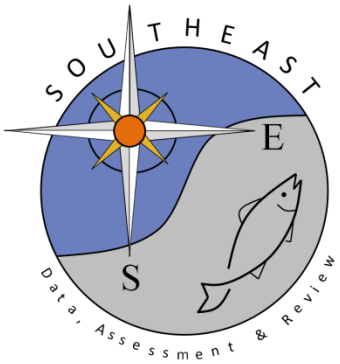
Biological Program Documentation: North Carolina Estuarine Trawl Survey

Katy West, Lynn Henry, Holly White, Tina Moore, Garry Wright, and Chris Stewart

SEDAR-PW6-RD43

6 June 2014



Biological Program Documentation

Independent Fishery

Program 120

Masterfile (after 1990): NER.NMA.NMA120-1.JUVENILE
Masterfile (before 1991): NER.NMA.NMA120-1.JV120B90

North Carolina Estuarine Trawl Survey

Biologists:

Katy West (documentation lead)
Lynn Henry
Holly White
Tina Moore
Garry Wright
Chris Stewart

Revised April 2009

PROGRAM DOCUMENTATION CHECK LIST

DOCUMENTATION COVER SHEET

Program Number	**120**
Program Title	**X**
Fishery (Dependent/Independent)	**X**
Masterfile location	**X**
Biologist	**X**

GENERAL DESCRIPTION

General historical perspective	X
Program objectives	**X**
Sampling methods & gears used	**X**
List of project titles (federal aid) incorporated in program	
List of Biologists & time spans worked on the program	
DMF reports providing additional information on program	
Memos pertaining to general description	

DATA and ANALYSIS ELEMENTS DESCRIPTION

Current Format A.	**X**
Visual aids	**X**
Completed set of data sheets for an entire collection of data	
Detailed technical analysis information	**X**
Metadata (table format) with description & dates of any changes or deviations in sampling or coding procedures	
Memos pertaining to data or analysis	
Prior period Format A.	**NA**

SITE INFORMATION

Current Format B.	X
GIS Information	
I. If station based sampling	X
1. Station Name	
2. Location (10digit water body)	
3. Latitude in deg min sec (dms)	
4. Longitude in deg min sec (dms)	
II. If grid based sampling	
1. Grid or area	
2. Quad (quadrant)	
3.Grid type: 1'/30"/15"	
4. Latitude in deg min sec (dms)	
5. . Longitude in deg min sec (dms)	
6. Coord: Coordinate type (c=centroid / r=right corner)	
Mapping (complete set of maps in Data management office)	X
Memos pertaining to site information	X

REFERENCE MATERIAL

List of codes specific to the program	X
Attachments	
Tables	
Appendices	
Other memos pertaining the program	X

REFERENCES

Resource references	See Memos

Documentation Updates

Program 120

The following list of documentation updates may be incomplete prior to May 1, 2007. If updates were sent by the US mail or hand delivered to data management the update would not be listed in the table below prior to May 2007. Also if issues were resolved over the telephone or in person they would not be listed.

Date Received	Requested By	Nature of Request
05/10/00	Mike Pulley	Add stations to documentation.
06/09/00	Mike Pulley	Add stations to documentation.
08/18/00	Mike Pulley	Add stations to documentation.
04/24/01	Katy West	Updates to documentation.
10/19/01	John Schoolfield	Update stations in documentation.
10/23/01	John Schoolfield	Update stations in documentation.
04/23/02	Rich Wong	Update stations in documentation.
05/01/02	Katy West	Update stations in documentation.
05/10/02	Lele Judy	Update stations in documentation.
05/14/02	Lele Judy	Update stations in documentation.
05/31/02	Lele Judy	Update stations in documentation.
06/03/02	George Joyner	Notification that stations have been added to the database.
06/14/02	Lele Judy	Correction to a data sheet.
02/04/04	George Joyner	Changes to station codes per instructions from Balu Chepuri in GIS.
02/17/04	George Joyner	Disregard email sent on 02/04/04.
04/30/04	M. Tyndall	In-depth review completed, request approvals.
05/04/04	Katy West	Updates to documentation.
05/05/04	M. Tyndall	Sent for approval.
05/05/04	Katy West	Has more updates will be sending soon.
06/04/04	Katy West	Revised documentation.
06/07/04	M. Tyndall	Notification that I had made minor updated to the revised documentation.
08/13/04	Katy West	Updates to documentation.
08/16/04	M. Tyndall	Notification to biologists that the documentation had been replaced with a new version.
10/01/04	Beth Burns	Update to documentation.
10/04/04	Katy West	Request the update sent by Beth Burns be processed.

10/05/04	Katy West	Add stations to documentation.
09/15/05	Lele Judy	Request corrections to 1992 data sheets.
04/04/06	Katy West	Revised documentation.
04/06/06	M. Tyndall	Sent for approvals.
04/06/06	John Schoolfield	Approved.
04/07/06	Mike Marshall	Approved.
04/07/06	Stopher Slade	Approved.
04/21/06	Sara Winslow	Approved.
03/26/07	Katy West	Question for George Joyner and Balu Chepuri.
03/26/07	Balu Chepuri	Response to Katy West's question.
04/03/07	Tina Moore	Copy of station list sent to Katy West.
04/03/07	Katy West	Response to Tina Moore's email.
04/03/07	Tina Moore	Response to Katy West's email.
04/04/07	Tina Moore	Update stations in documentation.
11/14/07	Lele Judy	Add station to documentation.
11/16/07	M. Tyndall	Request for information..
11/19/07	Lele Judy	Information sent.
11/19/07	M. Tyndall	Sent for approval.
07/24/08	Katy West	Updated with habitat fields
07/25/08	Katy West	Updates to text and Format A. Added additional biologists.
07/29/08	M. Tyndall	Sent for approval.
08/13/08	Lele Judy	Add station numbers
08/25/08	Chris Braddy	Add station number.
08/28/08	M. Tyndall	Emailed copy to Katy.
08/29/08	Katy West	Updates to text and Format A.
09/03/08	M. Tyndall	Sent for approval.
01/08/09	Katy West	Update to add Wilmington info to Format A.
01/09/09	M. Tyndall	Sent for approval.
02/13/09	Katy West	Update to Format A.
02/13/09	M. Tyndall	Sent for approval.
03/31/09	M. Tyndall	Moved to approved without all approvals.
05/01/09	Katy West	Replacement documentation updating text and Format A.
05/08/09	M. Tyndall	Sent for approval
01/07/10	Eric Fitzpatrick	Clarification of habitat fields in Format A.
01/07/10	M. Tyndall	Emailed Eric to let him know request completed.
07/29/10	Chip Collier	Change the biologist for southern district.
08/02/10	M. Tyndall	Emailed copy to all biologist.

01/10/11	Jason Rock	Change of Biologist. Approved by Katy West 1/11/11.
01/18/11	M. Tyndall	Sent for approval.
03/02/12	Katy West	Change in Biologists.
03/05/12	M. Tyndall	Emailed copy to all concerned.
11/14/12	Katy West	Update to Format A.
11/15/12	M. Tyndall	Sent for approval.

General Description Revised: July 2008

Program 120
Sampling Protocol and Quality Assurance

I. Purpose and Objectives:

- To identify primary nursery areas and other critical habitats.
- To provide a long-term data base of annual juvenile recruitment for economically important species.
- To provide a data base for evaluation/permit comment on projects with potential environmental impact.

II General Information and Background:

In 1971 the DMF initiated a statewide estuarine trawl survey. The initial objectives of the survey were to identify the primary nursery areas and produce annual recruitment indices for economically important species such as spot, Atlantic croaker, weakfish, flounders, blue crab, and brown shrimp. Other objectives included monitoring species distribution by season and by area and providing data for evaluation of environmental impact projects. Various gears and methodology have been used in the survey since 1971. In 1978 and 1989 major gear changes and standardization in sampling occurred. In 1978 tow times were set at one minute during the daylight hours. In 1989 an analysis was conducted to determine a more efficient sampling time frame to produce juvenile abundance indices with acceptable precision levels for the target species. A set of 105 core stations was identified, sampling would be conducted in May and June only, except for July sampling for weakfish (dropped in 1998, program 195 deemed adequate), and only the 10.5 ft head rope trawl would be used. July sampling for a subset of the cores was reinstituted in 2004 in order to produce a better index for spotted seatrout. Additional habitat fields were added in 2008.

Juvenile abundance indices with proportional standard errors (PSE) are computed and reported annually for southern flounder, spot, Atlantic croaker, blue crab, brown shrimp, and weakfish. The indices have been provided to the NCDMF and ASMFC stock assessment work groups and university researchers. The survey data have been used to characterize nursery area habitat and to help designate new nursery areas. The data have been important for the federal designation of Essential Fish Habitat. Classification analyses using species composition and abiotic variables produced distinct station groupings. Salinity was the key abiotic factor. NCDMF biologists routinely use survey data in their habitat alteration comments to document level of utilization of an area by fish and crustaceans.

Fishery-independent monitoring of juvenile populations enhances state and federal resource manager's ability to monitor population changes and assess the status of target species. Data from this project are being used by the NCDMF, other Atlantic coast fishery management agencies, and university researchers to evaluate the effectiveness of current management measures to conserve marine and estuarine stocks. Continuing a long-term database (1978 to present) of indices of abundance for target species allows management agencies to assess the status of these stocks. The survey provides a relative index of abundance for many key estuarine species in North Carolina. Indices of abundance created from this survey have been or currently are being used in stock assessments for blue crabs, southern flounder, spot, weakfish, Atlantic croaker, and brown shrimp. Additionally, the survey has the potential to be used for several other species such as Atlantic menhaden, white and pink shrimp, and summer flounder. For those species for which quantitative assessments are not available, the abundance indices provide a relative measure of stock condition.

The survey also provides a direct measure of habitat utilization by the various species captured. An index of relative abundance can be developed to categorize the sampling areas and establish a pattern of habitat utilization for target species. This habitat baseline has been used to monitor changes in utilization related to increased development and changing land uses. It can also be used in efforts to better incorporate ecosystem and environmental effects in stock assessments. By documenting habitat utilization of various species, managers can make informed decision on how issues such as coastal development impacts can be minimized. The survey data from this program has been used to characterize nursery area habitat and to help designate new critical habitat areas (PNA's, and SHA's). This data has also been used for the designation of Essential Fish Habitat by various federal agencies. NCDMF biologists routinely use this survey data in their habitat alteration comments to document levels of utilization for an area by fish and crustaceans.

