<u>Alternanthera philoxeroides</u>
4031		Giant cane	<u>Arundinaria gigantea</u>
4032		Black mangrove	<u>Avicennia germinans</u>
4045	32	Maritime saltwort	<u>Batis maritima</u>
4046	32	Bushy sea-ox-eye	<u>Borrchia frutescens</u>
4039		Carolina fanwort	<u>Cabomba caroliniana</u>
4056		(Alga - green)	<u>Caulerpa mexicana</u>
4057		(Alga - green)	<u>Caulerpa prolifera</u>
4030	20	(Alga - red)	<u>Centroceras clavulatum</u>
4067		Common hornwort (coontail)	<u>Ceratophyllum demersum</u>
4034	20	(Alga - brown)	<u>Cladosiphon occidentalis</u>
4064		(Green fleece)	<u>Codium isthmocladum</u>
4012	20	Manatee grass	<u>Cymodocea filiformis</u>
4019	20	(Alga - brown)	<u>Dictyota dichotoma</u>
4033	20	(Alga - red)	<u>Digenia simplex</u>
4048	32	Coastal saltgrass	<u>Distichlis spicata</u>
4021	16	Common water hyacinth	<u>Eichhornia crassipes</u>
4054	20	(Alga - green)	<u>Enteromorpha lingulata</u>
4027	20	(Algae - brown)	Family Ectocarpaceae
4020	20	(Algae - red)	Family Gracilariaceae
4071	20	(Branched uniseriate green algae - unidentified)	Genus Cladophora
4022	16	(Hornwort or coontail - unidentified)	Genus Ceratophyllum
4038		(Waterweed - unidentified)	Genus Egeria
4016	20	(Sargassum - unidentified)	Genus Sargassum
4015	16	(Cordgrass - unidentified)	Genus Spartina
4069	20	(Sea lettuce - unidentified)	Genus Ulva
4070	61,62	(Tri-lobe segmented alga)	<u>Halimeda incrassata</u>
4013	20	Shoal grass	<u>Halodule beaudettei</u>
4010	20	Star grass	<u>Halophila engelmannii</u>
4062	33	Grassleaf mudplantian	<u>Heteranthera dubia</u>
4065	33	Umbrella water-pennywort	<u>Hydrocotyle umbellata</u>
4059		(Alga - red)	<u>Jania capillacea</u>
4029	20	(Alga - red)	<u>Laurencia poitei</u>
4028		Common duckweed	<u>Lemna minor</u>
4047	32	Shoregrass	<u>Monanthochloe littoralis</u>
4035	16	Eurasian water milfoil	<u>Myriophyllum spicatum</u>
4026	16	Yellow waterlily	<u>Nymphaea mexicana</u>
4043	16	Duck-lettuce	<u>Ottelia alismoides</u>
4036	20	(Alga - brown)	<u>Padina vickersiae</u>
4072	20,65	(Broad-blade alga)	<u>Petalonia fascia</u>
4024	16	Common reed	<u>Phragmites australis</u>
4053	16	Water-lettuce	<u>Pistia stratiotes</u>
4040	16	Fennel-leaf pondweed	<u>Potamogeton pectinatus</u>
4063	33	Thin-leaf pondweed	<u>Potamogeton pusillus</u>
4014	20	Widgeon grass	<u>Ruppia maritima</u>
4061	16	Delta arrowhead	<u>Sagittaria platyphylla</u>
4041		Annual glasswort	<u>Salicornia bigelovii</u>
4044	32	Creeping glasswort	<u>Salicornia depressa</u>

VEGETATION SPECIES LIST (2015)
(Scientific Name Order)

CODE NO.	REF.	COMMON NAME	SCIENTIFIC NAME
4052	16	Water spangles	<u>Salvinia minima</u>
4066		Giant salvinia	<u>Salvinia molesta</u>
4017	20	(Broad-leaf sargassum)	<u>Sargassum fluitans</u>
4018	20	(Narrow-leaf sargassum)	<u>Sargassum natans</u>
4042		Saltmarsh bulrush	<u>Scirpus robustus</u>
4060	16	Coast sea purslane	<u>Sesuvium maritimum</u>
4025	16	Smooth cordgrass	<u>Spartina alterniflora</u>
4049	32	Marshhay cordgrass	<u>Spartina patens</u>
4011	20	Turtle grass	<u>Thalassia testudinum</u>
4037	20	(Narrow-thallus sea lettuce)	<u>Ulva fasciata</u>
4068	20	(Broad-thallus sea lettuce)	<u>Ulva lactuca</u>
4050	31	Sea oats	<u>Uniola paniculata</u>
4058	16	American wild celery	<u>Vallisneria americana</u>
4004		Emergent vegetation	VEGEMERGEN
4000		No vegetation	VEGNONE
4003		Submergent vegetation	VEGSUBMERG
4001		Vegetation presence undetermined	VEGUNDETER
4002		Vegetation type unidentified	VEGUNIDENT

VERTEBRATE SPECIES LIST (2015)
(Scientific Name Order)

CODE NO.	REF.	COMMON NAME	SCIENTIFIC NAME
949		Flat needlefish	<u><i>Ablennes hians</i></u>
572		Sergeant major	<u><i>Abudefduf saxatilis</i></u>
571		Night sergeant	<u><i>Abudefduf taurus</i></u>
547		Wahoo	<u><i>Acanthocybium solandri</i></u>
497		Scrawled cowfish	<u><i>Acanthostracion quadricornis</i></u>
548		Doctorfish	<u><i>Acanthurus chirurgus</i></u>
293	ARP	Blue tang	<u><i>Acanthurus coeruleus</i></u>
714		Lined sole	<u><i>Achirus lineatus</i></u>
742		Diamond killifish	<u><i>Adinia xenica</i></u>
727		Spotted eagle ray	<u><i>Aetobatus narinari</i></u>
559		Mountain mullet	<u><i>Agonostomus monticola</i></u>
263	14	Wood duck	<u><i>Aix sponsa</i></u>
118	15	Bonefish	<u><i>Albula vulpes</i></u>
994		African pompano	<u><i>Alectis ciliaris</i></u>
919		Longnose lancetfish	<u><i>Alepisaurus ferox</i></u>
281		American alligator	<u><i>Alligator mississippiensis</i></u>
881		Common thresher shark	<u><i>Alopias vulpinus</i></u>
717		Skipjack herring	<u><i>Alosa chrysochloris</i></u>
258		Dotterel filefish	<u><i>Aluterus heudelotii</i></u>
110	15	Unicorn filefish	<u><i>Aluterus monoceros</i></u>
501		Orange filefish	<u><i>Aluterus schoepfii</i></u>
500		Scrawled filefish	<u><i>Aluterus scriptus</i></u>
184		Rock bass	<u><i>Ambloplites rupestris</i></u>
300	ARP	Redspotted hawkfish	<u><i>Amblycirrhitus pinos</i></u>
736		Black bullhead	<u><i>Ameiurus melas</i></u>
737		Yellow bullhead	<u><i>Ameiurus natalis</i></u>
738		Brown bullhead	<u><i>Ameiurus nebulosus</i></u>
074		Bowfin	<u><i>Amia calva</i></u>
012	15	Fringed pipefish	<u><i>Anarchopterus criniger</i></u>
266	14	Northern pintail	<u><i>Anas acuta</i></u>
264	14	American widgeon	<u><i>Anas americana</i></u>
268	14	Northern shoveler	<u><i>Anas clypeata</i></u>
265	14	Green-winged teal	<u><i>Anas crecca</i></u>
269	14	Cinnamon teal	<u><i>Anas cyanoptera</i></u>
267	14	Blue-winged teal	<u><i>Anas discors</i></u>
270	14	Mottled duck	<u><i>Anas fulvigula</i></u>
271	14	Mallard	<u><i>Anas platyrhynchos</i></u>
066		American black duck	<u><i>Anas rubripes</i></u>
272	14	Gadwall	<u><i>Anas strepera</i></u>
733		Striped anchovy	<u><i>Anchoa hepsetus</i></u>
734		Dusky anchovy	<u><i>Anchoa lyolepis</i></u>
NOTE: Database includes records for synonym of above species (*292, *Longnose anchovy, * <i>Anchoa nasuta</i>).			
601		Bay anchovy	<u><i>Anchoa mitchilli</i></u>
778		Three-eye flounder	<u><i>Ancylopsetta dilecta</i></u>
649		Ocellated flounder	<u><i>Ancylopsetta quadrocellata</i></u>
701		American eel	<u><i>Anguilla rostrata</i></u>
592		Black margate	<u><i>Anisotremus surinamensis</i></u>
591		Porkfish	<u><i>Anisotremus virginicus</i></u>
060		Greater white-fronted goose	<u><i>Anser albifrons</i></u>
925		Striated frogfish	<u><i>Antennarius striatus</i></u>
957		Deepbody boarfish	<u><i>Antigonia capros</i></u>

VERTEBRATE SPECIES LIST (2015)
(Scientific Name Order)

CODE NO.	REF.	COMMON NAME	SCIENTIFIC NAME
131		Smooth softshell (turtle)	<u>Apalone mutica</u>
757		Freshwater drum	<u>Aplodinotus grunniens</u>
985		Bridle cardinalfish	<u>Apogon aurolineatus</u>
986		Flamefish	<u>Apogon maculatus</u>
108	15	Black snapper	<u>Apsilus dentatus</u>
621		Sheepshead	<u>Archosargus probatocephalus</u>
041		Sea bream	<u>Archosargus rhomboidalis</u>
533		Silver-rag	<u>Ariomma bondi</u>
610		Hardhead catfish	<u>Ariopsis felis</u>
696		Southern stargazer	<u>Astroscopus y-graecum</u>
048		Mexican tetra	<u>Astyanax mexicanus</u>
675		Alligator gar	<u>Atractosteus spatula</u>
546		Frigate mackerel	<u>Auxis thazard</u>
273	14	Lesser scaup	<u>Aythya affinis</u>
274	14	Redhead	<u>Aythya americana</u>
275	14	Ring-necked duck	<u>Aythya collaris</u>
200	17	Greater scaup	<u>Aythya marila</u>
276	14	Canvasback	<u>Aythya valisineria</u>
611		Gafftopsail catfish	<u>Bagre marinus</u>
627		Silver perch	<u>Bairdiella chrysoura</u>
971		Red barbier	<u>Baldwinella vivanus</u>
507		Gray triggerfish	<u>Balistes capriscus</u>
506		Queen triggerfish	<u>Balistes vetula</u>
872		Sooty eel	<u>Bascanichthys bascanium</u>
844		Whip eel	<u>Bascanichthys scuticaris</u>
767		Frillfin goby	<u>Bathygobius soporator</u>
524		Horned searobin	<u>Bellator militaris</u>
860		Duckbill flathead	<u>Bembrops anatirostris</u>
557		Goby flathead	<u>Bembrops gobioides</u>
075	15	Spotfin hogfish	<u>Bodianus pulchellus</u>
304	ARP	Spanish hogfish	<u>Bodianus rufus</u>
825		Ragged goby	<u>Bollmannia communis</u>
038		Nilgai	<u>Boselaphus tragocamelus</u>
351		Twospot flounder	<u>Bothus robinsi</u>
220		Canada goose	<u>Branta canadensis</u>
929		Antenna codlet	<u>Bregmaceros atlanticus</u>
658		Finescale menhaden	<u>Brevoortia gunteri</u>
604		Gulf menhaden	<u>Brevoortia patronus</u>
807		Atlantic bearded brotula	<u>Brotula barbata</u>
277	14	Bufflehead	<u>Bucephala albeola</u>
242		Common goldeneye	<u>Bucephala clangula</u>
585		Jolthead porgy	<u>Calamus bajonado</u>
584		Saucereye porgy	<u>Calamus calamus</u>
583		Whitebone porgy	<u>Calamus leucosteus</u>
555		Knobbed porgy	<u>Calamus nodosus</u>
582		Sheepshead porgy	<u>Calamus penna</u>
305	ARP	Whitespotted filefish	<u>Cantherhines macrocerus</u>
499		Orangespotted filefish	<u>Cantherhines pullus</u>
505		Rough triggerfish	<u>Canthidermis maculata</u>
320	ARP	Goldface toby	<u>Canthigaster jamestyleri</u>
321	ARP	Sharpnose puffer	<u>Canthigaster rostrata</u>

