Fishery-Independent Sampling: Florida

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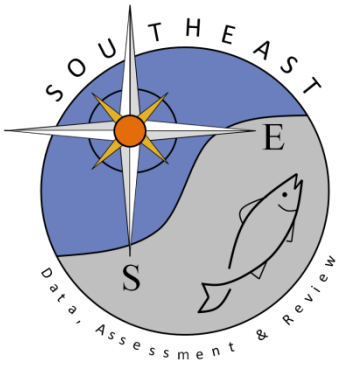


Florida Fish and Wildlife Conservation Commission, Fish and Wildlife Research Institute, Fisheries Independent Monitoring Program Procedures and Gear Description

Background

Two sampling designs (stratified-random and fixed-station) were initially employed by the FIM program to assess the status of fishery stocks in Florida estuaries. Both fixed-station and stratified-random sampling surveys provided information on length-frequency, age structure, reproductive condition, and relative abundance of fish populations. Fixed-station samples, however, cannot be statistically expanded to describe the fishery stocks beyond the actual sampling sites, while stratified-random samples can be extrapolated to describe an entire estuary. Monthly fixed-station sampling, therefore, was terminated in 1996. Monthly stratified-random sampling is currently conducted year-round using 21.3-m seines, 6.1-m otter trawls, and 183-m haul seines.

A third sampling design (directed) was added to the program in 1993. The directed sampling surveys also provide information on relative abundance, length-frequency, age structure, and reproductive condition of fish populations; however, these surveys target commercially or recreationally important species (red drum, striped mullet, and spotted seatrout) that appeared to be undersampled by the gears used in the stratified-random sampling surveys. In directed sampling, nets are set upon visually detected schools of fish or in areas where high concentrations of the target species are expected to occur. While directed-sampling surveys for striped mullet continue, surveys for red drum and spotted seatrout were terminated in 1999, as the numbers and sizes of these species collected during stratified-random sampling proved to be adequate for stock assessment.

The FIM program is intended to operate on a long-term basis and eventually expand to include each of the major estuarine and coastal nursery areas in the state. Routine monitoring programs have been established in Tampa Bay (1989), the northern half of Charlotte Harbor (1989), southern Charlotte Harbor including Estero Bay (2004), the northern and southern portions of the Indian River Lagoon (1990 and 1997, respectively), Florida Keys (1998), Cedar Key (1996), Apalachicola Bay (1997) and northeast Florida (2001). Additionally, sampling was conducted in the Choctawatchee Bay/Santa Rosa Sound area of the Florida Panhandle between 1993 and 1997.

Stratified Random Sampling

Estuarine systems are subdivided into zones delineated primarily on geographic and logistical criteria but which also define areas of greater biological and hydrographic homogeneity than the system as a whole. Zones are identified as being either bay or riverine. Both bay and riverine zones are subdivided into grids based upon a 1 x 1

minute cartographic grid that is overlaid on the entire system. Grids are further subdivided into microgrids using a 10 x 10 cell grid overlay

In bay zones, grids have been stratified by depth and may be further stratified by habitat type. Depth identifies the gear types (6.1-m trawl, 21.3-m offshore seine, 183-m haul seine, and/or 183-m purse seine) that can be used to sample each grid. Habitat stratification is gear and field lab specific. At field labs that stratify offshore seines by habitat, stratification is by the presence/absence of submerged aquatic vegetation and by the occurrence of a shoreline within the grid. At field labs that stratify the 183-m haul seines by habitat, stratification is based on the presence/absence of overhanging vegetation within the grid.

In riverine zones, microgrids are stratified by depth and may be further stratified by habitat type and salinity gradient. As with bay zones, depth identifies the gear types (6.1-m trawls and/or 21.3-m boat seines) that can be used to sample each microgrid. At some field labs, the 21.3-m boat seines are further stratified by the presence/absence of overhanging vegetation within the microgrid. Rivers may also be stratified into subzones to ensure that the river's entire salinity gradient is sampled each month.

Differences in the scale of stratification between bay and riverine zones results in slightly different definitions of the primary sampling unit (sampling site) between the two zone types. Bay zone stratification has only been taken to the grid level, so the grid is randomly selected based upon strata, but the microgrid is simply a random number between 0 and 99. Therefore, the primary sampling unit in bay zones is a randomly selected microgrid within a randomly selected grid. In riverine zones, where stratification has been taken to the microgrid level, microgrids are randomly selected based on strata; the primary sampling unit, therefore, is a randomly selected microgrid.

The number of sites to be sampled each month, for each gear and stratum within a given zone, is proportional to the total number of sampling sites that can be sampled within a particular stratum by a gear in an estuarine system. For example, if Zone A contains 12% of the vegetated offshore grids that can be sampled in an estuarine system, then ~12% of the vegetated offshore samples are collected from Zone A each month.

All sampling sites are selected and sampled without replacement each month. If a sampling site is selected for 21.3-m offshore vegetated seines in January, that site is removed from the universe of possible sampling sites prior to selecting additional 21.3-m offshore vegetated seine sites for January. That sampling site, however, can be selected again for 21.3-m offshore vegetated seines in February. A different gear (e.g., 183-m haul seine) or strata (e.g., 21.3-m offshore unvegetated seine), however, could be selected for that sampling site during January.

After the Bay System Coordinator (or his/her designee) has made the site selections for a month, zone boundaries are removed and sample sites are grouped to optimize sampling logistics. If sample sites in Zones K, C and E are relatively close to each other, they can be grouped together and sampled during the same sampling trip. Once sampling groups have been identified, the order in which these groups are sampled during a given month is randomized.

When a chosen microgrid can't be sampled with the designated gear and stratum, an alternate microgrid must be selected. There are two methods of selecting an alternate microgrid, depending on whether the zone being sampled is a bay or riverine zone.

Bay Zones: the primary microgrid is exited in a randomly selected direction (N, S, E, or W) and a randomly selected spiral (clockwise or counterclockwise) is completed until a microgrid, within the primary grid, that can be sampled is encountered. If none of the microgrids in the primary grid can be sampled with the designated gear and stratum, the spiral process is repeated at the grid level using the same randomly selected exit and spiral directions as the primary sampling unit. If a site for the designated gear and stratum (vegetated or unvegetated) cannot be found in the alternate grid, the alternate stratum may be sampled. The designated gear type cannot be changed if the alternate grid does not contain a site that can be sampled. Similarly, a shoreline stratum (21.3-m seines) cannot be changed to a vegetated or unvegetated stratum if the alternate grid does not contain a site that can be sampled. In these cases, spiraling at the grid level must continue until an acceptable sampling site is found. However, grid spiraling cannot cross the zonal boundaries.

Riverine Zones: the primary microgrid is exited in a randomly selected direction (N, S, E, or W) and a randomly selected spiral (clockwise or counterclockwise) is completed. Microgrid spiraling continues, regardless of grid, until a site that can be sampled with the designated gear and stratum is found. However, if the river is divided into subzones, microgrid spiraling cannot cross the subzonal boundaries.

Gear Descriptions

21.3-m Center-Bag Seine

Introduction

A 21.3-m center bag seine is used to collect juvenile and small adult fish and macrocrustaceans along bay edges, river banks, shallow tidal flats and most areas where water depth is less than 1.5 m (1.8 m in rivers). Two techniques are currently employed by the FIM program to cover specific habitats. The bay technique samples areas where the water depth is less than 1.5 m, such as tidal flats, mangrove fringes, sea wall habitats, sloping beaches, and banks. The river technique samples riverine areas and tidal creeks where water depth typically increases rapidly (to not more than

1.8 m) from the shoreline, making it impossible to use the bay technique. The beach seine technique samples shallow sloping beaches and banks and was discontinued in all areas by February 2001.

Gear Description

21.3-m center-bag seine, 1.8-m deep with 3.2-mm #35 knotless nylon Delta mesh. See *Appendix 10.1* for detailed description.

21.3-m Bay Seine Technique

Introduction

The 21.3-m bay (previously called offshore) seine technique is currently being used for stratified-random sampling in Tampa Bay, Charlotte Harbor, Cedar Key, Apalachicola, and Indian River Field Labs. This technique was implemented for SRS in Tampa Bay beginning in July 1991. It was used during fixed station sampling from January 1991 to March 1996. It was also used in conjunction with SRS dropnets from July 1990 to December 1994 and with fixed blocknets from October 1991 to May 1993. Sampling effort with the 21.3-m bay seine is separated into two stratification categories, shoreline stratum and non-shoreline stratum. At some field labs, the non-shoreline stratum is further subdivided into submerged aquatic vegetation (SAV) stratum and non-SAV stratum. Shoreline stratum samples must have an inshore wing on the actual shoreline or, if unable to get to the actual shoreline, directly against the nearest shoretype. The shoreline stratum was implemented January 1998 and replaced the beach seine technique in all areas by February 2001. The SAV and non-SAV strata samples are collected with the near shore seine wing more than 5 m from the shore or shoretype. Seines collected with ≥25% SAV or *Caulerpa* spp. are considered SAV stratum while samples with less than 25% SAV or *Caulerpa* spp. are non-SAV stratum.

Objective

1) To effectively sample areas within Florida estuaries where the water depth is less than 1.5 m, such as tidal flats, mangrove fringes, seawall habitats, and shallow sloping beaches and banks.

Procedure

A) Locate appropriate stratum (e.g., SAV, non-SAV or shoreline) to be sampled, if applicable.

NOTE: Bay seines with an “SAV” or “non-SAV” stratum must be greater than 5 m from the shore or shoretype. Bay seines with a "SHORELINE" stratum MUST have an inshore wing on the actual shoreline or directly against the nearest shoretype. If the net cannot be set against the shoreline/shoretype, then an alternate shoreline site should be selected using standard spiraling technique. If upon spiraling, an adequate shoreline site cannot be found due to submerged debris, rocks, or other obstacles, then the net

should be deployed with the inshore wing as close as possible to the nearest shoretype and the PROC EXCEPT variable should be filled in and noted.

B) Attach the end loops of the 15.5-m (51') line to the seine poles and stretch the seine out, perpendicular to the current, until the 15.5-m line is taut (*Figure 5.1-1* A). However, if the wind is strong, and has more influence on the seine than the current, stretch the seine out perpendicular to the wind. The bag depth (START DEPTH) should be noted at this time.

NOTE: Bay seines have a minimum bag depth of 0.3 m and a maximum bag depth of 1.5 m. If the bag depth is less than 0.3 m, or if the depth exceeds 1.5 m at any point along the net, an alternate sampling site should be selected following standard FIM program procedures (*Procedure 3.1*).

C) Pull the leads and floats of the bag back until the seine is in a fishing position (*Figure 5.1-1* A).

D) Plant the tether poles immediately adjacent to each PVC seine pole. Then take the free end of each 9.1-m (30') tether line and put the loop around its respective PVC seine pole.

NOTE: In the rare situation where the substrate is too hard to be penetrated by the tether pole, a five-pound weight may be used to anchor the 9.1-m line. In these cases, however, both seine poles must still be tethered and care must be taken not to drag the weights.

E) Angle seine poles so that the lead line is slightly ahead of the float line. The person with the pivot pole will walk at the same pace as or behind the seiners; walking ahead of the seine may scare fish into or out of the net.

F) For bay seines with shoreline strata, the inshore seiner should ensure the wing is on the actual shoreline or against the shore type. This person should also take note of the WING DEPTH. The WING DEPTH is the average depth of the water, to the nearest 0.1 m, along the path fished by the seine end(s) closest to the shore. The maximum wing depth for shoreline set seines is 0.5 m.

G) Seine into the current or wind. Keep the 15.5-m line taut at all times, until both 9.1-m tether lines are taut.

H) Take the loop for each 9.1-m tether line off of each seine pole.

I) The two seiners walk directly toward each other as rapidly as possible.

J) Plant a third pole (pivot pole) at the point where the two seiners meet (*Figure 5.1-1* B) and angle the pivot pole to help keep the leads down.

K) Orient the mouth of the bag into the current/wind to keep the bag open and ensure the movement of fish into the bag.

L) One of the two seiners takes both seine poles and pulls the seine around the pivot pole at an angle sufficient to avoid gaps between the pole and the netting (about 90°; *Figure 5.1-1* C).

M) The second seiner helps the pivot person hold the pole and guide the seine around the pole, keeping the lead line on the bottom at all times by “footing”. The second seiner and the pivot person will also push the wings firmly against the pivot pole to prevent fish from escaping.

> **NOTE**: In shallow water (<0.5 m), the two people responsible for guiding the seine around the pivot pole should pull the floats up out of the water as the net goes around the pivot pole to make sure that fish are not trapped in the folds.

N) If algae are encountered, push it into the bag while retrieving.

O) When the two sides of the bag meet the pivot pole, stop pulling the net (*Figure 5.1-1* D). The seiner pulling the wings will grab the lead lines and pull about 1.2 m of the lead line past the pivot pole (*Figure 5.1-1* E).

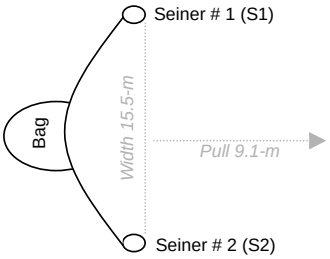
P) The pivot person then digs under the net with the pivot pole (at the point the net bends around the pivot pole) and pulls the net to the surface with the pole. (*Figure 5.1-1* F).

Q) Reduce the bag size by slowly inverting the bag to concentrate the fish in a smaller area.

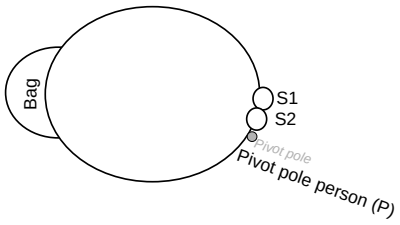
R) Subsample using *Procedure 6.2*, if necessary.

S) Follow *Procedure 6.1* for proper sample work-up.

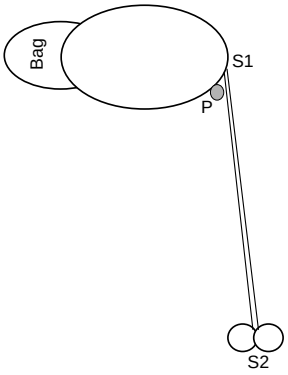
T) Physical data should be taken at the original bag location and recorded following the data sheet procedure (*Procedure 6.3*).



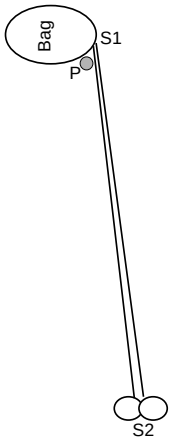
A. Center bag seine deployed offshore



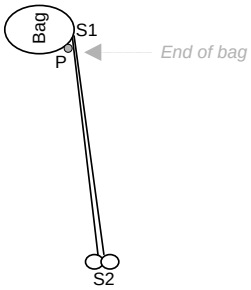
B. Seine wings brought together and pivot pole set



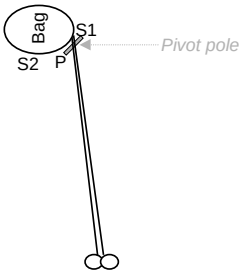
C. Net wings pulled around pivot pole. Seiner # 1 (S1) and pivot pole person (P) foot the lead line and push the net wings together.



D. When top of the bag reaches pivot pole, seiner # 2 (S2) stops pulling on the net wings.



E. Seiner # 2 (S2) pulls lead line of each net wing approximately 4 feet to move the lead lines at the front of the bag past the pivot pole.



F. Pivot pole person (P) and seiner # 1 (S1) use the pivot pole to pull the seine's bag opening out of the water.

21.3-m River Seine Technique

Introduction

The 21.3-m river (previously called boat) seine technique is currently being used during stratified-random sampling in Tampa Bay, Charlotte Harbor, Cedar Key, Jacksonville, Apalachicola and Indian River Field Labs. This technique was implemented in Tampa Bay during fixed station sampling in August 1990. In July 1991, this technique was implemented as an SRS gear. In some estuaries, sampling effort with the 21.3-m river seine is stratified into two habitat categories based upon the presence of overhanging shore vegetation. Overhanging shore vegetation is defined as a tree or shrub that extend over the sample site during a normal tidal cycle and is close (~1-m) to the water surface, such that it would provide permanent shade and/or structure when water was beneath it, through prop roots, branches or fronds. Floating weed mats, which provide shade and structure to the sample site, are considered overhanging vegetation. Emergent vegetation (*Juncus* spp., *Spartina* spp. and cattails) are not considered overhanging. During times of extreme low tide, particularly during the winter months, the land-water interface must be within 10-m of the overhanging vegetation and fish should have easy access to the overhanging area during normal tides in order to be considered an overhanging stratum. If the land-water interface is greater than 10-m from the overhanging vegetation, the site should be considered a non-overhanging stratum. A shoreline with greater than or equal to 10% coverage of overhanging vegetation is considered an overhanging stratum (Strata = C) while anything less is considered a non-overhanging stratum (Strata = D). A stratum code (Strata = C or D) should be assigned for all river seines regardless of whether pre-stratification occurred or not. Also, regardless of what stratum code is assigned, the coding of all habitat variables should follow FIM procedure (See *Procedure 6.3* and/or *Appendix 9.2*).

Procedure

U) The net should be set into the current. Based on the direction of the current, decide which side of the boat will be facing the shore.

V) Load the seine onto the boat so that when it is deployed the mouth of the bag opens toward shore. Place the lead line on the side of the boat that will be facing shore. This will ensure that the bag deploys correctly.

W) Slowly approach the sampling site, running the boat parallel to shore at the shallowest depth possible. Turn the boat away from the shore as the first person jumps on or close to shore.