III. Office Responsibilities

Northern District
Lynn Henry (Biologist) Ben Goforth (Technician)
Holly White (Biologist), Carol Etheridge (Technician)
Pamlico District
Garry Wright (Biologist), Gregory & Lele Judy, Chris Braddy, and William Schmidt (Technicians)
Central District
Tina Moore (Biologist), Marc Hamric (Technician)
Southern District
Chris Stewart (Biologist)

IV. Sampling Design and Protocol.

A. Station selection

Core stations: 104 stations that are sampled each year without deviation to produce the juvenile abundance indices: they cannot be discontinued (See Table).

Stations sampled in addition to the mandatory 104 core stations are selected for the following purposes by each office:

- Potential critical habitat designation, other than PNA
- Permit data stations: located near current or anticipated coastal development areas to obtain information for permit comment (specific).
- Marina comparison stations: paired stations in which a station located in a creek/tributary with a marina or other development that is subjected to continual alteration such as maintenance dredging is compared to a station located in the nearest undeveloped creek/tributary with regard to the utilization of these area types by juvenile finish and crustaceans.
- Nursery area comparison stations: located in areas that failed to be classified as nursery areas.
- Potential nursery area stations: located in creeks/tributaries that have not been classified as primary nursery areas but are suspect of being primary nursery areas. Need a minimum of two years of data, three years preferred.

- New stations within existing PNA's: located in PNA's that have no record of being sampled by Program 120.

- Re-sampling existing stations: past stations are selected to obtain current information. Resample for at least two years.

Station locations are mapped by each office. Any new station locations need to be forwarded to IT for inclusion in both the GIS and biological database station and edit files. A file of station latitude and longitude is maintained on the mainframe under NER.NMA.NMA999-9.SAS.STATIONS (previously in NERTSO. TEAM19. DATA. STATLIST). Station parameters such as depth, alteration state, and bottom composition need to be verified and recorded each year for each station sampled. Make a copy of SAS program DMFJCL.NCBKWSTY to produce a tabular reference listing of sampling frequency by station and year.

B. Gear Description: Otter Trawl

1. Construction: two-seam.
2. Headrope: length: 10-1/2 feet.
3. Body mesh: 1/4 inch bar mesh in body of net, 210/6 twine size.
4. Tailbag mesh: 1/8 inch bar, Delta style knot less nylon (35 lb test) with 150 meshes circumference and 450 meshes long (no extension).
5. Chain:-three loops of 3/16 inch diameter chain on each wing. Each loop is comprised of 13 links hung over a distance of 10 links. Two loops at the corners, where bars and points meet. One loop in the center.
6. Floats: two 3 inch X 4 inch gill net floats in the center of the headrope.
7. Tickler chain: 3/16 inch diameter chain one foot shorter than footrope.
8. Leg lines: six feet.
9. Two lines: 60 feet.

Refer to Memos Section for Greg Judy Memo for more detail on trawl and trawl door construction.

C. Season and Time

- Tows are one minute in duration and calibrated to span 75 yards. Tows should be made with the tide and the rpm's should be adjusted to account for wind.

- Core stations are sampled in the mid-two weeks of May and June. Sampling of non-core stations may be extended to meet specific area/office needs. For example, some grass bed stations along the Outer Banks are sampled from May through September.

- Samples should be taken during daylight hours at the same tidal stage.

D. Species Identification

If there is a species that is unidentifiable by the technician/biologist in the field, the specimen is stored on ice and returned to the office where it can be identified using one of the following keys:

- FAO Species Identification Sheets for Fishery Purposes, Western Central Atlantic (blue books)

- Development of Fishes of the Mid-Atlantic Bight, An Atlas of Egg, Larval and Juvenile Stages, FWS/OBS-78/12 (gray books).

In addition the specimen should be forwarded to Fritz Rohde (NOAA) to verify the identification. **IF ever in doubt, always bring the specimen back for positive identification.**

E. Sample Workup

Beginning in 2008 additional data parameters for Habitat were recorded:: Distance to Shoreline, Shoreline/ Shoreline Structure Type, Percent Shoreline Hardened, Land Use, and Percent Cover. If distances from shore are greater than a 550 yd radius, then code as 9s. In order to test the methodology and logistics of collecting these new data, programs 100, 120, 150 and 160 will be the first to begin implementation of this sampling. Based on this pilot collection of Habitat Data, changes were made for 2009 and the following methodology covers the current fields (began 2009)

Table 1. Revision to Habitat Variables in the Biological Database, 2008 versus 2009-current

2008 Name	Text	Rec 8	2008 Codes	2009 Name	2009 Codes Position
NatShr	$	121	A-L	NatShr	A-L (same as 2008)
ShrStr	$	122	A-J	ShrBoat	Y=yes, N=no
HardPct	$	123	A-E	HardPct	A-F (F=0% hardened)
LandUse	$	124	A-M	ShrGroin	Y=yes, N=no
CovPct	$	125	A-D	ShrSlope	Y=yes, N=no
HabVar1	$	126	Not used	ShrVert	Y=yes, N=no
HabVar2	$	127	Not used	HabVar2	Not used

Sampling Methodology

Bottom composition, qualitative sediment size, secchi depth, water level, water depth, water temperatures (surface and bottom), salinities (surface and bottom), and dissolved oxygen (surface and bottom) should be collected each time a station is sampled.

Qualitative Sediment Size (*SedSze)*

The following sediment size codes should be used at all shallow stations as defined in program documentation and if not quantified (Appendix D in BDB Coding Manual). In sampling areas/stations that cover a large area, the **dominant** sediment size should be recorded. Leave blank if unable to collect.

0 Cemented hard bottom or rock
1 Hard sand (firm to hard; small to large grained sand)
2 Soft mud (soft silt or clay)
3 Hard mud (firm to hard; silt or clay)
4 Clay
5 Silt
6 Muddy sand (small to large grained sand with a small amount of silt/clay)
7 Sandy mud (silt or clay with a small amount of small to large grained sand)
8 Sand (small to large grain size)
9 Mud (silt/clay grain size; very small)

Bottom Composition (*Btmcomp)*

The following bottom composition codes should be used at all shallow stations as defined in program documentation to denote the general bottom composition (excluding the size of the sediments). In sampling areas/stations that cover a large area, the **dominant** bottom composition should be recorded. Leave blank if unable to collect.

A Shell
B Grass
C Algae
D Detritus (small woody debris, dead marsh grass, etc)
E Sponge
F Coral_____
G Shell, grass \
H Grass, algae \
I Shell, grass, algae \ DO NOT USE ON PRGRAM 120

J Shell, algae \ (1989)
K Grass, detritus \
L Grass, algae, detritus \
M Shell, detritus_____ \
N Cinder
O No structure (prior to 2008 meant No Grass)
P Tunicate
Q Bryozoan
R Rock
S Rock, Shell
T Rock, grass
U Rock, algae
V Rock, shell, grass
W Rock, shell, grass, algae
X Tow relocated due to grass
Y Large woody debris (logs, snags, etc)
Z Other (unnatural objects; engine blocks, refrigerators)

Water Depths (*Depth*), Salinities (*Ssal, Bsal*), Temperatures (*Stemp, Btemp*) and Dissolved Oxygen (*SDO, BDO*).

Electronic gear (YSIs, etc) should be calibrated and kept in working order per the manufacturer's instructions in order to accurately record water temperature, salinities and dissolved oxygen. However, in the case of electronic malfunctions, low-tech backup equipment such as a refractometer and thermometer should be available on vessels to take at a minimum, surface water temperatures and salinities. If unable to record DO then make a note on the data sheet and leave blank. Refractometers should be routinely calibrated using distilled water.

Water Level (*Waterlvl)*

The following water level codes should be used to denote tidal influence, wind tide, or river stage based on professional judgment. Leave blank if unable to collect.

Tides-lunar – If gear is fished for longer that one hour then leave blank.

A Early ebb
B Mid ebb
C Late ebb
D Ebb slack
E Early flood

F Late flood
G Mid flood
H Flood slack
X Ebb (low)
Y Flood (high)
Z Slack

Wind tides and river stage

I High
J Normal
K Low
L Flood
M Ice

State of Alteration (*Alter)*

This is must be recorded for each collection.

1 No alteration
2 Closed due to pollution
3 Channeled
4 Channeled and closed due to pollution
5 Sample site unaltered, but alterations in nearby environment could affect site
6 Channeled but naturalized
7 Culvert downstream of station
8 Culvert upstream of station
9 Bridged

Allowed Fishing Activity (*Activity*)

Record the most severe bottom disturbing activity. Areas where fishing activities change will need to be verified through the rulebook and/or proclamations issued during the sampling period. The metadata database in the License and Statistics section is also a source for verification of fishing activity. This must be recorded for each collection.

A No commercial fishing activity allowed
B Crab or shrimp trawling allowed
C Dredging allowed
D Hydraulic dredging or clam trawling, kicking allowed
E. Trawling dredging, non-bottom disturbing activities allowed

F Trawling and hydraulic dredging allowed
G Dredging and hydraulic dredging allowed
H All fishing activities allowed
I Non-bottom disturbing fishing activities allowed
J All activities except trawling, hydraulic dredging

Shellfish Closures (P/T)

If Alteration code = 2, the areas closed due to pollution may need to be verified through prohibited closure area maps and/or proclamations issued during the sampling period. If an area has been closed to pollution, it should be recorded as permanent or temporary. Temporary closure information is available at http://www.ncdmf.net/paprocs/index.html. Permanent closure maps are available at http://www.ncdmf.net/maps/index.htm.

1 Permanent shellfish closure
2 Temporary shellfish closure

Secchi Depth (*G1_Depth End*)

Secchi depth methodology originated from program 637 (NC Cooperative Interagency SAV Mapping Program). Secchi disks should be eight inches in diameter and weighted with alternating black and white quarter sections

Secchi depth should be taken without the aid of sunglasses, and preferably where water depth is at least 1-2 ft. (40-60cm) in low-salinity areas, and 2-3 ft. (60-90cm) in high salinity areas. Lower the secchi disk into the water until you can no longer see it. Raise it up until you can barely see it then lower it again until it just barely disappears from view. Mark the depth by placing string between thumb and pointer finger at the surface of the water, slowly raise the secchi disk out of the water. Measure the distance from the secchi disk to the thumb and pointer finger in centimeters. This is the secchi depth. If the secchi depth is the same as the water depth (if you can see the secchi disk sitting on the bottom) still record the secchi depth. This issue can be addressed through analysis of the data. If secchi depth is unable to be recorded code as 9s.

Shoreline Development (Began 2009)

Distance from Station to Shoreline (*G2_Soak*)

This field indicates the distance from the station to the nearest shoreline, at the waters edge as viewed from a vessel. Biological and technical staff may develop the best way to

determined distance. These methods may include the use of a rangefinder, GPS unit, or GIS plots or any other method that best suits the program. Distance should be recorded in yards. If distances are greater than 550 yards then leave blank. The boat should be anchored for the determination of distance. Rangefinders should be calibrated according to manufacturer's specifications.