VERTEBRATE SPECIES LIST (2015)
(Scientific Name Order)

CODE NO.	REF.	COMMON NAME	SCIENTIFIC NAME
504		Ocean triggerfish	<u>Canthidermis sufflamen</u>
785		Yellow jack	<u>Caranx bartholomaei</u>
871		Blue runner	<u>Caranx crysos</u>
628		Crevalle jack	<u>Caranx hippos</u>
648		Horse-eye jack	<u>Caranx latus</u>
119	15	Black jack	<u>Caranx lugubris</u>
814		Bar jack	<u>Caranx ruber</u>
937		Pearlfish	<u>Carapus bermudensis</u>
100		Goldfish	<u>Carassius auratus</u>
887		Blacknose shark	<u>Carcharhinus acronotus</u>
793		Spinner shark	<u>Carcharhinus brevipinna</u>
888		Silky shark	<u>Carcharhinus falciformis</u>
784		Finetooth shark	<u>Carcharhinus isodon</u>
755		Bull shark	<u>Carcharhinus leucas</u>
787		Blacktip shark	<u>Carcharhinus limbatus</u>
889		Oceanic whitetip shark	<u>Carcharhinus longimanus</u>
890		Dusky shark	<u>Carcharhinus obscurus</u>
786		Sandbar shark	<u>Carcharhinus plumbeus</u>
788		Smalltail shark	<u>Carcharhinus porosus</u>
858		Night shark	<u>Carcharhinus signatus</u>
880		Sand tiger	<u>Carcharias taurus</u>
882		White shark	<u>Carcharodon carcharias</u>
866		Loggerhead seaturtle	<u>Caretta caretta</u>
859		Blackline tilefish	<u>Caulolatilus cyanops</u>
990		Anchor tilefish	<u>Caulolatilus intermedius</u>
848		Blueline tilefish	<u>Caulolatilus microps</u>
002		Largescale fat snook	<u>Centropomus mexicanus</u>
141		Smallscale fat snook	<u>Centropomus parallelus</u>
715		Common snook	<u>Centropomus undecimalis</u>
961		Bank sea bass	<u>Centropristis ocyurus</u>
811		Rock sea bass	<u>Centropristis philadelphia</u>
980		Graysby	<u>Cephalopholis cruentata</u>
117	15	Coney	<u>Cephalopholis fulva</u>
103	58, 59	Atlantic anchoveta	<u>Cetengraulis edentulus</u>
634		Atlantic spadefish	<u>Chaetodipterus faber</u>
298	ARP	Foureye butterflyfish	<u>Chaetodon capistratus</u>
577		Spotfin butterflyfish	<u>Chaetodon ocellatus</u>
576		Reef butterflyfish	<u>Chaetodon sedentarius</u>
297	ARP	Banded butterflyfish	<u>Chaetodon striatus</u>
651		Stretchjaw blenny	<u>Chasmodes longimaxilla</u>
941		Margined flyingfish	<u>Cheilopogon cyanopterus</u>
942		Spotfin flyingfish	<u>Cheilopogon furcatus</u>
943		Atlantic flyingfish	<u>Cheilopogon melanurus</u>
869		Green seaturtle	<u>Chelonia mydas</u>
225		Snow goose	<u>Chen caerulescens</u>
687		Striped burrfish	<u>Chilomycterus schoepfi</u>
916		Shortnose greeneye	<u>Chlorophthalmus agassizi</u>
669		Atlantic bumper	<u>Chloroscombrus chrysurus</u>
313	ARP	Blue chromis	<u>Chromis cyanea</u>
318	ARP	Yellowtail reeffish	<u>Chromis enchrysurus</u>
570		Sunshinefish	<u>Chromis insolata</u>

VERTEBRATE SPECIES LIST (2015)
(Scientific Name Order)

CODE NO.	REF.	COMMON NAME	SCIENTIFIC NAME
569		Brown chromis	<u>Chromis multilineata</u>
315	ARP	Purple reeffish	<u>Chromis scotti</u>
520		Horned whiff	<u>Citharichthys cornutus</u>
519		Spotted whiff	<u>Citharichthys macrops</u>
647		Bay whiff	<u>Citharichthys spilopterus</u>
849		Class ray-finned fishes	Class Actinopterygii
303	ARP	Creole wrasse	<u>Clepticus parrae</u>
250		Northern bobwhite quail	<u>Colinus virginianus</u>
863		Conger eel	<u>Conger oceanicus</u>
820		Barred grunt	<u>Conodon nobilis</u>
598		Pompano dolphinfish	<u>Coryphaena equiselis</u>
597		Dolphinfish	<u>Coryphaena hippurus</u>
073		Western diamond-backed rattlesnake	<u>Crotalus atrox</u>
770		Darter goby	<u>Ctenogobius boleosoma</u>
550		Freshwater goby	<u>Ctenogobius shufeldti</u>
706		Spottail goby	<u>Ctenogobius stigmaturus</u>
179	24	Grass carp	<u>Ctenopharyngodon idella</u>
828		Mexican flounder	<u>Cyclopsetta chittendeni</u>
518		Spotfin flounder	<u>Cyclopsetta fimbriata</u>
613		Sand seatrout	<u>Cynoscion arenarius</u>
614		Spotted seatrout	<u>Cynoscion nebulosus</u>
657		Silver seatrout	<u>Cynoscion nothus</u>
686		Sheepshead minnow	<u>Cyprinodon variegatus</u>
652		Common carp	<u>Cyprinus carpio</u>
521		Flying gurnard	<u>Dactylopterus volitans</u>
635		Southern stingray	<u>Dasyatis americana</u>
900		Roughtail stingray	<u>Dasyatis centroura</u>
724		Atlantic stingray	<u>Dasyatis sabina</u>
873		Bluntnose stingray	<u>Dasyatis say</u>
296	ARP	Mackerel scad	<u>Decapterus macarellus</u>
875		Round scad	<u>Decapterus punctatus</u>
565		Red hogfish	<u>Decodon puellaris</u>
261		Black-bellied whistling-duck	<u>Dendrocygna autumnalis</u>
262		Fulvous whistling-duck	<u>Dendrocygna bicolor</u>
113	15	Marbled grouper	<u>Dermatolepis inermis</u>
865		Leatherback seaturtle	<u>Dermodochelys coriacea</u>
102	15	Irish pompano	<u>Diapterus auratus</u>
927	01	Atlantic batfish	<u>Dibranchius atlanticus</u>
493		Porcupinefish	<u>Diodon hystrix</u>
812		Dwarf sand perch	<u>Diplectrum bivittatum</u>
962		Sand perch	<u>Diplectrum formosum</u>
581		Spottail pinfish	<u>Diplodus holbrookii</u>
861		Spreadfin skate	<u>Dipturus olseni</u>
723		Fat sleeper	<u>Dormitator maculatus</u>
606		Gizzard shad	<u>Dorosoma cepedianum</u>
711		Threadfin shad	<u>Dorosoma petenense</u>
685		Sharksucker	<u>Echeneis naucrates</u>
109	60, 15	Whitefin sharksucker	<u>Echeneis neucratoides</u>
910		Spotted spoon-nose eel	<u>Echiophis intertinctus</u>
912		Snapper eel	<u>Echiophis punctifer</u>
995		Rainbow runner	<u>Elagatis bipinnulata</u>

VERTEBRATE SPECIES LIST (2015)
(Scientific Name Order)

CODE NO.	REF.	COMMON NAME	SCIENTIFIC NAME
764		Largescaled spinycheek sleeper	<u>Eleotris amblyopsis</u>
659		Ladyfish	<u>Elops saurus</u>
864		Spiny flounder	<u>Engyophrys senta</u>
963		Rock hind	<u>Epinephelus adscensionis</u>
964		Speckled hind	<u>Epinephelus drummondhayi</u>
257		Red hind	<u>Epinephelus guttatus</u>
965		Atlantic goliath grouper	<u>Epinephelus itajara</u>
966		Red grouper	<u>Epinephelus morio</u>
968		Nassau grouper	<u>Epinephelus striatus</u>
319	ARP	Jackknife-fish	<u>Equetus lanceolatus</u>
868		Hawksbill seaturtle	<u>Eretmochelys imbricata</u>
765		Emerald sleeper	<u>Erotelis smaragdus</u>
851		Queen snapper	<u>Etelis oculatus</u>
779		Fringed flounder	<u>Etropus crossotus</u>
846		Round herring	<u>Etrumeus teres</u>
874		Spotfin mojarra	<u>Eucinostomus argenteus</u>
630		Silver jenny	<u>Eucinostomus gula</u>
756		Mottled mojarra	<u>Eucinostomus lefroyi</u>
036	04	Flagfin mojarra	<u>Eucinostomus melanopterus</u>
939		Flying halfbeak	<u>Euleptorhamphus velox</u>
544		Little tunny	<u>Euthynnus alletteratus</u>
768		Lyre goby	<u>Evorthodus lyricus</u>
944		Oceanic two-wing flyingfish	<u>Exocoetus obtusirostris</u>
385		Family surgeonfishes	Family Acanthuridae
373		Family American soles	Family Achiridae
453		Family lancetfishes	Family Alepisauridae
483		Family thresher sharks	Family Alopiidae
255		Family ducks, geese, and swans	Family Anatidae
463		Family freshwater eels	Family Anguillidae
444		Family frogfishes	Family Antennariidae
417		Family cardinalfishes	Family Apogonidae
448		Family sea catfishes	Family Ariidae
432		Family New World silversides	Family Atherinopsidae
371		Family triggerfishes	Family Balistidae
447		Family toadfishes	Family Batrachoididae
435		Family needlefishes	Family Belontiidae
390		Family combtooth blennies	Family Blenniidae
442		Family codlets	Family Bregmacerotidae
389		Family dragonets	Family Callionymidae
427		Family boarfishes	Family Caproidae
412		Family jacks	Family Carangidae
439		Family pearlfishes	Family Carapidae
480		Family requiem sharks	Family Carcharhinidae
450		Family suckers	Family Catostomidae
419		Family sunfishes	Family Centrarchidae
359	15	Family medusafishes	Family Centrolophidae
423		Family snooks	Family Centropomidae
356	ARP	Family tube blennies	Family Chaenopsidae
401		Family butterflyfishes	Family Chaetodontidae
876	35	Family seaturtles (scuted shell)	Family Cheloniidae
454		Family greeneyes	Family Chlorophthalmidae

