

FIN Biological Sampling Manual

June 2006

INTRODUCTION AND BACKGROUND

The Fisheries Information Network (FIN) is a state-federal cooperative program to collect, manage, and disseminate statistical data and information on the marine commercial and recreational fisheries of the Southeast Region.¹ The FIN consists of two components: Commercial Fisheries Information Network (ComFIN) and the Southeast Recreational Fisheries Information Network [RecFIN(SE)].

The scope of the FIN includes the Region's commercial and recreational fisheries for marine, estuarine, and anadromous species, including shellfish. Constituencies served by the program are state and federal agencies responsible for management of fisheries in the Region. Direct benefits will also accrue to federal fishery management councils, the interstate marine fisheries commissions, the National Park Service, the U.S. Fish and Wildlife Service, and the NOAA National Marine Sanctuaries Program. Benefits which accrue to management of fisheries will benefit not only commercial and recreational fishermen and the associated fishing industries, but the resources, the states, and the nation.

The mission of the FIN is to cooperatively collect, manage, and disseminate marine commercial, anadromous and recreational fishery data and information for the conservation and management of fishery resources in the Region and to support the development of a national program. The four goals of the FIN include to plan, manage, and evaluate commercial and recreational fishery data collection activities; to implement a marine commercial and recreational fishery data collection program; to establish and maintain a commercial and recreational fishery data management system; and to support the establishment of a national program.

The FIN established a formalized process for the development of species priorities and target sampling levels. The objective of the process is to determine the species that will be targeted for size frequency and bioprofile sampling. This plan is a result of the implementation of this process and addresses the needs of stock assessment and enable personnel to conduct assessment with the necessary data. The procedures for the development of the plan are:

- The Data Collection Plan Work Group will coordinate with their agency to identify species of priority (that will need stock assessments), the type and amount of data needed, and the geographic area over which the data need to be collected. The FIN Committee had developed a list of priority and secondary species. The list was developed by the Committee as well as the Data Collection Plan Work Group. The group will meet prior to the FIN meeting and develop a draft data collection plan. The plan will contain state, interstate, and federal priority species, type and amount of data needed, and the geographic distribution of the proposed data collection. This plan will be presented to the Committee at the annual FIN meeting for review and approval.
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- This plan will provide guidance to the states, NMFS, and FWS for the development

¹The Southeast Region (the Region) includes Alabama, Florida, Georgia, Louisiana, Mississippi, North Carolina, Puerto Rico, South Carolina, Texas, and the U.S. Virgin Islands.

of funding mechanisms that are implemented to provide funding support for collecting the data.

- Each year, during the annual FIN meeting, the Committee will review progress regarding current year's data collection efforts as well as conduct an evaluation of the prior year's effort, including evaluation of adherence to prior year's plan.

There are many difficulties inherent in dockside sampling; nevertheless, the FIN strives to ensure that the data collected are representative of the fisheries which are surveyed. To that end, the procedures in this document are guidelines which promote the collection of data in a consistent and well-documented manner. Without a set of standard procedures for data collection and reporting, analysis of the data becomes very difficult if not impossible. Although the FIN seeks to avoid bias in the collection of data, it provides for recording of bias, real or potential, where it may occur. Such documentation is extremely important to fisheries managers.

COLLECTION OF DATA

Base level biological data for recreational species will be collected through a separate survey to ensure the statistic validity of the MRFSS. Base level biological data for commercial species will be collected through the port sampling program. Sampling is designed to statistically collect random length-frequency measurements, age, sex and reproductive information to aid in stock assessments. An initial step in the data collection procedures is to identify fisheries which regularly land species that are the subject of current assessments or for which assessments are planned. These will be known as Priority Species for the purpose of this documentation. Of course, it is desirable to obtain data on all fisheries, but fisheries for assessment species must be prioritized until sampling targets are met. As detailed in the following sections, fisheries which land species in this list on a regular basis should be considered priority targets for trip selection and sampling. In sampling landings from such trips, sample the species on the list first, then the rest of the catch as the situation permits.