Natural Shoreline (*NatShr)*

These fields indicate the **dominant** natural shoreline type adjacent to normal high water level or normal water level as defined in DCM (2006) and based on best professional judgment.

Dominant Natural Shore (See Appendix for examples)

A Swamp Forest-poorly drained forested wetlands or shrub/scrub communities
B Marsh-low-lying meadows of herbaceous plants that occur along the margins of estuaries and shorelines of coastal rivers and streams
C Marsh with Oysters-marsh with oysters or oyster reefs adjacent to the marsh shoreline
D Marsh with Mudflats-marsh with adjacent flat muddy regions in inter-tidal areas
E Low Sediment Bank with Marsh-less than 5 feet of vertical height with unconsolidated sediment combined with marsh
F Low Sediment Bank with Swamp Forest-less than 5 feet of vertical height with swamp forest
G Low Sediment Bank with Sand-a combination of high or low sediment banks and a sandy bottom/beach waterward of the sediment bank
H Low Sediment Bank with Woody Debris-less than 5 feet of vertical height with partially or completely submerged trees, logs, and brush
I Low Sediment Bank with Oysters/SAV-less than 5 feet of vertical height with oysters, oyster reefs or SAV beds waterward of the sediment bank
J High Sediment Bank-greater than 5 feet vertical height above the high tide line
K Overwash Barrier/Inlet Areas-areas subject to active overwashing or inlet influence
L None

Shoreline structure (where present) (See Appendix within Habitat Documentation for examples)

Shoreline structure should be determined for the whole shoreline. The presence or absence of four different general shoreline structure types should be coded.

Boating Facilities (*ShrBoat*) Y=present, N=not present.
Upland basins, open marinas, docks, and/or boat ramps.

Groins (*ShrGroin*) Y=present, N=not present.
Rock or wood structures perpendicular to the shore.

Sloped structures (*ShrSlope*) Y=present, N=not present.
Rock revetment along the shore, low profile rock or wood structure parallel to the shore with marsh or water behind (sill), elongated rock or wood structure offshore, larger than sills parallel to the shore (breakwaters).

Vertical structures (*ShrVert*) Y=present, N=not present.
Bulkheads

Percent Hardened (*HardPct*)

This percentage should be an estimate of **all structures** found on the shoreline.

A < 10% hardened
B 10-25% hardened
C 26-50% hardened
D >50% hardened
E Unable to determine
X 0% hardened

Program 120 SAV (Test Sampling 2008, continued 2009 on)

The lead biologists will select trawl stations from based on historical presence and sampling logistics. If SAV is present, identify SAV species, and estimate grass density from the trawl. The grass densities include none, very sparse, sparse, moderate, and dense.

Grass density will be categorized as follows:

0 None: no SAV
1 Very Sparse: Few shoots/sprigs of SAV
2 Sparse: A one-gallon bucket or more
3 Moderate: A five-gallon bucket or more
4 Dense: Bushel basket or more
5 Floated into net

If grasses are encountered attached and floating in net then code for only attached density (1-4)

All species present are recorded. If necessary, samples (including root structure) should be brought back to the office in labeled Ziploc bags to verify species identification.

Specimen Work Up

All species are identified and counted. The economically important species (see Table 2) are counted and a random subsample of 30-60 individuals of each size group are measured to the nearest mm. The remaining species are identified and counted. The bottom type, depth, and bottom and surface temperature and salinity are recorded at each station. Beginning in 1997 with the purchase of YSI meters dissolved oxygen should also be recorded. Blue crabs less then 20 mm are not sexed and crabs should be measured on their backs. Blue crabs are subsampled if there are more than 30 individuals that are less than 20 mm (assigned

spstatus=1). Larger blue crabs, ones that that are greater or equal to 20 mm are sexed (assigned spstatus=2) and all of these are measured. For other fish, if there are two different size groups and they are subsampled, the smaller ones are spstatus=1 and the larger ones are spstatus=2. If all the fish are measured as a single unit, they are spstatus=0.
Historical Note for Anchovies (Caveat)
During 1982 & 1983 anchovies were not counted but were estimated by 10's (99995), 100's(99996), or 1000s (99997). In subsetting the program 120 data, during this time the colnum =. (missing). Appears this only occurred for a short time, and then went back to the pre 1982 method of recording. For this reason recommend not doing annual long term comparisons for anchovies. A March 2nd memo also notes this same process was used for mysids and grass shrimp

Don't Use-Upland Land Cover/Use (Only recorded in 2008 test)

This field indicates the type of land cover/use that is dominant within the area of the sampling station and is based on best professional judgment. Determination of upland land cover/use up to 500 meters from shore may be determined by use of GIS technology (maps, CAMA photos, etc.) but should be groundtruthed for verification. Lead biologists should be responsible for the method of determination and verification. GPS positions should be recorded in order to utilize GIS technology appropriately. However, upland land cover/use may also be determined in the field by locating the boat in the approximate center of the station, looking at the upstream shoreline on both sides if in a creek/river, or to closest mainland shoreline if in open waters/sound. Approximate dominant land cover/use visible within that area.

A Agriculture/crop
B Agriculture/livestock
C Commercial/Industrial
D Construction (building, demolition, clearing)
E Forest/Bush
F Herbaceous
G Institutional (hospitals, assisted living facilities, prisons, schools)
H Multi-Residential
I Residential
J Roadway
K Upland Marina
L Golf Course
M No Upland

Don't Use-Percent Covered (Only recorded in 2008 test)

This field indicates the amount of land covered by the dominant land cover/use indicated above within a 500 m radius and may be estimated by use of GIS technology

A < 10% covered
B 10-25% covered
C 26-50% covered
D >50% covered
(If dominant upland cover=M, this field would be blank.)

Collection of Quantitative Sediment Size Pilot Study (Program 120 only,2008)

Ross and Epperly (1985) statistically examined sediment data from 51 primary nursery areas (PNAs) adjacent to Pamlico Sound in the early 1980s and identified limited correlations of sediment properties with certain station groups and species (Table 1). Sediment samples from each of these stations were collected in order to determine if significant changes in sediment composition have occurred over time. Excel file of 1980's and 2008 results are stored at DMF/Bio_pgms/Other_info/Ref120 folder. Detailed comparative analysis is pending, initial review inconclusive, differences noted could be due to differences in technique. If it is determined that there are significant changes, then sediment samples should be collected statewide. This information may also be used to determine relationships between sediment properties and species distribution, diversity, and richness.

Three sediment samples from 51 stations listed in Ross and Epperly (1985) were collected in May and June of 2008 at each station using a 50.8 mm (2 inch) diameter coring device. A sediment sample was taken at the beginning, middle, and end of each trawl. Cores sampled the top 50 mm of sediment. Sediment was placed in a clean container, labeled, brought back to the lab and frozen for later analysis of sediment size by techniques modified from Ingram (1965). Additional sediment samples were also taken in the Southern District but were not analyzed.

Table 1. Stations sampled for quantitative sediment size (Ross and Epperly 1985)

SPB1	WB1	RB3	PAR13	B20	CN1	E15	G16	CC11
LSR5	OC1	PUR5	PAR16	B30	CS13	E10	G3	CC10
LSR1	JB1	PUR7	A2	B40	CS2	F1	J2	SB3
LSR3	SQB3	PUR3	A12	B43	D5	F3N	CC9	
FC1	SQB1	PAR9	A58	CN5	D8	F3D	J10	
FC3	RB1	PAR7	B10	CN3	E3	G19	CC0	

Quantified sediment sizes

The primary sediment size was denoted according to Ingram (1965). The secondary sediment size included those sizes in large enough amounts to affect the main name of the sediment. If actual sediment sizes are recorded use the following codes:

Code	Primary sediment size: Secondary sediment size
A	Gravel
B	Gravel: coarse sand
C	Gravel: fine sand
D	Gravel: coarse silt
E	Gravel: clay
F	Coarse sand
G	Coarse sand: gravel
H	Coarse sand: fine sand
I	Coarse sand: coarse silt
J	Coarse sand: clay
K	Fine sand
L	Fine sand: gravel
M	Fine sand: coarse sand
N	Fine sand: coarse silt
O	Fine sand: clay
P	Coarse silt
Q	Coarse silt: gravel
R	Coarse silt: coarse sand
S	Coarse silt: fine sand
T	Coarse silt: clay
U	Clay
V	Clay: gravel
W	Clay: coarse sand
X	Clay: fine sand
Y	Clay: coarse silt

F. Nursery area classification & CHPP Implementation

The Biological Review Team (BRT) protocol for the designation of nursery areas can be found on the DMF LAN in the DMF/BRT/Subcom/Habitat folder, document DesignPNA. Offices may also extend sampling past May and June for nursery classification or other reasons. A number of the Outer Banks stations and Southern District stations are sampled

through November. Sampling for nursery area classification in the southern area may begin in March or April.

Data elements needed to address CHPP implementation include: sediment size, bottom composition, depth, surface and bottom temperatures, surface and bottom salinities, surface and bottom dissolved oxygen, water level, alteration activity and allowed fishing activity. Beginning in 2008, additional environmental data collected as a test pilot included: secchi disk depth, shoreline type, land use, percent development, and SAV identification and density. Methodology for the collection of shoreline data and SAV data within certain programs as pilots are discussed in the general Habitat Program Documentation. In 2009 the shoreline fields were revamped to record presence/absence of 4different shoreline modifications, and the upland use and amount was dropped. The format A notes how this data is recorded.

G. Data Management / Program Documentation

Data were recorded on the yellow DMF-BM09.25 form according to the program documentation, until the new habitat fields were added in 2008. Form is SS127 Habitat form that can be found on the shared DMF drive in the Bioforms folder. Data is reviewed by the office program lead biologist or technician prior to submittal to Data Management by the 10th of the following month.

Any revisions to Program 120 must be forwarded through Katy West, 120 Program lead.

Refer to the Format A that follows.

V Quality Assurance measures

The lead biologist in each district is responsible for implementing the following quality assurance measures prior to and during the sampling:

- Collections: Verify all stations have been sampled each month according to the stated sampling protocols. Any new stations added must be forwarded to IT for inclusion in the station/location edit table and GIS.

- Tow speed: Determine the RPM necessary to cover 75 yards/min, recalibrate when any modification has been made to the boat engine (overhaul, tune-up, replacement of propeller, etc.).

- Electronics: Maintain oxygen/salinity/temperature meter to manufacturer's specifications.

