

INSTRUCTIONS FOR MENHADEN SAMPLING PROGRAM

Revised May 1995 (from 1972, 1977, 1985 editions)

National Marine Fisheries Service
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INTRODUCTION

The primary function of our catch-sampling activity is to develop a comprehensive picture of the size and age structure of the Nation's valuable menhaden resource. In theory sampling consists of small collections of data from some larger population about which we desire information. Since menhaden populations are so widely distributed along the Atlantic and Gulf coasts, examination of all members of a population is a physical impossibility; thus, we are compelled to obtain the required data from small portions, or samples, of the population. Our hope is that the characteristics of the samples will be similar to those of the population as a whole. Catches by commercial fishing vessels provide the raw material from which our samples are drawn.

Data collected systematically in the field are processed at the Beaufort Laboratory. Data from port samplers are used to estimate numbers of fish at age in the coastwide landings. Simplistically speaking, **data from each fish measured by the port samplers is expanded 10^6 times** in order generate estimates of numbers of fish at age harvested by the fishery. Therefore, **randomness in acquisition of the sample, and reliability and accuracy of the data are paramount** to the Program. Subsequent analysis yields information on (1) the abundance of fish in each year class; (2) their rate of growth; (3) the rate at which they are harvested, as well as the death rate from natural causes; and (4) the seasonal pattern of their movements throughout the fishery. Such information facilitates forecasting year-to-year menhaden abundance and fishing success, and aids the Service in formulating

guidelines for resource management.

To insure uniformity in the sampling procedure, the following instructions have been prepared for the guidance of field personnel (port samplers). If program objectives are to be realized, **these instructions must be followed faithfully.**

COLLECTION OF SAMPLES

The actual physical process of obtaining a menhaden sample requires the port sampler to enter the hold of the vessel after it has docked at the plant and to randomly scoop a bucket of fish from the top of the load. Scooping the sample from the top of the load insures that the sample contains only fish from the last school caught. Since fish on the surface of the load are often dried out, scrape off the top layer of fish so as to obtain moist specimens. Note that some of the larger, more modern vessels in the menhaden fishery have multiple fish holds separated by bulkheads or baffles. If such is the case, the sampler may be required to ask the captain or a crewman into which hold the last set of fish was pumped.

After the sample has been secured, the sampler completes a sample label (2x3 inch waterproof label) noting: 1) date of the last catch, 2) vessel from which it came, 3) location of the last set, and 4) the sampler's initials. Information on the date and location of the last set should be secured from the captain or one of the crew members. The label remains with the sample until the sample is processed.

Each sample should be taken from a different vessel, and insofar as is possible, the catches sampled should be selected at random. In other words, be careful not to sample the same vessel each day.

TREATMENT OF SAMPLES

Processing of the samples occurs at either the plant or back at the laboratory depending upon the particular port sampler's situation. Randomly select 10 fish from the sample bucket. Each of the 10 fish should be carefully examined to make certain that it is not mutilated and, more importantly, that sufficient scales are present along the left side of its body to provide an adequate scale sample. (If scales are missing or the body is mutilated, select another fish of approximately the same length, ± 5 mm). Return the remaining fish to the hold of the boat or to the plant rawbox. Do not throw them into the water near the plant.

Beginning in 1990 we changed data collection procedures. Starting in spring 1990, all data pertinent to a 10-fish collection (= sample) will be recorded on a single #1 data form (Fig. 1). The #1 data forms have been pre-stamped with serial collection numbers. It is important that the #1 data forms are used in consecutive numbered order, that is, as a fish collection becomes available, use the next collection number in the sequence. If an unused #1 data form (or forms) is lost, note this in the REMARKS section of the next available #1 data form and on the Weekly

Activity Report (see below).