Site Selection

Samples are to be stratified by priority species of concern, gear used, and area fished. Species of concern are listed as priority and will be provided to the sampler. Sampling sites are pre-selected on a 2-month period (wave) by weighting sites on the landings of each priority species in the strata for the same wave the previous years. Sample selection adjustments should be made with insight from the previous waves' activity on landings as well as changes in activity at a site reported by field samplers. The intent is to sample a site in proportion to the total landings for a particular stratum. For recreational activities, fishing tournaments should not be targeted for sampling since this could introduce some biases. The location where sampling takes place will vary trip by trip. There are typically two locations involved; the landing dock and the dealer site. Vessels will not always land at the same dock or sell to the same dealer. Dealers may handle landings differently from day to day. The preferred method is to sample the catch at the initial point of off-loading. This is really the only way the samplers can be sure at the time of sampling that they are seeing the entire catch. Sometimes the dealer is this initial point. In other cases, dealer sites can be used as back-up locations only if the sampler has access to the entire catch of a particular species/market category from the trip. Although it is preferred that the entire catch of all species from a trip be available for sampling, this is not

always possible. Sampling may take place if the sampler can be sure he/she is seeing the entire catch of the sampled species/market category for a particular trip.

Timely knowledge of the sampler will often supercede historical data. The samplers are generally aware of changes in the fishery long before they are reflected in the data. In these instances, samplers should prioritize sampling as best they can. There are practical problems involved such as time considerations. In most fisheries, it is difficult to schedule an intercept very far in advance. In addition, the time of landing may not coincide with the samplers' normal working hours. Samplers should document where odd landing hours become a hindrance to sampling. In order to sample at the point of landing, the sampler must remain in close contact with the selected vessel or dealer. In any case, it is required of the fishermen and dealers that they make their catch available for sampling. Try to maintain contact throughout the week with the vessels or dealers you have selected and be ready to sample if the landing time is within your schedule. If there are questions regarding sampling priorities, contact your immediate supervisor. Feedback on the conditions and situations at the docks is very useful. If fishing patterns change so that certain priority species are not available for sampling, or other local conditions affect your ability to meet sampling targets, that information should be documented in written correspondence to the supervisors.

Sampling Targets (Age, Reproduction)

Species of priority or secondary concern can be sampled at a site with emphasis placed on priority species. It is essential that the samplers identify the fish to species level. Individuals should be selected based on completing a matrix of the number of samples required at a given size range. Individuals should be sampled in a manner that would spread collection throughout the wave. For commercial fisheries, every effort should be made to associate a sample with a trip ticket number, but the ticket number is not required. Port samplers should work closely with dealers to enhance the productivity of their sampling effort. A list of minimum data elements is included in Table 1. For priority species, sampling target levels for otoliths and lengths were developed by the Data Collection Plan Work Group. These targets were developed based on age proportions (multinomial distribution). The literature cites that 500 samples per key strata are adequate to determine the status and size of the stock. The key strata are defined as areas where one would expect to have differences in age of fish between strata. The key strata are year, gear and region. The Work Group identified the key strata for both primary and secondary species. The list of primary and secondary species with their associated key strata is included in Table 2. The totals from Table 2 were then distributed by administrative strata (waves, modes, states, etc.) throughout the Gulf region.

Sampling Targets (Length-Frequencies)

Species of priority concern can be sampled at a site with emphasis placed on priority species in the stratum assigned by the sample site selection criteria. It is essential that the samplers identify the fish to species level. Individuals should be sampled in a manner that would spread collection throughout the wave. It is possible to introduce bias into the data by not selecting the fish randomly. Try to avoid selecting fish in a manner that will introduce biases, e.g., always selecting large or small fish. If the catch is sorted, the potential for size bias is reduced. If possible, the total number and/or weight of the sorted group should be recorded. It is best not to begin taking individual measurements until the sample(s) have been separated from the catch. Having the sample(s) already

set aside and under the sampler's control will facilitate taking the individual measurements. It is not usually necessary to measure all of the fish of the same species from a trip. No more than 30 fish per species should be sampled from each mode (or gear) from a trip. It is best to follow some simple process like selecting every third or fifth fish to measure in order to avoid non-representative selection. Estimate the number of fish in the catch or sorted portion of the catch, divide by 30 and round down to obtain the order of selection. In the case of large catches, it may be desirable to measure more than 30, but it should not be necessary to sampler more than 50 as long as the selection is random. The emphasis is on sampling more individual trips rather than taking a large number of measurements from a few trips; of course, the number of trips available within a set of strata will depend on the fishery. For commercial fisheries, every effort should be made to obtain an associated trip ticket number with the sample, but the ticket number is not required. Port samplers should work closely with dealers to enhance the productivity of their sampling effort. For priority species, sampling target levels for lengths were developed by the Data Collection Plan Work Group. These targets were developed based on historical landings. The number of lengths was determined by doubling the number of needed otoliths. It needs to be noted that this is an initial step and the number of samples may be adjusted as more information is collected and becomes available.