- Net: Visually inspect for damage, tears, etc. Make all needed repairs made prior to sampling.

- Measuring Boards: Maintain such that scale is accurate and legible.

- Data entry: Review Report 4's to verify correct entry. All data for a year should be coded, entered, and corrected by the end of January of the subsequent year.

- Habitat fields are verified and coded on each collection.

VI Reports

Annual indices of abundance from this program are included in the annual reports for F-42 *Survey of Population Parameters of Marine Recreational Species*.

Other relevant reports can be found in the DMF/BRT/Reports/Program120 folder and include:

1989 Phalen, P.S., D.W. Moye, and S.A. Spence
Comparison of two trawls used for monitoring juvenile fish abundance in North Carolina, DENR, DMF, 14 p.

1985 Devries, D. A.
Description and preliminary evaluation of a statewide estuarine trawl survey in North Carolina. NAFO SCM Doc. 85/103, 24 p.

1985 Ross, S. W. and S. P. Epperly
Utilization of estuarine nursery areas by fishes in Pamlico Sound and adjacent tributaries, North Carolina, p 207-232, In A Yanez-Arancibia (ed.). Fish Community Ecology in Estuaries and Coastal Lagoons: Towards an Ecosystem Integrations, Univ. Nac. Auton. Mex., Inst. Cien. Mar. Limn., 654 p

Economically important species to be measured to the nearest midline length, mm.

Common Name	Scientific Name	Species Code
Alewife	Alosa pseudoharengus	8747010105
American eel	Anguilla rostrata	8741010101
American shad	Alosa sapidissima	8747010101
American croaker	Micropogonias undulatus	8835440701
Atlantic menhaden	Brevoortia tyrannus	8747010401
Atlantic spadefish	Chaetodipterus faber	8835520101
Black drum	Pogonias cromis	8835440801
Black crappie	Pomoxis nigromaculatus	8835160702
Black grouper	Mycteroperca bonaci	8835020502
Black sea bass	Centropristis striata	8835020301
Blueback herring	Alosa aestivalis	8747010102
Bluefish	Pomatomus saltatrix	8835250101
Bluegill	Lepomis macrochirus	8835160504
Brown bullhead	Ameiurus nebulosus	8777020104
Butterfish	Peprilus triancanthus	8851030103
Channel catfish	Ictalurus punctatus	8777020105
Cobia	Rachycentron canadum	8835260101
Crevalle jack	Caranx hippos	8835280303
Florida pompano	Trachinotus carolinus	8835280901
Gag grouper	Mycteroperca microlepis	8835020501
Gizzard shad	Dorosoma cepedianum	8747010501
Gray snapper	Lutjanus griseus	8835360102
Gulf flounder	Paralichthys albigutta	8857030302
Harvestfish	Peprilus alepidotus	8851030106
Hickory shad	Alosa mediocris	8747010103
King mackerel	Scomberomorus cavalla	8850030501
Lane snapper	Lutjanus synagris	8835360112
Largemouth bass	Micropterus salmoides	8835160602
Mutton snapper	Lutjanus analis	8835360103
Northern kingfish	Menticirrhus saxatilis	8835440603
Northern puffer	Sphoeroides maculatus	8861010201
Permit	Trachinotus falcatus	8835280902
Pigfish	Orthopristis chrysoptera	8835400201
Pumpkinseed	Lepomis gibbosus	8835160505
Red drum	Sciaenops ocellata	8835440901
Red grouper	Epinephelus morio	8835020408
Rock sea bass	Centropristis philadelphica	8835020305
Sheepshead	Archosargus probatocephalus	8835430301
Silver perch	Bairdiella chrysoura	8835440301

Common Name	Scientific Name	Species Code
Southern flounder	Paralichthys lethostigma	8857030304
Southern hake	Urophycis floridana	8791031007
Southern kingfish	Menticirrhus americanus	8835440601
Spanish mackerel	Scomberomorus maculatus	8850030502
Spot	Leiostomus xanthurus	8835440401
Spotted hake	Urophycis regia	8791031002
Spotted seatrout	Cynoscion nebulosus	8835440102
Striped bass	Morone saxatilis	8835020102
Striped mullet	Mugil cephalus	8836010101
Summer flounder	Paralichthys dentatus	8857030301
Tautog	Tautoga onitis	8839010101
Weakfish	Cynoscion regalis	8835440104
White catfish	Ameiurus catus	8777020101
White perch	Ameiurus americana	8835020101
Yellow bullhead	Ictalurus natalis	8777020103
Yellow perch	Perca flavescens	8835200201
Blue crab	Callinectes sapidus	6189010301
Brown shrimp	Farfantepenaeus aztecus	6177010101
Pink shrimp	Farfantepenaeus duorarum	6177010102
White shrimp	Litopenaeus setiferus	6177010103

NOTE: Various offices may also measure additional species for office specific reasons or interests (e.g. pinfish-Morehead City, gobies- Wilmington).

Data Elements and Analysis Descriptions

(**DO NOT CHANGE** THE MAINFRAME PROGRAMS REFERENCED BELOW, COPY TO YOUR OWN DATA MEMBER!!!) Non-DMF data requests need to follow the DMF Biological Data Release Policy.

Juvenile Abundance Indices:

A subset of stations is used for the calculations of indices. The stations utilized are listed in a table in this documentation. The Documentation Lead creates a subset of the core stations each year (data member NCBKWS2) after each office leads verifies that all the data is current and correct. The subset (nma120-2.sas.juvc72YY) is then used for the computation of indices that are included in the F-42 report. The subset includes the 10.5 ft net stations for all months and species. A core field is added with values as follows: 1 or 2 is May-June index sample, 3=July weakfish sample, and 0 or blank extra data for station but not for index. Programs that calculate indices are NCBZJV01 (for species other than weakfish), and NCBZJV06 (weakfish stations). These programs contain length cutoffs by month to determine what is most likely an age 0 individual (see F-42 reports for description). Also a Raising Factor for expanding sampled lengths to all individuals collected must be computed in analysis programs because this is not done as part of the DMF subset macro program. Also remember any proc freq or mean on length should include the Weight statement (weight newfreq or weight frequenc).

Nursery Area Designation:

Programs for data analysis can be found on the mainframe. Mainframe names are despna1, despna2, despna3, despna4, and despna5. Be sure that juvge90 is updated with the data needed for analysis. You may also copy these programs to PC SAS and download data through the web based biological database interface. It is suggested that data be downloaded as a SAS file. Updating the database on the mainframe and any problems creating the data set through the web for program 120 should be addressed to IT (George Joyner).

DESPNA1
Tests abundance normality for pna designation;tests length nomality for pna designation; printout of environmental parameters ;printout of species list for each location
DESPNA2
Abundance comparisons for designating pnas
DESPNA3
Length comparisons for designating pnas
DESPNA4
Shannon-weiner index
DESPNA5
Creates species numbers by date and location for whitiker percent similarity matrix

Metadata Table for Program 120

YEAR	ACTIVITY
1970-1975	Initial sampling to determine nursery areas. Generally tow times varied and modal lengths usually taken.
1978	Established statewide juvenile stock assessment survey with standardized daytime tow times, intensive sampling stations, and months Mar – November. The Ross/Epperly/DeVries era of standardization and analysis.
1981	Most seine stations discontinued
1982	Station sediment and nutrient parameters collected and assessed
1986	Diseased specimens to be noted in each collection
1987	Heavily chained trawl (gear 558) used at 20ft open water stations, (except for Wilmington) to improve catch of crabs
1989	Bottom comp a mandatory field and included id of sea grass on record 3s
1990	Analysis completed and cut back to May and June sampling at 10.5 stations for computation of JAIs. Open water 20 ft stations dropped. (Phalen, McKenna, and Moye)
1993	Coding of VAR2 field with value=1 to indicate JAI sample
1997	Analysis of validated JAIs completed, agreed to importance of program for JAIs as well as habitat and ecosystem utility. (McKenna, West, & Wilson)
1998	July sampling for weakfish at selected stations discontinued. (Daniel)
1999	Coding procedure for core station tow altered due to heavily grassed conditions
2003	Number of station water location code changes, result of review of GIS location coverage and station locations. Stations lat & long verified with each office.
2004	July sampling of subset of cores for spotted seatrout index initiated (Burns).
2006-2008	Southern area sampled non-core stations in Chadwick Bay for nursery determination during months of May-Oct.
2008	New Habitat Fields test pilot added and SAV quantified in the trawl
2009	Habitat fields restructured and SAV quantified in the trawl required as a standard field

II. Data Elements Descriptions

FORMAT A

The following should be completed to reflect current activities. Please note in written description any deviations from the current activities listed below.

Rec. Type	Column #	Field Name	Units	Limits	Mandatory (M) vs. Desired(D)	Comments
I	2-8	Control1 (Sequence #)	N/A	N/A	M	Assigned by Data Management Section
	25-27	Program	N/A	N/A	M	120
	28-33	Date (YYMMDD)	N/A	N/A	M	Date sampled (YYMMDD)
	34-38	Station	N/A	N/A	M	Station #
	39-48	Location	N/A	N/A	M	Waterbody codes found in Appendix B in Manual
	49-53	Grid &Quad	N/A	N/A	D	Code as MOVED or name of alternate station if station tow is moved over 200yds because of grass.
	54-57	Time	N/A	0000-2400	M	Time Gear Ended Fishing
	58-61	Duration	Minutes	1, 5	M	Tow Time=1 minute, historical times varied, (5 minutes for 20 foot net)
	62-64	Gear1	N/A	556	M	556 current, historical (558,311,300)
	65-68	G1_Parm1	head rope length (ft.)	10.5, 20	M	10.5 Ft. headrope, historical 20 Ft and 2 sizes of seines
	69-72	G1_Pamr2	body mesh (bar-in.)	0.25, 0.75	M	0.25 (bar-in.) 210/6 twine, (0.75 for WLM)
	73-76	G1_Parm3	tail bag mesh (bar-in.)	0.125, 0.25	M	0.125 (bar-in.) tailbag, (0.25 for WLM
	77	Rig	N/A	1	M	1=single rigged

FORMAT A

The following should be completed to reflect current activities. Please note in written description any deviations from the current activities listed below.

Rec. Type	Column #	Field Name	Units	Limits	Mandatory (M) vs. Desired(D)	Comments
I	78	Tow	N/A	3	M	3=bottom
	79	Sediment Size (Sedsize)	N/A	N/A	D	Quantified sediment is A-Y , while estimates are coded as 0-9: 0. Cemented hard bottom or rock 1. Hard sand 2. Soft mud 3. Hard mud 4. Clay 5. Silt 6. Muddy sand 7. Sandy mud 8. Sand 9. Mud

FORMAT A

The following should be completed to reflect current activities. Please note in written description any deviations from the current activities listed below.