> **NOTE**: River seines set against an inundated shoreline have a maximum wing depth of 0.5 m unless the seine is set along a seawall, where the maximum wing depth is 1.0 m. The minimum and maximum bag depth for river seines is 0.3 m and 1.8 m, respectively. If the depths do not meet the minimum or maximum depth requirements, an alternate sampling site should be selected following standard FIM procedures (*Procedure 3.1*).

X) The first person on shore waits while the remainder of the net is deployed. This person ensures that there are no escape routes either under the lead line or along the shore edge.

Y) The boat operator increases speed and steers a semi-circular course along the shoreline, paying out the net until the bag is overboard.

Z) Once the bag is deployed the driver should be notified and the water depth at the bag (START DEPTH) should be noted.

AA) The boat operator then turns the boat toward shore, slowing the boat and lifting the engine as the boat approaches shore and the end of the seine.

BB) A second person jumps overboard and quickly drags the second pole to shore.

CC) When both seine poles are on shore, they are pulled toward each other, keeping the leads on the bottom.

> **NOTE**: Be sure to get the seine poles as close to the land-water interface as possible.

DD) When the poles are about 1 m apart, drop the poles to begin working the net to shore. Note the WING DEPTH at this time. The WING DEPTH is the average depth of water, to the nearest 0.1 m, along the path fished by the seine end(s) closest to shore.

EE) One crew member begins pulling in the leads while the other two assist by holding the wings up and pulling them toward shore. Any fish remaining in the wings should be put inside the net.

FF) When the leading edge of the bag's lead line is on shore, trip the net by lifting at the bag/wing junctions. If the sample is muddy, pull the bag offshore and rinse in deeper, clearer water.

GG) Reduce the bag size by slowly inverting the bag to concentrate the fish.

HH) Place the sample into a bucket or tub. Large fish may be measured and released at this time.

II) Collect fish that remained in the wings or on the beach and place in the sample. Most of the fish should have been put into the bag as it was retrieved.

JJ) Subsample using *Procedure 6.2*, if necessary.

KK) Follow *Procedure 6.1* for proper sample work-up.

LL) Physical data should be taken at the original bag location and recorded following the data sheet procedure (*Procedure 6.3*).

21.3-m Beach Seine Technique

Introduction

The beach seine technique was first implemented in Tampa Bay in July 1991 and was expanded to each field lab. In January 1998, the beach seine technique was replaced by the shoreline stratum of the bay seine technique in all field stations except Cedar Key. In February 2001, the shoreline stratum of the bay seine technique replaced the beach seine technique in Cedar Key.

Objective

2) To effectively sample shallow sloping beaches and banks.

Procedure

MM) Attach the 15.5-m (51') line to the top of the seine poles. Separate poles until 15.5-m line is taut.

NN) Stretch out seine perpendicular to the shoreline with the mouth of the bag facing into the current. Measure and note water depth (START DEPTH) at the bag.

> **NOTE**: Beach seines have a minimum and maximum bag depth of 0.3 m and 1.5 m, respectively. If the bag depth is less than 0.3 m, or if the depth exceeds 1.5 m at any point along the net, an alternate sampling site should be selected following standard FIM procedures (*Procedure 3.1*).

OO) Pull the leads and floats of the bag back until the seine is in a fishing position.

PP) Plant the tether poles immediately adjacent to each PVC seine pole. Then take the free end of each 9.1-m (30') tether line and put the loop around its respective PVC seine pole.

> **NOTE:** In the rare situation where the substrate is too hard to be penetrated by the tether pole, a five-pound weight may be used to anchor the 9.1-m line. In these cases, however, both seine poles must still be tethered and care must be taken not to drag the weights.

QQ) Angle seine poles so the lead line is slightly ahead of the float line. The inshore seiner should seine along the water's edge while the offshore seiner should stay approximately 1.5 m ahead of the inshore seiner.

RR) Seine along the shoreline, parallel to shore and into the current. Keep the 15.5-m line taut at all times, until both 9.1-m tether lines are taut.

SS) Take the loop for each 9.1-m tether line off each seine pole.

TT) At this time, the offshore seiner drags the seine toward shore in a semi-circular direction, maintaining the 15.5-m width between the two seine poles.

UU) When both seine poles are on shore, they are pulled toward each other, keeping the leads on the bottom.

VV) When poles are about 1 m apart, drop the poles and begin working the net to shore. Note the WING DEPTH at this time.

> **NOTE**: Maximum wing depth for beach seines set against inundated shorelines is 0.5 m. If the net is pulled along a seawall, the maximum wing depth is 1.0 m. If the wing depth is greater than 0.5 m (1.0 m against a seawall), an alternate sampling site should be selected following standard FIM procedures (*Procedure 3.1*).

WW) One crew member begins pulling in the leads while the other two assist by holding the wings up and pulling them toward shore. Any fish remaining in the wings should be put inside the net.

XX) When the leading edge of the bag's lead line is on shore, trip the net by lifting at the bag/wing junctions. If the sample is muddy, pull the bag offshore and rinse in deeper, clearer water.

YY) Reduce the bag size by slowly inverting the bag to concentrate the fish in a smaller area.

ZZ) Place the sample into a bucket or tub. Large fish may be measured and released at this time.

AAA) Collect fish that remained in the wings or on the beach and place in the sample. Most of the fish should have been put into the bag as it was retrieved.

BBB) Subsample using *Procedure 6.2*, if necessary.

CCC) Follow *Procedure 6.1* for proper sample work-up.

DDD) Physical data should be taken at the original bag location and recorded following the data sheet procedure (*Procedure 6.3*).

183-m Center Bag Seine

Introduction

The 183-m haul seine is used to catch larger sub-adult and adult fishes. The seine is set in a rectangular shape along the shoreline. This gear has many inherent benefits including ease of deployment in a standardized way, deployment from a small, shallow draft mullet skiff, less size selectivity than other sampling gears (i.e., gillnets and trammel nets), and collection of a wide variety of species. To ensure the collection of adequate sample sizes of species that demonstrate strong habitat preferences, sampling is stratified in some bay systems into two habitat types (with and without overhanging shoreline vegetation). Overhanging shore vegetation is defined as a tree or shrub that extends over the sample site during a normal tidal cycle and is close (~1-m) to the water surface, such that it would provide permanent shade and/or structure when water was beneath it, through prop roots, branches or fronds. Floating weed mats,

which provide shade and structure to the sample site, are considered overhanging vegetation. Emergent vegetation (*Juncus* spp., *Spartina* spp. and cattails) are not considered overhanging. During times of extreme low tide, particularly during the winter months, the land-water interface must be within 10-m of the overhanging vegetation and fish should have easy access to the overhanging area during normal tides in order to be considered an overhanging stratum. If the land-water interface is greater than 10-m from the overhanging vegetation, the site should be considered a non-overhanging stratum. A shoreline with greater than or equal to 10% of overhanging vegetation is considered an overhanging stratum (Strata = C), while anything less is considered a non-overhanging stratum (Strata = D). A stratum code (Strata = C or D) should be assigned for all seines regardless of whether pre-stratification occurred or not. Also, regardless of what stratum code is assigned, the coding of all habitat variables should follow FIM Procedure (See *Procedure 6.3* and/or *Appendix 9.2*).

Gear Description

183-m center-bag seine, 3.0-m deep with 38-mm stretch knotted nylon mesh. See *Appendix 10.1* for detailed description.

Objectives

3) To estimate abundance of sub-adult and adult fishes which inhabit shoreline habitats within select Florida estuaries.
4) To obtain data on size composition, habitat use, and spatial and temporal distribution of sub-adult and adult fishes.
5) To provide data and biological samples for use in species-specific studies.

Procedure

EEE) If site selection for this gear is by stratum, ensure that samples are collected in the predetermined stratum, or that proper alternate site selection criteria are followed.

FFF) Net Deployment and Retrieval

1) The boat is backed to the edge of the shoreline. Two crew members jump off the boat and take one end of the net to shore. Do not begin retrieving the net until it is fully deployed and the opposite end reaches the shore.

NOTE: The maximum wing depth for a 183-m haul seine is 0.5 m unless the net is set along a seawall where the maximum depth is 1.0 m. If the wing depth is greater than these maximum values, an alternate sampling site should be selected.

2) The boat operator motors the boat at idle speed, perpendicular to the shoreline until reaching the first section of painted floats.

NOTE: The net should have a 10-15 m section of painted floats with the center of those painted floats located at approximately 40 m from each end of the net to designate the corner (at 40 meters) and aid in setting the net. (painted floats implemented 4/96).

3) The boat operator makes a 90° turn at the painted floats, accelerates the boat onto a slow plane, and continues deploying the net parallel to the shoreline.

4) When the bag of the net is deployed, a crew member notifies the boat operator. The crew member then drops a weighted buoy near the outside of the bag to mark the location of the bag.

NOTE: Maximum bag depth for 183-m haul seine is 2.5 m. If the bag depth is greater than 2.5 m, an alternate sampling site should be selected.

5) The rest of the net is deployed parallel to the shoreline until the second section of painted floats is reached. The boat operator then makes a 90° turn toward the shore.

6) The remaining net is then deployed perpendicular to shore, ending at the shoreline. If set properly, the net should be in a rectangular shape when fully deployed.

7) The third crew member quickly takes the end of the net to shore while the boat operator anchors the boat.

8) Prior to retrieving the net, the crew should visually check for any overlays along the wings and that the bag is in proper fishing position. If there are overlays or the bag is twisted, the crew should fix these problems prior to retrieving the net. If they cannot be fixed in a timely manner, the sample should be aborted, and another set made.

9) The net is retrieved by hand, with two crew members on each end of the seine, one person working the lead line and the other the float line. The lead line should be pulled ahead of (toward the inside of the net) the float line and be kept as close to the bottom as possible to minimize fish escapement. This is typically easiest if the crew member pulling the lead line sits on the bank to retrieve the net, if possible. The wings are laid out (flaked) along the shoreline until the two wings meet in the center. Then, the remainder of the wings and the bag are retrieved.

10) Work the sample toward the bag, removing any gilled fish along the way. Gilled fish are considered part of the sample. Concentrate the sample in the bag and place the sample in a tub. If the catch is too large for a tub, bring the boat to the sample, put water in the net well, and lift or dip net the catch into the net well.

GGG) Sample Work-Up

1) Smaller specimens (<50 mm SL) may be collected because they were associated with or mixed in with the bycatch that was collected by the net. If a sample contains bycatch, it should be discarded but the specimens contained within it should be taken out and placed back into the bag of the net to allow the mesh of the net to do the “size-selecting”. **No specimen should be removed from the sample and discarded by hand**. After this

process, specimens remaining in the bag should be measured and counted according to standard FIM procedures (*Procedure 6.1*).

2) Cull selected species as indicated by the current Species Action Notice.

3) The PI is responsible for being up to date on all program procedures, including any Species Action Notices that may be in effect.

4) Bycatch (e.g., algae and grasses) should be identified and quantified before discarding.

HHH) Physical Data

1) Physical data should be taken at the original bag location (marked by the weighted buoy) and recorded following the data sheet procedure (*Procedure 6.3*).

2) Current and wind relation are recorded in relation to the boat as the bag is being deployed.

183-m Purse Seine

(Discontinued 01/01/05)

Introduction

The Fisheries-Independent Monitoring (FIM) program utilizes a purse seine to sample larger sub-adult and adult fishes. This gear is a modification of nearshore purse seines used in the commercial baitfish fisheries in southwest Florida. It is intended to fish seagrass and sand bottoms in depths of up to 3.3 meters. Extensive testing of this gear by FIM in 1995 and 1996 has shown the purse seine to be an effective way to capture sub-adult and adult fishes in Tampa Bay.

Gear Description

183-m terminal bag seine, 5.2 m deep with 50-mm stretch knotless nylon mesh. Stainless steel alpine clips are attached to the net and used as the purse rings. See *Appendix 10.1* for detailed gear description.

Objectives

6) To use the purse seine in a random sampling design to estimate abundance of sub-adult and adult fishes utilizing the shallow water habitats in select Florida estuarine systems.

7) To obtain data on size composition, habitat use, and spatial and temporal distributions of sub-adult and adult fishes.

8) To provide data and biological samples for use in species-specific studies.

Procedure

III) Obtain sampling site locations and coordinates from the Bay System Coordinator.

JJJ) Arrive at the site safely and without disturbing the area to be sampled.

KKK) Net Deployment

1) Upon reaching the site, anchor the boat and ensure starting depth is between 1.0 and 3.3 m. Determine the direction of current by observing the bottom vegetation or the tell tales on the anchor line. Also, determine wind direction and velocity.

2) Once you have established the direction of the wind and current, set the net into whichever variable is most influential on the set. This will usually be the current.

NOTE: The direction in which the net is set (into either the current or wind) will effect how the net fishes. Be careful to have the boat down current or down wind from the bag after closing the net.

3) The net is deployed bag first.

4) The net is set in a clockwise circle into the prevailing wind or current. Floats are marked every 61 m to aid in completing the circle.

5) Once the set is made, the net ends are quickly brought together.

6) The purse line is run through the tom weight, the last ring from each end of the net is clipped to the eye bolt on respective sides of the tom weight, and the tom weight is lowered to the bottom.

7) The hydraulic system is engaged to retrieve the net.

NOTE: BEWARE--this method requires the use of mechanically driven hydraulic components and is potentially more dangerous than other gears used in FIM sampling.

LLL) Net Retrieval

1) Wrap the purse line over the cat-head. Reverse the direction for each set to minimize twisting.

2) Keep tension on the line as the cat-head brings in the purse line.

3) To remove slack from the net wing, flake the floats along the stern of the boat as the purse line is retrieved.

4) As the cat-head brings in the line, the net is pursed along the bottom, becoming increasingly smaller until all the rings are at the tom weight. Lift the tom weight and all the rings to the surface. This purses the net.

NOTE: If the net rolls up during the set, note this on the field sheet (see section F1-b).

5) The net is then hauled back into the boat by the hydraulic net roller. The wing end is retrieved first, working the fish toward the bag end of the net.

6) As the net is brought in, place the purse rings on the shotgun as they enter the boat. Be careful not to cross the rings.

7) When the bag is reached, the sample is collected. Concentrate the sample by pulling in most of the bag. Using a dip net, remove the sample from the bag and place in gray tubs. Any fish trapped in the wing of the net should be included in the sample. Retrieve the remainder of the net.

8) Disengage the hydraulics and shut off the gas engine.

9) Secure the davit and tom weight before traveling to the next sampling location.

10) At the end of each day's sampling, run the purse line off the stern while moving forward. This will take the kinks out of the line, preparing it for further sampling.

MMM) Sample Work-up

1) Smaller specimens (<50 mm SL) may be collected because they were associated with or mixed in with the bycatch that was collected with the net. If a sample contains bycatch, the bycatch should be discarded but the specimens contained within it should be taken out and placed back into the bag of the net to allow the mesh of the net to do the "size-selecting". **No specimen should be removed from the sample and discarded by hand**. After this process, specimens remaining in the bag should be measured and counted according to standard FIM procedures (*Procedure 6.1*).

2) Cull selected species as indicated by the current Species Action Notice. The PI is responsible for being up to date on all program procedures, including any Species Action Notices that may be in effect.

3) Bycatch (e.g., algae and seagrasses) should be identified and quantified before discarding.

NNN) Recording Field Variables

1) Physical data should be recorded at the original bag location and recorded following the data sheet procedure (*Procedure 6.3*).

   a) CIRCUMFERENCE for the purse seine is 183 m. If the net is set too long, the CIRCUMFERENCE should be recorded as 183.9 m. If more than five rings are left on the ring bar, multiply the number of rings left by 3 and subtract from 183.0.

   b) The TWIST variable is used to describe how twisted the net is around the purse line once the net has been pursed (See *Appendix 9.2* for code list).

6.1-m Otter Trawl

Introduction

A 6.1-m otter trawl is used in the Fisheries-Independent Monitoring (FIM) program to sample areas of the estuarine system between 1.8 m and 7.6 m in depth. In addition to sampling areas of the bay not accessible to seines, trawls tend to collect epibenthic fish and macrocrustaceans that are larger than those typically collected in seines.

Gear Description

6.1-m otter trawl with 38-mm stretch mesh and 3-mm mesh liner. See *Appendix 10.1* for detailed gear description.

Objective

9) To collect a quantitative sample of epibenthic fish found in deeper (1.8 – 7.6 m) portions of the bay and rivers.

Procedure

OOO) Preliminary procedures

1) Obtain sampling site locations and coordinates from the Bay System Coordinator.

2) Arrive at the site safely and without disturbing the area to be sampled.

3) Check to ensure trawl can be towed into current along an unobstructed path (no bars, channels, bridges, etc.).

4) Ensure starting depth is less than 7.6 m and greater than 1.8 m.

NOTE: If water depths shallower than 1.8 m are encountered during a trawl, an alternate sampling site should be selected. Exceptions to this rule include sampling in rivers and basins (Florida Bay) where an arc tow can be completed in lieu of a straight tow (Section H). Preference, however, should always be given to completing a straight-towed trawl when possible.

PPP) Trawl preparation

1) Attach the trawl harness to the cleats on each gunwale.

2) Coil the tow line and bridle forward of the gas tank bulkhead so they will deploy without tangling.

3) Attach the ends of the bridle lines to the trawl doors.

4) Tie the cod end of the trawl and ensure a crab float is securely attached to the net.

5) Unfold the net, with the doors separated in the net well, and make sure it is not tangled.

QQQ) Trawl deployment

1) Position the boat into the current (or wind if no current is detected), while keeping forward momentum.

NOTE: The current within a river can flow backwards (upstream) if a dam is holding water back during a rising tide. Open bays may also experience currents that flow contrary to predicted tables. Therefore, the current direction should be assessed at the sampling site to determine tow direction.