Length Measurements

It is necessary to take length measurements on all fish which age structures are taken from. These length measurements are taken during the course of sampling and are recorded on the data sheets. All lengths are to be fork (center-line) lengths and taken in millimeters. Fish lengths can be measured on a board with a built in measuring scale or with a meter stick. The length of the fish is read from the board and either written on paper or recorded on tape. The punch board is a modification of the conventional measuring board and is more versatile in that it can be used to record lengths either by the conventional manner or by punching holes into the data sheet that overlays the board.

Sex Determination

Sex may be determined if samplers are allowed to open the body cavity or if the fish have been gutted and still retain a portion of the gonads. Sex should be recorded using only one of three codes (M=male, F=female, U= unknown). Length and weight must be recorded along with the sex. Sex can usually be determined by macroscopic inspection of the viscera.

The ovaries are paired sausage shaped organs suspended from the dorsal wall. They are round to elliptical in cross-section and contain a central cavity or lumen into which ripe ova are shed. The color of ovaries vary from clear to whitish, to yellow-orange in ripening and ripe adults. As the ovaries become highly vascularized (many blood vessels) to accommodate increased blood flow during reproductive season, very ripe or spent ovaries take on a reddish color. Ovarian texture varies from smooth to slightly granular in young fish to grossly granular in ripe fish. Like the ovaries, the testes are suspended from the dorsal wall within the body cavity. The testes are elongate, but are more elliptical to almost triangular in cross section and are without a lumen characteristic of ovaries. The testes vary in color from clear in the young to creamy-white in ripe adults: texture is smooth and the testes are frequently lobed in mature adults. In less fresh specimens of both sexes, the color may fade or turn grey. When in doubt, cut a cross-section and note the presence/absence of the lumen

characteristic of the ovaries in females. Lack of the lumen indicates testes/male. Both male and female gonads may be covered with large amounts of fat up to 100 X the gonad weight. This may cause ID problems. In these cases sex determination in the field will require close examination.

Correct sex determination is crucial in developing age-length keys for stock assessment, incorrect sex determinations can lead to erroneous conclusions regarding the status of a fisheries stock. If samplers are not sure of the sex, send a portion of the gonad on ice for verification, with the other biological samples for that fish. It can be difficult to macroscopically sex spent or undeveloped gonads. For reef fish species, especially the groupers that change sex, gonads will have to be collected and shipped on ice for sex determination at a laboratory. There are often apparent differences among species. For example, triggerfish testes are quite small and atypical compared to other reef fish. Another reason to ship intact gonads, besides problems associated with staging, is for accurate weight and fecundity determination. Priorities for reproductive studies will also be indicated by separate memo.

Aging Structure Collection (otolith, head, dorsal spine)

Information and materials that must be recorded and used for aging structure sampling include all of the instructions stated for gonad samples. Aging structures include scales, otolith, spines, and/or vertebrae. Aging (structure) samples should be maintained separately from all other biological (gonad, tissue etc.) samples. For each species, port samplers will be told which structure (otolith, scale etc.) and quantity (quota) (number/size increment/gear type/location) to be taken. If otoliths are taken instead of heads, they must be cleaned with fresh water and dried before being placed in vials for shipment. No more than 30 fish per species (for unsorted catches) and 10 fish per species (for sorted catches) should be sampled from each mode (or gear) from a trip. Unless samplers are instructed otherwise, all scales will be taken beneath the tip of the posteriorly extended pectoral fin; at least 6-10 scales should be taken and stored in a scale envelope. Spines, when required, should be cut at the base and stored in a scale envelope. An otolith/head/spine sample is defined as one or more fish, one or more heads, or one or more pairs of otolith, or up to 6 dorsal spines from a single species taken from a single location by one gear type for a given date. The standard for otolith collection is to obtain both otoliths from a fish; however, if only one otolith is available, it is still considered a viable sample and should be collected. If dorsal spines are to be sampled, collect the first 6 spines from the dorsal fin, cutting as close to the base as possible and from the leading edge of the dorsal fin. Place the spines in a pre-labeled small plastic bag and ice them immediately. Freeze them as soon as possible, and ship them by overnight express frozen. For our purposes, the otolith and spines will be used to determine the age of the fish in each fishery.