VERTEBRATE SPECIES LIST (2015)
(Scientific Name Order)

CODE NO.	REF.	COMMON NAME	SCIENTIFIC NAME
515		Family cichlids and tilapias	Family Cichlidae
458		Family herrings	Family Clupeidae
460		Family conger eels	Family Congridae
411		Family dolphinfishes	Family Coryphaenidae
372		Family tonguefishes	Family Cynoglossidae
451		Family carps and minnows	Family Cyprinidae
434		Family pupfishes	Family Cyprinodontidae
376		Family flying gurnards	Family Dactylopteridae
471		Family whiptail stingrays	Family Dasyatidae
366		Family porcupinefishes	Family Diodontidae
413		Family remoras	Family Echeneidae
388		Family sleepers	Family Eleotridae
464		Family tenpounders	Family Elopidae
252		(Family emydid turtles)	Family Emydidae
457		Family anchovies	Family Engraulidae
402		Family spadefishes	Family Ephippidae
358		Family groupers	Family Epinephelidae
436		Family flyingfishes	Family Exocoetidae
426		Family cornetfishes	Family Fistulariidae
489		Family topminnows	Family Fundulidae
441		Family cods	Family Gadidae
254	34	Family loons	Family Gaviidae
490		Family snake mackerels	Family Gempylidae
408		Family mojarras	Family Gerreidae
446		Family clingfishes	Family Gobiesocidae
387		Family gobies	Family Gobiidae
407		Family grunts	Family Haemulidae
487		Family cow sharks	Family Hexanchidae
456		Family mooneyes	Family Hiodontidae
429		Family squirrelfishes	Family Holocentridae
449		Family North American catfishes	Family Ictaluridae
381		Family billfishes	Family Istiophoridae
403		Family sea chubs	Family Kyphosidae
399		Family wrasses and parrotfishes	Family Labridae
482		Family mackerel sharks	Family Lamnidae
465		Family gars	Family Lepisosteidae
409		Family tripletails	Family Lobotidae
445		Family goosefishes	Family Lophiidae
410		Family snappers	Family Lutjanidae
425		Family snipefishes	Family Macroramphosidae
438		Family grenadiers	Family Macrouridae
416		Family tilefishes	Family Malacanthidae
491		Family tarpons	Family Megalopidae
386		Family wormfishes	Family Microdesmidae
365		Family molas	Family Molidae
370		Family filefishes	Family Monacanthidae
422		Family temperate basses	Family Moronidae
397		Family mullets	Family Mugilidae
404		Family goatfishes	Family Mullidae
462		Family morays	Family Muraenidae
452		Family lanternfishes	Family Myctophidae

VERTEBRATE SPECIES LIST (2015)
(Scientific Name Order)

CODE NO.	REF.	COMMON NAME	SCIENTIFIC NAME
468		Family eagle rays and mantas	Family Myliobatidae
461		Family duckbill eels	Family Nettastomatidae
484		Family sand tigers	Family Odontaspidae
443		Family batfishes	Family Ogcocephalidae
459		Family snake eels	Family Ophichthidae
440		Family cusk-eels	Family Ophidiidae
395		Family jawfishes	Family Opistognathidae
368		Family boxfishes	Family Ostraciidae
375		Family sand flounders	Family Paralichthyidae
430		Family armorheads	Family Pentacerotidae
394		Family flatheads	Family Percophidae
374		Family righteye flounders	Family Pleuronectidae
433		Family livebearers	Family Poeciliidae
431		Family beardfishes	Family Polymixiidae
392		Family threadfins	Family Polynemidae
355	ARP	Family angelfishes	Family Pomacanthidae
400		Family damselfishes	Family Pomacentridae
415		Family bluefishes	Family Pomatomidae
418		Family bigeyes	Family Priacanthidae
475		Family sawfishes	Family Pristidae
414		Family cobias	Family Rachycentridae
472		Family skates	Family Rajidae
199	17	Family rails, gallinules, and coots	Family Rallidae
105		Family frogs	Family Ranidae
485		Family whale sharks	Family Rhincodontidae
474		Family guitarfishes	Family Rhinobatidae
095		Family trouts and salmon	Family Salmonidae
405		Family drums and croakers	Family Sciaenidae
383		Family mackerels	Family Scombridae
379		Family scorpionfishes	Family Scorpaenidae
481		Family cat sharks	Family Scyliorhinidae
421		Family sea basses	Family Serranidae
406		Family porgies	Family Sparidae
396		Family barracudas	Family Sphyraenidae
478		Family hammerhead sharks	Family Sphyrnidae
477		Family dogfish sharks	Family Squalidae
476		Family angel sharks	Family Squatinidae
380		Family butterfishes	Family Stromateidae
424		Family pipefishes and seahorses	Family Syngnathidae
455		Family lizardfishes	Family Synodontidae
367		Family puffers	Family Tetraodontidae
369		Family spikefishes	Family Triacanthodidae
384		Family cutlassfishes	Family Trichiuridae
377		Family searobins	Family Triglidae
393		Family stargazers	Family Uranoscopidae
469		Family American round stingrays	Family Urotrygonidae
382		Family swordfishes	Family Xiphiidae
428		Family dories	Family Zeidae
958		Bluespotted cornetfish	<u>Fistularia tabacaria</u>
551		Spotfin dragonet	<u>Foetorepus agassizi</u>
239		Ocellated frogfish	<u>Fowlerichthys ocellatus</u>

VERTEBRATE SPECIES LIST (2015)
(Scientific Name Order)

CODE NO.	REF.	COMMON NAME	SCIENTIFIC NAME
924		Singlespot frogfish	<u>Fowlerichthys</u> <u>radiosus</u>
053		American coot	<u>Fulica</u> <u>americana</u>
674		Golden topminnow	<u>Fundulus</u> <u>chrysotus</u>
702		Gulf killifish	<u>Fundulus</u> <u>grandis</u>
743		Saltmarsh topminnow	<u>Fundulus</u> <u>jenkinsi</u>
692		Bayou killifish	<u>Fundulus</u> <u>pulvereus</u>
691		Longnose killifish	<u>Fundulus</u> <u>similis</u>
891		Tiger shark	<u>Galeocerdo</u> <u>cuvier</u>
885	02	Marbled cat shark	<u>Galeus</u> <u>arae</u>
744		Western mosquitofish	<u>Gambusia</u> <u>affinis</u>
132	17	Common loon	<u>Gavia</u> <u>immer</u>
111	15	Snake mackerel	<u>Gempylus</u> <u>serpens</u>
161	15	(Menhaden - unidentified)	Genus Brevoortia
164		(Seatrout - unidentified)	Genus Cynoscion
163		(Killifish - unidentified)	Genus Fundulus
162		(Kingfish - unidentified)	Genus Menticirrhus
360	24	(Shiner - unidentified)	Genus Notropis
198	15	(Batfish - unidentified)	Genus Ogocephalus
157		(Flounder - unidentified)	Genus Paralichthys
707		(Lionfish - unidentified)	Genus Pterois
156		(Mackerel - unidentified)	Genus Scomberomorus
361		(Tilapia - unidentified)	Genus Tilapia
593		Yellowfin mojarra	<u>Gerres</u> <u>cinereus</u>
878		Nurse shark	<u>Ginglymostoma</u> <u>cirratum</u>
740		Stippled clingfish	<u>Gobiesox</u> <u>punctulatus</u>
688		Skilletfish	<u>Gobiesox</u> <u>strumosus</u>
769		Violet goby	<u>Gobioides</u> <u>broussonetii</u>
766		Bigmouth sleeper	<u>Gobiomorus</u> <u>dormitor</u>
684		Highfin goby	<u>Gobionellus</u> <u>oceanicus</u>
626		Naked goby	<u>Gobiosoma</u> <u>bosc</u>
792		Code goby	<u>Gobiosoma</u> <u>robustum</u>
969		Spanish flag	<u>Gonioplectrus</u> <u>hispanus</u>
221	56	Sandhill crane	<u>Grus</u> <u>canadensis</u>
165		Gold brotula	<u>Gunterichthys</u> <u>longipenis</u>
781		Fringed sole	<u>Gymnachirus</u> <u>texae</u>
307	ARP	Goldentail moray	<u>Gymnothorax</u> <u>miliaris</u>
663		Spotted moray	<u>Gymnothorax</u> <u>moringa</u>
783		Blackedge moray	<u>Gymnothorax</u> <u>nigromarginatus</u>
904		Honeycomb moray	<u>Gymnothorax</u> <u>saxicola</u>
901		Smooth butterfly ray	<u>Gymnura</u> <u>micrura</u>
590		Tomtate	<u>Haemulon</u> <u>aurolineatum</u>
589		Spanish grunt	<u>Haemulon</u> <u>macrostomum</u>
116	15	Cottonwick	<u>Haemulon</u> <u>melanurum</u>
588		Sailors choice	<u>Haemulon</u> <u>parra</u>
026	15	White grunt	<u>Haemulon</u> <u>plumierii</u>
587		Striped grunt	<u>Haemulon</u> <u>striatum</u>
564		Slippery dick	<u>Halichoeres</u> <u>bivittatus</u>
563		Painted wrasse	<u>Halichoeres</u> <u>caudalis</u>
112	15	Puddingwife	<u>Halichoeres</u> <u>radiatus</u>
804		Pancake batfish	<u>Halieutichthys</u> <u>aculeatus</u>
732		Scaled sardine	<u>Harengula</u> <u>jaquana</u>