2) Toss the crab float and cod end over the stern of the boat.

3) Motor the boat forward at an appropriate speed to deploy the net (except the doors) off the stern.

4) Check the trawl doors to make sure the lead line and float line are not crossed.

5) Swing the trawl doors out and over the stern of the boat.

6) Record the START DEPTH. If the depth to be sampled is less than 1.8 m or greater than 7.6 m, choose an alternate grid or see special trawl procedure (Section H).

7) Feed doors out at the same speed and watch to make sure they are vertical and pulling the net open.

CAUTION: Stay outside of the bridle and keep feet clear of lines!

8) Continue to deploy the bridle lines, while keeping equal tension on both lines at all times.

9) When bridle lines are out, the crew should step forward of the bullet buoy. One person should maintain tension and continue to guide the tow line out.

10) Deploy the bullet buoy at the end of the tow line.

11) Tell the boat operator that the net is deployed.

RRR) Fishing procedure

1) Save starting waypoint using a GPS or LORAN after the tow line has been extended and the trawl begins fishing (*Procedure 6.6*).

2) Record START TIME: all trawl tows should last 10 minutes, except on rivers where a 5 minute tow time is standard.

3) Set boat speed to tow approximately 0.2 nm in 10 minutes during bay sampling, 0.1 nm in 5 minutes during river sampling, or 0.07 nm in 3 minutes during Indian River bay sampling (1.2 knots and ~1200-1400 rpm).

NOTE: In order to achieve the desired tow distance, it is useful to know your progression during the trawl. To do this, follow *Procedure 6.6*.

4) Fill out the remaining portion of the field data sheet.

5) Before the end of the tow, the boat operator should alert the crew so that the area near the rear of the boat is clear and ready to receive the trawl. A tub with water should be ready to receive the sample.

SSS) Trawl retrieval

1) At the end of the tow, save the present position (ending waypoint), using the GPS or LORAN (*Procedure 6.6*).

2) Place the boat in reverse, as needed, while one crew member retrieves the tow line as quickly as possible. The tow line and bridle lines should be kept taut at all times. Another crew member should coil the line forward of the gas tank bulkhead, so the trawl will be ready to be deployed.

3) At the first appearance of the bridle lines, the person coiling the tow line should stop coiling and help in retrieving the bridle lines.

4) Place the boat out of gear or in forward to prevent the boat from drifting over the trawl. Record END DEPTH.

5) Recover the doors and remove any fouling on the net, chain, or doors.

6) After the doors are in the boat, the wings and the tickler chain should be pulled into the boat together to retrieve the net quicker and thus help eliminate fish escapement.

7) Concentrate the sample by shaking it down to the cod end taking care not to shake gilled fish out of the net. Remove any remaining gilled fish once the trawl is on board. Gilled fish are to be considered part of the sample. After removing the catch from the cod end, inspect the cod end liner for small fish and invertebrates that may not have been removed by shaking down the net.

8) At some point during trawl retrieval or sample collection the PI should determine the DISTANCE TOWED and the BEARING (*Procedure 6.6*). The distance towed is measured from when the tow line becomes taut and the net is fishing to when the boat is stopped to begin retrieving the tow line. When sampling in the bay, this distance should equal 0.2 nautical miles (acceptable range is 0.16 to 0.24 nautical miles). for a 10 minute tow. If it does not fall within this guideline, the sample should be aborted and speed adjusted accordingly on subsequent trawls. For river sampling, see section H.

NOTE: If the distance towed is not properly taken, the tow has to be repeated. If the GPS or LORAN is inoperative, abort the trip. **No trawl tows will be made without a GPS or LORAN.**

TTT) Determination of acceptable sample

1) After several aborts, trawls with a minimum of 60% of the original tow time for bay trawls (6 minutes), river trawls (3 minutes), and Indian River bay

trawls (2 minutes) are acceptable. Tow times below these levels should be aborted.

2) If the bycatch appears to have affected the fishing ability of the trawl, the sample must be aborted. Unacceptable bycatch that may affect the fishing ability of the trawl include any natural or man-made debris that creates a barrier near the mouth, body, or cod end of the net. A large volume of bycatch (i.e., exceeding ~50 gallons) may also affect how a trawl fishes such that the pressure wave created during towing prevents the trawl from fishing properly.

3) In some cases, a net that gets hung up while towing can indicate the point where unacceptable quantities of bycatch have been collected. If any of the previously mentioned bycatch types are collected after an acceptable period of time (see Step 1) the tow will be discontinued at that point and the sample would be accepted, barring any obstructions within the net as described in Step 2. In cases where the net gets hung momentarily prior to an acceptable tow time, the tow should be completed, and a determination of acceptability should be made upon retrieval and examination of the net.

4) Bycatch that includes small portions of crab traps and other manmade items that do not appear to affect the trawl opening or otherwise hinder normal operation (e.g. twisting of trawl body) would be acceptable.

5) Trawls will be aborted anytime the gear fails to fish in the manner it is intended (i.e. twisted bridle lines, doors flying or not on the bottom, mechanical failure).

6) Samples in which traps or debris are snagged on the outside of the trawl body or trawl doors will be aborted if the trawl has become twisted, if debris has impeded the flow through the mouth of the trawl, if debris is tangled in the bridle, or if debris has changed the shape of the opening or body of the trawl.

UUU) Sample collection

1) Empty the sample into the tub and examine the liner to recover any fish remaining in the net webbing.

2) Determine and record bycatch and quantity.

3) Subsample using *Procedure 6.2*, if appropriate.

4) Follow *Procedure 6.1* for proper sample work-up.

VVV) Physical Data

1) Water quality data should be taken at the recorded trawl start position and recorded following the data sheet procedure (*Procedure 6.3*).

WWW) Special trawl procedures

1) When trawling in a river, follow normal trawling procedures except that the duration of the trawl should be 5 minutes and the distance traveled should equal 0.1 nautical miles (acceptable range is 0.08 to 0.12 nautical miles).

2) When trawling in Indian River, follow normal trawling procedures except that the duration of the trawl should be 3 minutes and the distance traveled should equal 0.07nm (acceptable range is 0.06 to 0.08 nautical miles).

3) When trawling in water shallower than 1.8 m but greater than 1.0 m, execute an arc tow. During an arc tow, the boat should be turned (1/3 total turning radius) to prevent the trawl from sampling an area possibly disturbed by the boat propeller. See *Appendix 9.2* for specific gear code.

NOTE: If water depths shallower than 1.0 m are encountered during a trawl, the trawl should be aborted and an alternate sampling site should be selected. Arc-towed trawls should be used as a last resort (i.e., Florida Bay and river sampling).

Sample Work-Up

Introduction

All fishery samples collected by the Fisheries-Independent Monitoring (FIM) program are processed following a standard set of protocols. These protocols ensure that an accurate size representation and number collected are recorded for each species in each sample and that the data taken reflect the entire catch. All species of fish and select macroinvertebrates (*Callinectes sapidus, Callinectes similis, Callinectes bocourti, Callinectes ornatus, Menippe* spp., *Limulus polyphemus, Portunus* spp., *Charybdis hellerii, Platychirograpsus spectabilis, Farfantepenaeus aztecus, Farfantepenaeus braziliensis, Farfantepenaeus duorarum, Litopenaeus setiferus, Rimapenaeus constrictus, Xiphopenaeus kroyeri, Sicyonia spp., Macrobrachium* spp., *Panulirus argus*, *Stomolophus meleagris, Argopecten* spp. and *Mercenaria* spp.) are worked up for each sample. Freshwater turtles and sea turtles are also identified and measured.

Objective

10) To ensure that all fish and selected macroinvertebrates collected are counted and measured according to a standardized method, the measurements taken are reflective of the size structure of the entire sample, and accurate counts of all species are recorded.

Procedure

NOTE: This procedure applies to all stratified-random sampling only. For work-up procedure of directed sampling specimens, see Section I.

XXX) Cull the sample thoroughly for all fish and selected macroinvertebrates. Specimens should be separated by species, selected randomly to be measured, and counted according to the guidelines listed below. Special care should be taken to remove vegetation and other bycatch that may interfere with the work-up of the sample. Record the type, amount, and ratio of bycatch on the field data sheet.

NOTE: 21.3-m seine and 6.1-m otter trawl samples that contain large numbers of specimens (>1000) may be split according to *Procedure 6.2* (Subsampling).

YYY) Selected Species

1) "Selected Species" are species that the FIM program considers to be of recreational or commercial importance (*Appendix 11.1*). These fish should be processed first and released alive whenever possible.

NOTE: Not all recreationally and commercially important species are included in this list.

2) If a sample is to be subsampled (*Procedure 6.2*), a conscious and deliberate effort to cull all Selected Species from the sample prior to subsampling must be accomplished.

3) Cull through the entire sample and randomly select up to 40 individuals for each species designated as Selected Species (100 individuals prior to 10/97; *Appendix 11.1*).

   a) If multiple size classes of a particular Selected Species exist, then 40 specimens from each size class should be measured. More than 40 specimens should be measured when a large size range exists with no clear size classes.

   b) If a sample has been subsampled and the species is present in both the split and unsplit portions, up to 40 specimens will be measured from each size class within both the split and unsplit portions.

4) Count all individuals that were not measured. If different size classes were measured, then the number collected within each size class must be counted separately. Record numbers on a length data sheet (*Procedure 6.3*).

5) Any Selected Species that die should be included in the representative sample (*Procedure 6.5*) or brought back for the reference collection.

ZZZ) Common Teleosts

1) Identify specimens to the species or species-complex level. If unable to do so, identify to the lowest taxa possible and return the specimen(s) to the lab for further identification (*Procedure 6.5*).

   a) The following species are only identified to genus level when under a certain size:

(i) *Eucinostomus* spp. <40 mm SL

(ii) *Gobiosoma* spp. <20 mm SL

(iii) *Strongylura* spp. (*marina* and *timucu* only) <100 mm SL

(iv) *Lepomis* spp. (beginning 1/04) <20 mm SL

(v) *Oreochromis/Sarotherodon* spp. (beginning 1/05) <40 mm SL

(a) Includes *Tilapia* spp., *Oreochromis* spp., *Sarotherodon* spp.

(vi) *Hyporhamphus* spp. (beginning 5/06) <100 mm SL

b) The following species are only identified to the genus level regardless of size:

(i) *Brevoortia* spp.

(ii) *Menidia* spp.

2) Measure standard length for all species except sea horses for which head to tail length will be recorded (*Figure 6.1-1*). Standard length is the length of a fish from the most anterior part of the body to the end of the hypural plate.

3) Number of common specimens to measure

a) 21.3-m seine and 6.1-m otter trawl samples

(i) <150 mm SL: measure up to 10 (40 prior to 10/97)

(ii) ≥150 mm SL: measure up to 20 (40 prior to 10/97)

b) 183-m haul samples

(i) Measure up to 20

c) If a species has multiple size classes, the minimum number of specimens should be measured and recorded for each size class. If a wide size range exists but there are no obvious size classes, more than the minimum number of specimens should be measured.

d) If a sample was subsampled and the same species is present in both the split and unsplit portions, the minimum number of specimens should be measured from both the split and unsplit portions.

e) Count and record the number of remaining individuals for each species. If different size classes were measured, then the number collected within each size class must be counted separately.

Subsampling

Introduction

Subsampling devices (splitters) or techniques are used to divide samples that

contain large quantities of organisms or algae into smaller, more manageable subsamples. Data from these subsamples can then be extrapolated to provide an estimate of the original sample. The time spent removing specimens from large quantities of algae or measuring and counting all of the specimens in a large sample can affect the success and timely completion of a field trip, making it logistically necessary to subsample. Subsampling reduces the time required to work up samples and reduces the amount of fish mortality per sample. However, the splitting process must be done correctly in order to provide accurate estimates of abundance, species composition, and length frequency distributions in the original sample.

Subsampling can be a source of considerable error in the estimation of original sample totals. There are several possible sources contributing to this error: presence of inanimate materials limiting the mixing of the sample, presence of rare or unusually large specimens, variance of splitting technique, interference (clumping) of organisms, over or under-dilution of sample, edge effects, and the repeated subdivision of a sample. Many of these factors can be eliminated or controlled by splitter design and standardization of the subsampling protocol/technique.

The following procedures outline the guidelines for subsampling in the field. These guidelines are based upon several years of testing the modified Motoda box splitter by the FIM program and should be followed as closely as possible to ensure the validity of subsampled data.

Objectives

11) Establish and maintain a subsampling protocol that will accurately and precisely estimate abundance in the original sample while allowing for timely sample work-up.
12) Reduce fish mortality caused by field sampling.

Procedure

AAAA) Motoda Box Splitter Method

1) Sample Preparation

*This part of the subsampling process is just as important as the actual splitting of the sample. It is the responsibility of the PI and crew to ensure that the following guidelines are followed. The PI and crew must ascertain whether time will be saved by subsampling and if the sample can be effectively and accurately subsampled. If the sample does not meet these requirements (listed below), then proceed to work up the entire sample (*Procedure 6.1*).*

NOTE: Samples should contain no less than 1,000 individuals of a particular species before being considered for subsampling. Testing has shown that splitting error increases with decreasing sample size. This can also affect our estimates of length frequency and species composition of a sample.

a) Remove vegetation and foreign material from the sample (i.e., drift algae, leaves, seagrass, sticks, detritus, etc.).

b) Cull out fish with a standard length greater than 100 mm.

c) Cull out all fish that are designated as **Selected Species** (*Appendix 11.1*) by the FIM Program. If there are over 1,000 specimens of a particular Selected Species, cull 40 and split the rest.

d) Cull out "RARE" species (n<20) from the sample.

NOTE: It is extremely important to cull “RARE” species. Splitting error increases as the size of the final subsample decreases, which can cause gross over-estimations of “RARE” species densities.

e) Fish culled out via steps 1b-1d should be measured and counted (*Procedure 6.1*). They should be entered on a length data sheet separate from the split portion of the sample.

2) Subsampling

a) Lay the splitter flat with the divided portion (receptacle end) of the splitter farthest from you and the open end (reservoir end) nearest you.

b) Place the sample in the reservoir end of the splitter. If the sample is large, portions of it should be split separately to the same level (i.e., initially no greater than Level = 2) and then combined for further splitting, if necessary, or for measuring and counting. The amount of fish placed into the splitter should not exceed a level at which mixing of the fish in the splitter is impeded.

NOTE: If a sample is too large to fit into the splitter then the sample should be split in portions. However, you need to maintain the same amount of fish in each portion being split. This can be accomplished by combining split portions after the first or second levels (when the portions themselves are too small to split alone) and splitting them together for the remaining split levels. The portions must be at the same split level prior to combining.

c) Add approximately 4000-5000 ml of water to the sample in the splitter. The volume of both fish and water should fill the reservoir from the lip of the leading edge to the receptacle when the splitter is tilted toward you at a 45o angle.

d) Tilt the splitter toward you at a 45o angle. Hold the splitter firmly with one hand and use your other hand to mix the sample in the reservoir. Mix the sample by placing your hand in the splitter and rotate the sample counterclockwise.

e) Immediately grasp the splitter with both hands (it works best to grasp it on the sides just above the receptacle) and rotate it in a single quick motion away from your body into an upright position. This should split

the sample into two equal portions, one that is discarded overboard and another that is retained in the receptacle of the splitter.

f) If fish are caught on the floor or septum of the splitter once the sample has been split and the splitter is sitting upright, draw an imaginary line from the receptacle septum upward to the top of the splitter. Any fish on the receptacle side of this line should be placed into the receptacle portion of the sample and any fish on the open side of the line should be discarded. If there is a question about which side the fish belongs on, the head of the fish is the indicator.

NOTE: Any fish that sloshed out of a sample before splitting and are not included in the split should be measured and counted with the unsplit portion of the sample.

g) Continue this process (2c-f) if additional splitting is necessary.

h) Pour the split portion of the sample, retained in the receptacle, into a net or bucket for work-up.

i) Work up sample according to FIM *Procedure 6.1*

j) Enter the fish from the split portion on a separate length data sheet from the unsplit portion. This sheet should have the same collection number as the unsplit portion but should indicate the splitter METHOD (METHOD = M), splitter TYPE (indicates number of cells the splitter has; TYPE = 2), and the split LEVEL (number of times the sample was split) (See *Appendix 9.2*).

BBBB) Table Split Method

NOTE: This splitting method should only be used in extreme situations where many small fish are mixed with large quantities of drift algae or other bycatch. Combining splitter methods (e.g.: Table Split followed by a Motoda Box Split) for a single sample may occasionally be warranted. In these cases the least accurate, typically first, method of splitting (e.g., Table) should be recorded as METHOD, and LEVEL should be the sum of all splits conducted (e.g.: one Table Split followed by two Motoda Box splits would be coded METHOD = "T", TYPE = 2, LEVEL = 3).

1) Sample Preparation

a) Follow FIM procedure for culling rare species (n < 20), large specimens (SL > 100 mm), and Selected Species from the sample (See A-1a-e above).

2) Subsampling

a) Place the remainder of the sample on the sorting table, making sure it is evenly distributed and of similar depth throughout.

b) Measure the long side of the sorting table and divide the sample into **two** equal halves.

c) Randomly select one half and discard the selected half.

d) If further subsampling is required, measure the short side of the sorting table and divide the sample into two equal halves again.

e) Randomly select one half and discard the selected half.

f) Continue this process (2a-e) if additional splitting is necessary.

g) Work up sample according to FIM *Procedure 6.1*.

h) Enter the fish from the split portion on a separate length data sheet from the unsplit portion. This sheet should have the same field number as the unsplit portion but should indicate the splitter METHOD (METHOD = T), splitter TYPE (TYPE = 2) and the split LEVEL (number of times the sample was split).