There are several ways to remove otoliths. The method will depend on the size of the fish and whether one needs to preserve the appearance of the fish. The following three methods have been used: (1) horizontal cut; (2) vertical cut; and (3) hidden cut.

Horizontal Cut - This method is useful for large fish; otolith exposure is accomplished by making a horizontal incision with a sharp knife from the top of the eye posteriorly to the trunk. This can be done more efficiently by removing the head, and placing it on a solid object so that the snout is pointing upward, cut to expose the top of the cranial cavity. Use forceps to remove the two otoliths which are located posteriorly in the otic vesicles on both sides of the cranial cavity.

Vertical Cut - This incision allows otoliths to be removed from small fish by making a vertical cut behind the eye near the edge of the preopercle. The otic vesicles should appear as two small cavities on either side of the midline. If they are not visible, shave anteriorly until they appear. Use forceps to remove otoliths. The vertical cut can be used when removing the head for later isolation of the otoliths. After making the vertical cut, remove any organs still attached to the head, and place head in bag and freeze. Use waterproof paper for labels.

Hidden Cut - When the appearance of the fish is importance (marketing), the hidden cut or incision should be used. The dorsal insertion of the gill arch is severed. The operculum is then lifted and the tissue is scraped away from the otic vesicle. In most fish a slight "bump" will coincide with the distal (outside) surface of the otic capsule. Gently remove the thin layer of bone using a sharp chisel to shave it off a little at a time. When the capsule is open, a cavity will appear with a visible white otolith. Remove the otolith with forceps. All otoliths must be cleaned with fresh water and dried before being placed in vials, stamped coin envelopes, or plastic bags. Aging structures can be shipped in the same box with their corresponding gonads. If no other biological samples were taken, then they can be shipped in a cardboard box along with copies of completed data sheets.

A sample tag must be included with the tag number as indicated for **LABEL** below. Use only waterproof labels and use only #1 pencils for writing labels.

Date (mm/dd/yyyy)

Sampler ID

Species code

Tag number

Interview number, species code, sampler ID, length and tag number (tag number's should be unique within the same sample). These tag numbers will be used to match biological samples with other FIN information.

Procedures for Preservation of Samples

At the end of each day, all samples in plastic bags must be taken out and wrapped in gauze and placed on ice. Permanent labels must be securely tied to the gauze bags. Labels must also be inserted in vials if otolith were collected. Before storing each sample, labels for the viscera and aging structures should be checked against the tag numbers. All age structures collected must have corresponding length, weight etc. information from which the structures were taken.

SAFETY AND SANITATION

The following are some general guidelines on seafood sanitation and safety in biological sampling. Samplers should be aware that dealers have Hazard Analysis Critical Control Point Systems (HACCP) plans which they have submitted to the FDA to ensure that their product is safe. These plans follow a basic outline but differ from dealer to dealer. Dealers may have a person designated to

oversee the HACCP at their dealership. The dealer should point out the guidelines to the sampler where they exist. Samplers should observe these guidelines. When samplers visit new sites, they should inquire what sanitation/safety guidelines the dealer requires prior to taking samples. In the absence of more specific standards, samplers should adhere to general guidelines which follow.

Instruments should be calibrated and maintained according to manufacturer's specifications. Sampling instruments which contact the fish should be disinfected each day prior to taking samples and each time the sampling location changes during the day. More frequent cleaning may be necessary. Instruments need to be corrosion resistant; nevertheless, they may be treated with a rust preventative when stored. In this case, the instrument must be thoroughly washed with disinfectant soap and water to remove any traces of lubricant prior to sampling. A rusty instrument should be replaced. Tables, containers, and measuring boards provided by the sampler should be cleaned with disinfectant soap and water prior to each day's sampling and when location changes. More frequent cleaning may be necessary. Paper overlays to sampling boards such as 'punch sheets' should be cleaned or changed between locations. All instruments and contact surfaces must be rinsed to remove residue of soap or other cleaning agent prior to sampling. All water used for cleaning purposes should be from a treated source; for example, a municipal water supply system. There may be more than one source of water at a given location (ie. one may be treated, the other untreated). When in doubt, ask the dealer. Samplers should carry a source of clean water when going into situations where it may not be available (ie. at a boat ramp). Any ice used by the sampler should also be from a treated source. Ice should be discarded after use at each location or more frequently if necessary.