VERTEBRATE SPECIES LIST (2015)
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CODE NO.	REF.	COMMON NAME	SCIENTIFIC NAME
970		Longtail bass	<u>Hemanthias leptus</u>
815		Bluntnose jack	<u>Hemicaranx amblyrhynchus</u>
020	15	Balao	<u>Hemiramphus balao</u>
940		Ballyhoo	<u>Hemiramphus brasiliensis</u>
545		Rio Grande cichlid	<u>Herichthys cyanoguttatus</u>
015	15	Glasseye snapper	<u>Heteropriacanthus cruentatus</u>
877		Bluntnose sixgill shark	<u>Hexanchus griseus</u>
721		Goldeye	<u>Hiodon alosoides</u>
913		Mooneye	<u>Hiodon tergisus</u>
662		Lined seahorse	<u>Hippocampus erectus</u>
746		Dwarf seahorse	<u>Hippocampus zosterae</u>
705		American plaice	<u>Hippoglossoides platessoides</u>
945		Blackwing flyingfish	<u>Hirundichthys rondelietii</u>
926		Sargassumfish	<u>Histrio histrio</u>
575		Blue angelfish	<u>Holacanthus bermudensis</u>
308	ARP	Queen angelfish	<u>Holacanthus ciliaris</u>
309	ARP	Rock beauty	<u>Holacanthus tricolor</u>
954		Squirrelfish	<u>Holocentrus adscensionis</u>
955		Longspine squirrelfish	<u>Holocentrus rufus</u>
798		Freckled pikeconger	<u>Hoplunnis macrura</u>
799		Spotted pikeconger	<u>Hoplunnis tenuis</u>
847		Black driftfish	<u>Hyperoglyphe bythites</u>
678		Crested blenny	<u>Hypleurochilus geminatus</u>
972		Butter hamlet	<u>Hypoplectrus unicolor</u>
741		False silverstripe halfbeak	<u>Hyporhamphus meeki</u>
364		Yellowedge grouper	<u>Hyporthodus flavolimbatus</u>
967		Warsaw grouper	<u>Hyporthodus nigritus</u>
256		Snowy grouper	<u>Hyporthodus niveatus</u>
761		Feather blenny	<u>Hypsoblennius hentz</u>
295	ARP	Tessellated blenny	<u>Hypsoblennius invemar</u>
762		Freckled blenny	<u>Hypsoblennius ionthas</u>
617		Blue catfish	<u>Ictalurus furcatus</u>
622		Channel catfish	<u>Ictalurus punctatus</u>
631		Smallmouth buffalo	<u>Ictiobus bubalus</u>
623		Bigmouth buffalo	<u>Ictiobus cyprinellus</u>
537		Sailfish	<u>Istiophorus platypterus</u>
883		Shortfin mako	<u>Isurus oxyrinchus</u>
114	15	Longfin mako	<u>Isurus paucus</u>
125	04	Dwarf herring	<u>Jenkinsia lamprotaenia</u>
862		Lancer stargazer	<u>Kathetostoma albigutta</u>
543		Skipjack tuna	<u>Katsuwonus pelamis</u>
789		Yellow chub	<u>Kyphosus incisor</u>
578		Bermuda chub	<u>Kyphosus saltatrix</u>
554		Hairy blenny	<u>Labrisomus nuchipinnis</u>
561		Hogfish	<u>Lachnolaimus maximus</u>
021	48	Smooth trunkfish	<u>Lactophrys triqueter</u>
782		Smooth puffer	<u>Lagocephalus laevigatus</u>
633		Pinfish	<u>Lagodon rhomboides</u>
673		Banded drum	<u>Larimus fasciatus</u>
608		Spot	<u>Leiostomus xanthurus</u>
867		Kemp's ridley seaturtle	<u>Lepidochelys kempii</u>

VERTEBRATE SPECIES LIST (2015)
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CODE NO.	REF.	COMMON NAME	SCIENTIFIC NAME
028		Escolar	<u>Lepidocybium flavobrunneum</u>
728		Spotted gar	<u>Lepisosteus oculatus</u>
697		Longnose gar	<u>Lepisosteus osseus</u>
729		Shortnose gar	<u>Lepisosteus platostomus</u>
488		Green sunfish	<u>Lepomis cyanellus</u>
720		Warmouth	<u>Lepomis gulosus</u>
718		Bluegill	<u>Lepomis macrochirus</u>
126	24	Longear sunfish	<u>Lepomis megalotis</u>
637		Redear sunfish	<u>Lepomis microlophus</u>
013		Spotted sunfish	<u>Lepomis punctatus</u>
014	38	Bantam sunfish	<u>Lepomis symmetricus</u>
703		Blackedge cusk-eel	<u>Lepophidium brevibarbe</u>
909		Sailfin eel	<u>Letharchus velifer</u>
898		Rosette skate	<u>Leucoraja garmani</u>
022	15	Wrasse basslet	<u>Liopropoma eukrines</u>
672		Atlantic tripletail	<u>Lobotes surinamensis</u>
558		Swordtail jawfish	<u>Lonchopisthus micrognathus</u>
922		Goosefish	<u>Lophius americanus</u>
278	14	Hooded merganser	<u>Lophodytes cucullatus</u>
991		Tilefish	<u>Lopholatilus chamaeleonticeps</u>
693		Rainwater killifish	<u>Lucania parva</u>
596		Mutton snapper	<u>Lutjanus analis</u>
670		Schoolmaster	<u>Lutjanus apodus</u>
837		Blackfin snapper	<u>Lutjanus buccanella</u>
818		Red snapper	<u>Lutjanus campechanus</u>
115	15	Cubera snapper	<u>Lutjanus cyanopterus</u>
722		Gray snapper	<u>Lutjanus griseus</u>
726		Dog snapper	<u>Lutjanus jocu</u>
671		Lane snapper	<u>Lutjanus synagris</u>
362		Silk snapper	<u>Lutjanus vivanus</u>
007	29	Bobcat	<u>Lynx rufus</u>
127	24, 66	Ribbon shiner	<u>Lythrurus fumeus</u>
059		Alligator snapping turtle	<u>Macrochelys temminckii</u>
959		Longspine snipefish	<u>Macroramphosus scolopax</u>
536		Blue marlin	<u>Makaira nigricans</u>
992		Sand tilefish	<u>Malacanthus plumieri</u>
289		Diamond-backed terrapin	<u>Malaclemys terrapin</u>
903		Giant manta	<u>Manta birostris</u>
730		Tarpon	<u>Megalops atlanticus</u>
503		Black durgon	<u>Melichthys niger</u>
667		Rough silverside	<u>Membras martinica</u>
615		Inland silverside	<u>Menidia beryllina</u>
064		Texas silverside	<u>Menidia clarkhubbsi</u>
212		Tidewater silverside	<u>Menidia peninsulae</u>
758		Southern kingfish	<u>Menticirrhus americanus</u>
676		Gulf kingfish	<u>Menticirrhus littoralis</u>
759		Northern kingfish	<u>Menticirrhus saxatilis</u>
279	14	Common merganser	<u>Mergus merganser</u>
280	14	Red-breasted merganser	<u>Mergus serrator</u>
549		Pink wormfish	<u>Microdesmus longipinnis</u>
771		Clown goby	<u>Microgobius gulosus</u>

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CODE NO.	REF.	COMMON NAME	SCIENTIFIC NAME
710		Green goby	<u>Microgobius thalassinus</u>
009		Opossum pipefish	<u>Microphis brachyurus</u>
602		Atlantic croaker	<u>Micropogonias undulatus</u>
065		Smallmouth bass	<u>Micropterus dolomieu</u>
632	66, 68	Spotted bass	<u>Micropterus punctulatus</u>
791		Largemouth bass	<u>Micropterus salmoides</u>
317	ARP	Yellowtail damselfish	<u>Microspathodon chrysurus</u>
492		Ocean sunfish	<u>Mola mola</u>
004		Fringed filefish	<u>Monacanthus ciliatus</u>
624		White perch	<u>Morone americana</u>
749		White bass	<u>Morone chrysops</u>
750		Yellow bass	<u>Morone mississippiensis</u>
751		Striped bass	<u>Morone saxatilis</u>
062		Hybrid bass (striped x white)	<u>Morone x (M. saxatilis x M. chrysops)</u>
612		Striped mullet	<u>Mugil cephalus</u>
760		White mullet	<u>Mugil curema</u>
821		Red goatfish	<u>Mullus auratus</u>
017		Mink	<u>Mustela vison</u>
892		Smooth dogfish	<u>Mustelus canis</u>
855		Florida smoothhound	<u>Mustelus norrisi</u>
839		Gulf smoothhound	<u>Mustelus sinuamexicanus</u>
978		Western comb grouper	<u>Mycteroperca acutirostris</u>
974		Black grouper	<u>Mycteroperca bonaci</u>
975		Yellowmouth grouper	<u>Mycteroperca interstitialis</u>
976		Gag	<u>Mycteroperca microlepis</u>
977		Scamp	<u>Mycteroperca phenax</u>
237		Yellowfin grouper	<u>Mycteroperca venenosa</u>
253		Nutria	<u>Myocastor coypus</u>
664		Speckled worm eel	<u>Myrophis punctatus</u>
796		Lesser electric ray	<u>Narcine bancroftii</u>
790		Lemon shark	<u>Negaprion brevirostris</u>
934	01	Stripefin brotula	<u>Neobythites marginatus</u>
907		Ridged eel	<u>Neoconger mucronatus</u>
031	15	Spinycheek scorpionfish	<u>Neomerinthe hemingwayi</u>
938		Marlin-spike	<u>Nezumia bairdi</u>
532		Man-of-war fish	<u>Nomeus gronovii</u>
046	24	Golden shiner	<u>Notemigonus crysoleucas</u>
595		Yellowtail snapper	<u>Ocyurus chrysurus</u>
224		White-tailed deer	<u>Odocoileus virginianus</u>
008		Longnose batfish	<u>Ogcocephalus corniger</u>
357		Polka-dot batfish	<u>Ogcocephalus cubifrons</u>
805		Shortnose batfish	<u>Ogcocephalus nasutus</u>
197	04	Spotted batfish	<u>Ogcocephalus pantostictus</u>
806		Roughback batfish	<u>Ogcocephalus parvus</u>
668		Leatherjack	<u>Oligoplites saurus</u>
019	42	Common muskrat	<u>Ondatra zibethicus</u>
731		Shrimp eel	<u>Ophichthus gomesi</u>
716		Spotted snake eel	<u>Ophichthus ophis</u>
704		Palespotted eel	<u>Ophichthus puncticeps</u>
363		King snake eel	<u>Ophichthus rex</u>

VERTEBRATE SPECIES LIST (2015)
(Scientific Name Order)

CODE NO.	REF.	COMMON NAME	SCIENTIFIC NAME
306		Blotched cusk-eel	<u>Ophidion grayi</u>
935		Bank cusk-eel	<u>Ophidion holbrookii</u>
679		Crested cusk-eel	<u>Ophidion josephi</u>
936		Striped cusk-eel	<u>Ophidion marginatum</u>
294	ARP	Redlip blenny	<u>Ophioblennius macclurei</u>
712		Atlantic thread herring	<u>Opisthonema oglinum</u>
689		Gulf toadfish	<u>Opsanus beta</u>
350		Leopard toadfish	<u>Opsanus pardus</u>
236		(Shark - unidentified)	Order Lamniformes/Squaliformes
473		(Electric ray - unidentified)	Order Torpediniformes
023		Blue tilapia	<u>Oreochromis aureus</u>
642		Pigfish	<u>Orthopristis chrysoptera</u>
946		Smallwing flyingfish	<u>Oxyporhamphus micropterus</u>
018		Ruddy duck	<u>Oxyura jamaicensis</u>
005	15	Red porgy	<u>Pagrus pagrus</u>
552		Seaweed blenny	<u>Parablennius marmoratus</u>
661		Margintail conger	<u>Paraconger caudilimbatus</u>
498		Jambeau	<u>Parahollardia lineata</u>
780		Gulf flounder	<u>Paralichthys albigutta</u>
616		Southern flounder	<u>Paralichthys lethostigma</u>
856		Broad flounder	<u>Paralichthys squamilentus</u>
979		Atlantic creolefish	<u>Paranthias furcifer</u>
918		Longnose greeneye	<u>Parasudis truculenta</u>
580		High-hat	<u>Pareques acuminatus</u>
010		Blackbar drum	<u>Pareques iwamotoi</u>
311		Cubbyu	<u>Pareques umbrosus</u>
947		Sailfin flyingfish	<u>Parexocoetus brachypterus</u>
683		Gulf butterfish	<u>Peprilus burti</u>
682		Harvestfish	<u>Peprilus paru</u>
528		Slender searobin	<u>Peristedion gracile</u>
525		Armored searobin	<u>Peristedion miniatum</u>
205	15	Freckled cardinalfish	<u>Phaeoptyx conklini</u>
006		Neotropic cormorant	<u>Phalacrocorax brasilianus</u>
932	01	Metallic codling	<u>Physiculus fulvus</u>
104		Keeltail needlefish	<u>Platybelone argalus</u>
226		Horned grebe	<u>Podiceps auritus</u>
288	17	Eared grebe	<u>Podiceps nigricollis</u>
024	15	Amazon molly	<u>Poecilia formosa</u>
745		Sailfin molly	<u>Poecilia latipinna</u>
511	04	Deepwater dab	<u>Poecilopsetta beanii</u>
625		Black drum	<u>Pogonias cromis</u>
641		Atlantic threadfin	<u>Polydactylus octonemus</u>
952		Beardfish	<u>Polymixia lowei</u>
574		Gray angelfish	<u>Pomacanthus arcuatus</u>
573		French angelfish	<u>Pomacanthus paru</u>
310	ARP	Townsend's angelfish (variable hybrid of Blue and Queen angelfishes)	<u>Pomacanthus x (P. bermudensis x P. ciliaris)</u>
586		Burro grunt	<u>Pomadasys crocro</u>
752		Bluefish	<u>Pomatomus saltatrix</u>
336		White crappie	<u>Pomoxis annularis</u>
719		Black crappie	<u>Pomoxis nigromaculatus</u>