Rec. Type	Column #	Field Name	Units	Limits	Mandatory (M) vs. Desired(D)	Comments
I	80	Bottom Comp (BtmComp)	N/A	A-F, N-Q, X	M	Use the code that is most prevalent at the site. Code "B" indicates grass is present. Code "X" is station moved due to grass. All living material (grasses, tunicates, etc.) should be coded in own Record Type III. A. Shell B. Grass C. Algae D. Detritus E. Sponge F. Coral N. Cinder O. No grass P. Tunicate Q. Bryozoan X. Tow relocated due to Grass (1993)
	81	Bottom Profile	N/A	9	D	Enter value=9 when used to distinguish tow taken with a boat powered by a "jet drive". Very shallow stations from Manteo beginning 2003.
	82-84	Depth	Meters	N/A	M	Average depth of tow (Station depth must be recorded at least once per sampling season)

FORMAT A

The following should be completed to reflect current activities. Please note in written description any deviations from the current activities listed below.

Rec. Type	Column #	Field Name	Units	Limits	Mandatory (M) vs. Desired(D)	Comments
I	88-90	Surface Temp. (Stemp)	C	0.0-40.0	M	
	91-93	Bottom Temp. (Btemp)	C	0.0-40.0	M	
	94-96	Surface Salinity (Ssal)	0/00 (ppt)	0.0-40.0	M	
	97-99	Bottom Salinity (Bsal)	0/00 (ppt)	0.0-40.0	M	
	100-103	Var1	N/A	N/A	D	Conductivity (taken where salinity is 0 ppt)
	104-106	Surface Dissolved Oxygen (Sdo)	mg/l	N/A	M	
	107-109	Bottom Dissolved Oxygen (Bdo)	mg/l	N/A	M	
	112	Weather	N/A	N/A	D	1=clear skies, 2=one-quarter cover (25%) 3=one-half cover (50%), 4=three-quarter cover (75%), 5=one hundred percent cover 6=haze, 7=fog, 8=precipitation, 9=snow
	113-116	Var2	N/A	0,1	M	0= critical habitat stations (a blank denotes 0) **1= CORE STATION FOR JAI**
	117	Wind Direction (WindDir)	N/A	N/A	D	1=N 2=NE 3=E 4=SE 5=S 6=SW 7=W 8=NW

FORMAT A

The following should be completed to reflect current activities. Please note in written description any deviations from the current activities listed below.

Rec. Type	Column #	Field Name	Units	Limits	Mandatory (M) vs. Desired(D)	Comments
I	118-119	WindSpeed (WindSpd)	Knots	N/A	D	Wind Speed
	123	Water Level (WaterLvl)	N/A	A-G, I-M	D	Lunar Tide: A High Ebb B Mid Ebb C Low Ebb D Low Slack E Low Flood F High Flood G Mid Flood Wind Tide: I High J Normal K Low L Flood M Ice
	124	Alteration State (Alter)	N/A	N/A	D	Record the alteration state of the sampling site. 1= no alteration 2= closed due to pollution 3= channelized 4= channelized and closed due to pollution 5= sample sit unaltered, but alterations in nearby environment could affect site.

FORMAT A

The following should be completed to reflect current activities. Please note in written description any deviations from the current activities listed below.

Rec. Type	Column #	Field Name	Units	Limits	Mandatory (M) vs. Desired(D)	Comments
I	125	Allowed Fishing (Activity)	N/A	N/A	D	A= no commercial fishing activity allowed B= crab or shrimp trawling allowed C= dredging allowed D= hydraulic dredging or clam trawling, kicking allowed E= trawling, dredging, non bottom disturbing activities allowed F= trawling, and hydraulic dredging allowed G= dredging and hydraulic dredging allowed H= all fishing activities allowed I= non-bottom disturbing fishing activities J= all activities except trawling, hydraulic dredging allowed, clam kicking allowed.
	126-127	No. of Replicates (NbrRep)	N/A	N/A	M	Must correspond to the number Replicates of Record Type 2's.
VIII	27-32	Var5 (Latitude)	N/A	N/A	D	Latitude in 6 spaces (of just moved station). (Right Justified)
	38	Shellfish closure (P/T) (Info Source)	N/A	1-2	D	If Alter=2 then Prohibited closure=1 Temporary closure=2

FORMAT A

The following should be completed to reflect current activities. Please note in written description any deviations from the current activities listed below.

Rec. Type	Column #	Field Name	Units	Limits	Mandatory (M) vs. Desired(D)	Comments
VIII	44-49	Var3 (Longitude)	N/A	N/A	D	Longitude in 6 spaces (of just moved station)., code right justified, degrees minutes, seconds.
	52	Quantitative Sediment (QuantSed) (Var. Field #4)	N/A	A - Y	D	**Program 120**-Quantitative sediment category for selected subset of stations 2008 sampling (page 7).
	56-58	Secchi (Gear 1 Depth End)	Centimeters	N/A	M	Each sample. Take on sunny side of boat, near GPS position, should be middle of boat side. Record secchi depth regardless of water depth. Code as 999 if not taken.
	80-83	Distance from shore (G2_Soak)	Yards	N/A	D	If the distance from shore is greater than 550 yards (500 meters) leave blank.
	109-112	Gear 2 Depth End (G2_DepE)	N/A	N/A	D	For "moved" tow code the last 4 digits of the location code of the "moved" location.

FORMAT A

The following should be completed to reflect current activities. Please note in written description any deviations from the current activities listed below.

Rec. Type	Column #	Field Name	Units	Limits	Mandatory (M) vs. Desired(D)	Comments
VIII	121	Natural Shore (NatShr)	N/A	A-L	M (G2_Soak<550) D (G2_Soak>550)	Began 2009. Dominant shoreline type adjacent to normal high water level or normal water level as defined in DCM (2006) and/or based on best professional judgment. A - Swamp Forest-poorly drained forested wetlands or shrub/scrub communities B - Marsh-low-lying meadows of herbaceous plants that occur along the margins of estuaries and shorelines of coastal rivers and streams C - Marsh with Oysters-marsh with oysters or oyster reefs adjacent to the marsh shoreline D - Marsh with Mudflats-marsh with adjacent flat muddy regions in inter-tidal areas E - Low Sediment Bank with Marsh-less than 5 feet of vertical height with unconsolidated sediment combined with marsh F - Low Sediment Bank with Swamp Forest-less than 5 feet of vertical height with swamp forest G - Low Sediment Bank with Sand-a combination of high or low sediment banks and a sandy bottom/beach waterward of the sediment bank H - Low Sediment Bank with Woody Debris-less than 5 feet of vertical height with partially or

FORMAT A

The following should be completed to reflect current activities. Please note in written description any deviations from the current activities listed below.

Rec. Type	Column #	Field Name	Units	Limits	Mandatory (M) vs. Desired(D)	Comments
						completely submerged trees, logs, and brush **I** - Low Sediment Bank with Oysters/SAV-less than 5 feet of vertical height with oysters, oyster reefs or SAV beds waterward of the sediment bank **J** - High Sediment Bank-greater than 5 feet vertical height above the high tide line **K** - Overwash Barrier/Inlet Areas-areas subject to active overwashing or inlet influence **L** - None **NOTE:** If distance from shore is greater than 550 yards you may leave blank or fill in if influences catch rates...

FORMAT A

The following should be completed to reflect current activities. Please note in written description any deviations from the current activities listed below.

Rec. Type	Column #	Field Name	Units	Limits	Mandatory (M) vs. Desired(D)	Comments
VIII	122	Shoreline Boating Facilities (ShrBoat)	N/A	Y, N	M (G2_Soak<550) D (G2_Soak>550)	Y=present, N=not present. For 2008 pilot, this field was ShrStr (values A-J) **NOTE:** If distance from shore is greater than 550 yards you may leave blank or fill in if influences catch rates...
	123	Percent Hardened (HardPct)	N/A	A-F	M (G2_Soak<550) D (G2_Soak>550)	Percent Hardened (all structures) A < 10% hardened B 10-25% hardened C 26-50% hardened D >50% hardened E Unable to determine F 0% **NOTE:** If distance from shore is greater than 550 yards you may leave blank or fill in if influences catch rates... In 2008 if ShrStr=J this field was left blank.
	124	Groin (ShrGroin)	N/A	Y, N	M (G2_Soak<550) D (G2_Soak>550)	Y=present, N=not present Rock or wood structures perpendicular to the shore Beginning 2009 **NOTE:** If distance from shore is greater than 550 yards you may leave blank or fill in if influences catch rates....

FORMAT A

The following should be completed to reflect current activities. Please note in written description any deviations from the current activities listed below.

Rec. Type	Column #	Field Name	Units	Limits	Mandatory (M) vs. Desired(D)	Comments
VIII	125	Sloped Structure, Sills, Breakwaters (ShrSloped)	N/A	Y, N	M (G2_Soak<550) D (G2_Soak>550)	Y=present, N=not present . Sloped Structure, Sills, Breakwaters For 2008 pilot, this field was CovPct (values A-D). **NOTE:** If distance from shore is greater than 550 yards you may leave blank or fill in if influences catch rates...
	126	Vertical Structure (ShrVert)	N/A	Y, N	M (G2_Soak<550) D (G2_Soak>550)	Y=present, N=not present For 2008 pilot, this field was Habvar1 and was not used. **NOTE:** If distance from shore is greater than 550 yards you may leave blank or fill in if influences catch rates....
II	9-10	Replicate (Rep)	N/A	N/A	M	Note any diseased specimens in Replicate 00. ; Replicate 01contains all information for the tow.
	25-30	Collection Size (ColSze)	kilograms (to nearest.1)	N/A	M	Total weight of all species in catch. Normally coded as 9's.
	31-36	Sample Size (SamSze)	kilograms (to nearest. 01)	N/A	M	Normally code as 9's. Total weight of species in sample (Sum of Record Type 3's sample weights)
	37-38	No. of Record Type III's (NbrRec3)	N/A	N/A	M	Total # of Record Type 3's associated with the replicate.

FORMAT A

The following should be completed to reflect current activities. Please note in written description any deviations from the current activities listed below.