Samplers should wear outer garments suitable to the operation in a manner that protects against contamination of fish, fish contact surfaces or fish-packing materials. Samplers must maintain adequate personal cleanliness. Samplers must wash hands thoroughly (and sanitize if necessary) in an adequate hand washing facility before starting work, and after each absence from the work station. Hands should be dried with clean dry towels or other sanitary drying device. Samplers must remove all unsecured jewelry and other objects that might fall into the food or containers, and remove or cover any hand jewelry that cannot be properly sanitized. If gloves are used, they should be in an intact, clean, and sanitary condition. Gloves should be of an impermeable material. Samplers should not eat, chew gum, drink beverages, or use tobacco where the fish may be exposed or where equipment and utensils are washed.

Fish should be handled in a manner so as not to decrease their market quality. Fish should be placed on surfaces or in containers, not thrown. If the fish have been on ice or in cold storage, they need to be put back there as soon as possible. This is especially true of shellfish and pelagic fish (tunas, mackerels, dolphinfish, wahoo). Fish should be replaced as they were before being selected. The dealer may want his own personnel to do this job; if not, it is up to the sampler. In general, the sampler should allow the fishermen or fish house personnel to handle the fish as they wish, as long as this does not interfere with proper sampling. When handling heavy fish, samplers should use gloves having a friction surface. For heavy fish in awkward locations (ie. at the bottom of a container), the sampler may wish to employ a device such as a snare to grab the tail so that the sampler can use adequate leverage when lifting the fish from the container. Any device such as a snare or hook should be approved by the dealer prior to use. If a fish is too heavy for the sampler, he/she should ask for assistance from fish house personnel.

Samplers should wear shoes with adequate traction. When sampling on a board a vessel or transport vehicle, samplers should enter and exit by the proper access/egress points. Samplers should always have both hands free to assist them in boarding or exiting a vessel or transport vehicle. No sampling should ever be done in a moving vehicle. Sampling may be done on board a moving vessel as the captain permits. When setting up a sampling station, samplers should avoid potential safety hazards such as mechanical processors, forklifts, etc. Samplers should be mindful of proper fish handling procedures such as outlined previously in order to avoid potential injury. Samplers should avoid confrontations with fishermen or fish house personnel. If ordered off the sampling location, the sampler should comply and refer the manner to their supervisor. Such incidents should be well documented.

QUALITY CONTROL AND ASSURANCE

Sampler Training

New field samplers will be initially trained in fish identification and sampling techniques. Samplers will be tested on a minimum of 20 fish that are predominant in the fisheries in their state. Fish should be identified to species level and correct ITIS codes associated with each species. Samplers will be re-tested every six months to ensure proper identification of fish. Each new sampler will be accompanied on his first assignment by a supervisor to insure that proper procedures are utilized for sampling and identification of fish. If the supervisor deems it necessary, he/she will accompany the sampler on subsequent assignments until the supervisor is sure the sampler is performing efficiently.

Supervisors will review 100% of data collected from the first three solo assignments of a new sampler for accuracy, completeness and compliance with standard operating procedures. After the first three solo assignments, supervisors will review data from one assignment every three months for accuracy.

For each 6 months of active sampling, a sampler will have a quality assurance/quality control (QA/QC) visit from a supervisor. The supervisor will check that the sampler has all standard equipment, forms and procedures manual. The supervisor will administer a written questionnaire on standard sampling procedures to the sampler. The supervisor will also observe the sampler conducting an assignment. The supervisor will fill out a rating form grading the sampler on his/her ability to properly identify and subset a sample, record weight and length information, record trip information and properly code all information obtained during the assignment. If the sampler is found to be deficient in one or more areas, the supervisor may recommend partial or complete re-training of the sampler. Periodic meetings of samplers are also part of QA/QC for FIN. The meetings allow for interaction among the samplers and provide a forum to discuss data collection methods, problems encountered in the field and potential solutions, and other related issues.