CCCC) Bag Split Method

NOTE: This splitting method should only be used in extreme situations (e.g. many small fish mixed with large quantities of drift algae or bycatch) when the Table Split cannot be completed. Combining splitter methods (e.g.: Bag Split followed by a Motoda Box Split) for a single sample may occasionally be warranted. In these cases the least accurate, typically first, method of splitting (e.g., Bag) should be recorded as METHOD, and LEVEL should be the sum of all splits conducted (e.g.: one Bag Split followed by two Motoda Box splits would be coded METHOD = "B", TYPE = 2, LEVEL = 3).

1) Sample Preparation

a) After completing the appropriate seining technique, harden the bag until all fish are worked into the bag and all empty space is removed.

b) Follow FIM procedure for culling rare species (n < 20), large specimens (SL > 100 mm), and Selected Species from the sample (See A, 1, a-e above).

2) Subsampling

a) Run the 9.1-m seining line from one side, under the bag, and through to the other side of the bag, making sure it is in the center, equally splitting the sample into **two** equal halves.

b) Raise the seine line up until it splits the bag into **two** equal halves.

c) Randomly select which half will be removed and discard the selected half.

d) Split again, if necessary, using the same technique (2a-c).

e) Work up sample according to *Procedure 6.1*.

f) Enter the fish from the split portion on a separate length data sheet from the unsplit portion. This sheet should have the same field number as the unsplit portion but should indicate the splitter METHOD (METHOD = B), splitter TYPE (TYPE = 2) and the split LEVEL (number of times the sample was split).

DDDD) Bucket Split Method

NOTE: This splitting method should only be used in extreme situations when the volume of fish collected is nearly mono-specific and contains at least 10 gallons of fish. Sample should contain very little or no bycatch/vegetation. Combining splitter methods (e.g.: Bucket Split followed by a Motoda Box Split) for a single sample may occasionally be warranted. In these cases the least accurate, typically first, method of splitting (e.g., Bucket) should be recorded as METHOD, and LEVEL should be the sum of all splits conducted (e.g.: one Bucket Split followed by two Motoda Box splits would be coded METHOD = "U", TYPE = 2, LEVEL=3).

1) Sample Preparation

   a) Follow FIM procedure for culling rare species (n < 20), large specimens (SL > 100 mm), and Selected Species from the sample (See A, 1, a-e above).

2) Subsampling

   a) Evenly distribute the sample amongst **two** standard 5-gallon buckets.

   b) Randomly select one bucket and discard its contents.

   c) If the sample is larger than 10 gallons, repeat this process for the remainder of the sample until all portions are at the same split level.

   d) Combine sample portions and repeat as needed (until a single bucket remains).

   e) Work up the remaining sample according to *Procedure 6.1*.

   f) Enter the fish from the split portion on a separate length data sheet from the unsplit portion. This sheet should have the same field number as the unsplit portion but should indicate the splitter METHOD (METHOD = U), splitter TYPE (TYPE = 2) and the split LEVEL (number of times the sample was split).

Commonly Used Field Codes

CODE	GEAR
20	21.3-m center-bag seine, 3-mm mesh, leads spaced every 15-cm: offshore-circular bay seine set.
23	21.3-m center-bag seine, 3-mm mesh, leads spaced every 15-cm: River seine set.
160	183-m center-bag seine, green dipped, 38-mm stretch mesh, 15-cm lead spacing. Net set from skiff on shore in a rectangular pattern. (08/94)

250 548.6-m nylon trammel net, 11.75-cm stretch mesh (inner netting) 35.6-cm stretch mesh (outer netting) (used for redfish survey)

251 365.8-m monofilament trammel net, 2.4-m deep, 7.0-cm stretch mesh (inner netting), 30.5-cm stretch mesh (outer netting) (used for mullet survey)

300 6.1-m otter trawl with 3-mm liner & tickler chain: straight tow

301 6.1-m otter trawl with 3-mm liner & tickler chain: arc tow

SHORE TYPE		BOTTOM VEGETATION		BYCATCH	
BM	Black Mangrove	GM	Grasses: Mixed	AM	Algae: Mixed
JU	*Juncus* spp.	HA	*Halodule* spp.	CT	Ctenophores
MA	Mangrove	NO	None	DT	Detritus
MG	Marsh Grass	SY	*Syringodium* spp.	GM	Grasses: Mixed
RM	Red Mangrove	TH	*Thalassia* spp.	HA	*Halodule* spp.
RR	Rip Rap	UN	Unknown	LL	Leaf Litter
SN	*Spartina* spp.	VA	*Valisneria* spp.	NO	None
TP	Trees: Pine			SF	Starfish
SW	Seawall			TH	*Thalassia* spp.

Field Code List

FIELD NUMBER

FIELD_NO's are twelve digit variables comprised of seven distinct parts designed to give every sample taken a unique, identifying number. The parts are: BBTYYMMNN##X

PART	DESCRIPTION
BB	BAY system sampled
T	SAMPLING TRIP TYPE
YY	YEAR sample was taken (e.g., 94)
MM	MONTH sample was taken (e.g., 01)
NN	TRIP NUMBER, assigned by the RA from each field lab
##	SEQUENTIAL NUMBER of sample within each trip (USE LEADING ZERO)
X	MODIFIER

New field numbering system incorporated 01/01/01. Refer to the 2000 Procedure Manual for previous field numbering system.

BAY (Code Incorporation Date)

CODE	BAY
AN	Anclote River (10/04)
AP	Apalachicola
BB	Big Bend (05/08)
CH	Charlotte Harbor
CK	Cedar Key
CR	Crystal River (03/08)
CZ	Chassahowitzka River (08/05)
EB	Estero Bay (10/04)
EV	Everglades (06/96)
FB	Florida Bay (06/06)
FK	Florida Keys
FW	Fort Walton (10/92 – 04/97)
GL	Guana Lake (01/08-12/10)
HI	Honeymoon Island (06/09)
HS	Homosassa River (12/06)
IR	Indian River
KY	Florida Bay
LB	Lemon Bay (06/09)
JX	Jacksonville (12/94)
RI	River study
SA	St. Andrew's Bay (05/08)
SB	Sarasota Bay (03/04)
SF	Directed Sawfish sampling (11/04)
SR	St. Sebastian River
TI	Ten Thousand Islands (07/10)
TB	Tampa Bay
TQ	Tequesta (01/97)
VC	Volusia County
WW	Weeki Wachee

SAMPLING TYPE

CODE	SAMPLING TYPE
A	Adult Monitoring
B	Bought (09/94)
C	Cryptic Mortality
D	Directed
F	Fixed-Station Sampling
G	Gear Testing
H	Hatchery Release Sampling
K	Alafia River Acid Spill Sampling
M	Stratified-Random Sampling
N	Nutrients
O	Oil spill sampling
P	Photosynthesis

R	Reconnaissance
S	Seagrass
V	Visual Survey (Used with 'KY' only)
V	River Study (Used with 'RI' only)
X	Extra (09/94)
Z	Zoology

MODIFIER

CODE	DESCRIPTION
A-E	Identifies each panel (mesh size) of a gillnet. A is the smallest mesh size in a given net while E represents the largest mesh size.
L, M, R	Designates the Left, Middle, and Right net in a series of three dropnets when samples removed by the internal seine.
X, Y, Z	Correspond to dropnets L, M, and R (respectively) when samples removed with a dipnet.

GEAR CODES

Code	Gear Description
1	6.1m seine w/o bag, 3.1mm mesh.
2	6.1m center bag seine, 3.1mm mesh, leads spaced at 150mm. Modified beach set. Incorporated 10/93.
3	6.1m center bag seine, 1.6-mm mesh, 1.2-m deep. Used from 1981-1983 during McMichael red drum study (04/99)
4	12.2m center bag seine, 6.3-mm mesh, 1.2-m deep. Used from 1981-1983 during McMichael red drum study (04/99)
5	9.1m center-bag seine, 3.1mm mesh, leads spaced every 150mm, raft set.
10	21.3m center-bag seine, 3.1mm mesh, 300mm mesh lead spacing, on shore, deployed from boat (boat set),
11	21.3m center-bag seine, 3.1mm mesh, 300mm lead spacing, offshore set.
12	21.3m center-bag seine, 3.1mm mesh, 300mm lead spacing, onshore w/o boat (beach set).
13	21.3m terminal-bag seine, 3.1mm mesh, leads spaced every 300mm, offshore-circular set.
20	21.3m center-bag seine, 3.1mm mesh, leads spaced every 150mm, offshore-circular set.
21	21.3m terminal-bag seine, 3.1mm mesh, leads spaced every 150mm, offshore-circular set.
22	21.3m center-bag seine, 3.1mm mesh, leads spaced every 150mm, onshore set w/o boat (beach set).
23	21.3m center-bag seine, 3.1mm mesh, leads spaced every 150mm, boat set.
24	21.3m center-bag seine, 3.1mm mesh, 150mm lead spacing, w/many ends line, onshore set w/o boat (beach set).
25	21.3m center-bag seine, 3.1mm mesh, 150mm lead spacing, w/many ends line, offshore-circular set.
26	21.3m center-bag seine, 3.1mm mesh, 150mm lead spacing, offshore-circular set that specifically targets seagrass habitats. (06/94) (Used only at FW field lab.)
27	21.3m center-bag seine, 3.1mm mesh, 150mm lead spacing, onshore set w/o boat (beach set) that specifically targets seagrass habitats. (06/94) (Used only at FW field lab.)
28	21.3m center-bag seine, 3.1mm mesh, 150mm lead spacing, w/many ends line, onshore set w/o boat (beach set) that specifically targets seagrass habitats. (06/94) (Used only at FW field lab.)
29	21.3m center-bag seine, 3.1mm mesh, 150mm lead spacing, w/many ends line, offshore circular set that specifically targets seagrass habitats. (06/94) (Used only at FW field lab.)
100	21.3m terminal-bag seine, 300mm lead spacing, offshore-circular set in association with mangrove blocknets.
101	21.3m terminal-bag seine, 300mm lead spacing, offshore-circular set in association with seawall blocknet sets.
102	21.3m terminal-bag seine, 150mm lead spacing, offshore-circular set in association with seawall blocknets sets.
103	21.3m terminal-bag seine, 150mm lead spacing, offshore-circular set in association with mangrove blocknet sets.
104	21.3m center-bag seine, 150mm lead spacing, offshore-circular set in association with seawall blocknet sets.
105	21.3m center-bag seine, 150mm lead spacing, offshore-circular set in association with mangrove blocknet sets.
106	21.3m terminal-bag seine, offshore-circular set in association with $1m^2$ dropnets.
107	21.3m center-bag seine, 3.1mm mesh. 150mm lead spacing, offshore-circular set in association with $1m^2$ dropnets.
148	30.5m center bag seine, 6.3-mm mesh, 2.4-m deep. Used from 1981-1983 during McMichael red drum study (04/99)

Code	Gear Description
150	61m seine, used as a drag seine on poles and deployed from a boat
151	122m pull through seine, 3.1mm mesh, w/ terminal-bag
152	122m purse seine, 3.1mm mesh, w/terminal-bag
153	61m blocknet, 300mm lead spacing. Used in association with mangroves.
154	61m blocknet, 300mm lead spacing. Used in association with seawall.
155	183m center-bag seine 25.4mm stretch mesh (12.7mm bar mesh), 150mm lead spacing, set from skiff onshore (boat set). (Code used for Gear Testing)
156	30m center-bag seine 6.25mm stretch mesh, set from skiff onshore (boat set). Similar to McMichael & Peters net.
157	183m center-bag seine 25.4mm stretch mesh (12.7mm bar mesh), 150mm lead spacing. Net set from skiff in a semicircular pattern on shore in water depth < 0.1 m. (04/94)
158	183m center-bag seine 25.4mm stretch mesh (12.7mm bar mesh), 150mm lead spacing. Net set from skiff in a semicircular pattern on shore in water depth > 0.1 m. (04/94)
159	183m center-bag seine 25.4mm stretch mesh (12.7mm bar mesh), 150mm lead spacing. Net set from skiff in a circular pattern on shore in water depth > 0.1 m. (04/94)
160	183m center-bag seine, green dipped, 37.5mm stretch mesh (18.8mm bar mesh), 150mm lead spacing. Net set from skiff in a rectangular pattern on shore in water depth < 0.5 m. (08/94)
161	183m center-bag seine, green dipped, 37.5mm stretch mesh (18.8mm bar mesh), 150mm lead spacing. Net set in a rectangular pattern on shore with water depth <0.1m. Net Not Set. (10/95)
162	183m center-bag seine, green dipped, 37.5mm stretch mesh (18.8mm bar mesh) with 150mm lead spacing. Net set from skiff offshore in a three-sided rectangular pattern. Used in Apalachicola. (09/95)
170	183m terminal bag purse seine, 51mm stretch mesh (25.5mm bar mesh) with 305-mm lead spacing and 457-mm float spacing. Wing depth is 5.2-m and bag depth is 7.6-m.
180	61m center-bag seine, 3.7m deep, 25.4mm stretch mesh with 102mm lead spacing and 229mm float spacing. Used in Tampa Bay during the red drum hatchery release study beginning 03/00.
181	61m center-bag seine, 3.7m deep, 25.4mm stretch mesh with 102mm lead spacing and 229mm float spacing. Used as part of the directed portion of the Tampa Bay red drum hatchery project. Sets will vary in size and shape depending upon the sampling situation so data cannot be used to estimate relative abundance of red drum (hatchery or wild) populations. Began testing 08/02.
200	Small mesh gillnet (5-panel)
201	Small mesh gillnet with three panels: 15m of 50mm mesh, 30m of 75mm mesh and 100m of 100mm mesh.
202	Small mesh gillnet with three panels: 15m of 50mm mesh, 45m of 75mm mesh and 45m of 100mm mesh.
203	Small mesh gillnet with three panels: 15m of 50mm mesh, 60m of 75mm mesh and 60m of 100mm mesh
204	184m large mesh gillnet with four panels: 46m each of 75mm, 100mm, 125mm, and 150mm mesh. NORMAL SET: Small mesh to shore.
205	184m large mesh gillnet with four panels: 46m each of 75mm, 100mm, 125mm, and 150mm mesh. REVERSE SET: Large mesh to shore. Set in association with a NORMAL SET.
206	184m large mesh gillnet with four panels: 46m each of 75mm, 100mm, 125mm, and 150mm mesh. NORMAL SET: Small mesh to shore. Set in association with a REVERSE SET.
207	198m large mesh gillnet with five panels: 15m of 50mm mesh (#139 twine), and 46m each of 75mm, 100mm, 125mm, and 150mm mesh (#208 twine). NORMAL SET: Small mesh to shore. Set in association with a REVERSE SET. (02/94)
208	198m large mesh gillnet with five panels: 15m of 50mm mesh (# 139 twine), and 46m each of 75mm, 100mm, 125mm, and 150mm mesh (#208 twine). REVERSE SET: Large mesh to shore. Set in association with a NORMAL SET. (02/94)
209	198m large mesh gillnet with five panels: 15m of 50mm mesh (#139 twine), and 46m each of 75mm, 100mm, 125mm, and 150mm mesh (#208 twine). NOT set in association w/ REVERSE SET gillnet. NORMAL SET: Small mesh to shore. (05/94)

Code	Gear Description
211	46m gill net with 6 panels: 7.6m of 51mm, 45mm, 38mm, 32mm, 25mm and 19mm monofilament mesh, 10mm poly foam top line and a lead core bottom line. Hung on a ratio of 55% with No. 15 bonded twine, set perpendicular to shore. NORMAL SET (03/07)
212	46m gill net with 6 panels: 7.6m of 51mm, 45mm, 38mm, 32mm, 25mm and 19mm monofilament mesh, 10mm poly foam top line and a lead core bottom line. Hung on a ratio of 55% with No. 15 bonded twine, set perpendicular to shore. REVERSE SET (03/07)
225	243.8m gillnet with 50mm mesh. Used from 1981 – 1983 during McMichael red drum study. (04/99)
226	183m gillnet with four panels: 13mm, 19mm, 25mm, and 38mm. Used from 1981 – 1983 during McMichael red drum study. (04/99)
250	547m nylon trammel net with 117mm stretch mesh inner wall and 330mm stretch mesh outer walls. Net used in directed redfish study.
251	366m monofilament trammel net. 2.4m deep, 72mm mesh (#104 twine) inner wall and 300mm mesh (#208) outer walls. Net used in directed mullet survey.
252	547m nylon trammel net with 117mm stretch mesh inner wall and 330mm stretch mesh outer walls. Net used in directed redfish study. Net Not Set. (10/95)
253	547m nylon trammel net with 117mm stretch mesh inner wall and 330mm stretch mesh outer walls. Net used in directed redfish study. Blind Set. (10/95)
254	366m monofilament trammel net. 2.4m deep, 72mm mesh (#104 twine) inner wall and 300mm mesh (#208) outer walls. Net used in directed mullet survey. Net Not Set. (10/95)
255	366m monofilament trammel net. 2.4m deep, 72mm mesh (#104 twine) inner wall and 300mm mesh (#208) outer walls. Net used in directed mullet survey. Blind Set. (10/95)
256	366m nylon trammel net. 3m deep, 50mm str mesh (#9 twine) inner wall and 300mm str mesh (#18 twine) outer walls. Net used in directed hatchery redfish survey. (11/00)
257	366m nylon trammel net. 3m deep, 50mm str mesh (#9 twine) inner wall and 300mm str mesh (#18 twine) outer walls. Net used in directed hatchery redfish survey. Blind Set. (11/00)
258	366m nylon trammel net. 3m deep, 50mm str mesh (#9 twine) inner wall and 300mm str mesh (#18 twine) outer walls. Net used in directed hatchery redfish survey. Net Not Set. (2/01)
260	253m nylon trammel net. 3m deep, 50mm str mesh (#9 twine) inner wall and 300mm str mesh (#21 twine) outer walls. Net used in directed hatchery redfish survey. (03/06)
261	253m nylon trammel net. 3m deep, 50mm str mesh (#9 twine) inner wall and 300mm str mesh (#21 twine) outer walls. Net used in directed hatchery redfish survey. Net Not Set. (03/06)
262	253m nylon trammel net. 3m deep, 50mm str mesh (#9 twine) inner wall and 300mm str mesh (#21 twine) outer walls. Net used in directed hatchery redfish survey. Blind Set. (03/06)
300	6.1m otter trawl w/ 3.1mm liner & tickler chain. A straight tow.
301	6.1m otter trawl w/ 3.1mm liner & tickler chain. An arc tow.
302	6.1m otter trawl w/o liner w/tickler chain. A straight tow.
303	3.7m otter trawl w/ 3.1mm liner & w/o tickler chain. A straight tow.
304	3.7m otter trawl w/o liner & w/o tickler chain. A straight tow.
305	3.7m otter trawl w/ 3.1mm liner & w/o tickler chain. An arc tow.
306	6.1m otter trawl w/ 3.1mm liner & tickler chain. A combination tow (straight trawl/arc boat)
325	3.0m PI&F trawl with 19mm mesh, 0.5m deep with 6.3mm cod end. Used from 1981 – 1983 during McMichael red drum study. (04/99)
349	Roller frame trawl
350	Roving dropnet, 1 m^2, deployed from skiffs
351	Stationary dropnet, 1 m^2
352	Stationary dropnet, 2 m^2