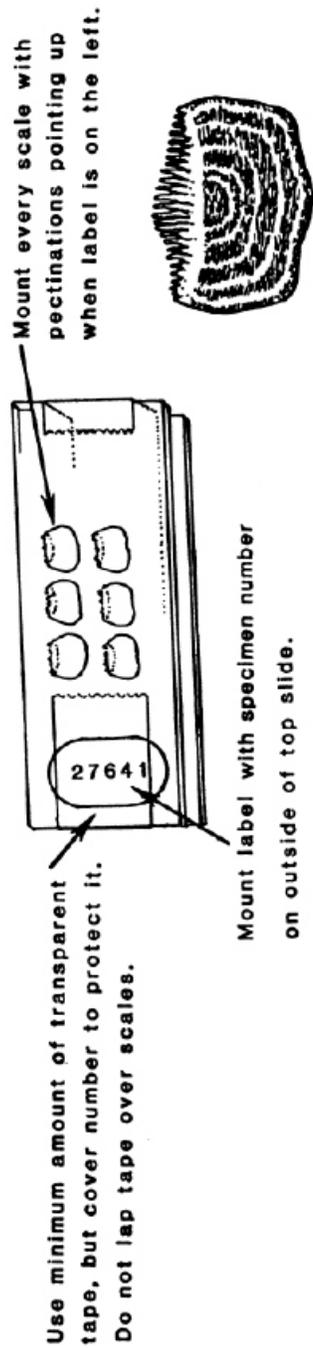
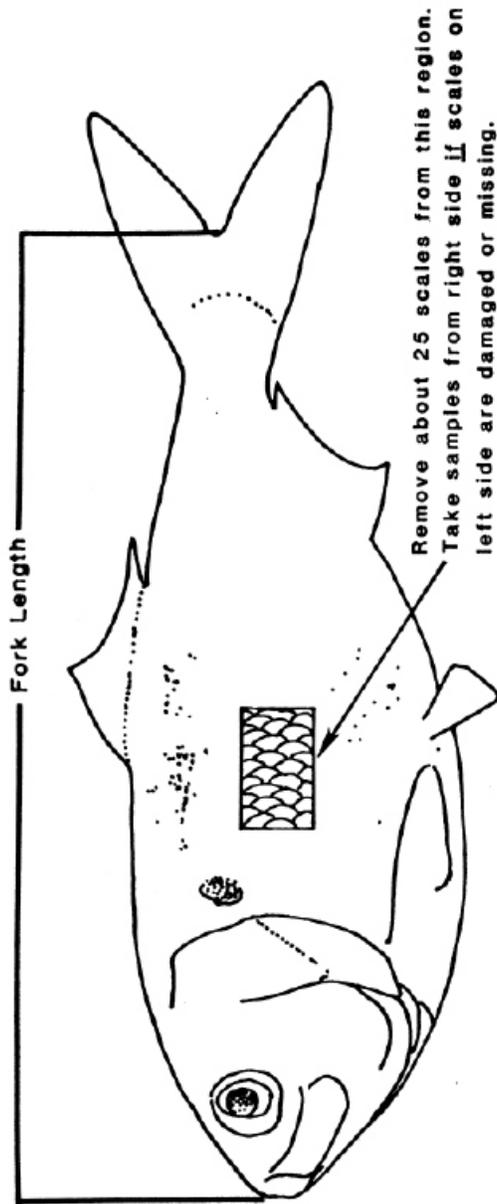
For each 10-fish collection (= sample) you will record "header" information on the left side of the #1 data form. The following information for each collection is required (instructions for coding this information is found in Appendix A):

- Full name and code number of vessel from which sample was taken.
- Location where sample fish were caught (determined by referring to area and subareas shown on appropriate chart of the fishing grounds and by using stated distance and bearing of last set from charted landmark).
- Date of collection (year, month and day).
- Code number of plant at which the vessel landed its catch.
- Single digit fishing area code.

Process each fish in a 10-fish collection for fork length, weight (Appendix B), and a scale sample following these guidelines:

- Measure fork length to the nearest millimeter. Fork length is the distance from the snout to the median rays of the tail fin (= fork in the tail).
- Weigh to the nearest gram.
- Remove approximately 25 scales from the left side of the body. It is extremely important that you remove scales from the prescribed area (Fig. 2), that is, below the insertion of the dorsal fin and

FIGURE 2



along or slightly below the lateral line. Scales from any other region are unsuitable for ageing analyses. The right side of the fish may be used if the left side appears damaged or a sufficient number cannot be obtained from the prescribed area. Place the scales in a vial and add ██████ water. Use the sample vial wood holder provided to maintain the sample vials in the same order as the fish are processed. Place a small slip of paper with the collection number in the first vial of each block to identify all 10 scale samples.