Otolith Processing Training

On an annual basis, an otolith processors training workshop will be conducted in the Gulf region. Processors from the various state and federal processing laboratories will attend this meeting to discuss issues related to otolith processing. The main purpose of the meeting will be to ensure that the processors from the various labs are consistent in their techniques. This consistency will ensure that all the processors are determining the ages (for the identified species) in a similar manner. One way to ensure consistency is the development of reference sets for the various species. These sets are used to test reader precision among all the personnel reading the identified species in the Gulf of

Mexico. For each set, the distribution group (who will be utilizing the set) as well as the direction of distribution (e.g. east to west) will be determined. In addition, a primary point of contact and a reading time frame for each agency will be established. The reading of the reference sets will be conducted on an annual basis. For established readers, they will read a subset of the otoliths just to refresh their memory but for new readers, they should conduct the reading of all the otoliths in the reference set every year for the first couple of years. Once all of the agencies have read the set, the primary contact will compile the ages and calculate an APE among the agencies and this information would be presented at the annual otolith processors training workshop.

Under the FIN program, there are two (2) readers for each otolith. This ensures that several people look at the otolith to determine the age and there is some comparability among the readers. However, the readers are not consistent, that is, a person could be the first reader for one otolith and be the second reader for another otolith. When there are discrepancies between the two readers, they need to get together and come to agreement about the ring count and edge code. If agreement cannot be reached, the otolith is discarded and not included in the data set. The agreed upon number of rings and edge code would be entered into the reader1 variable. When states send their data to the FIN Data Management System (DMS), the information from reader2 will not be sent. However, the states will continue to utilize the reader2 information as a reference to identify potential discrepancies between the readers.

TRACKING OF DATA

In conjunction with the collection of these data, tracking of the amount obtained in reference to the established targets will also be conducted. The GSMFC will provide coordination and administration of this activity. Based on the needs identified in the data collection plan, sampling targets will be established for the priority species and these targets will be provided to commercial and recreational field samplers. The samplers will be responsible for providing summaries of collected biological data needs to the GSMFC on a monthly basis. The tally information should be provided to the GSMFC office no later than the 5th day of each month. Based on the analysis of the amount, type, and distribution of data that have come in, adjustments can be made, if necessary during the wave. Notices will be sent out by GSMFC to the partners that need to take some action, either to cease collecting a certain kind of data, or to shift effort over to other priorities as well as a periodic summary report which will contain the progress to date in achieving the data collection goals. In addition to routine monitoring of targets, this process allows for emergency in-season data needs. Requestors will notify the coordinator (provided by GSMFC) of the species and the type, amount, and distribution of the necessary data. Either a work group or the entire FIN Committee will meet, via conference call, to discuss the nature of the emergency data request and its relative priority and then implement the action decided by the group.

Table 1. Standard data elements of biological sampling.

DATA ELEMENT	DESCRIPTION	FORMAT
Unique Identifier	Some Combination of Data Elements That Allows for the Unique Identification of this Action. Use Trip Ticket Number If Available. For the recreational component, it will be site #, date, interviewer id.	see Table A.1
Record Type	Type of data collection activity that data was captured under: 01=MRFSS; 02=Texas survey; 03=Biological sampling add-on; 04=TIP sampling; 05=At-sea observer; 06=Head boat survey	2 digit numeric
Interview Number	Sequential number of total amount of interviews conducted per day	3 digit numeric
Sample Date	Month / Day / Year	MM/DD/YYYY
Sampler	Port Agent Code/Recreational interviewer ID	4 digit numeric
State (Landing)	State Code (FIPS)	see Table A.8
County (Landing)	County Code (FIPS)	see Table A.8
Sampling Location	Dealer Number/MRFSS site number	see Table A.2
Gear Code	Gear Code	see Table A.3
Area Fished	Area Code	see Table A.10
Depth	Depth of water (in feet) where fishing occurred	4 digit numeric
Landing Condition	Condition Landed (Whole, Guttled, Headed, Etc.). For recreational, this would be a disposition code	see Table A.6
Market Size Range	Actual Size Range	4 digit numeric
Market Category	Code that will specify any market or grade categories that affect price, usually size related.	see Table A.5
State (Sampled)	State Code (FIPS)	see Table A.8
County (Sampled)	County Code (FIPS)	see Table A.8
Total sample weight	Weight of sample	4 digit numeric
Species	ITIS species code	see Table A.7
Mode	Mode of fish: charter boat, head boat, private/rental, shore, commercial	2 digit character
Specimen Method	Method used to collect the specimen (random vs. non-random)	2 digit character
Length1	First length of individual fish (in millimeters)	4 digit numeric
Length1 Type	Type of measurement taken for first length. This will always be fork or center line length, either actual measurement or converted measurement.	2 digit alphanumeric
Length2	Second length of individual fish (in millimeters)	4 digit numeric
Length2 Type	Type of measurement taken for second length (total length, forked length, etc)	2 digit alphanumeric
Length3	Third length of individual fish (in millimeters)	4 digit numeric