Code	Gear Description
353	Stationary dropnet, 4 m^2
354	Roving dropnet (w/17' whaler)
400	Plexiglass traps
401	Pound net
402	Stop nets, e.g. Alafia canal
403	184m large mesh gillnet with four panels: 46m each of 75mm, 100mm, 125mm, and 150mm mesh. NORMAL SET: Large mesh to shore. Set in association with a five panel gillnet.
404	184m large mesh gillnet with four panels: 46m each of 75mm, 100mm, 125mm, and 150mm mesh. REVERSE SET: Large mesh to shore. Set in association with a five panel gillnet.
405	198m large mesh gillnet with five panels: 15m of 50mm mesh (#208 twine), and 46m each of 75mm, 100mm, 125mm, and 150mm mesh (#208 twine). NORMAL SET: small mesh to shore. Set in association with a four panel gillnet. (01/94)
406	198m large mesh gillnet with five panels: 15m of 50mm mesh (#208 twine), and 46m each of 75mm, 100mm, 125mm, and 150mm mesh (#208 twine). REVERSE SET: large mesh to shore. Set in association with a four panel gillnet. (01/94)
407	91m center bag seine, 18.8m stretch mesh, leads spaced at 150mm. Boat set. Gear Testing 07/93 – PRESENT
408	6.1m center bag seine 3.1mm mesh, leads spaced at 150mm. Modified beach set. Gear Testing discontinued 10/93. Now under Gear Code 2.
409	198m large mesh gillnet with five panels: 15m of 50mm mesh (#139 twine), and 46m each of 75mm, 100mm, 125mm, and 150mm mesh (#208 twine). NORMAL SET: small mesh to shore. Set in association with a five panel gillnet. Gear testing (01/20/94 – 02/25/94)
410	198m large mesh gillnet with five panels: 15m of 50mm mesh (#139 twine), and 46m each of 75mm, 100mm, 125mm, and 150mm mesh (#208 twine). REVERSE SET: small mesh to shore. Set in association with a five panel gillnet. Gear testing (01/20/94 - 02/25/94)
411	366m multi-panel gillnet, four panels 30.5m by 3.0m deep: 100mm mesh (#177 twine), 125mm mesh (#208 twine), 150mm mesh (#208 twine) and 175mm mesh (#277 twine). One net, small mesh set perpendicular to shore. (02/94)
412	366m multi-panel gillnet, four panels 30.5m by 3.0m deep: 100mm mesh (#177 twine), 125mm mesh (#208 twine), 150mm mesh (#208 twine) and 175mm mesh (#277 twine). One net, set perpendicular to shore. (02/94)
413	366m trammel net, inner wall 72mm mesh (#104 twine), 300mm outer wall (#208 twine). Set on shore. (02/94)
414	366m trammel net, inner wall 72mm mesh (#104 twine), 300mm outer wall (#208 twine). Set off shore in an "S" pattern. (02/94)
415	122m center-bag undipped seine, 25mm stretch mesh (12.5mm bar mesh), 150mm lead spacing, net set onshore from a skiff (Boat Set). Net set in a semicircular pattern onshore or on the edge of a sandbar with water depth < 1.0m. (07/94)
416	122m center-bag black dipped seine, 37.5mm stretch mesh (18.8mm bar mesh), 150mm lead spacing. Net set from skiff (Boat Set) in a semicircular pattern onshore or on the edge of a sandbar in water depth < 1.0m. (07/94)
417	183m center-bag green dipped seine, 37.5mm stretch mesh (18.8mm bar mesh), 150mm lead spacing. Net set from skiff in a semicircular pattern onshore or on the edge of a sandbar in water depth < 1.0m. (07/94)
418	244m center-bag undipped seine, 50mm stretch mesh (25mm bar mesh), set onshore from a skiff (Boat Set). Net set from a skiff (boat set) in a semicircular pattern onshore or on the edge of a sandbar in water depth < 1.0m. (07/94)
419	365.8m purse seine, 38.1mm stretch mesh, 10.7m bag depth and 6.7m wing depth. 203-305mm lead spacing and 305-381mm float spacing. (04/95)
420	183m center-bag seine, undipped, 50.8mm stretch mesh (25.4mm bar), 4.6m deep with 152mm lead spacing and 304mm float spacing. Net set onshore in a rectangular shape along mangroves from a skiff. (06/95)
421	183m center-bag seine, undipped, 50.8mm stretch mesh (25.4mm bar), 2.3m deep with 152mm lead spacing and 457mm float spacing. Net set onshore in a rectangular shape along mangroves from a skiff. (07/95)
422	183m center-bag seine, undipped, 50.8mm stretch mesh (25.4mm bar), 3.0m deep with 152mm lead spacing and 457mm float spacing. Net set onshore in a rectangular shape along mangroves from a skiff. (08/95)
423	61m center-bag seine, undipped, 6.4mm stretch mesh, 304mm lead spacing. Offshore circular set. (10/95)
424	61m center-bag seine, undipped, 6.4mm stretch mesh, 304mm lead spacing. Beach set. (10/95)

Code	Gear Description
425	61m center-bag seine, undipped, 6.4mm stretch mesh, 304mm lead spacing. Boat set. (10/95)
426	Fish trap, modified Antillean Z trap design with 30mm x 50mm mesh with diagonal 55mm. Used in the Florida Keys. (06/96)
427	Fish trap, modified Antillean Z trap design with 30mm x 15mm mesh with diagonal 30mm. Used in the Florida Keys. (06/96)
428	0.6m Fyke net, 3.0m long with 38mm square mesh. Used in the Florida Keys. (06/96)
429	0.9m Fyke net, 3.7m long with 25mm square mesh. Used in the Florida Keys. (06/96)
430	229mm Gee minnow trap, 444.5mm long with 6mm mesh. Used in the Florida Keys. (06/96)
431	183m terminal bag purse seine, 51mm stretch mesh (25.5mm bar mesh) with 305-mm lead spacing and 457-mm float spacing. Wing depth is 5.2-m and bag depth is 7.6-m. Used during gear testing 04/96 – 12/97; now under gear code 170.
432	3.6m x 2.7m midwater beam trawl. All knotless polyethylene material. 75-mm stretch mesh (70 ply) at opening tapering down to 50-mm stretch (24 ply) and again down to 42-mm (24 ply). Cod end will be 38-mm str. (Minimum fishing depth 2.2-m water) (07/03)
433	3.6m x 2.1m midwater beam trawl. All knotless polyethylene material. 75-mm stretch mesh (70 ply) at opening tapering down to 50-mm stretch (24 ply) and again down to 42-mm (24 ply). Cod end will be 38-mm str. (Minimum fishing depth 1.7-m water) (07/03)
434	229m nylon trammel net, inner wall 45mm mesh (#9 twine), outer wall 359mm mesh (#21 twine), 2.4m deep. Used in MPA project. (06/04)
435	183m center-bag seine, polyethylene, 37.5mm stretch mesh (18.8mm bar mesh), 150mm lead spacing. Net set from skiff in a rectangular pattern on shore in water depth < 0.5 m. (06/05)
800	Hook and line (09/95)
801	Castnet (11/97)
802	Electrofishing (11/97)
803	Hook and line. Additional sampling effort conducted on special guided trips. Established 8/02 for documenting additional hook and line sampling effort by MML on the Hatchery red drum project.
804	Hook and line. Additional sampling effort conducted in conjunction with sonic tracking trips. Established 8/02 for documenting additional hook and line sampling effort by MML on the Hatchery red drum project.
810	1.0m Plankton net with 500μm mesh. Used from 1981 – 1993 during McMichael red drum study. (04/99)
811	1.0m Plankton net with 1mm mesh. Used from 1981 – 1993 during McMichael red drum study. (04/99)
812	1.0m Plankton net with 1mm mesh on bottom sled. Used from 1981 – 1993 during McMichael red drum study. (04/99)
813	1.0m Bottom sled, 0.6m deep with 1mm mesh. Used from 1981 – 1993 during McMichael red drum study. (04/99)
814	$1.0m^2$ Push net with 1mm mesh. Used from 1981 – 1993 during McMichael red drum study. (04/99)
816	Dip net
850	Fish kill. Any fish found dead in water that was not caught by a biologist or angler. Includes red tides, cold kills, low DO, etc. (07/97)

PROJECTS

CODE	Project Description
AA	Marine Protected Area study (MacDill and Weedon Island) (06/04) (used in TB; A)
AB	Bishop Harbor Sampling (11/03) (used in TB; B)
AC	Directed Red drum sampling (all field labs; C)
AD	Directed Regular Mullet Sampling (all field labs; D)
AE	Sawfish Study (07/04) (used in CH; E)
AF	Fish Health Sampling (all field labs; F)
AG	Gear Testing (07/03) (all field labs; G)
AH	Hatchery Release Monitoring (used in TB; H)
AI	IMAP sampling (all field labs; I)
AJ	Dredge Hole sampling (all field labs, J)
AK	Florida Bay sampling (08/06) (used in FB; K)
AL	Apalachicola SWG Sampling (used in AP; L)
AM	Monthly FIM SRS Sampling (all field labs; M)
AN	MARFIN Sampling (04/05) (used in TB; N)
AO	Low D.O. Study in Jacksonville (07/05) (used in JX; O)
AP	Directed Post-spawn mullet sampling (all field labs; P)
AR	River Sampling (all field labs; R)
AS	Non-monthly periodic FIM sampling (spring/fall, quarterly, bimonthly, wet/dry, index period) (all field labs; S) (redefined 05/09) (before 05/09, defined as Seasonal Sampling)
AT	Directed Spotted Seatrout Sampling (06/02) (used in TB; T)
AV	Marine Protected Area study (MacDill and Community Hole) (10/05) (used in TB; V)
AW	TBEP Tidal Tributary (Backwater) sampling (01/06) (used in TB; W)
AX	Pre- or post- event sampling (09/04) (all field labs; X)
BR	Peace River SWG (07/07) (used in CH)
CR	Indian River Lagoon SWG (07/07) (used in IR)
OG	Offshore Gear Testing in the Gulf of Mexico (10/06) (used in TB)
OS	Offshore quarterly sampling in the Dry Tortugas (04/08) (used in TB)
WD	West Florida Shelf – 10000 Islands (microchemistry sampling) (07/10)
WI	West Florida Shelf – Inshore sampling (04/08)

Incorporated into the database on 01/01/00. Began two-letter code 09/01/07.

REP

(Discontinued 04/2009)

A numeric value describing the replicate sample number within a grid or fixed station site. Replicate sampling was discontinued in SRS sampling 04/1996 and should now always be recorded as 1. REP is still recorded during hatchery program sampling in St. Pete and when taking replicate Hydrolab reading for HBMP. In April 2009, REP was removed from the Sample Identification section of the FIM Field Data Sheet. Beginning April 2009, REP was move to the Water Quality section of the FIM Data Sheet and is used only for replicate water quality readings taken as part of the HBMP study in Tampa Bay.

WORK UP

(Discontinued 04/2009)

CODE	WORK UP DEFINITION
S	Standard sample work up.
N	Non-standard sample work up.

STRATA

See Procedure 3.2 for description of SAV, shoreline and overhanging strata.

CODE	STRATA DESCRIPTION
A	Offshore seine (>5m from shoreline) over SAV or *Caulerpa* spp. (≥25%)
B	Offshore seine (>5m from shoreline) not over SAV or *Caulerpa* spp. (<25%)
C	Boat seine with overhanging vegetation (≥10% OV)
D	Boat seine without overhanging vegetation (<10% OV)
G	Gulfside (Marathon lab only)
H	Shoal sampling with 183-m seine
M	Mainstream (used with Charlotte Harbor 21.3-m boat seines only; 11/03)
O	Oceanside (Marathon lab only)
S	Shoreline sampled using the offshore seine technique (1/98)
W	Backwater (used with Charlotte Harbor 21.3-m boat seines only; 11/03)
Y	Deep water (≥1.8m) trawl with ≥50% grass coverage. Five minute straight tow. (used in 2008 only)
Z	Shallow water (1.0 to 1.7m) trawl with ≥50% grass coverage. Five minute arc tow. (used in 2008 only)

Incorporated into the database on 02/01/96.

TIME

Start time, End time, Sunrise, and Sunset are recorded in HH:MM format using the 24 hour clock.

DEPTH

Start Depth and End Depth are recorded in meters rounded off to the nearest 1/10th.

LOCATION INSTRUMENT

CODE	INSTRUMENT
C	Chart (03/96)
D	Differential GPS (02/94)
G	GPS (Not Differential) (02/94)
L	LORAN (02/94)
W	WAAS GPS (10/02)

Incorporated into the data base on 01/01/94

WIND DIRECTION

CODE	DIRECTION
E	East
N	North
NE	Northeast
NW	Northwest
S	South
SE	Southeast
SW	Southwest
W	West
0	No wind

WIND SPEED

Estimated wind speed recorded in miles per hour (MPH).

% CLOUD COVER

CODE	PERCENT CLOUD COVER
0	No clouds (clear)
1-100	Visual estimation
101	Fog (Discontinued 07/01)
102	Rain (Discontinued 07/01)

PRECIPITATION

CODE	PRECIPITATION
F	Fog
N	No Precipitation
R	Rain

Incorporated into the data base on 07/24/01

TIDE

CODE	TIDAL HEIGHT/FLOW
HF	High & falling
HR	High & rising
HS	High & slack
LF	Low & falling
LR	Low & rising
LS	Low & slack
MF	Mid & falling
MR	Mid & rising
NG	Negligible tidal fluctuation (IR only)

MOON

Recorded as the number of days past full moon. (Full moon = 0).
Not recorded after 01/01/01.

PERIOD

CODE	PERIOD OF THE DAY
1	dawn crepuscular, one hour before sunrise to one hour after sunrise
2	day, one hour after sunrise to one hour before sunset
3	dusk crepuscular, one hour before sunset to one hour after sunset
4	night, one hour after sunset to one hour before sunrise

WATER QUALITY INSTRUMENT

CODE	INSTRUMENT
Common codes used at all labs:	
NE	Nephalometer (02/94; N)
RF	Refractometer (02/94; R)
SC	YSI SCT-Meter (02/94; Y)
TH	Thermometer (05/96; Z)
PH	PHep pH tester (09/96; 4)
DO	YSI D.O. Meter (10/96; 5)
YS	YSI Model 85 (SCTD-Meter) (10/96; 6)
Apalachicola	
50	YSI 650MDS/600QS Sonde, (01/04; D)
62	YSI 650MDS/600QS Sonde, (06/05)
79	YSI 650MDS/600QS Sonde (03/07)
85	YSI 650MDS/600QS (03/10)
Cedar Key	
39	YSI 650MDS/600QS Sonde (02/02; B)
44	YSI 650MDS/600QS-01 (09/02; C)
45	YSI 650MDS/600QS-01 (12/02; D)
84	YSI 650MDS/600QS (03/10)
87	YSI 650 MDS/600QS (11/10)
Charlotte Harbor	
42	YSI 650MDS/600R Sonde, #42 (08/02;E)
51	YSI 650MDS/600QS Sonde, #51 (01/04; G)
55	YSI 650MDS/600QS-01 (11/02; F)
61	YSI 650MDS/600QS (03/05; H)
73	YSI 650MDS/600QS (10/06)
74	YSI 650MDS/600QS (2006)
Indian River	
37	YSI 650/600R Sonde (09/01; C)
54	YSI 650/600R (11/04; D)
71	YSI 650/600R (2006)
83	YSI 650MSD/ 600R
86	YSI 650 MDS/600QS (11/10)
Jacksonville	
33	YSI 650/600R Sonde (03/01; A)
46	YSI 650/600R Sonde (10/02; B)
53	YSI 650MDS/600QS (11/04; P)
82	YSI 650MSD/600R
Marathon	
11	Hydrolab Surveyor 3/H20 Sonde (03/94; K)
17	Hydrolab Scout 2/H20 Sonde (03/96; Q)
35	YSI 600XL (01/01; A)
38	YSI 600R/650MDS (09/01; B)
SERF	
68	Hydrolab Surveyor 4A/MiniSonde 4
69	Hydrolab Surveyor 4A/MiniSonde 4A
70	Quanta
72	YSI 650 MDS/6600 Sonde (2006)
Tampa Bay	
CA	CastAway CTD by YSI (09/10)
21	YSI 650/600R Sonde (04/96; U)
23	Hydrolab Surveyor 4A/Minisonde 4A(03/98; A)
25	Hydrolab Surveyor 4/Minisonde (10/98; B)
36	Hydrolab Surveyor 4A/Minisonde 4A (04/01; D)
41	YSI 650/600R Sonde (04/02; G)
43	Hydrolab Surveyor 4A/Minisonde 4A (09/02; H)
48	YSI 650/600R Sonde (12/03; K)
49	YSI 650/600R Sonde (12/03; M)
52	Hydrolab Surveyor 4A/Minisonde 4A (10/04; N)
56	Mote Marine Unit: Quanta (E)
63	YSI 650MDS/6600 Sonde (2005)
64	Hydrolab Surveyor 4A/Minisonde 5 (09/05)

66	YSI 650/600R (12/05)
67	Hydrolab Surveyor 4A/Series 5 MiniSonde and Chlorophyll probe (05/06); sonde rebuilt Data Sonde Series 5 w/ chlorophyll a sensor (12/09)
75	Hydrolab Surveyor 4a/Series 5 MiniSonde (12/06)
80	YSI 650MDS/600R Sonde (04/07)
81	YSI 650MDS/600R Sonde (03/08)
Tequesta	
29	Hydrolab Scout 2/H20 Sonde (04/99; B)
47	YSI 650/600R Sonde (03/03; C)
57	Hydrolab Surveyor 4/Minisonde (A)
65	YSI 650/600R
USGS	
76	YSI 556 MPS (USGS Instrument A) (03/07)
77	YSI 600 QS (USGS Instrument B) (03/07)
78	YSI 556 MPS (Instrument C) (03/07)

Incorporated into the data base on 01/01/94

TEMPERATURE

Recorded in degrees Celsius (^{o}C) rounded off to the

nearest 1/10th.