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CODE NO.	REF.	COMMON NAME	SCIENTIFIC NAME
853		Longspine scorpionfish	<u>Pontinus longispinis</u>
690		Atlantic midshipman	<u>Porichthys plectrodon</u>
841		Bigeye	<u>Priacanthus arenatus</u>
775		Bigeye searobin	<u>Prionotus longispinosus</u>
523		Barred searobin	<u>Prionotus martis</u>
773		Bandtail searobin	<u>Prionotus ophryas</u>
774		Mexican searobin	<u>Prionotus paralatus</u>
522		Bluespotted searobin	<u>Prionotus roseus</u>
827		Blackwing searobin	<u>Prionotus rubio</u>
776		Leopard searobin	<u>Prionotus scitulus</u>
777		Shortwing searobin	<u>Prionotus stearnsi</u>
644		Bighead searobin	<u>Prionotus tribulus</u>
291		Short bigeye	<u>Pristigenys alta</u>
819		Wenchman	<u>Pristipomoides aquilonaris</u>
895		Smalltooth sawfish	<u>Pristis pectinata</u>
896		Largetooth sawfish	<u>Pristis pristis</u>
016		Common raccoon	<u>Procyon lotor</u>
299	ARP	Bank butterflyfish	<u>Prognathodes aya</u>
948		Bluntnose flyingfish	<u>Prognichthys occidentalis</u>
531		Bluefin driftfish	<u>Psenes pellucidus</u>
033		Eastern river cooter	<u>Pseudemys concinna concinna</u>
101	54	Parana sailfin catfish	<u>Pterygoplichthys anisitsi</u>
739		Flathead catfish	<u>Pylodictis olivaris</u>
656		Cobia	<u>Rachycentron canadum</u>
797		Clearnose skate	<u>Raja eglanteria</u>
899		Roundel skate	<u>Raja texana</u>
107		American bullfrog	<u>Rana catesbeiana</u>
106		Pig frog	<u>Rana grylio</u>
063		Southern leopard frog	<u>Rana sphenoccephala</u>
842		Whalesucker	<u>Remora australis</u>
993		Marlinsucker	<u>Remora osteochir</u>
843		Remora	<u>Remora remora</u>
879		Whale shark	<u>Rhincodon typus</u>
897		Atlantic guitarfish	<u>Rhinobatos lentiginosus</u>
660		Cownose ray	<u>Rhinoptera bonasus</u>
763		Atlantic sharpnose shark	<u>Rhizoprionodon terraenovae</u>
594		Vermilion snapper	<u>Rhomboplites aurorubens</u>
905		Yellow conger	<u>Rhynchoconger flavus</u>
906		Whiptail conger	<u>Rhynchoconger gracilior</u>
001		Oilfish	<u>Ruvettus pretiosus</u>
143	15	Whitespotted soapfish	<u>Rypticus maculatus</u>
984		Greater soapfish	<u>Rypticus saponaceus</u>
542		Atlantic bonito	<u>Sarda sarda</u>
802		Spanish sardine	<u>Sardinella aurita</u>
735		Largescale lizardfish	<u>Saurida brasiliensis</u>
061	15	Smallscale lizardfish	<u>Saurida caribbaea</u>
553		Molly miller	<u>Scartella cristata</u>
629		Red drum	<u>Sciaenops ocellatus</u>
826		Atlantic chub mackerel	<u>Scomber colias</u>
772		King mackerel	<u>Scomberomorus cavalla</u>
681		Spanish mackerel	<u>Scomberomorus maculatus</u>

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CODE NO.	REF.	COMMON NAME	SCIENTIFIC NAME
541		Cero	<u>Scomberomorus regalis</u>
514		Windowpane	<u>Scopthalmus aquosus</u>
694		Barbfish	<u>Scorpaena brasiliensis</u>
854		Smoothhead scorpionfish	<u>Scorpaena calcarata</u>
530		Hunchback scorpionfish	<u>Scorpaena dispar</u>
852		Spotted scorpionfish	<u>Scorpaena plumieri</u>
886		Chain dogfish	<u>Scyliorhinus retifer</u>
816		Bigeye scad	<u>Selar crumenophthalmus</u>
754		Atlantic moonfish	<u>Selene setapinnis</u>
655		Lookdown	<u>Selene vomer</u>
996		Greater amberjack	<u>Seriola dumerili</u>
003		Lesser amberjack	<u>Seriola fasciata</u>
997		Almaco jack	<u>Seriola rivoliana</u>
998		Banded rudderfish	<u>Seriola zonata</u>
981		Pygmy sea bass	<u>Serraniculus pumilio</u>
813		Blackear bass	<u>Serranus atrobranchus</u>
982		Tattler	<u>Serranus phoebe</u>
983		Belted sandfish	<u>Serranus subligarius</u>
011		Greater siren	<u>Siren lacertina</u>
560		Bucktooth parrotfish	<u>Sparisoma radians</u>
496		Marbled puffer	<u>Sphoeroides dorsalis</u>
650		Least puffer	<u>Sphoeroides parvus</u>
495		Bandtail puffer	<u>Sphoeroides spengleri</u>
494		Checkered puffer	<u>Sphoeroides testudineus</u>
823		Great barracuda	<u>Sphyraena barracuda</u>
824		Guaguanche	<u>Sphyraena guachancho</u>
794		Scalloped hammerhead	<u>Sphyrna lewini</u>
795		Great hammerhead	<u>Sphyrna mokarran</u>
725		Bonnethead	<u>Sphyrna tiburo</u>
893		Smalleye hammerhead	<u>Sphyrna tudes</u>
894		Cuban dogfish	<u>Squalus cubensis</u>
857		Atlantic angel shark	<u>Squatina dumeril</u>
568		Dusky damselfish	<u>Stegastes adustus</u>
314	ARP	Longfin damselfish	<u>Stegastes diencaeus</u>
567		Beaugregory	<u>Stegastes leucostictus</u>
312	ARP	Bicolor damselfish	<u>Stegastes partitus</u>
316	ARP	Threespot damselfish	<u>Stegastes planifrons</u>
566		Cocoa damselfish	<u>Stegastes variabilis</u>
620		Star drum	<u>Stellifer lanceolatus</u>
301	ARP	Atlantic spotted dolphin	<u>Stenella frontalis</u>
677		Longspine porgy	<u>Stenotomus caprinus</u>
699		Planehead filefish	<u>Stephanolepis hispidus</u>
326		Pygmy filefish	<u>Stephanolepis setifer</u>
665		Atlantic needlefish	<u>Strongylura marina</u>
950		Redfin needlefish	<u>Strongylura notata</u>
666		Timucu	<u>Strongylura timucu</u>
068		Feral hog	<u>Sus scrofa</u>
829		Shoal flounder	<u>Syacium gunteri</u>
513		Dusky flounder	<u>Syacium papillosum</u>
121	29	Eastern cottontail	<u>Sylvilagus floridanus</u>
838		Offshore tonguefish	<u>Symphurus civitatum</u>

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CODE NO.	REF.	COMMON NAME	SCIENTIFIC NAME
510		Spottedfin tonguefish	<u><i>Symphurus diomedeanus</i></u>
509		Pygmy tonguefish	<u><i>Symphurus parvus</i></u>
508		Longtail tonguefish	<u><i>Symphurus pelicanus</i></u>
646		Blackcheek tonguefish	<u><i>Symphurus plagiusa</i></u>
137	04	Spottail tonguefish	<u><i>Symphurus urospilus</i></u>
988		Blackmouth bass	<u><i>Synagrops bellus</i></u>
989	01	Keelcheek bass	<u><i>Synagrops spinosus</i></u>
747		Dusky pipefish	<u><i>Syngnathus floridae</i></u>
748		Northern pipefish	<u><i>Syngnathus fuscus</i></u>
654		Chain pipefish	<u><i>Syngnathus louisianae</i></u>
960		Sargassum pipefish	<u><i>Syngnathus pelagicus</i></u>
713		Gulf pipefish	<u><i>Syngnathus scovelli</i></u>
645		Inshore lizardfish	<u><i>Synodus foetens</i></u>
914		Sand diver	<u><i>Synodus intermedius</i></u>
803		Offshore lizardfish	<u><i>Synodus poeyi</i></u>
535		White marlin	<u><i>Kajikia albida</i></u>
534		Longbill spearfish	<u><i>Tetrapturus pfluegeri</i></u>
302	ARP	Bluehead	<u><i>Thalassoma bifasciatum</i></u>
240	15	Yellowfin tuna	<u><i>Thunnus albacares</i></u>
540		Blackfin tuna	<u><i>Thunnus atlanticus</i></u>
830		Bigeye tuna	<u><i>Thunnus obesus</i></u>
539		Bluefin tuna	<u><i>Thunnus thynnus</i></u>
152		Red-eared slider	<u><i>Trachemys scripta elegans</i></u>
915		Snakefish	<u><i>Trachinocephalus myops</i></u>
753		Florida pompano	<u><i>Trachinotus carolinus</i></u>
999		Permit	<u><i>Trachinotus falcatus</i></u>
599		Palometa	<u><i>Trachinotus goodei</i></u>
817		Rough scad	<u><i>Trachurus lathami</i></u>
680		Atlantic cutlassfish	<u><i>Trichiurus lepturus</i></u>
512		Sash flounder	<u><i>Trichopsetta ventralis</i></u>
619		Hogchoker	<u><i>Trinectes maculatus</i></u>
247		Bottlenose dolphin	<u><i>Tursiops truncatus</i></u>
951		Houndfish	<u><i>Tylosurus crocodilus</i></u>
579		Sand drum	<u><i>Umbrina coroides</i></u>
822		Dwarf goatfish	<u><i>Upeneus parvus</i></u>
324		Cottonmouth jack	<u><i>Uraspis secunda</i></u>
902		Yellow stingray	<u><i>Urobatis jamaicensis</i></u>
908		Threadtail conger	<u><i>Uroconger syringinus</i></u>
808		Gulf hake	<u><i>Urophycis cirrata</i></u>
809		Southern hake	<u><i>Urophycis floridana</i></u>
810		Spotted hake	<u><i>Urophycis regia</i></u>
502		Sargassum triggerfish	<u><i>Xanthichthys ringens</i></u>
556		Freckled stargazer	<u><i>Xenocephalus egregius</i></u>
538		Swordfish	<u><i>Xiphias gladius</i></u>
562		Pearly razorfish	<u><i>Xyrichtys novacula</i></u>
928		Tricorn batfish	<u><i>Zalieutes mcgintyi</i></u>
090	17	White-winged dove	<u><i>Zenaida asiatica</i></u>
204	17	Mourning dove	<u><i>Zenaida macroura</i></u>
956		Buckler dory	<u><i>Zenopsis conchifera</i></u>