Fork length and weight data are to be listed in a consecutive fashion on the right side of the #1 data form. Individual specimen numbers for each fish in the 10-fish collection have been pre-stamped. Data for the first fish in the collection is written to the right of the specimen number that ends in 1, data for the second fish is written to the right of the specimen number that ends with 2, ... data for the tenth fish is written to the right of the specimen number ending in 0. Initial the #1 data form in the space provided and add any remarks you feel are pertinent to the collection, for example, observations on by-catch.

INSPECTION AND MOUNTING OF SCALE SAMPLES

Remove scales from each vial to a paper towel or watchglass. Use a microscope or hand lens to check individual scales for defects. Then, choose only those scales that are symmetrical, uniform in size, and free of defects for mounting.

Clean the selected scales by rubbing them between the fingertips and mount them dry between two glass slides. Arrange them on the first (bottom) slide with pectinations (spines) pointed up and the smooth or concave scale side down (sculptured scale surface up), and cover with the second slide (Fig. 2). Use a transparent tape to fasten slides together. Do not lap tape over the scales. Affix a label containing the specimen number to the slide as shown in Fig. 2. You must establish a routine with a number of data check points to assure completeness and accuracy in your handling and identifying of all samples.

On the Atlantic coast, select six (6) scales from each vial for mounting. On the Gulf coast, select ten (10) scales from each vial for mounting.

MIXED CATCHES OF MENHADEN AND ATLANTIC THREAD HERRING

Landings of menhaden along the Atlantic coast almost invariably consist of a single species, the Atlantic menhaden (Brevoortia tyrannus). An exception occurs in the Georgia-northern Florida area where the yellowfin menhaden (B. smithi) is infrequently taken along with the Atlantic species. In the Gulf of Mexico the problem of mixed species catches is somewhat more

complicated although one species, the gulf menhaden (B. patronus), nearly always predominates. Landings of gulf menhaden which are caught to the east of the Mississippi River delta may include some yellowfin menhaden, those to the west some finescale menhaden (B. gunteri), and those in the delta region itself some of both.

If the fish hold of a vessel is observed to consist of a species of menhaden in addition to, or other than, the usual one dominating the fishery that you are sampling (B. tyrannus in the Atlantic, B. patronus in the Gulf), process a 10-fish sample of each species in the same manner as described above. Identify the species by means of the key provided. Note on the #1 data form (next to species) the identity of the rare species. Be alert for mixed catches and obtain samples of the rarer menhaden species whenever possible.

If while processing your original bucket of fish, you discover the rarer menhaden species, separate the two species. Process the common species as per your normal routine. If the rare species is represented by 5 or more individuals, process them as per your normal routine using the next available #1 data form (if more than 10 individuals are present, randomly select 10 fish for work-up). In addition, get estimates of the quantities caught from the captains or mates of vessels in whose landings such species are detected. Enter such information on the Weekly Activity Report described below.

Occasionally, purse seine vessels in the South Atlantic and the Gulf of Mexico will target schools of Atlantic thread herring,

Opisthonema oglinum. If a vessel that you are sampling has capture a significant quantity of thread herring, try to get a sample of these and process them as you would a menhaden sample, writing "thread herring" next to SPECIES on the #1 data form. Get an estimate from the captain of the quantity of thread herring in the catch. Note this information in the REMARKS section of the #1 data form and also on the Weekly Activity Report.

RECORDS AND REPORTS

All data records are to be kept accurately and in the required detail cited above. Fish measurements, in particular, must be checked carefully. If an error is suspected or discovered, either delete the data by drawing a line through them or place a question mark after the entry. **Records, including #1 data forms and scale samples, are to be shipped every 2 weeks to the Beaufort Laboratory.** Use only those packaging materials provided and mail them according to a schedule assigned by your supervisor. All data and material become the exclusive property of the NMFS, and as such are to be treated as confidential information. Their security is of the utmost importance.