DISSOLVED OXYGEN

Recorded in milligrams per liter (mg/l) rounded off to the nearest 1/10th.

CONDUCTIVITY

Recorded in milliseimens per cubic centimeter (mS/cm^{3}) rounded off to the nearest 1/10th.

pH

Recorded in pH units rounded off to the nearest 1/10th.

SALINITY

Recorded in parts per thousand (λ) rounded off to the nearest 1/10th.

SECCHI DISK

Depth recorded to the nearest tenth of a meter.

Incorporated into the data base on 01/01/94

SECCHI BOTTOM

CODE	DEFINITION
Y	Yes. Secchi disk sighted on bottom
N	No. Secchi disk not sighted on bottom

Incorporated into the data base on 02/01/94

REP

A numeric value describing a water quality sample at a station. Rep should be recorded as "." (null) for most FIM sampling. Replicate water quality readings are recorded only in the HBMP study in Tampa Bay. For the HBMP study, the initial water quality parameters should be coded as REP = "." (null) and the replicate water quality parameters should be recorded as REP = "2".

Incorporated into the database 04/2009.

BOTTOM TYPE

CODE	BOTTOM TYPE
C	Corals: Hard (06/97)
D	Detritus
E	Peat (10/09)
F	Mussels, not *Perna viridis* (Asian green mussel) (12/08)
H	Shell
M	Mud
O	Oysters
P	Sponge
R	Rocks
S	Sand
T	Tunicates
U	Unknown
V	*Perna viridis* (Asian green mussel; 11/02)

BOTTOM VEGETATION

CODE	BOTTOM VEGETATION
AB	*Acetabularia* spp.
AC	Algae: Calcareous (05/05)
AG	Algae: Filamentous green
AM	Algae: Mixed
AR	Algae: Filamentous red
AT	*Acanthophora* spp.
AU	Algae: Unidentified
BA	*Batophora* spp. (08/06)
CA	*Caulerpa* spp.
EL	*Eleocharis* spp. (08/03)
GM	Seagrasses: Mixed
GR	*Gracilaria* spp. (only if attached) (09/07)
GU	Seagrasses: Unidentified
HA	*Halodule* spp.
HC	*Halophila decipiens* (Paddle grass) (12/07)
HE	*Halophila engelmannii* (Star grass) (12/07)
HJ	*Halophila johnsonii* (Johnson's seagrass) (12/07)
HM	*Halimeda* spp. (07/05)
HD	*Hydrilla* spp. (08/03)
LA	*Laurencia* spp. (05/05)
LS	*Limnophila* spp. (Asian marshgrass) (08/07)
MK	Muskgrass (*Chara* spp.; 11/01)
MY	*Myriophyllum* spp. (05/04)
NJ	*Najas* spp. (09/03)
NO	None
PE	*Penicillus* spp. or *Rhipocephalus* spp. (11/08) (previously defined as *Penicillus capistratus*)
PO	Pond weed (*Potamogeton* spp.; 8/03)
RU	*Ruppia* spp.
SG	*Sargassum* spp. (08/03)
SK	*Sagittaria kurziana* (strap-leaf sagittaria) (05/08)
SP	Spatterdock (*Nuphar* spp.) (08/07)
SY	*Syringodium* spp.
TH	*Thalassia* spp.
UN	Unknown
VA	*Valisneria* spp. (10/94)
ZA	Horned pond weed (*Zannichellia palustris*; 08/03)
HI	*Halophila* spp. Beginning December 2007, *Halophila* should be identified to species level.

BOTTOM VEG % COMP

A visual or tactile estimation of the percent that each seagrass or attached algae makes up of the total amount of vegetation sampled. Ranges from 10 to 100% (recorded as 1 – X) for each type of SAV or *Caulerpa* spp., but the sum of all % comp values must equal 100%.

BOTTOM VEG PERCENT COVER

A visual or tactile estimation of the percent of the sampled area covered with any type of SAV or *Caulerpa* spp. It can range from 0 to 100% and accounts for all SAV in the sample site. '101' may be recorded when SAV or *Caulerpa* spp. is present, but a good estimate of SAV or *Caulerpa* spp. coverage could not be made (large gears only).

(Code 101 incorporated into the database 07/17/00)

LEVEL

Used to identify the order of shore types from the net's closest approach to land and the mean high tide mark (MHTM). When assigning LEVEL, shorelines are to be "straightened out", or alternatively (but with the same end result) LEVEL is to be assigned based upon what shore type the net wing(s) pass closest too while the net is being set and the bag recovered. See *Procedure 6.3* for more details.

SHORE TYPE

CODE	SHORE TYPE DESCRIPTION
AH	Arrowhead (*Sagittaria* spp.; 09/01)
AP	Australian Pines
AV	Aquatic Vegetation; mixed
AW	Alligator weed (08/02)
BC	Bay cedar (*Suriana maritima*) (11/08)
BM	Black Mangrove
BP	Brazilian Pepper
BU	Bulrush (09/01)
BW	Buttonwood
CS	Cattails
CY	*Cyperus alternifolius* (umbrella palm) (05/08)
DO	Docks (08/01)
DS	Relocated dead oyster shells (08/07)
EL	*Eleocharis* spp. (06/95)
FM	Mussels, not *Perna viridis* (Asian green mussel) (12/08)
HP	Halophytes (*Batis maritima, Sesuvium portulacastrum, Salicornia* spp., *Sueda linearis,* etc.) (11/08)
HS	Hardwood swamp (08/01)
HY	Water Hyacinth (10/03)
IF	*Iva fritescens* (marsh elder) (05/08)
JU	Juncus spp.
LF	Leather Fern (12/93)
LS	*Limnophila* spp. (Asian marshweed) (08/07)
MA	Mangrove
MG	Marsh Grasses
MM	Manmade (08/04)
NO	None
NW	Natural Wall (not man-made) (01/01/06)
OE	Sea ox-eye daisy (*Borrichia* spp.; 12/04)
OS	Overhanging shrubs/trees
OY	Naturally occurring oysters
PA	Palmetto
PG	Panic grass: *Panicum repens* (exotic) & *Panicum hemitomon* (native) (08/07)
PH	Common Reed (*Phragmites australis*; 09/01)
PV	*Perna viridis* (Asian green mussel) (12/07)
PW	Pickerelweed (*Pontederia cordata*; 8/01)
RM	Red Mangrove
RO	Rocks
RR	Rip Rap
RW	Root Wad (roots that have been exposed along an undercut bank) (08/07)
SD	Sedge (01/00)
SG	Seagrapes (06/97)
SL	Swamp lily (*Crinum americanum*; 08/03)
SN	*Spartina* spp.
SP	Spatterdock (11/01)
SS	Saw grass (09/01)
SV	Submerged Aquatic Vegetation (SAV) exposed at time of sampling (01/08)
SW	Seawall
TA	Trees: Palm (02/01)
TC	Trees: Cypress (11/01)
TD	Trees: Dead (08/01)
TE	Trees: Cedar (*Juniperus silicicola*; 08/02)
TG	Terrestrial Grasses
TN	Trees: Pond Apple (*Annona glabra*; 8/04)
TO	Trees: Oak
TP	Trees: Pine
TS	Trees: Unidentified Tree species (03/06)

TV	Terrestrial Vegetation
TW	Trees: Willow (03/06)
UN	Unknown—Too far away to tell (02/96)
VI	Vines (08/02)
WM	White Mangrove
WR	Algal mat (Wrack)
WX	Wax Myrtle
ZZ	Wild rice (*Zizania aquatica*; 08/03)

Halodule (HA), Sand (SA), Unidentified Seagrass (SG), Shell (SH), Mixed Seagrasses (SM), Syringodium (SY), and Thalassia (TH) were omitted from the variable list Feb 1996. Bamboo (BB) was omitted from the variable list Jul 2002.

SHORE TYPE % INUNDATED

Associated with each of the shore types to indicate what percentage of that shore type was inundated within a given LEVEL **at the time of sampling**. Values for each shore type are recorded in 10% increments and can range from 10% to 100%. (denoted in 0% increments as 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, X). See *Procedure 6.3* for more details.

Prior to 03/01/08, recorded as Yes (Y) or No (N).

SHORE TYPE % OVERHANGING

Associated with each of the shore types to indicate what percentage of that shore type was overhanging the water (~1 meter or less from the water's surface and provide permanent shade) within a given LEVEL **at the time of sampling**. Values for each shore type are recorded in 10% increments and can range from 0% to 100% (denoted in 10% increments as 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, X). See *Procedure 6.3* for more details.

Prior to 03/01/08, recorded as Yes (Y) or No (N).

% COVER / % COMP

CODE	RATIO
0	None
1	1-10%
2	11-20%
3	21-30%
4	31-40%
5	41-50%
6	51-60%
7	61-70%
8	71-80%
9	81-90%
X	91-100%

Incorporated into the data base on 09/14/95

SHORE TYPE % COVER

The percent cover of each shore type within the tidal zone along the sampled shoreline. Values for each shore type are recorded in 10% increments and can range from 10% to 100%. The sum of the % COVER values, even within a given level, can exceed 100%

TOTAL % SHORELINE COVERED

The percent cover of the shoreline with all shore types combined. For example, if there are two shore types (OY, RM) and each has a %COVER of 30% but each overlaps the other by 10%, then the TOTAL % SHORELINE COVERED would be 50%. This variable cannot exceed a value of 100%.

% OVERHANGING SAMPLE SITE

The total percentage of shore type, regardless of level, under which the net wing was pulled, that met the definition of overhanging as found in the FIM procedure manual. Shore types where the overhang is so highly structured that the net can only be pulled directly against the overhang will be included in this definition if the overhang meets the definition found in the FIM procedure manual. If the net wing was pulled away from the overhang for any reason (i.e. walked around a log or oysters, too shallow, etc.), that area will not be included in this percentage. This variable will only be recorded for shoreline sets (gears 5, 20 "stratum = S", 23, 160 and 180) and shall be coded in 10% increments ranging from 0% to 100% (coded as % OVERHANGING SAMPLE SITE = 0 – X).

Incorporated into the database on 01/01/08.

INTERMITTENT LAND

A single character variable that describes the linear percentage of the nearest shoreline that completely inundates at high tide such that permanent water exists behind the shoreline (no mean high tide mark exists). Intermittent land values are recorded in 10% increments and can range from 0% (No intermittent land) to 100% (denoted in 10% increments as 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, X).

BANK

Discontinued 12/31/03

Bank is defined as the gradient in the upper tidal portion of the intertidal zone, more specifically defined as the area from the high water mark to 1-m below the normal high water mark.

CODE	BANK DESCRIPTION
E	Shoreline that periodically inundates so that the location of the bank (mean high water mark) cannot be determined. This code should be used whether or not the shoreline is currently inundated. (10/96)
G	Gently sloping bank (01/01)
S	Steep bank (01/01)
U	Unknown. Bank is too far away or is inundated, such that the bank type cannot be determined (flood conditions). (02/96)

Incorporated into the data base on 09/29/92. Bank codes A, B, C, D, and F were discontinued 01/01/01. See 2000 Procedure Manual for a description of these codes.

DISTANCE TO SHORE

Visually estimated distance, recorded to the nearest meter, from the net's closest approach to the land-water interface. When sampling on intermittent land that is completely inundated, the DISTANCE TO SHORE should be recorded as null (".").

Incorporated into the database on 01/01/96. Redefined on 1/1/04 (Previously called Shore Distance).

DISTANCE TO SHORE-TYPE

Visually estimated distance, recorded to the nearest meter from the net's closest approach to the leading edge of the nearest shore-type. When sampling site contains no shore-type, the DISTANCE TO SHORE TYPE should be recorded as null (".").

Incorporated into the database on 01/01/04.

DISTANCE TO MHTM

Visually estimated distance, recorded to the nearest meter, from the net's closest approach to the mean high tide mark (MHTM). When sampling on intermittent land that contains shore-type, the DISTANCE TO MHTM is measured from the net's closest approach to the shore type on the FAR side of the intermittent land. When sampling on intermittent land that contains NO shore-type, the DISTANCE TO MHTM should be recorded as null (".").

Incorporated into the database on 01/01/96. Redefined on 1/1/04 (Previously called Bank Distance).

SEAGRASS HABITAT DESCRIPTOR

A single numeric variable that describes the visual estimation of the bottom habitat sampled. If habitat is not visible, SEAGRASS HABITAT DESCRIPTOR will be recorded as "." (null). SEAGRASS HABITAT DESCRIPTOR is only recorded for West Florida Shelf-Inshore (Project WI) samples in the Notes section of the Field Data Sheet.

CODE	SEAGRASS HABITAT DESCRIPTOR
.	(null) Seagrass Habitat Descriptor not recorded
0	Continuous unvegetated bottom: unvegetated area with no seagrass in the sampled area
1	Sparse SAV: unvegetated area with some sea grass, but no vegetated patches (no single area of seagrass larger than $10m^2$) in the area sampled
2	Highly-Fragmented SAV: multiple vegetated and/or unvegetated patches in the area sampled; 3 or more edges present within the area sampled.
3	SAV With Little Fragmentation: Few vegetated and/or unvegetated patches in the area sampled; 1 or 2 edges present within the area sampled.
4	Blemished SAV: continuous vegetated area with some unvegetated bottom, but no unvegetated patches (>$10m^2$) in the area sampled
5	Continuous SAV: continuous vegetated bottom with no unvegetated bottom in the area sampled

Incorporated into the database on 05/01/09.

DISTANCE TO EDGE

Visually estimated distance, recorded to the nearest meter, from the net's closest approach to the nearest edge (a transition from a vegetated patch to an unvegetated patch). Available values are integers between 0 and 99. If the distance is ≥99m then the DISTANCE TO EDGE is recorded as "99". In instances where the edge is crossed, the DISTANCE TO EDGE is recorded as "0". If no seagrass/sand edge is visible, the DISTANCE TO EDGE should be recorded as null (".") DISTANCE TO EDGE is only recorded for West Florida Shelf-Inshore (Project WI) samples in the Notes section of the Field Data Sheet.

Incorporated into the database on 05/01/09.

BYCATCH

CODE	BYCATCH TYPE
AB	*Acetabularia* spp.
AC	Algae: Calcareous
AD	Algae: Drift
AF	Algae: Floating Mat
AG	Algae: Filamentous green
AM	Algae: Mixed
AR	Algae: Filamentous red
AT	*Acanthophora* spp.
AU	Algae: Unknown
AV	Floating aquatic vegetation (01/00)
BA	*Batophora* spp. (08/06)
BR	Bryozoans
BV	Bivalves: non-commercial bivalves
CA	*Caulerpa* spp.
CG	Corals: Gorgonian
CO	Corals: Hard (06/97)
CI	Crabs: Spider
CL	Clay
CM	Crabs: Mixed
CQ	Crab Traps (12/93)
CS	Grasses: Cattails/Marsh
CT	Ctenophores
DT	Detritus

DW	Duck Weed (01/94)
EM	Egg mass: gelatinous
ES	Egg cases: snail
FM	Mussels, not *Perna viridis* (Asian green mussel) (12/08) (previously defined as freshwater mussels)
GA	Gastropods (03/95)
GM	Grasses: Mixed
GR	*Gracilaria* spp.
GU	Grasses: Unknown
HA	*Halodule* spp.
HC	*Halophila decipiens* (paddle grass) (12/07)
HD	*Hydrilla* spp. (09/05)
HE	*Halophila engelmannii* (star grass) (12/07)
HJ	*Halophila johnsonii* (Johnson's seagrass) (12/07)
HY	Hyacinth
JF	Jellyfish
JU	*Juncus* spp.
LA	*Laurencia* spp. (11/08)
LL	Leaf Litter
LO	Logs (12/98)
MI	Mixed Invertebrates
MM	Man-made objects other than crab traps.(12/93)
MS	Mangrove seeds/propogules
MU	Mud
MY	*Myriophyllum* spp. (05/04)
NO	None
NJ	*Najas* spp. (03/07)
NM	Clams: not *Mercenaria mercenaria* (03/09)
NU	Nudibranch/Seahares
OC	Oil Contaminated sample

OY	Oysters
PA	Sea Pansie (*Ranilla* spp., 1/04)
PC	Pine Cones
PE	*Penicillus* spp. or *Rhipocephalus* spp. (11/08)
PN	Pine Needles
PO	Pond Weed (*Potamogeton* spp.; 09/05)
PR	Palm Root
PT	Peat (10/09)
PV	Asian Green Mussels (*Perna viridis*)
PW	Polychaete worms (01/04)
QH	Quahogs: *Mercenaria mercenaria*
RO	Rocks
RU	*Ruppia* spp.
SA	Sand
SB	Sea Biscuits (12/02)
SC	Sea Cucumbers (12/02)
SD	Sand Dollars
SF	Starfish
SG	*Sargassum* spp. (06/95)
SH	Shell
SR	Shrimp; noncommercial
SN	*Spartina* spp.
SP	Sponges
SQ	Squid (06/95)
ST	Sticks and branches
SY	*Syringodium* spp.
TA	Tubes; amphipod (09/94)
TD	Tadpoles (01/00)
TH	*Thalassia* spp.