Rec. Type	Column #	Field Name	Units	Limits	Mandatory (M) vs. Desired(D)	Comments
II	39	Quality2	N/A	N/A	D	If station tow "moved", code as 1.
	50	SAV density (RepSize)	N/A	0-5	D prior to 2008 M after 2008	Beginning in 2008, qualitative tailbag method for all grass species encountered implemented. 0 none 1 Very sparse: few shoots/sprigs of SAV 2 Sparse: one-gallon bucket or more 3 Moderate: five gallon bucket or more 4 Dense: bushel basket or more 5 Floated into net Blank – not determined prior to 2008 If grasses are encountered attached and floating in net then code for only attached density (1-4).
III	9-10	Replicate	N/A	N/A	M	Corresponds to Replicate # from Record Type II that sample came from (see manual).
		Species	N/A	N/A	M	Scientific or common name written out on data sheet.
	11-20	Species Code (Species)	N/A	N/A	M	See manual. Appendix G.2. **Program 120** BtmComp =B then SAV species listed on Rec III's

FORMAT A

The following should be completed to reflect current activities. Please note in written description any deviations from the current activities listed below.

Rec. Type	Column #	Field Name	Units	Limits	Mandatory (M) vs. Desired(D)	Comments
III	21	SPStatus	N/A	N/A	M	If there are two different sampling units (size groups) and they are subsampled, the smaller ones are spstatus=1 and the larger ones are spstatus=2. If all the fish are measured as a single unit, enter as spstatus=0.
	25-29	Collection# (ColNum)	N/A	N/A	M	Total # of particular species in the catch.
	30-35	Collection Weight (ColWgt)	N/A	N/A	M	Recorded as 9's
	36-40	Sample # (SamNum)	N/A	N/A	M	Number of particular species in sampling unit.
	41-46	Sample Weight (SamWgt)	N/A	N/A	M	Recorded as 9's
	47-51	Subsample # (SubNum)	N/A	N/A	M	Number of particular species measured in sampling unit.
	52-57	Subsample Weight (SubWgt)	N/A	N/A	M	Recorded as 9's
	58	Form of Record Type IV (Form_4)	N/A	N/A	M	See Manual

FORMAT A

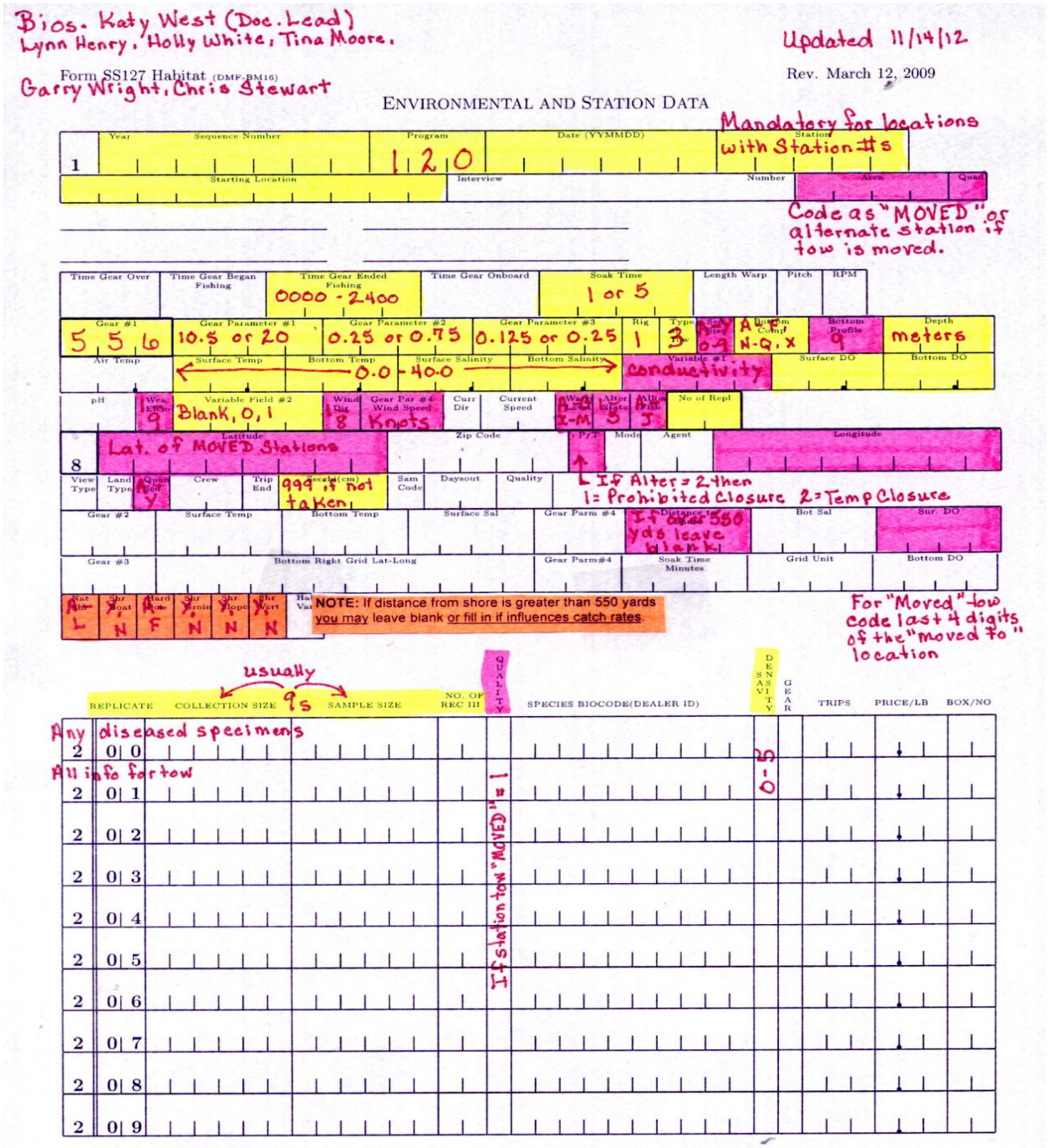
The following should be completed to reflect current activities. Please note in written description any deviations from the current activities listed below.

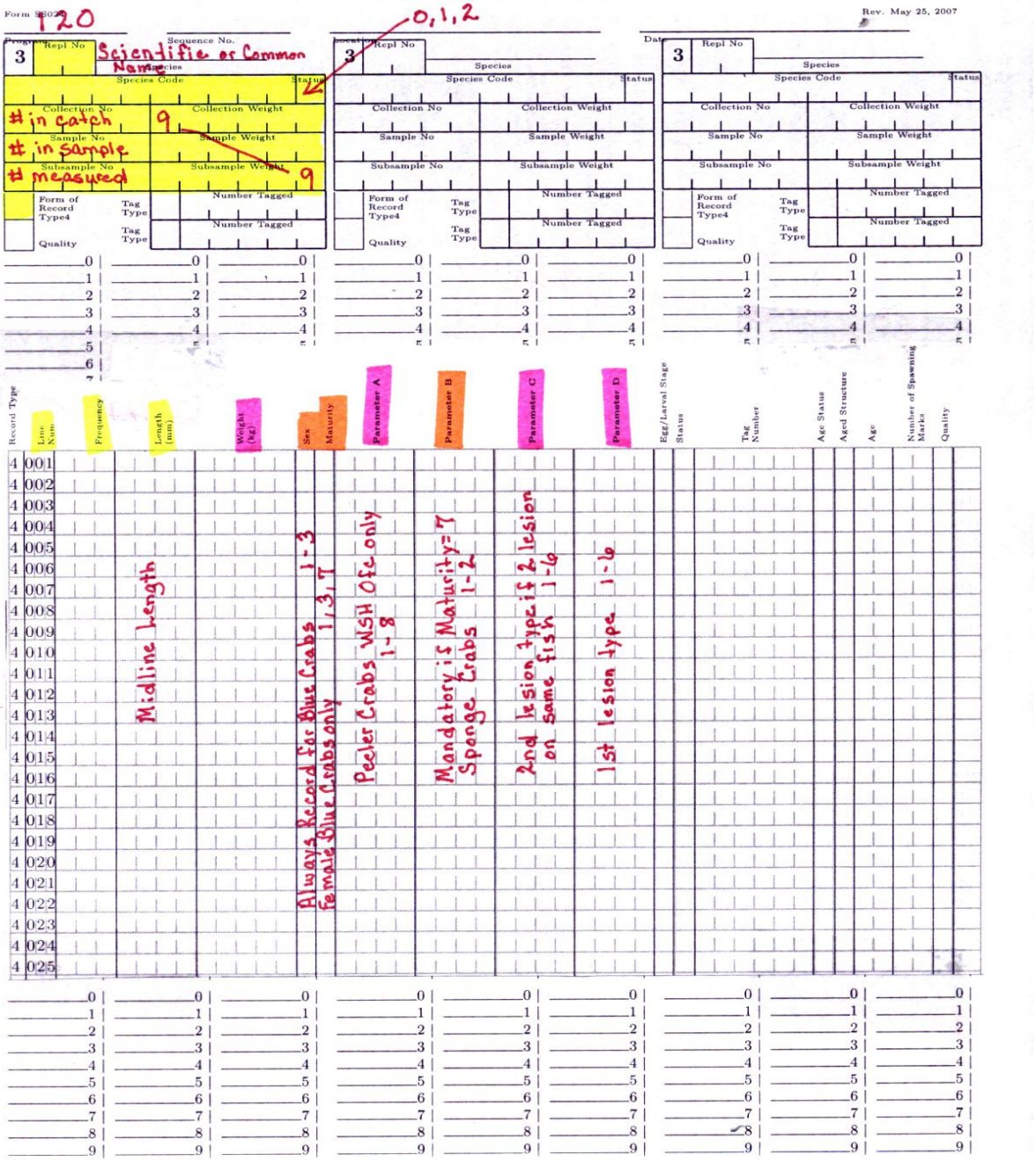
Rec. Type	Column #	Field Name	Units	Limits	Mandatory (M) vs. Desired(D)	Comments
IV	22-24	LineNum	N/A	N/A	M	Each record type 4 numbered sequentially
	25-27	Frequency (Frequenc)	N/A	N/A	M	
	28-31	Length	Millimeters	N/A	M	Record the midline length as shown as in species appendix G2
	32-36	Weight	grams		D	In the 80s weights of selected blue crabs recorded
	37	Sex	N/A	1-3	M for blue crabs	Sex should always be recorded for blue crabs. 1=male 2=female
	38	Maturity	N/A	1,3,7	M for blue crabs	1=immature 3=mature 7=sponge crab for female crabs only
	39-42	Parameter A (Parm_A)	N/A	1-8	D	Peeler stage for crabs: 1=Green, no peeler sign; 2=Hair line; 3=White line; 4=Pink line; 5=red line; 6=buster; 7=soft; 8=paper (Peeler data only from Washington office)
	43-46	Parameter B (Parm_B)	N/A	1,2	M	For sponge crabs only. 1= sponge yellow to orange in color 2= sponge brown to black in color
	47-50	Parameter C (Parm_C)	N/A	1-6	D	2nd Lesion Type (if 2 lesions on same fish);

FORMAT A

The following should be completed to reflect current activities. Please note in written description any deviations from the current activities listed below.