In addition, a Weekly Activity Report (See Appendix C), outlining fleet activity, biological observations and estimated weekly landings, is to be submitted to the Beaufort Laboratory at the end of each week. The following information should be included:

- A sequential listing of collections acquired for the week, including plant, vessel, and collection numbers, date, fishing location and fork length range.
- A summary of week's fishing activity by the fleet, noting areas fished and additions or transfer of vessels in the fleet.
- Related biological observations, such as the occurrence of significant quantities other fish species in the catches, appearance or disappearance of large bodies of menhaden in the area(s) fished and their locations, heavy mortalities, etc.
- An estimated or actual figure of the week's landings, obtained in a casual manner or reconstructed from the sampler's knowledge of day-to-day operation. Do not bother the office or plant personnel for this information.

Completed reports should be mailed by Saturday noon. Address: National Marine Fisheries Service, Beaufort Laboratory, 101 Pivers Island Road, Beaufort, North Carolina 28516-9722.

As standard operating procedure, you will be contacted by your supervisor from the Beaufort Laboratory once a week for the purpose of noting condition of your supplies, recent mailings of data forms and scales, anticipated leave, and general comments about the fishery and fleet activities. Contacts for samplers on the Gulf and Atlantic coasts are J. Smith or D. Vaughan (see p. 12 for phone numbers).

EQUIPMENT AND SUPPLIES

At the beginning of the season, adequate supplies and equipment in good condition will be furnished. Keep equipment clean and store carefully and securely. Additional instructions on care of the triple-beam balance are provided in Appendix B.

Do not allow your supplies to become depleted. In the space provided at the bottom of the Weekly Activity Report, record what supplies are needed. Do not let your supply of slides and #1 data forms fall below a 2-week supply. Other supplies are not as critical and may be obtained locally in an emergency.

EMERGENCY PROCEDURES

In an medical emergency, of course any doctor or medical facility can be called upon. Regardless of the circumstances, however, provide your supervisor with the full name and address of any doctor or medical facility that was used.

- Injuries. Office of Workers' Compensation, Employee's Notice of Injury (attached), is to be prepared and forwarded to your supervisor **within 48 hours** of any injury, however, slight. All injuries received on the job and requiring medical attention must be reported to your supervisor as soon as possible after receiving medical attention.
- Serious accident. Notify supervisor immediately by telephone.
- Temporary residence. Provide the Beaufort Laboratory with the address of your temporary residence and a telephone number at which you can be reached.
- Absences. Adequate sampling of landings and monitoring of the menhaden fishery in your locality, according to the instructions provided, is your responsibility. When each daily assignment is accomplished, your time is your own. Normally you will not be expected to work on Saturday and Sunday. However, if boats do not land fish on more than 1 day during any week, then attempt to obtain samples on Saturday, availability of fish

permitting. If you anticipate necessary and lengthy absences other than on weekends, please submit note these to your supervisor in advance.

- Auto Accidents. In case of an accident while driving a government vehicle, fill in the accident report form(s) located in dash compartment of same and notify your supervisor. The forms may be xeroxed to assure a supply.

In the event of an emergency or problem in which you do not know what should be done, you should contact Mr. Joseph Smith at:

National Marine Fisheries Service
Beaufort Laboratory
Beaufort, North Carolina 28516-9722
Telephone: (Lab) 919-728-8765
(Home) 919-726-7689

Alternately, ask for Doug Vaughan (728-8761) or John Merriner (728-8708) at the Laboratory; Office hours at the Lab are 7:45 a.m. to 4:30 p.m. ET, Monday through Friday.

Appendix A. Instructions for Completing #1 Data Forms

One digit numbers are written in the far right blank(s) of all multi-blank spaces. You may omit placing zeros to the left of any code or data numbers. Use care in recording information and make certain items are legible. Use a #1 or #2 lead pencil.

Please use GOOD PENMANSHIP!