TU	Tunicates
UL	*Ulva* spp.
UR	Sea Urchins
UN	Unknown
VA	Eel grass (*Valisneria* spp.; 09/01)
WR	Wrack (08/04)
WT	Worm Tubes

Crabs: Horseshoe (CH), Crabs: Portunid (CP) and Freshwater turtles (FT) were omitted from the variable list in Oct 1999, Jan 2006 and May 2000, respectively, when the FIM program began measuring these individuals. Halophila (HI) was omitted from the variable list in Dec 2007 when the FIM program began identifying this SAV to the species level.

BYCATCH % COMP

A visual estimation of the percent that each bycatch type makes up of the total amount of bycatch. Ranges from 0 to 100% (denoted in 10% increments as 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, X) for each type of bycatch, but the sum of all % comp values must equal 100%.

QUANTITY

Recorded in gallons; an estimation of the amount of total bycatch.

CURRENT RELATION

Recorded in degrees from 0-180°; 0° is into the current, 90° is perpendicular to the current and 180° is with the current. If there is no current, current relation should be recorded as 0.

WIND RELATION

Recorded in degrees from 0-180°; 0°□is into the wind, 90° is perpendicular to the wind and 180˚ is with the wind. If there is no wind, wind relation should be recorded as 0.

SPEED

The RPM reading from tachometer (X 100).

Discontinued 01/01/01.

SOAK TIME

Recorded in HH:MM format representing the total number of hours and minutes that the net has been set.

BEARING

Directional unit to indicate the direction the trawl was towed (0 - 359°).

DISTANCE TOWED

Recorded in nautical miles (nm), for trawls, using the start and end waypoint recorded by a Loran or GPS.

CIRCUMFERENCE

Discontinued 01/01/05

Describes the circumference of the purse seine set.

CODE	CIRCUMFRENCE DESCRIPTION
183.0	The net is set perfectly (≤ 5 rings remaining)
183.9	The net is set too long
183 - (3x)	If the net is set too short and more than 5 rings remain, multiply the number of rings left by three and subtract from 183.

TWISTED

Discontinued 01/01/05

Describes how twisted the net is around the purse line once the bag has been pursed. Recorded for purse seines only.

CODE	TWISTED DESCRIPTION
0	Not twisted
1	Slightly twisted
2	Moderately twisted
3	Ridiculously twisted

Previously called distance to bag. Prior to 08/97, this variable was used to describe the distance from the mouth of the bag to the location where the net was landed. Recorded to the nearest 0.1 m, for large seines only.

WING DEPTH

The average depth of the water, to the nearest 0.1-m, along the path fished by the seine end(s) closest to the shore, with the exception of offshore seines and purse seines. No wing depth will be recorded for offshore seines (SAV / non-SAV strata) or purse seines.

Definition clarified on 05/04

SPLITTER

CODE	SPLITTER TYPE
2	Two-way splitter
3	Three-way splitter
5	Twenty-five-way splitter
6	Six-way splitter

SPLITTER METHOD

CODE	SPLITTER METHOD
.	Not split
B	Bag split
M	Box split (Motoda)
T	Table split
U	Bucket split

Incorporated into the database on 07/01/03

FISH LENGTH DATABASE – USE CODES

Identifies that the specimen(s) in this data record were either culled for additional work up in the lab, or that they were released after taking a genetics sample, or recording an FHC or TAG code.

CODE	USE DESCRIPTION
.	Null value – Specimens were not culled
C	Specimens *randomly** culled for further study (except IMAP contaminants and rep/id samples)
F	Specimens were assigned an FHC or TAG code, or a genetics sample was taken before they were released. (09/00)
I	Unidentified specimen
K	Specimens *randomly* culled for IMAP contaminant study
N	Specimens *non-randomly*** culled for further study (10/96)
S	Fish kept for representative sample
G	Fish culled for genetics only (11/99)
M	Fish dead when measured (Mortality) (1/06) (changed to fish Health Code: D)
R	Fish Recaptured with tag
T	Fish Tagged and released
W	Fish randomly culled for length-weight project (2/01)

Incorporated into the database on 06/25/94. Shaded codes not used after 08/01/02

***Random cull**: Length-frequency of the culled specimens represents the length-frequency of all specimens of that species, within the designated size class, in the entire sample.

****Non-Random cull**: Length-frequency of the culled specimens does not necessarily represent the length-frequency of all specimens of that species, within the designated size class, in the entire sample.

SEX

CODE	SEX
.	No attempt made to determine sex
B	Synchronous hermaphrodites (Both sexes at once – i.e., *Diplectrum formosum*. *Not* used for transitioning, sequential hermaphrodites – i.e., *Centropomus undecimalis*) (10/06)
E	Immature female *Callinectes* spp. (04/01/05)
F	Female (not used for *Callinectes* spp.; used for all species prior to 04/01/05)
G	Mature female *Callinectes* spp. (04/01/05)
H	"Pregnant" male seahorse (distended brood pouch) (04/08)
L	Leptocephalus Larvae
M	Male
N	Sex not checked, but should have been.
P	Parasitized crabs
U	Unsexed. Although attempted, sex could not be determined or animal was not sexed due to established size limitation rule. (definition clarified 01/05/11)
I	Immature

Incorporated into the database on 09/29/92. Shaded code not used after 01/01/10.

SIZE CLASS (SC)

Alphabetic variable designed to identify different size classes of a single species. "A" designates the first size class measured, "B" designates the second size class, etc.

TAG CODE

CODE	USE DESCRIPTION
.	Null value – no tag
N	Fish without coded wire tag (CWT)
R	Previously tagged fish recaptured
T	Fish tagged and released alive
U	Tagged status not checked
B	Broken tag
L	Lost tag
M	Fish dead when measured (mortality)
P	Fish preyed upon after release
Y	Tag found without fish

Shaded codes not used

FISH HEALTH CODES "FHC"

CODE	FHC DESCRIPTION
B	Animal with red or bloody areas (5/98)
D	Fish Dead prior to collection (mortality) (01/06)
E	Animal with scale loss or erosion (erosion = epidermis or dermis involved, muscle tissue not involved) (06/99)
F	Animal with fin erosion (fin rot = inflammation of fins, frayed fins) (5/98)
M	Mixed / unsorted sample (01/01)
N	Normal fish with no apparent abnormalities culled for baseline data (02/08)

O	Other (animal with conditions not specifically listed – describe condition in comments) (06/99)
P	Animal with parasitic infestation (01/01)
S	Animal with skeletal malformation (vertebral, opercular, or fin deformities) (06/99)
T	Animal with raised area (tumor, cyst) (06/99)
U	Animal with depressed area (ulcer or lesion with inflammation, redness, swelling—muscle tissue involved) (4/98)

TAGGING DATBASE - TAG TYPE

CODE	TAG TYPE DESCRIPTION
I	Internal anchor tag – originally code 2, changed 04/01/00
C	Coded wire tag – originally code 3, changed 04/01/00
P	Pit tag – originally code 4, changed 04/01/00
D	Dart tag – originally code 5, changed 04/01/00
N	No tag – added 04/01/00
U	Unknown – added 04/01/00
X	PDX Small Australian dart tag $1^1/_2$" Streamer – originally code 8, changed 04/01/08
1	Fluorescent pigment mark
6	Fin clipped
7	Australian dart tag
9	IEX Small belly tag
38	Coded wire w/PDX tag
39	Coded wire w/IEX tag
71	Australian dart tag: $3^3/_4$" Streamer (12/93)
72	Australian dart tag: $2^1/_2$" Streamer (12/93)
73	Australian dart tag: 4" Streamer (12/93)
74	Australian dart tag: 5" Streamer, shark tags (12/93)

Shaded codes were no longer used after 04/01/00
after 06/01/05

FISHING MODE

CODE	FISHING MODE DESCRIPTION
A	Fishing from an Anchored boat
B	Fishing from a Bridge
D	Fishing from a boat Drifting with wind or current
P	Fishing from a boat that a person is Poling through the water
R	Fishing from a pier
S	Fishing from Shore
T	Trolling for fish
W	Wading to catch fish

Incorporated into the database 06/01/04

GUIDE

CODE	GUIDE DESCRIPTION
N	Not fishing with a professional guide
Y	Fishing with a professional guide

Incorporated into the database 06/01/04

BAIT

CODE	BAIT DESCRIPTION
A	Fishing with Artificial single hook lure
D	Fishing with Dead bait
F	Fishing with live Fish
M	Fishing with artificial multi-hook lure
S	Fishing with live Shrimp

Incorporated into the database 06/01/04

ATTEND

CODE	ATTEND DESCRIPTION
N	Fishing rod Not attended
Y	Fishing rod attended

Incorporated into the database 06/01/04

HOOK TYPE

CODE	HOOK TYPE DESCRIPTION
C	Fishing with Circle hook
J	Fishing with J hook
T	Fishing with Treble hook

Incorporated into the database 06/01/04

HOOK POSITION

CODE	HOOK POSITION DESCRIPTION
F	Fish Foul hooked
G	Fish hook swallowed (in Gut)
I	Fish hooked Inside mouth
L	Fish hooked in Lip
R	Fish hooked in gill
T	Fish hook in Throat

Incorporated into the database 06/01/04

HOOK REMOVED

CODE	HOOK REMOVED DESCRIPTION
N	Fish hook Not removed before releasing fish
Y	Fish hook removed before releasing fish

Incorporated into the database 06/01/04

CORK

CODE	CORK DESCRIPTION
N	Not fishing with a cork
Y	Fishing with a cork

Incorporated into the database 06/01/04

CONDITION

CODE	CONDITION DESCRIPTION
.	(Null) Fish culled (not released)
B	Fish released in Bad condition
D	Fish died, either before or after release (12/06)
F	Fish released in Fair condition
G	Fish released in Good condition
P	Fish Preyed upon after release

WETLAB SAMPLES

Place an "X" in each of the appropriate columns to indicate the types of tissue samples that were taken.

CODE	CONDITION DESCRIPTION
.	(Null) No wetlab sample taken.
D	Stomach removed for dietary analysis for FWRI.
F	Sample taken for fish health analysis for FWRI.
G	Sample taken for genetic analysis for FWRI.
H	Gonad sample taken for histology for FWRI.
M	Tissue removed for mercury analysis for FWRI.
O	Otoliths removed for age and growth for FWRI.
S	Dorsal spine removed for age and growth for FWRI (began recording 01/11, recorded as "Other" from 2009-2010).
X	Other form of sample(s) taken from the specimen for FWRI, or ANY sample that will be sent outside of FWRI. "Other" samples will obtain a destination and further notes within the application.
T	Fish contained a Coded Wire Tag (CWT) (ended 12/09).

Detailed Gear Descriptions

21.3-m Center-Bag Seine

Description

The 21.3-m center-bag seine is a small-mesh net designed to sample small fish in shallow (<1.8 m) habitats. The net forms a vertical "wall" in the water, with the top supported at the surface by floats and the bottom held on the substrate by lead weights. The "bag", positioned at the center of the net, is an enlarged area of mesh that serves to enclose or box the fish and prevent escapement. The seine is pulled by hand using PVC poles attached to the ends of the net. When the net is pulled through the water the fish cannot swim over, under, or through the net, so they follow the wall of netting which leads them to the bag. When the bag is closed off, the fish are trapped.

Specifications

The 21.3 m (70') seine is made of 3-mm (1/8") #35 knotless nylon stiff material Delta mesh. The net is exactly 21.3-m (70') long and 1.8-m (6') high with a 1.8-m x 1.8-m x 1.8-m bag placed in the center (*Figure 10.1-1*). The top and bottom lines are 3-mm (1/8") 450-lb test braided nylon. The sponge floats are SB4 (3" diameter by 1½" long with a ½" hole) and spaced at 20-cm (8") on center along the wings and front of bag. The float spacing along the sides and back of the bag is every 30.5-cm (12") on center. The bottom line is leaded with #13, 1.3 oz leads (1" long, 3/8" hole) spaced every 15-cm (6") on center on the main net (wings) and front of the bag. The leads are spaced every 30.5-cm (12") on center along the sides and back of the bag. The top and bottom braided nylon lines extend 1-m beyond the net so they can be tied to PVC poles for fishing (there should be a 12" gap between the mesh and the seine poles once the top and bottom lines are tied off). All actual lengths of the nets and accessories must be within 10% of the stated lengths.

Accessories

13) Three 2-m (6½') PVC poles (sch 40, 38-mm (1½") diameter), one at each end of the net and one as a pivot pole for net retrieval.
14) Two tether poles with attached 9.1-m (30') tow line (9.5-mm (3/8") polypropylene), looped at the end so it can be slipped over the top of the seine poles when hauling. This line is used to standardize the distance of the tows.
15) 15.5-m (51') area line made of 9.5-mm (3/8") polypropylene, looped at each end so it can be slipped over the top of the seine poles when hauling. Each end of the line has a sponge float tied into the loop. This line assures the net is being pulled with the same inter-pole distance for every haul.

Program usage: See *Procedure 5.1*.

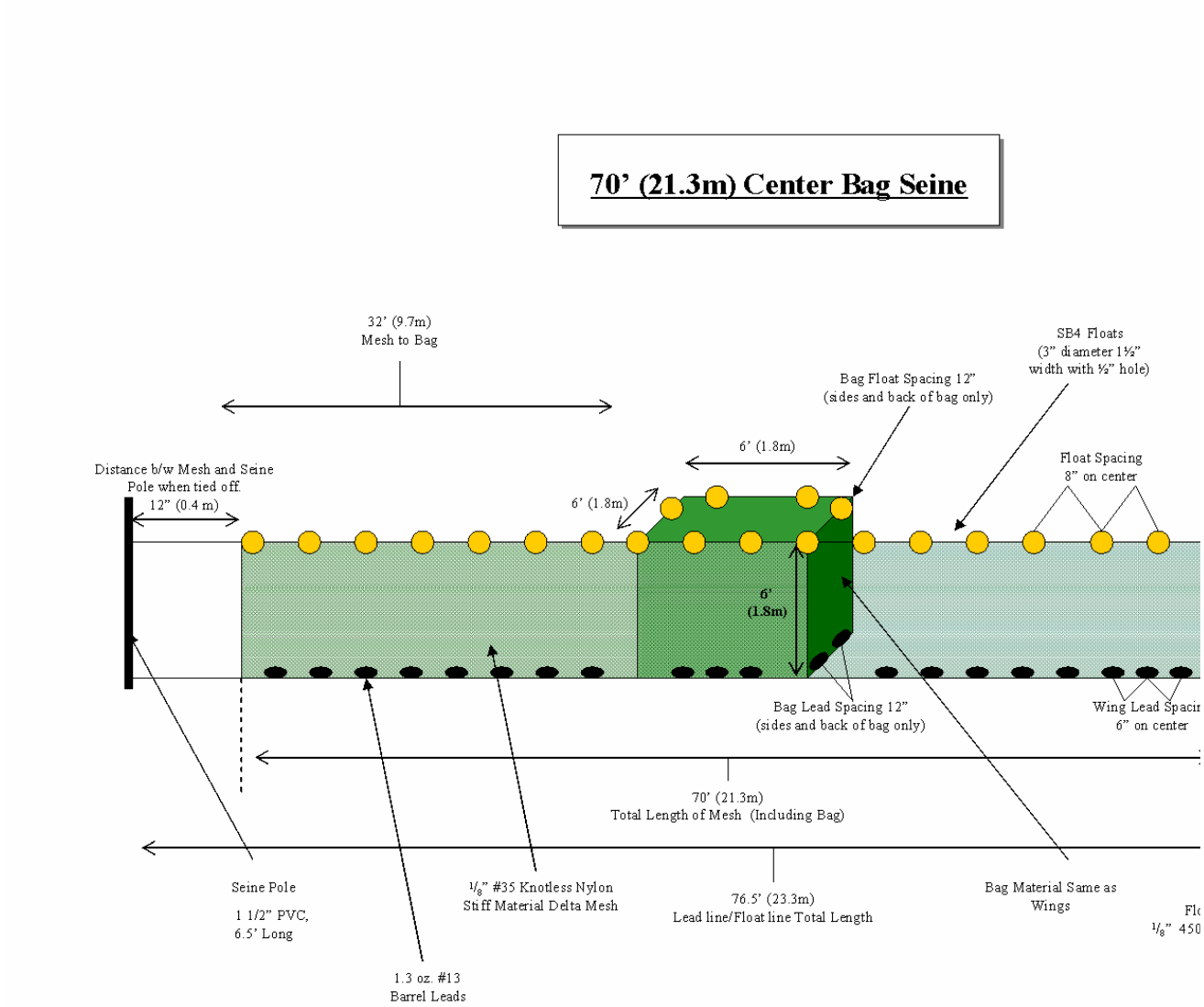


Figure 10.1-1. Gear specifications for 21.3-m center bag seine

183-m Center-Bag Seine

Description

The 183-m center-bag seine has a larger mesh than the 21.3-m seine and is designed to sample larger fish along shoreline areas in water depths up to 2.5 m. The net forms a vertical "wall" in the water, with the top supported at the surface by floats and the bottom held on the substrate by lead weights. The "bag", positioned at the center of the net, is an enlarged area of mesh that serves to enclose or box the fish and prevent escapement. The seine is pulled by hand with two crew members at each end, along a shore. When the net is pulled through the water, the fish cannot swim over, under, or through the net, so they follow the wall of netting which leads them to the bag. When the bag is closed off, the fish are trapped and collected.