Rec. Type	Column #	Field Name	Units	Limits	Mandatory (M) vs. Desired(D)	Comments
IV	51-54	Parameter D (Parm_D)	N/A	1-6	D	FIRST Lesion Type Code: 1= Skin ulcer 2= Fin erosion 3= Abnormal pigmentation 4= Tumors 5= Skeletal anomalies 6= Opercular damage


Bios. Katy West (Doc. Lead)
Lynn Henry, Holly White, Tina Moore.
Garry Wright, Chris Stewart
Updated 11/14/12
Form SS127 Habitat (DMF-BM16)
Rev. March 12, 2009
ENVIRONMENTAL AND STATION DATA
Mandatory for locations with Station #s
Code as "MOVED" or alternate station if tow is moved.
Time Gear Ended Fishing: 0000 - 2400
Soak Time: 1 or 5
Gear #1: 5 5 6
Gear Parameter #1: 10.5 or 20
Gear Parameter #2: 0.25 or 0.75
Gear Parameter #3: 0.125 or 0.25
Rig: 1
Type: 3
Bottom Profile: 9
Depth: meters
Surface Temp / Bottom Temp: 0.0 - 40.0
Variable #1: conductivity
Variable Field #2: Blank, 0, 1
Wind Dir: 8
Gear Par #4 Wind Speed: Knots
Alter: 5
Latitude: Lat. of MOVED Stations
Mode: 8
If Alter = 2 then 1 = Prohibited Closure 2 = Temp Closure
If over 550 yds leave blank
NOTE: If distance from shore is greater than 550 yards you may leave blank or fill in if influences catch rates.
For "Moved" tow code last 4 digits of the "moved to" location
usually
REPLICATE
COLLECTION SIZE
SAMPLE SIZE
NO. OF REC III
QUALITY
SPECIES BIOCODE(DEALER ID)
DENSITY
GEAR
TRIPS
PRICE/LB
BOX/NO
Any diseased specimens
All info for tow
If station tow "MOVED" = 1

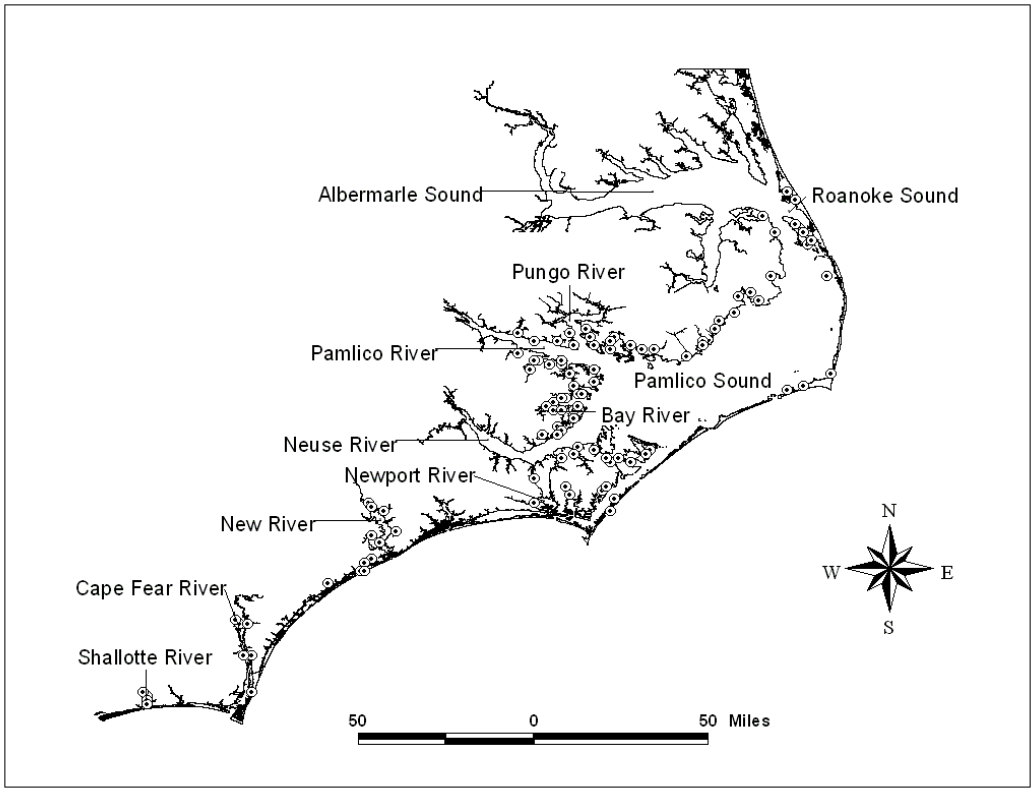

120
Rev. May 25, 2007
Scientific or Common Name
0,1,2
#in catch
#in sample
#measured
9
9
Midline Length
Always Record for Blue Crabs 1-3
Female Blue Crabs only 1,3,7
Peeler Crabs WSH Ofc only
1-8
Mandatory if Maturity=7
Sponge Crabs 1-2
2nd lesion type if 2 lesion
on same fish 1-6
1st lesion type 1-6

III. Site Information

A. Written Description

Station locations are maintained as part of the Division GIS program and are contained in the Program 120 GIS coverage that is maintained on the DMF LAN K drive. Station coverage is a component of the BIO-GIS Link Project funded as part of the F-75 federal aid project. IT GIS staff may be contacted for maps and other assistance with GIS products.

Map of Core Stations



List of CORE stations for the ¼ inch trawl sampling. See ner.nma.nma999-9.sas.stations for most current lat/longs. (revised May 2009) DO NOT ADD STATIONS TO THIS TABLE

Station	WaterBody	Lat	Long	LAT_dd	LONG_dd	Quad	County	Depth	Bottom Comp	Sediment Size	Alteration State	Allowed Activity
46	0702000300	344720	763637	34.78900	-76.61000	WILLIS	CARTE	3	O	6	1	H
A12	0528400702	351800	763604	35.29960	-76.60137	LOWLND	PAMLI	1.3	H	N	2	I
A2	0528400201	351907	763813	35.31783	-76.63667	SCREEK	PAMLI	0.9	B	8	1	I
A58	0528410300	351802	763039	35.30058	-76.51147	LOWLND	PAMLI	1.4	D	X	1	I
AB1	0528030300	352424	763028	35.40700	-76.50800	PAMBH	HYDE	0.9	K	S	1	I
B10	0529010000	351853	763004	35.31450	-76.50117	PAMPT	PAMLI	1.2	C	X	1	I
B20	0531010000	351551	763007	35.26385	-76.50105	PAMPT	PAMLI	1.2	O	Y	1	I
B40	0533050000	351424	763529	35.24023	-76.59180	JONEBY	PAMLI	1.1	B	X	2	I
B43	0533040000	351254	763419	35.21447	-76.57200	JONEBY	PAMLI	1.2	B	X	1	I
BB4	0216000000	360000	754050	36.00000	-75.68000	MANTEO	DARE	0.9	B	7	1	H
BI1A **end91**	0400040000	354815	753321	35.80430	-75.55570	OREGIN	DARE	0.9	B	6	1	H
CB13	0601100100*	344619	762525	34.77200	-76.42400	DAVIS	CARTE	1	H	6	5	I
CB17	0602140000	344352	762651	34.73100	-76.44800	HPENPT	CARTE	1	H	6	5	I
*CB19*end89	0601100100*	344324	762803	34.72300	-76.46800	HPENPT	CARTE	0.5	B	8	5	I
CC0	0601010000	345838	761600	34.97700	-76.26700	ATLANT	CARTE	0.5	C	N	1	I
CC10	0601040200	345523	762132	34.92300	-76.35900	ATLANT	CARTE	0.5	B	X	1	I
CC11	0601020100	345659	761721	34.95000	-76.28900	ATLANT	CARTE	0.5	D	2	1	I
CC3	0801001300*	344507	764503	34.79300	-76.49800	NWPORT	CARTE	0.5	O	9	1	I
CC5	0702000200	344905	763722	34.81800	-76.62300	WILLIS	CARTE	2	O	5	1	I
CC6	0601130100	344821	762850	34.80600	-76.48100	DAVIS	CARTE	1	B	X	1	I
CC7	0601110000	344930	762728	34.82500	-76.45800	DAVIS	CARTE	1	B	X	1	I
CC9	0537030200	345524	762611	34.92300	-76.43700	LONGBY	CARTE	1.5	D	9	1	B
CFR1	1902000000	341507	775805	34.25200	-77.96800	WILMIN	BRUNSW	1.2	D	2	1	I
CFR11	1901030100	335856	775519	33.98200	-77.92200	KUREBH	BRUNSW	0.6	O	2	1	I
CFR2	1902030100	341557	775649	34.26600	-77.94700	CASTLH	NEWHAN	1.3	O	6	1	I
CFR4	1901030200	340726	775546	34.12400	-77.92900	CARABH	NEWHAN	1	O	6	1	I