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CODE NO.	REF.	COMMON NAME	SCIENTIFIC NAME
*292	15	*Longnose anchovy (Synonym of Dusky anchovy)	* <u>Anchoa nasuta</u> (Synonym of <u>A. lyolepis</u>)
*923	01	*(Frogfish)	* <u>Antennarius nuttingi</u>
*884	01	*Black cat shark	* <u>Apristurus indicus</u>
*917	01	*(Medium-nose greeneye)	* <u>Chlorophthalmus chalybeius</u>
*920	01	*(Low-spot lanternfish)	* <u>Diaphus dumerili</u>
*921	01	*(Intermediate lanternfish)	* <u>Diaphus intermedius</u>
*933	01	*(Paired-fin brotula)	* <u>Dicrolene intronigra</u>
*911		*Snapper eel	* <u>Echiophis mordax</u> (Synonym of <u>E. punctifer</u>)
*987	01	*(Cycloid-scale cardinalfish)	* <u>Epigonus pandionis</u>
*391		*Family clinids	*Family Clinidae
*420		*Family soapfishes	*Family Grammistidae
*470	01	*Family butterfly rays	*Family Gymnuridae
*437		*Family halfbeaks	*Family Hemiramphidae
*466		*Family mantas	*Family Mobulidae
*486		*Family carpet sharks	*Family Orectolobidae
*378		*Family armored searobins	*Family Peristediidae
*467		*Family cownose rays	*Family Rhinopteridae
*398		*Family parrotfishes	*Family Scaridae
*479		*Family smooth dogfishes	*Family Triakidae
*930	01	*(Barbelless codlet)	* <u>Gadella maraldi</u>
*953	01	*Armorhead	* <u>Hoplostethus mediterraneus</u>
*973		*Yellowtail hamlet	* <u>Hypoplectrus chlorurus</u>
*931	01	*(Notched-fin codfish)	* <u>Merluccius magnoculus</u>
*870		*(Turtle-unidentified)	*Order Testudinata
*516	01	*(Close-eyed flounder)	* <u>Paralichthys triocellatus</u>
*527		*Prickly armored searobin	* <u>Peristedion greyi</u>
*526	01	*(Longpath searobin)	* <u>Peristedion longispathum</u>
*529	01	*(Deep-line scorpionfish)	* <u>Setarches guentheri</u>

* = Discontinued; do not use

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CODE NO.	REF.	COMMON NAME	SCIENTIFIC NAME
9062	08	Granulose purse crab	<u>Acanthilia intermedia</u>
9244	08	(Sergestid shrimp)	<u>Acetes americanus</u>
9242	53	(Many-ribbed non-papillaed jellyfish)	<u>Aequorea forskalea</u>
9150	05	Texas venus	<u>Agriopoma texasiana</u>
9251		Surf mole crab	<u>Albunea gibbesii</u>
9298		Beach mole crab	<u>Albunea paretii</u>
9087	09	(Sea cucumber)	<u>Allothyone mexicana</u>
9031	08	Banded snapping shrimp	<u>Alpheus armillatus</u>
9638		Estuarine snapping shrimp	<u>Alpheus estuariensis</u>
9224		Sand snapping shrimp	<u>Alpheus floridanus</u>
9010		Striped snapping shrimp	<u>Alpheus formosus</u>
9059	08	Bigclaw snapping shrimp	<u>Alpheus heterochaelis</u>
9083	05	Mitchell's wentletrap	<u>Amaea mitchelli</u>
9116		(Spiral bryozoan)	<u>Amathia alternata</u>
9112		Atlantic paper mussel	<u>Amygdalum papyrium</u>
9078	05	Cut-ribbed ark	<u>Anadara floridana</u>
9161	05	Transverse ark	<u>Anadara transversa</u>
9344		Stilt spider crab	<u>Anasimus latus</u>
9023	08	Smooth duck clam	<u>Anatina anatina</u>
9190		Tampa tellin	<u>Angulus tampaensis</u>
9005	25	Pointed venus	<u>Anomalocardia auberiana</u>
9120	05	Common jingle	<u>Anomia simplex</u>
9243	09	Mottled sea hare	<u>Aplysia fasciata</u>
9321	09	(Purple-spined sea urchin)	<u>Arbacia punctulata</u>
9084	05	Mossy ark	<u>Arca imbricata</u>
9295	05	Common sundial	<u>Architectonica nobilis</u>
9151	05	Florida spiny jewelbox	<u>Arcinella cornuta</u>
9840		Speckled swimming crab	<u>Arenaeus cribrarius</u>
9094	05	Atlantic calico scallop	<u>Argopecten gibbus</u>
9653	64	Western bay scallop	<u>Argopecten irradians amplicostatus</u>
9158	50	Brazilian armina	<u>Armina muelleri</u>
9163		Royal sea star	<u>Astropecten articulatus</u>
9355		(Two-spined starfish)	<u>Astropecten duplicatus</u>
9320	05	Saw-toothed pen shell	<u>Atrina serrata</u>
9318	09	Moon jelly	<u>Aurelia aurita</u>
9265	64	(Aeolidiid nudibranch)	<u>Berghia verrucicornis</u>
9343		(Sea walnut)	<u>Beroe ovata</u>
9152	39	(Dark-banded mantis shrimp)	<u>Bigelowina biminiensis</u>
9191		Scorched mussel	<u>Brachidontes exustus</u>
9352		(Heart urchin)	<u>Brissopsis alta</u>
9200	44	(Common bugula)	<u>Bugula neritina</u>
9218	05	Striate bubble	<u>Bulla striata</u>
9153	05	Ragged sea hare	<u>Bursatella leachii</u>
9327	05	Lightning whelk	<u>Busycon pulleyi</u>
9246	64	Shouldered pearwhelk	<u>Busycotypus plagosus</u>
9253	64	Pearwhelk	<u>Busycotypus spiratus</u>
9490		Flame box crab	<u>Calappa flammea</u>
9052	08	Ocellate box crab	<u>Calappa ocellata</u>
9489		Yellow box crab	<u>Calappa sulcata</u>
9117		(Tricolor anemone)	<u>Calliactis tricolor</u>
9167	06	Beach ghost shrimp	<u>Callichirus islagrande</u>

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CODE NO.	REF.	COMMON NAME	SCIENTIFIC NAME
9097	06	(Sargassum crab)	<u>Callinectes marginatus</u>
9605		Blue crab	<u>Callinectes sapidus</u>
9836	03	Lesser blue crab	<u>Callinectes similis</u>
9315		Common nutmeg	<u>Cancellaria reticulata</u>
9225		Blue land crab	<u>Cardisoma guanhumi</u>
9018	05	Caribbean corbula	<u>Caryocorbula caribaea</u>
9288	64, 71	(Aeolidiid nudibranch)	<u>Cerberilla tanna</u>
9034		Plicate hornsnail	<u>Cerithidea pliculosa</u>
9030		Variable cerith	<u>Cerithium lutosum</u>
9169	09	Parchment tube worm	<u>Chaetopterus variopedatus</u>
9175	06	Roughwrist soft crab	<u>Chasmocarcinus mississippiensis</u>
9241	05	Florida cross-barred venus	<u>Chione elevata</u>
9215	09	(Sea wasp)	<u>Chiropsalmus quadrumanus</u>
9312	07	Sea nettle	<u>Chrysaora quinquecirrha</u>
9234	51, 52	(Sea squirt)	<u>Ciona intestinalis</u>
9314	07	Class sessile tunicates	Class Ascidiacea
9700	12	Class starfishes	Class Asteroidea
9060		Class squids and octopuses	Class Cephalopoda
9090	11	Class acorn worms	Class Enteropneusta
9110		(Class snails)	Class Gastropoda
9259	12	Class sea cucumbers	Class Holothuroidea
9095	11	Class hydrozoans	Class Hydrozoa
9026		(Class malacostracan crustaceans)	Class Malacostraca
9216	12	Class brittle stars	Class Ophiuroidea
9187		Class polychaete worms	Class Polychaeta
9196	12	Class jellyfish	Class Scyphozoa
9330	06	Thinstripe hermit	<u>Clibanarius vittatus</u>
9017		Stimpson's cone	<u>Conus stimpsoni</u>
9086	05	Greedy dovesnail	<u>Costoanachis avara</u>
9073	05	Semplicate dovesnail	<u>Costoanachis semiplicata</u>
9264	64	Well-ribbed dovesnail	<u>Costoanachis translirata</u>
9300	05	Eastern oyster	<u>Crassostrea virginica</u>
9201	05	Convex slippersnail	<u>Crepidula convexa</u>
9044	05	Eastern white slippersnail	<u>Crepidula depressa</u>
9123	05	Common Atlantic slippersnail	<u>Crepidula fornicata</u>
9085	06	Blackpoint sculling crab	<u>Cronius ruber</u>
9148		Hairy sponge crab	<u>Cryptodromiopsis antillensis</u>
9081	05	White bearded ark	<u>Cucullaearea candida</u>
9236	53	Lion's mane	<u>Cyanea capillata</u>
9144	05	Atlantic cyclinella	<u>Cyclinella tenuis</u>
9036		Flamingo tongue	<u>Cyphoma gibbosum</u>
9159	05	Angelwing	<u>Cyrtopleura costata</u>
9286	05	Yellow prickly cockle	<u>Dalocardia muricatum</u>
9046	06	Bareye hermit	<u>Dardanus fucosus</u>
9164	06	Broadspine ghost shrimp	<u>Dawsonius latispina</u>
9308		Atlantic giant cockle	<u>Dinocardium robustum</u>
9137	05	Cayenne keyhole limpet	<u>Diodora cayenensis</u>
9257	64	Eveline's dorid	<u>Discodoris evelinae</u>
9092	05	Atlantic distorsio	<u>Distorsio clathrata</u>
9135	05	Coquina shell	<u>Donax variabilis</u>
9271	69, 70	Western dondice	<u>Dondice occidentalis</u>