DATA ELEMENT	DESCRIPTION	FORMAT
Weight	Weight of individual fish	4 digit numeric
Weight Units	Units weight was collected in (pounds, kilograms, etc.)	2 digit alphanumeric
Sex	Sex Code	2 digit alphanumeric
Age Tag Number1	First Age Structure Identifier, sequential # by port sampler/rec interview	4 digit numeric
Age Tag Number2	Second Age Structure Identifier, sequential # by port sampler/rec interview	4 digit numeric
Gonad Tag Number	Gonad Identifier, sequential # by port sampler/rec interviewer	4 digit numeric
Stomach Tag Number	Stomach identifier, sequential # by port sampler/rec interviewer	4 digit numeric
Tissue Tag Number	Tissue Identifier, sequential # by port sampler/rec interviewer	4 digit numeric
Tissue Type	Type of Tissue collected - muscle, eye parts, etc	see Table A.2

Table 2. Primary and secondary species, by gears and regions.

SPECIES	#GEAR	#REGIONS	#OTOLITHS	GEARS	REGIONS
Primary species					
Black Drum	3	2	3,000	rec HL, com HL, com TRAWLS	N GOMEX, FL
Gag	3	1	1,500	rec HL, com HL, com LL	GOMEX
Golden Tilefish	2	1	1,000	com HL, com LL	GOMEX
Gray Snapper	2	2	2,000	rec HL, com HL	E/W GOMEX
Gray Triggerfish	3	2	3,000	rec HL (PR) rec HL (CH), com HL	E/W GOMEX
Greater Amberjack	2	2	2,000	rec HL, com HL	E/W GOMEX
Gulf Flounder	1	1	500	com HL	GOMEX
King Mackerel	2	3	3,000	rec HL, com HL	E/W GOMEX, S. ATL
Red Drum	1	3	1,500	rec HL	TX, LA, MS/AL/FL
Red Grouper	3	1	1,500	rec HL, com HL, com LL	GOMEX
Red Snapper	3	2	3,000	rec HL, com HL, com LL	E/W GOMEX
Sheepshead	3	2	3,000	rec HL, com HL, com TRAWL	E/W GOMEX
Southern Flounder	2	2	2,000	rec HL/GIG, com HL/GIG	E/W GOMEX
Spotted Seatrout	2	3	3,000	rec HL (PR) rec HL (CH)	TX, LA, MS/AL/FL
Striped Mullet	2	3	3,000	rec CAST, com CAST, com STRIKE	LA, MS/AL, FL
Vermilion Snapper	2	2	2,000	rec HL, com HL	E/W GOMEX
Yellowedge Grouper	2	1	1,000	com HL, com LL	GOMEX
Secondary species					
Spanish Mackerel	3	2	3,000	rec HL, com CAST, com GILL	GOMEX, ATL
Scamp	3	1	1,500	rec HL, com HL, com LL	GOMEX
Yellowtail Snapper	2	1	1,000	rec HL, com HL	E GOMEX
Cobia	1	2	1,000	rec HL	E/W GOMEX
Black Grouper	1	1	500	rec/com	GOMEX
Black Sea Bass	3	1	1,500	rec HL, com HL, com POTS	E GOMEX
Red Pogy	3	1	1,500	rec HL, com HL, com LL	GOMEX
Snowy Grouper	1	1	500	rec/com	GOMEX
Speckled Hind	1	1	500	rec/com	GOMEX
Warsaw Grouper	1	1	500	rec/com	GOMEX
TOTAL			47,500		