<u>Item</u>	<u>Instructions</u>
Species	Leave blank. However, if sampling in Gulf and species <u>not</u> <u>Brevoortia patronus</u> , or if sampling in the Atlantic and species is <u>not</u> <u>B. tyrannus</u> , write fish's name next to species on #1 form. Do not record data for more than one species in any 10-fish collection. If there are fewer than 10-fish leave the remaining specimen number spaces blank.
Year caught	Record last two digits of the year e.g. 95=1995. If N.C. Fall Fishery extends into next calendar year, continue use of previous year.
Scale reader	Leave blank.
Vessel number	Record code number assigned the vessel and write vessel's complete name on the line above (You will be provided with a vessel list for your area).
Location caught	Record location of last set as given on charts of the fishing grounds in terms of Latitude and Longitude and sublocation, e.g., 2989 B2 (Your will be provided with fishing area location charts).
Month	Record number corresponding to month's numerical order in year, e.g., 4=April, 5=May, etc. If N.C. Fall Fishery extends into next calendar year, 13=Jan., 14=Feb.
Day	Record day of Month.
Plant	Record code number assigned plant (See Appendix D).
Collection Number	A consecutive <u>pre</u> stamped number. Each collection (or sample) consists of 10 individual fish. Check for legibility.

Area Use codes given below to locate on coast the area where last set was made (location caught).

Area Delineations

North Atlantic Area 1 - Waters along the southern coast of Long Island, east of a line due south of Moriches Inlet, NY (lat. 40°46'N and long. 72°44'W), Long Island Sound, and waters northward.

Middle Atlantic Area 2 - Waters north of Great Machipongo Inlet, VA. (lat. 37°22'N and long. 75°43'W) to a line running due south of Moriches Inlet on the southern coast of Long Island.

Chesapeake Bay Area 3 - Chesapeake Bay proper and coastal waters outside Bay lying between Avon, NC (35°20'N) and Great Machipongo Inlet, VA.

South Atlantic Area 4 - Waters between Cape Canaveral, FL and a line running due east from Avon, NC 35°20'N.

N.C. Fall Fishery Area 5 - This is a temporal area (approx. Nov.-Feb.), not an actual geographic area. All catches landed in North Carolina after commencement of North Carolina Fall Fishery, regardless of location caught.

Eastern Gulf Area 6 - Waters east of line running due south from the tip of the Mississippi River at Point of the Bay, LA (lat. 28°55'N and long. 89°25'W), and north along the Mississippi River.

Western Gulf Area 7 - Waters west of a line running due south from the tip of Mississippi River at Point of the Bay, LA, and north along the Mississippi River.

Specimen number A consecutive prestamped number. Represents number assigned each sampled fish. Check for legibility.

Fork Length Record fork length of fish in millimeters.

Weight Record weight of whole fish in grams.

APPENDIX C

National Marine Fisheries Service
Beaufort Laboratory
Beaufort, North Carolina 28516

WEEKLY SAMPLING ACTIVITY REPORT

Location: Moss Point, MS

Date: April 22-26, 2002

PLANT (Code Nos.)	VESSEL	COLL. NO.	DATE	LOCATION CAUGHT (6 digit fishing area code)	FORK LENGTH RANGE
55	746	6738	4/16	2989 D4	162 - 185
55	620	6739	4/16	2989 E4	159 - 192
56	686	6740	4/18	2984 D4	158 - 172
56	679	6741	4/18	3088 E5	145 - 174
55	621	6742	4/19	2989 E3	160 - 181
56	725	6743	4/19	2989 D3	152 - 204
56	732	6744	4/19	2989 E3	171 - 189
					-
					-
					-
					-
					-
					-
					-
					-

Estimated Weekly Landings: Plant 55 ~ 10 million ; Plant 56 ~ 11 million

Brief summary of fishing activities for the week: _____

Monday 4/16 - First day of new season; good catches Breton Sound.

Tues. 4/17 - no fishing, stormy weather.

Wed. 4/18 - a few boats return from Appalachicola area; plant 5
down for 1/2 day because of dryer problems.

Thurs. 4/19 Fair catches from LA; Gult Coast to boatyard. (OVER)

Fri. 4/20 no activity, rain.

Supplies needed: Scale vials, envelopes

Moss Bunker Apr. 28, 2002
Biological Aide

APPENDIX D. Codes for menhaden reduction plants

Atlantic Coast

Plant 10	Omega Protein	Reedville, VA
Plant 13	Beaufort Fisheries	Beaufort, NC

Gulf Coast

Plant 56	Omega Protein	Moss Point, MS
Plant 58	Daybrook Fisheries	Empire, LA
Plant 68	Omega Protein	Abbeville, LA
Plant 71	Omega Protein	Cameron, LA