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CODE NO.	REF.	COMMON NAME	SCIENTIFIC NAME
9833		Longfin inshore squid	<u><i>Doryteuthis pealeii</i></u>
9072		Slender inshore squid	<u><i>Doryteuthis plei</i></u>
9176	05	Disk dosinia	<u><i>Dosinia discus</i></u>
9876		Gulf grassflat crab	<u><i>Dyspanopeus texanus</i></u>
9029		(Rock-boring urchin)	<u><i>Echinometra lucunter</i></u>
9140	06	Puerto Rican sand crab	<u><i>Emerita portoricensis</i></u>
9188		Minor jackknife clam	<u><i>Ensis minor</i></u>
9267	67	(Eelgrass isopod)	<u><i>Erichsonella attenuata</i></u>
9180	06	Olivepit porcelain crab	<u><i>Euceramus praelongus</i></u>
9133	08	Lobate mud crab	<u><i>Eurypanopeus abbreviatus</i></u>
9214	08	Flatback mud crab	<u><i>Eurypanopeus depressus</i></u>
9183	05	Alternate tellin	<u><i>Eurytellina alternata alternata</i></u>
9100	06	Broadback mud crab	<u><i>Eurytium limosum</i></u>
9346		Paper scallop	<u><i>Euvola papyracea</i></u>
9099	08	Redleg humpback shrimp	<u><i>Exhippolysmata oplophoroides</i></u>
9096	08	Family snapping shrimps	Family Alpheidae
9038		Family bristle worms	Family Amphinomidae
9213	21	Family crayfishes	Family Astacidae
9240	57	(Family skeleton shrimps)	Family Caprellidae
9007		(Family cerith snails)	Family Cerithiidae
9258	11	(Family hyperiid amphipods)	Family Hyperiidae
9230		(Family elongate squids)	Family Loliginidae
9069	06	(Family majid crabs)	Family Majidae
9027	26	(Family mysid shrimps)	Family Mysidae
9042	05	(Family nerite snails)	Family Neritidae
9033	08	Family longeye shrimps	Family Ogyrididae
9301		Family right-handed hermit crabs	Family Paguridae
9302		Family mud crabs	Family Panopeidae
9708		Family penaeid shrimps	Family Penaeidae
9103	06	Family pea crabs	Family Pinnotheridae
9006		Family porcelain crabs	Family Porcellanidae
9304		Family swimming crabs	Family Portunidae
9045	05	Family tritons	Family Ranellidae
9130		Family slipper lobsters	Family Scyllaridae
9056	05	(Family tellin and macoma bivalves)	Family Tellinidae
9035		Family freshwater clams	Family Unionidae
9618		Brown shrimp	<u><i>Farfantepenaeus aztecus</i></u>
9640		Pink shrimp	<u><i>Farfantepenaeus duorarum</i></u>
9261	05	Banded tulip	<u><i>Fasciolaria liliium</i></u>
9013		Delicate ark	<u><i>Fugleria tenera</i></u>
9074		(Spiny-back scud)	<u><i>Gammarus mucronatus</i></u>
9011	05	Tinted cantharus	<u><i>Gemophos tinctus</i></u>
9089	05	(Sea hare - unidentified)	Genus Aplysia
9131	37	(Giant waterbug - unidentified)	Genus Belostoma
9102	11	(Colonial hydroid - unidentified)	Genus Bougainvillia
9303		(Pearwhelk - unidentified)	Genus Busycotypus
9048		(Stonefly nymph - unidentified)	Genus Claassenia
9004	25	(Dovesnail - unidentified)	Genus Costoanachis
9237	18, 55	(Sea star - unidentified)	Genus Echinaster
9041		(Mayfly nymph - unidentified)	Genus Isonychia
9197	11	(Sea cucumber - unidentified)	Genus Leptosynapta

INVERTEBRATE SPECIES LIST (2015)
(Scientific Name Order)

CODE NO.	REF.	COMMON NAME	SCIENTIFIC NAME
9024	08	(River shrimp - unidentified)	Genus Macrobrachium
9317		(Moonsnail - unidentified)	Genus Neverita
9609		(Grass shrimp - unidentified)	Genus Palaemonetes
9132	37	(Water scorpion - unidentified)	Genus Ranatra
9834		(Rimapenaeid shrimp - unidentified)	Genus Rimapenaeus
9168	08	(Fiddler crab - unidentified)	Genus Uca
9245	05	Southern ribbed-mussel	<u>Geukensia granosissima</u>
9851		(Lesser mantis shrimp)	<u>Gibbesia neglecta</u>
9049	25	(Ghost shrimp)	<u>Glypturus acanthochirus</u>
9217	05	Antillean paperbubble	<u>Haminoea antillarum</u>
9009		Conrad's paperbubble	<u>Haminoea succinea</u>
9014		(Banded brittle star)	<u>Hemipholis elongata</u>
9491		Calico box crab	<u>Hepatus epheliticus</u>
9297		Flecked box crab	<u>Hepatus pudibundus</u>
9091	06	Smooth elbow crab	<u>Heterocrypta granulata</u>
9222		Smooth mud crab	<u>Hexapanopeus angustifrons</u>
9177	06	Knobbed mud crab	<u>Hexapanopeus paulensis</u>
9238	05	Giant eastern murex	<u>Hexaplex fulvescens</u>
9204	05	Arctic hiatella	<u>Hiatella arctica</u>
9065	22	Zostera shrimp	<u>Hippolyte zostericola</u>
9105	11	(Spiny snail fur)	<u>Hydractinia americana</u>
9194		Granulate shellback crab	<u>Hypoconcha arcuata</u>
9146	08	Rough shellback crab	<u>Hypoconcha parasitica</u>
9252		Hooked mussel	<u>Ischadium recurvum</u>
9138	26	Surf hermit	<u>Isocheles wurdemanni</u>
9172	05	Yellow egg cockle	<u>Laevicardium mortoni</u>
9071		Slender sargassum shrimp	<u>Latreutes fucorum</u>
9127	22	Sargassum shrimp	<u>Latreutes parvulus</u>
9109	28	Brown grass shrimp	<u>Leander tenuicornis</u>
9340		White elbow crab	<u>Leiolambrus nitidus</u>
9088	06	(Mole crab)	<u>Lepidopa benedicti</u>
9174	06	Estuarine ghost shrimp	<u>Lepidophthalmus louisianensis</u>
9313	06	Longnose spider crab	<u>Libinia dubia</u>
9698		Portly spider crab	<u>Libinia emarginata</u>
9170	05	Clench's thick-ringed venus	<u>Lirophora clenchi</u>
9600		White shrimp	<u>Litopenaeus setiferus</u>
9067	30	Pacific white shrimp	<u>Litopenaeus vannamei</u>
9155	05	Marsh periwinkle	<u>Littoraria irrorata</u>
9835		Atlantic brief squid	<u>Lolliguncula brevis</u>
9337	08	(Luciferid shrimp)	<u>Lucifer faxoni</u>
9341	18	(Banded sea star)	<u>Luidia alternata</u>
9307	07	(Striped sea star)	<u>Luidia clathrata</u>
9296		Blood ark	<u>Lunarca ovalis</u>
9136	13	(Giant mantis shrimp)	<u>Lysiosquilla scabricauda</u>
9248		Peppermint shrimp	<u>Lysmata wurdemanni</u>
9219		(Short-spined sea urchin)	<u>Lytechinus variegatus</u>
9002		Short macoma	<u>Macoma brevifrons</u>
9022	05	Matagorda macoma	<u>Macoma mitchelli</u>
9107		Elongate macoma	<u>Macoma tenta</u>
9122	22	Cinnamon river shrimp	<u>Macrobrachium acanthurus</u>
9607		Ohio shrimp	<u>Macrobrachium ohione</u>

INVERTEBRATE SPECIES LIST (2015)
(Scientific Name Order)

CODE NO.	REF.	COMMON NAME	SCIENTIFIC NAME
9028		Bristled river shrimp	<u>Macrobrachium olfersii</u>
9054	05	Calico clam	<u>Macrocallista maculata</u>
9254		Fragile surf clam	<u>Mactrotoma fragilis</u>
9037	05	Eastern melampus	<u>Melampus bidentatus</u>
9354		(Five-holed sand dollar)	<u>Mellita quinquesperforata</u>
9636		Gulf stone crab	<u>Menippe adina</u>
9293	05	Southern quahog	<u>Mercenaria campechiensis</u>
9149		Texas quahog	<u>Mercenaria texana</u>
9282	06	False arrow crab	<u>Metoporphaphis calcarata</u>
9015		(Brittle star)	<u>Microphiopholis atra</u>
9319	09	(Phosphorus jelly)	<u>Mnemiopsis mccradyi</u>
9063		(Mud-burrowing heart urchin)	<u>Moira atropos</u>
9055	09	(Sea squirt)	<u>Molgula manhattensis</u>
9210	05	Dwarf surf clam	<u>Mulinia lateralis</u>
9115	05	Dark false mussel	<u>Mytilopsis leucophaeata</u>
9212	05	Sharp nassa	<u>Nassarius acutus</u>
9290	10	Bruised nassa	<u>Nassarius vibex</u>
9249		(Hydromedusa)	<u>Nemopsis bachei</u>
9106		Southern clamworm	<u>Nereis succinea</u>
9019		Olive nerite	<u>Neritina usnea</u>
9147		Virgin nerite	<u>Neritina virginea</u>
9247	63	(False shark eye)	<u>Neverita delessertiana</u>
9250	63	Shark eye	<u>Neverita duplicata</u>
9171	05	Ponderous ark	<u>Noetia ponderosa</u>
9184	05	Concentric nut clam	<u>Nuculana concentrica</u>
9323	05	Common octopus	<u>Octopus vulgaris</u>
9040		Diffuse ivory bush coral	<u>Oculina diffusa</u>
9139	26	Atlantic ghost crab	<u>Ocypode quadrata</u>
9294	10	Lettered olive	<u>Oliva sayana</u>
9093	07	(Rosette-scaled brittle star)	<u>Ophiolepis elegans</u>
9025	26	(Beach flea)	<u>Orchestia grillus</u>
9339	12	Order anemones	Order Actiniaria
9075		Order amphipods	Order Amphipoda
9285	12	Order soft corals	Order Alcyonacea
9121	37	Order bugs	Order Hemiptera
9208	23	Order hydroids	Order Hydroidea
9053	11	Order isopods	Order Isopoda
9119	07	(Order nudibranchs and sea slugs)	Order Nudipleura
9079	12	Order sea pens	Order Pennatulacea
9111		(Order veneroid bivalves)	Order Veneroida
9192		Crested oyster	<u>Ostrea equestris</u>
9839	27	Florida lady crab	<u>Ovalipes floridanus</u>
9283	06	(Blue-spot hermit)	<u>Paguristes hummi</u>
9211	08	(Brown-banded hermit)	<u>Pagurus annulipes</u>
9195		(Short-fingered hermit)	<u>Pagurus brevidactylus</u>
9082	06	Dimpled hermit	<u>Pagurus impressus</u>
9643	08	Longwrist hermit	<u>Pagurus longicarpus</u>
9329		Flatclaw hermit	<u>Pagurus pollicaris</u>
9198	43	Florida grass shrimp	<u>Palaemon floridanus</u>
9193		Daggerblade grass shrimp	<u>Palaemonetes pugio</u>
9101	22	Marsh grass shrimp	<u>Palaemonetes vulgaris</u>

INVERTEBRATE SPECIES LIST (2015)
(Scientific Name Order)