Specifications

The net is a 183-m (600') long center-bag seine, 3-m (10') deep, made of 38-mm (1½") stretch nylon mesh (*Figure 10.1-2*). The float and lead line are made of ½" black twisted polypropylene rope. The float and lead line are a double rope with the lead and floats being attached to the outer rope (See Figure 1). The wings are made of double selvedge #9 nylon twine 38-mm (1½") stretch mesh. The barrel leads (2.0 ounce #8) will be placed every 15-cm (6") on center on the wing and every 30.5-cm (12") on center along the sides and back of the bag. The floats will be SB5 (3½" diameter x 1½" width, with ½" hole) and spaced every 30.5-cm (12") on center on the wings and along the sides and back of the bag. The bag will be 3-m x 3-m x 3-m, centered on the net and made of double selvedge #15 nylon twine 38-mm (1 ½") stretch mesh. The lead and float line (without the floats and leads attached) will be extended an extra 3-m from each end of the net to be used to pull the net through the water. With the extensions on each end of the net, the float line and lead line will be a total of 189-m (620') and the mesh part of the net will be 183-m (600') long including the 3-m (10') for the bag mouth. The entire net should be dipped in green net dip. The net should have a 10-15 m section of painted floats (neon orange) with the center of those painted floats located at approximately 40 m from each end of the net to designate the corner (at 40 meters) and aid in setting the net. All actual lengths of the nets and accessories must be within 10% of the stated lengths.

Accessories

1) Weighted marker buoy, with approximately 3.0-m of line. The buoy is used to mark the location of the bag.

Program Usage: See *Procedure 5.2*.

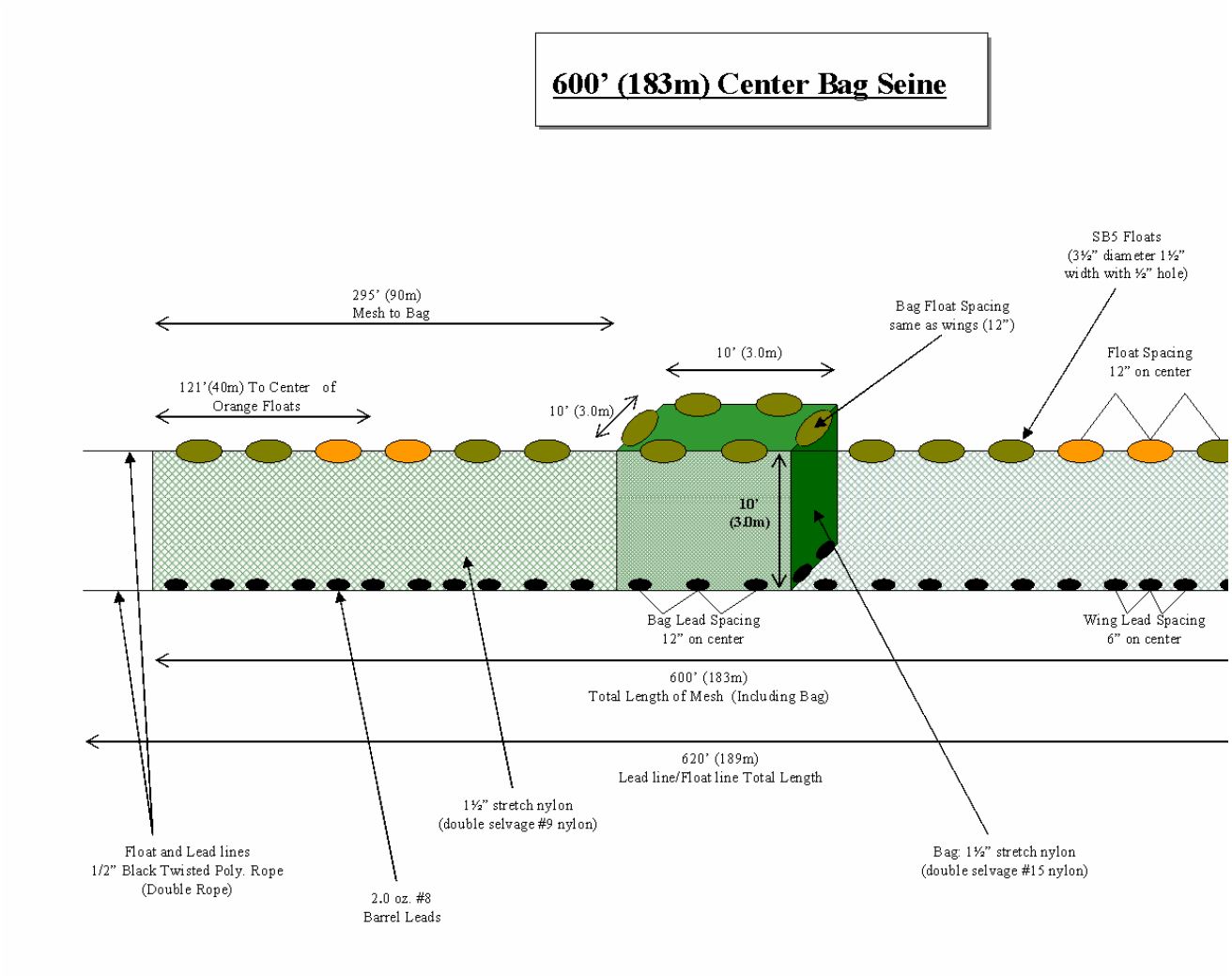


Figure 10.1-2. Gear specifications for 183-m center bag seine.

Otter Trawl

Description

Trawls are fished in waters too deep to sample with seines. They are conical in shape with a wide elliptical mouth opening which gradually tapers backwards toward a narrow bag. Each side of the trawl mouth has lines attached to weighted doors. A tow line is tethered to each of these doors and is used to pull the net through the water. The trawl mouth is leaded at the base and floated on top. Running from the base of the doors is a long chain that is pulled just ahead of the mouth of the trawl. This is called a tickler chain and serves the purpose of scaring bottom organisms into the water column where they can be collected by the trawl. When the net is fishing, the doors are spread apart by the forward motion of the boat. This forward action opens the mouth of the trawl. Organisms on the bottom stirred up by the tickler chain and those already present in the water column are funneled down the trawl toward the bag where they are trapped. The bag is lined with a small-mesh liner and tied off at the end to prevent escapement of organisms.

Specifications

The trawl is a two-panel 6.1-m (20') otter trawl. The main body of the net is constructed of #9 twine 38-mm (1½") stretch mesh and is 4.7-m (15 -1/2') long (*Figure 10.1-5*). The bag (cod end) is constructed of #18 twine 38-mm (1½") stretch mesh and is 3.2-m (10-1/2') long. A Delta #35 3-mm (1/8") knotless nylon mesh liner is sewn into the bag 46-cm (1-1/2') from the bag seam, leaving 30.5-cm (1') of liner extending out past the bag. A length of nylon rope is tied to the bag 2.1-m (7') from the liner seam to tie off the bag when the trawl is deployed. The top and bottom lines of the trawl extend 1.2-m (4') past the mesh and are attached through holes at the back of the trawl door. The distance between the trawl door and the mesh on the top and bottom lines should be 61.0-cm (2'). The top line of the trawl opening is constructed of 9.5-mm (3/8") PolyDac line and has four SB3 floats (2½" diameter x 1½" width, with ½" hole) spaced evenly along its entirety. The bottom line of the trawl mouth is constructed of 9.5-mm (3/8") PolyDac line and is weighted by a length of 6-mm (¼") chain along the mesh length. Shackled to the bottom line where it ties to the trawl door is a 6-mm (¼") tickler chain, 7.3-m (24') long. All actual lengths of the nets and accessories must be within 10% of the stated lengths.

The doors are rectangular in shape and are made of 12.7-mm (½") plywood and weighted with iron bars along the inside length (*Figure 10.1-6*). The doors measure 91.4-cm (36") along their outside edge, 45.7-cm (18") along their back, 79.4-cm (31¼") along the inside edge where the iron bar is, then there is a cut at approximately 45º that is 16.5-cm (6½") long slanting toward the front edge of the door that is 33.7-cm (13¼") long. Each door is outfitted with four chains that are attached to the door at one end and joined with a shackle at the other.

Accessories

2) Trawl tow line system consisting of a boat harness, tow line, and trawl bridles. The boat harness is 5.5-m (18') long, 12.7-mm (½") twisted nylon rope. The harness is looped on each end to attach to the port and starboard cleats on the towing vessel. A single aluminum fast eye block (63.5-mm (2½") sheave) is placed on the line between the two end loops. Running from the eye in the pulley is the tow line constructed of 19-mm (¾") twisted nylon rope. A bullet buoy (PVC foam, 7" diameter, 14" long, with a 1" hole) is hung on the tow line just behind the eyed swivel attached to the boat harness. The tow line is 30.5-m in length and is attached at its end to the trawl bridles by a heavy-duty stainless steel 8-mm (5/16") eye to eye swivel. The trawl bridle is constructed of 9.5-mm (3/8") poly-propylene line and is 30.5-m long. It is threaded through the eye of the swivel and looped with a thimble to an 8-mm (5/16") stainless steel alpine clip at each end. These alpine clips are used to attach the entire tow line system to the shackle on the trawl doors.
3) CRAB BUOY: 15-cm (6") foam float attached to the end of the bag with a 6.1-m (9.5-mm (3/8") braided nylon) line with a long-line clip on its end.

Monitoring Program usage: See *Procedure 5.4*.

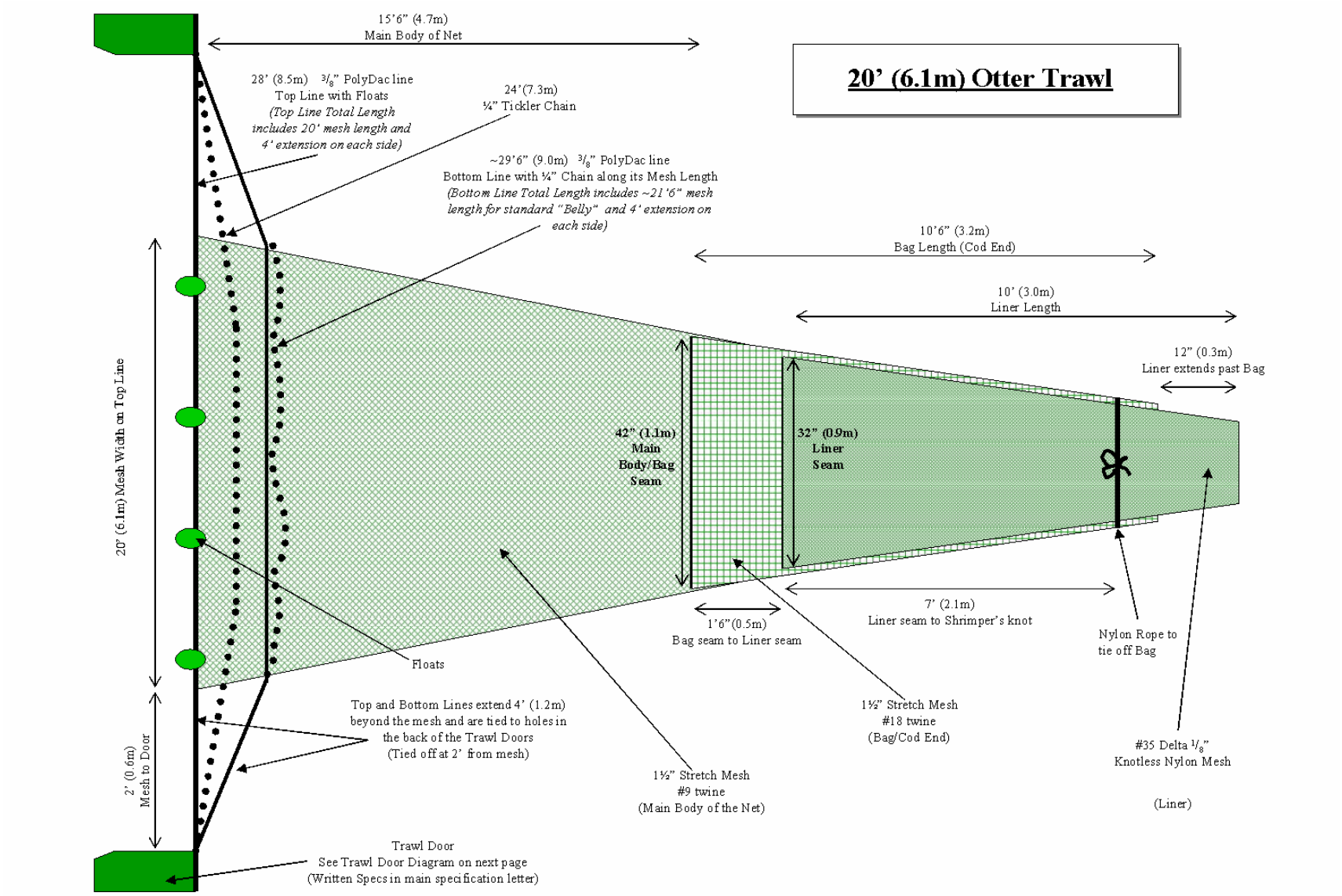


Figure 10.1-3. Gear specifications for 6.1-m otter trawl.

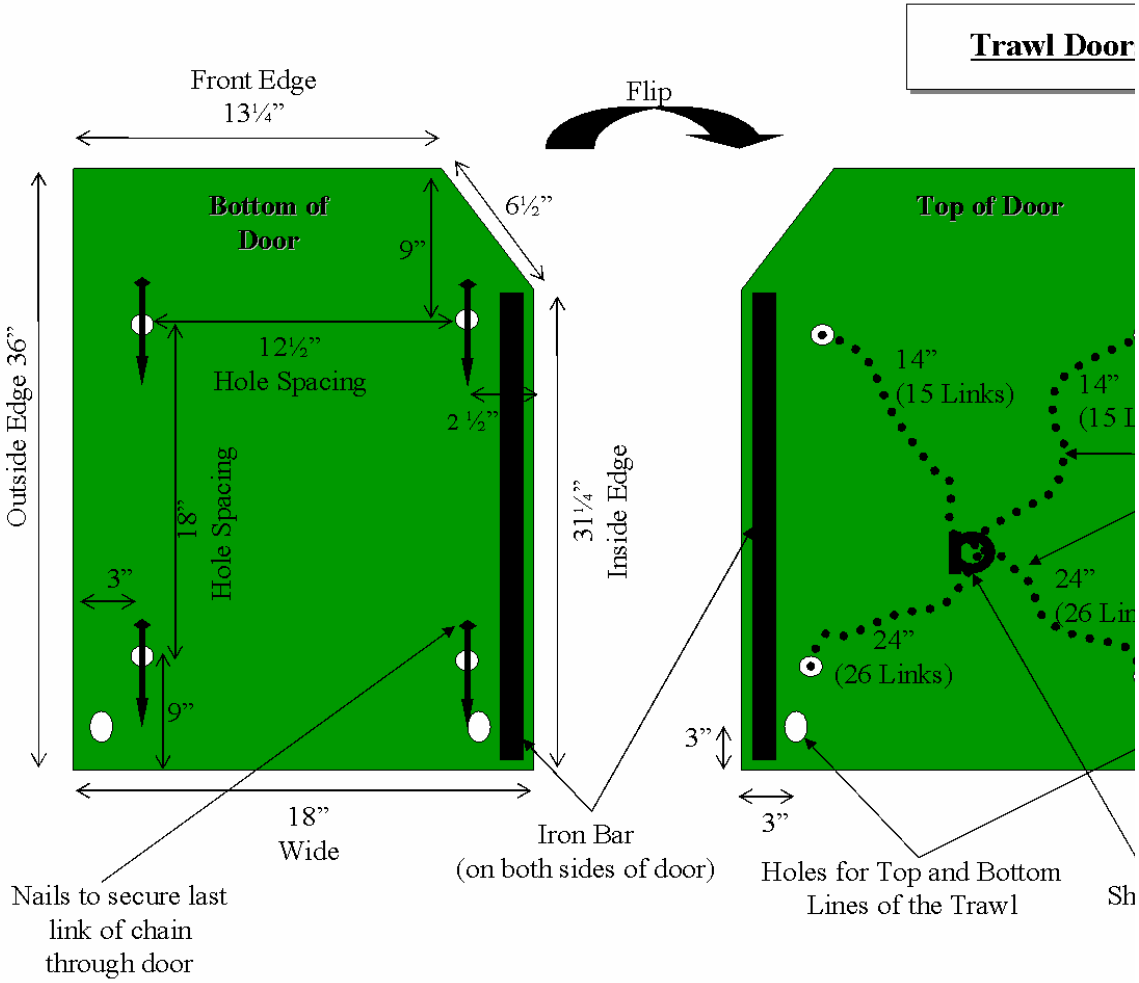


Figure 10.1-4. Trawl door specifications for 6.1-m otter trawl.