CODE NO.	REF.	COMMON NAME	SCIENTIFIC NAME
9335		Oystershell mud crab	<u>Panopeus simpsoni</u>
9154	22	Caribbean spiny lobster	<u>Panulirus argus</u>
9098	11	(Onion anemone)	<u>Paranthus rapiformis</u>
9260	22	Rose shrimp	<u>Parapenaeus politus</u>
9165	41	(Purple jellyfish)	<u>Pelagia noctiluca</u>
9325	06	Cryptic teardrop crab	<u>Pelia mutica</u>
9003		Brown mussel	<u>Perna perna</u>
9331	06	Pink purse crab	<u>Persephona crinita</u>
9837	27	Mottled purse crab	<u>Persephona mediterranea</u>
9263	64	False angelwing	<u>Petricolaria pholadiformis</u>
9262	08	Giant hermit	<u>Petrochirus diogenes</u>
9310	06	Green porcelain crab	<u>Petrolisthes armatus</u>
9232	22	Banded porcelain crab	<u>Petrolisthes galathinus</u>
9129	05	Thick lucine	<u>Phacoides pectinata</u>
9118	36	Australian spotted jellyfish	<u>Phyllorhiza punctata</u>
9070		Phylum segmented worms	Phylum Annelida
9051		Phylum moss animals	Phylum Bryozoa
9287	11	Phylum comb jellies or sea walnuts	Phylum Ctenophora
9847		Phylum mollusks	Phylum Mollusca
9185	12	Phylum nemertean worms	Phylum Nemertinea
9206	12	Phylum sponges	Phylum Porifera
9124	26	Portuguese man o' war	<u>Physalia physalis</u>
9108		Sea scallop	<u>Placopecten magellanicus</u>
9207	08	Sawtooth elbow crab	<u>Platylambrus serratus</u>
9231		Royal red shrimp	<u>Pleoticus robustus</u>
9000	64	(Side-gilled sea slug)	<u>Pleurobranchaea inconspicua</u>
9039	08	Longfinger neck crab	<u>Podochela riisei</u>
9166	06	Shortfinger neck crab	<u>Podochela sidneyi</u>
9008		(Sea slug)	<u>Polycera hummi</u>
9066		Carolina marsh clam	<u>Polymesoda caroliniana</u>
9080	05	Southern marsh clam	<u>Polymesoda maritima</u>
9141	06	Eastern tube crab	<u>Polyonyx gibbesi</u>
9305	06	Spotted porcelain crab	<u>Porcellana sayana</u>
9058	08	Striped porcelain crab	<u>Porcellana sigsbeiana</u>
9032	08	Delicate swimming crab	<u>Portunus anceps</u>
9830		Iridescent swimming crab	<u>Portunus gibbesii</u>
9268	22, 43	Redhair swimming crab	<u>Portunus ordwayi</u>
9227		Sargassum swimming crab	<u>Portunus sayi</u>
9358		Longspine swimming crab	<u>Portunus spinicarpus</u>
9359		Blotched swimming crab	<u>Portunus spinimanus</u>
9332	06	(Swimming crab)	<u>Portunus ventralis</u>
9160		Red swamp crawfish	<u>Procambarus clarkii</u>
9104	08	(Night shrimp)	<u>Processa hemphilli</u>
9128	05	Intermediate cyphoma	<u>Pseudocyphoma intermedium</u>
9179	05	Atlantic wing oyster	<u>Pteria colymbus</u>
9126	05	Lady-in-waiting venus	<u>Puberella intapurpurea</u>
9299	05	Atlantic rangia	<u>Rangia cuneata</u>
9203	05	Brown rangia	<u>Rangianella flexuosa</u>
9157		Furrowed frog crab	<u>Raninoides loevis</u>
9348		Gulf frog crab	<u>Raninoides louisianensis</u>
9356		(Sea pansy)	<u>Renilla muelleri</u>

INVERTEBRATE SPECIES LIST (2015)
(Scientific Name Order)

CODE NO.	REF.	COMMON NAME	SCIENTIFIC NAME
9061	05	Awl miniature cerith	<u>Retilaskeya bicolor</u>
9113		(Many-ribbed papillaed jellyfish)	<u>Rhacostoma atlanticum</u>
9334	06	Estuarine mud crab	<u>Rhithropanopeus harrisi</u>
9235	11	Mushroom jellyfish	<u>Rhopilema verrilli</u>
9223		Roughneck shrimp	<u>Rimapenaeus constrictus</u>
9707		Roughback shrimp	<u>Rimapenaeus similis</u>
9145	05	Incongruous ark	<u>Scapharca brasiliiana</u>
9182	11	Sargassum nudibranch	<u>Scyllaea pelagica</u>
9270	64, 5	White Atlantic semele	<u>Semele proficua</u>
9289	64, 5	Purplish semele	<u>Semele purpurascens</u>
9309		Scotch bonnet	<u>Semicassis granulata</u>
9057	06	Purple marsh crab	<u>Sesarma reticulatum</u>
9831		Brown rock shrimp	<u>Sicyonia brevirostris</u>
9832		Lesser rock shrimp	<u>Sicyonia dorsalis</u>
9345		Eyespot rock shrimp	<u>Sicyonia stimpsoni</u>
9162	08	Kinglet rock shrimp	<u>Sicyonia typica</u>
9077	05	Sea-whip simnia	<u>Simnialena marferula</u>
9316	05	White baby ear	<u>Sinum perspectivum</u>
9012		Striped false limpet	<u>Siphonaria pectinata</u>
9001	05	Blake's vitrinella	<u>Solariorbis blakei</u>
9360		Humpback shrimp	<u>Solenocera vioscai</u>
9202	05	Cancellate cantharus	<u>Solenosteira cancellaria</u>
9209	22	Gulf squareback crab	<u>Speocarcinus lobatus</u>
9221		Southern surf clam	<u>Spisula raveneli</u>
9064	05	Atlantic thorny oyster	<u>Spondylus americanus</u>
9284	13	(Offshore mantis shrimp)	<u>Squilla chydaea</u>
9603		(Common mantis shrimp)	<u>Squilla empusa</u>
9239	42	Furcate spider crab	<u>Stenocionops furcatus</u>
9322	06	Yellowline arrow crab	<u>Stenorhynchus seticornis</u>
9353		Cannonball jelly or cabbagehead	<u>Stomolophus meleagris</u>
9220	05	Hays' rocksnail	<u>Stramonita canaliculata</u>
9328	05	Florida rocksnail	<u>Stramonita haemastoma</u>
9173	05	Florida fighting conch	<u>Strombus alatus</u>
9266		Pleated sea squirt	<u>Styela plicata</u>
9125	37	(Dragonfly nymphs)	Suborder Anisoptera
9848		Suborder crabs and lobsters	Suborder Reptantia
9050	19	(Damselfly nymphs)	Suborder Zygoptera
9255	45	(Hermit crab - unidentified)	Superfamily Paguroidea
9349		Speckled snapping shrimp	<u>Synalpheus fritzmuelleri</u>
9186	05	Stout tagelus	<u>Tagelus plebeius</u>
9226	47	(Four-tentacle box jelly)	<u>Tamoya haplonema</u>
9043	05	Miniature moonshell	<u>Tectonatica pusilla</u>
9143	05	Silky tegula	<u>Tegula fasciata</u>
9020	05	Common American auger	<u>Terebra dislocata</u>
9134	05	Fine-ribbed auger	<u>Terebra protexta</u>
9181	05	Giant tun	<u>Tonna galea</u>
9338	08	Arrow shrimp	<u>Tozeuma carolinense</u>
9269	22, 43	Serrate arrow shrimp	<u>Tozeuma serratum</u>
9076	05	Horse conch	<u>Triplofusus giganteus</u>
9047	26	Squatter pea crab	<u>Tumidotheres maculatus</u>
9199	06	Red-joint fiddler	<u>Uca minax</u>

INVERTEBRATE SPECIES LIST (2015)
(Scientific Name Order)

CODE NO.	REF.	COMMON NAME	SCIENTIFIC NAME
9142	27	Gulf sand fiddler	<u>Uca panacea</u>
9156	06	Mudflat fiddler	<u>Uca rapax</u>
9016	25	Spined fiddler	<u>Uca spinicarpa</u>
9178	06	Coastal mud shrimp	<u>Upogebia affinis</u>
9342		By-the-wind sailor	<u>Velella velella</u>
9233	49	(Pipe cleaner sea pen)	<u>Virgularia presbytes</u>
9709		Seabob	<u>Xiphopenaeus kroyeri</u>
9068		(Sauerkraut bryozoan)	<u>Zoobotryon verticillatum</u>
*9021		*Smooth scallop	* <u>Amusium pleuronectes</u>
*9695	03	*Dana swimming crab	* <u>Callinectes danae</u>
*9205	45	*Family mud crabs	*Family Panopeidae
*9347		*(Portunid crab - unidentified)	*Genus Portunus
*9639		*(Squid)	* <u>Loligo brevis</u>
*9189		*Phylum ribbon worms	*Phylum Rhynchocoela (Synonym of Phylum Nemertinea)

* = Discontinued; do not use.

Appendix N: Lower Laguna Madre Memorandum on “Open Water Gill Net Sets”

TEXAS PARKS AND WILDLIFE

OFFICE MEMORANDUM

TO: Mark Fisher

FROM: Randy Blankinship

SUBJECT: Clarification of “Open Water Gill Net Sets” in the Lower Laguna Madre

RE:

DATE: December 7, 2004

COORDINATION - ROUTING			
DIV.	NAME	INITIAL	DATE
REMARKS:			
RETURN TO:			

Since approximately 1989, gill nets have been set along the eastern side of the Lower Laguna Madre (LLM) in grids without a shoreline and in water >0.2 m deep. This practice is not consistent with the Resource Monitoring Operations Manual gill net sampling procedure which stipulates that the shallow end of a gill net may be set in water ≤0.2 m deep if conditions warrant. The method of sampling these grids in the LLM was never documented and I have gathered background information to explain this practice.

According to Bill Balboa, current Matagorda Bay Ecosystem Leader and Resource Program Biologist in the LLM from 1989-91, following the 1989 freeze he and staff noticed large numbers of stunned black drum harvested by commercial fishermen in very shallow water along the east side of the LLM. At the time, this area was not in the gill net sampling frame leaving a specific habitat type covering a large portion of the bay without monitoring. Following discussions with Larry McEachron, Science Director, it was decided that if gill nets could be set on the east side of the LLM in the shallowest water possible the grids could be added to the sampling frame. This was accomplished and these grids remain in the sampling frame.

With the use of GPS units in the late 1990's, crews gained the capability of more accurate navigation. This caused a problem with active grids on the east side of the LLM because they were actually in much deeper water than originally intended. Prior to the use of GPS, crews navigated to these grids by traveling east as far as possible thus setting the net in the shallowest water possible. These crews did not know if the net was actually set in the intended grid or not. With the use of GPS, nets have been set in the intended grid, although the water depth is frequently greater than originally intended.

To rectify this problem, avoid large changes in the sampling frame, preserve the original intent of sampling the east side of the LLM and follow sampling procedures as closely as possible, the following measures will be taken.

1. Appropriate active sampling grids on the east side will be changed to shallower adjacent grids.
2. We have agreed that an exception to the 0.2 m maximum depth for the shallow end of a gill net will be made to allow for sets on the east side of the LLM. The shallow end of gill nets in these grids will be set in the shallowest water possible.
3. Staff will be briefed on station alternation procedures to allow for nets to be set in the shallowest water possible.