Station	WaterBody	Lat	Long	LAT_dd	LONG_dd	Quad	County	Depth	Bottom Comp	Sediment Size	Alteration State	Allowed Activity
CFR5	1901030200	340744	775701	34.12900	-77.95000	CARABH	NEWHAN	3	O	6	1	I
CN1	0534110000	351036	764030	35.17642	-76.67548	VANDEM	PAMLI	1.1	H	T	2	I
CN14	0534130000	350915	764250	35.15543	-76.71405	VANDEM	PAMLI	1.4	O	X	2	I
CN3	0534050100	351144	763715	35.19443	-76.62120	JONEBY	PAMLI	1.1	B	Y	1	I
CN6	0534020000	351205	763329	35.20190	-76.55758	JONEBY	PAMLI	1.2	K	Y	1	I
CR22	0301000000	355630	754832	35.94200	-75.80900	MANNHB	DARE	0.8	D	7	1	I
CR23	0302000000	355204	754518	35.86800	-75.75500	ELAKE	DARE	0.8	D	2	1	I
CS13	0534170000	350844	764001	35.14532	-76.66680	VANDEM	PAMLI	0.9	B	X	1	I
CS2	0534200200	350852	763811	35.14762	-76.63605	VANDEM	PAMLI	0.6	C	Y	1	I
D03C	0534100100	351125	763840	35.18820	-76.64417	VANDEM	PAMLI	1.2	O	9	2	I
D5	0534210204	350818	763540	35.13537	-76.59630	JONEBY	PAMLI	0.8	B	Y	1	I
D8	0534210302	350925	763408	35.15783	-76.56710	JONEBY	PMALI	0.6	B	U	1	I
E10	0535030600	350457	763929	35.08245	-76.65780	ORIENT	PAMLI	1.1	Q	X	1	I
E15	0535031100	350633	763509	35.10932	-76.58575	BRDCK	PAMLI	1.2	Q	X	1	I
F1	0535050000	350347	763843	35.06353	-76.64548	ORIENT	PAMLI	1.5	K	9	1	I
F12	0535080300	350217	764325	35.03845	-76.72517	ORIENT	PAMLI	1	B	Y	2	I
F3N	0535060000	350237	763959	35.04347	-76.66618	ORIENT	PAMLI	0.9	H	X	2	I
FC1	0506000000	353044	755911	35.51200	-75.98600	ENGHE	HYDE	1	C	S	2	I
FC3	0509010000	352827	760029	35.47400	-76.00800	MIDTN	HYDE	0.9	C	P	2	I
G14	0535220600	345925	763433	34.99000	-76.57600	SRIVER	CARTE	1	B	X	1	I
G16	0535220200	345659	763528	34.95000	-76.59100	SRIVER	CARTE	1	B	Y	1	I
G19	0535200701	345622	763812	34.94000	-76.63700	MERRIM	CARTE	1	D	Y	1	I
G3	0535240600	345844	763025	34.97900	-76.50700	SRIVER	CARTE	1	D	O	1	I
H2	0535170000	345154	764543	34.86500	-76.76200	NWPORT	CRAVEN	1	K	Y	1	I
HAT1	0500300123	351753	753124	35.29800	-75.52300	BUXTON	DARE	0.9	B	6	1	I
HAT4	0500300111*	351435	753806	35.24300	-75.63500	HATTER	DARE	0.9	B	6	1	I
HAT8	0500300113*	351308	754229	35.21900	-75.70800	HATTER	DARE	0.8	B	7	1	I
HI15A	0500300115*	354157	753224	35.69900	-75.54000	PEAIS	DARE	0.7	B	6	1	I
J10	0537040100	345612	762423	34.93700	-76.40600	LONGBY	CARTE	1.4	O	X	1	I

Station	WaterBody	Lat	Long	LAT_dd	LONG_dd	Quad	County	Depth	Bottom Comp	Sediment Size	Alteration State	Allowed Activity
J2	0537030100	345632	762749	34.94200	-76.46400	LONGBY	CARTE	1.5	D	Y	1	I
JB1	0521040000	352328	761518	35.39100	-76.25500	BLUFPT	HYDE	0.6	D	P	2	I
KHB2	0215000000	360203	754213	36.03400	-75.70400	KHAWK	DARE	1.1	B	7	1	I
LSR1	0503020000	353727	755152	35.62400	-75.86400	LGSHPT	DARE	0.8	D	P	2	I
LSR11	0504000000	353258	755521	35.54900	-75.92300	ENGHE	HYDE	0.9	D	9	2	I
LSR3	0503030000	353605	755412	35.60100	-75.90300	ENGHE	HYDE	1.1	Q	P	1	I
LSR5	0503010000	353552	754905	35.59800	-75.81800	LGSHPT	DARE	0.9	D	S	2	I
NR1	1201030100	344522	772611	34.75600	-77.43600	JKVLN	ONSLOW	1.5	D	X	1	I
NR10	1201010100	343536	772354	34.59300	-77.39800	SNEDFY	ONSLOW	1.6	O	X	1	I
NR13	1201020104	343732	772548	34.62500	-77.43000	SNEDFY	ONSLOW	1.2	O	T	1	I
NR2	1201030100	344417	772535	34.73800	-77.42600	JKVLS	ONSLOW	1.3	O	X	1	I
NR4	1201030300	344328	772300	34.72400	-77.38300	JKVLS	ONSLOW	1.8	O	Y	1	I
NR6	1201020202	343811	771951	34.63600	-77.33100	CLEJUN	ONSLOW	1.6	O	U	1	I
OC1	0518010000	352131	760749	35.35900	-76.13000	BLUFPT	HYDE	0.8	H	S	1	I
PAR11	0528370000	351833	764700	35.30900	-76.78300	AURORA	BEAUF	1.7	O	T	2	I
PAR13	0528371203	351950	764106	35.33100	-76.68500	SSCREEK	BEAUF	1.8	B	T	2	I
PAR16	0528390101	352024	763839	35.34000	-76.64400	SSCREEK	BEAUF	1.2	B	T	5	I
PAR20	0528070200	352556	763914	35.43200	-76.65400	RANSLV	BEAUF	0.9	B	9	1	I
PAR27	0528370100	352050	764458	35.34700	-76.74900	SSCREEK	BEAUF	0.6	B	9	2	I
PAR31	0528370200	352008	764555	35.33600	-76.76500	AURORA	BEAUF	0.6	L	9	2	I
PAR7	0528350400	352243	764902	35.37900	-76.81700	BATH	BEAUF	1.7	H	T	2	I
PAR8	0528120000	352716	764905	35.45400	-76.81800	BATH	BEAUF	1.2	H	N	2	I
PAR9	0528100000	352542	764540	35.42800	-76.76100	BATH	BEAUF	1.7	K	T	2	I
PUR3	0528063803	352416	763547	35.40400	-76.59600	PAMLBH	BEAUF	1.2	B	T	2	I
PUR34	0528063501	352737	763623	35.46000	-76.60600	PAMLBH	BEAUF	1.2	B	9	2	I
PUR5	0528060107	352644	763142	35.44500	-76.52800	PAMLBH	HYDE	0.9	B	S	1	I
PUR7	0528060209	352850	763229	35.48100	-76.54100	PAMLBH	HYDE	1.5	H	S	2	I
RB1	0526070000	352630	762553	35.44200	-76.43100	SCRANT	HYDE	0.8	H	S	2	I
RB3	0526050000	352530	762601	35.42500	-76.43400	SCRANT	HYDE	0.9	B	P	1	I

Station	WaterBody	Lat	Long	LAT_dd	LONG_dd	Quad	County	Depth	Bottom Comp	Sediment Size	Alteration State	Allowed Activity
RI10	0401010000	355358	753931	35.89900	-75.65900	MANTEO	DARE	0.9	D	7	1	I
RI11	0404000000	355225	753829	35.87400	-75.64100	WANCHE	DARE	0.9	D	7	1	I
RI1-RI1A	0401020000	355445	754011	35.91200	-75.67000	MANTEO	DARE	0.9	D	7	1	I
RI6	0307000000	354912	753719	35.82000	-75.62200	WANCHE	DARE	0.6	D	7	1	I
RS2	0400000000	355036	753610	35.84300	-75.60300	OREGIN	DARE	0.9	K	1	1	I
SB3	0527010000	352345	762632	35.39600	-76.44200	SCRANT	HYDE	1.2	C	S	1	J
SB5	0527020400	352521	762645	35.42200	-76.44600	SCRANT	HYDE	0.9	H	9	1	I
SPB1	0501000000	354144	754614	35.69600	-75.77100	ENGHNE	DARE	4.6	O	P	1	H
SQB1	0522040000	352450	762125	35.41400	-76.35700	SWANQU	HYDE	0.9	C	S	2	I
SQB3	0522020000	352308	761844	35.38500	-76.31200	SWANQU	HYDE	0.9	C	S	1	I
SR1	2101000000	335720	782149	33.95600	-78.36400	HOLDBH	BRUNSW	1	O	2	1	I
SR12	2101000000	335818	782243	33.97200	-78.37900	SHALLO	BRUNSW	1.6	O	2	1	I
SR4	2101000000	335601	782144	33.93400	-78.36200	HOLDBH	BRUNSW	1.2	O	6	1	I
SR9	2101010000	335502	782137	33.91700	-78.36000	HOLDBH	BRUNSW	0.7	O	2	1	I
SSI1	1301010000	343102	772527	34.51700	-77.42400	SNEDFY	ONLSOW	1.2	O	2	1	I
SSI6	1301020000	343020	772758	34.50600	-77.46600	SPICBY	ONSLOW	1.6	O	6	1	I
SSO1	1302020000	342837	772829	34.47700	-77.47500	SPICBY	ONSLOW	0.8	O	7	1	I
SSO11	1302030000	342830	772750	34.47500	-77.46400	SPICBY	ONSLOW	0.8	O	2	1	I
UCF1	1902010103	341602	775904	34.26700	-77.98400	LELAND	BRUNSW	2	O	7	1	I
VC1	1401020000	342553	773620	34.43100	-77.60600	HOLYRD	PENDER	1	O	2	1	I
WB1	0514000000	352546	760351	35.43000	-76.06400	MIDTN	HYDE	0.8	C	S	2	I
WB3	0514030000	352449	760355	35.41400	-76.06500	MIDTN	HYDE	0.8	B	P	1	I

List of core stations for the ¾ inch trawl sampling. THE 20 FT STATIONS NO LONGER DONE. See ner.nma.nma999-9.sas.stations for most current lat/longs. (revised May 2004)

Station	WaterBody	Lat	Long	Quad	County	Depth	Bottom Comp	Sediment Size	Alteration State	Allowed Activity
3/4" net										
AB2	0528030000	352350	763020	PAMLBH	HYDE	1.7	C	P	1	J
A13	0528400000	351846	763704	LOWLND	PAMLI	4.3	O	Y	3	H
A52	0528410000	351912	763210	LOWLND	PAMLI	2.4	B	X	3	J
BB3	0216000000	355951	754142	MANTEO	DARE	2.0	B	6	3	H
BI2	0400020000	354730	753334	OREGIN	DARE	1.5	O	6	3	H
B33	0532000000	351413	763006	JONEBY	PAMLI	2.4	P	X	1	J
B42	0533000000	351355	763347	JONEBY	PAMLI	2.9	Q	M	3	J
CFR6	1901040000	340407	775543	CARABH	NEWHAN	4.3	O	9	3	B
CFR7	1901040000	340421	775605	CARABH	BRUNSW	5.5	O	9	3	B
CFR8	1901030100	340222	775517	CARABH	NEWHAN	4.3	O	7	3	B
CFR9	1901040000	340020	775625	CARABH	BRUNSW	3.7	O	6	1	B
CN8	0534030000	351237	763523	JONEBY	PAMLI	5.0	O	X	4	J
CN49	0534140000	3509.182	7643.745	PAML/VAN	PAMLI	0.7	TBD	2	1	I
CR21A	0300000000	355249	754447	MANNHB	DARE	2.1	O	6	1	H
CR22A	0301000000	355649	754831	MANNHB	DARE	1.8	O	6	1	H
D7	0534210300	350855	763430	JONEBY	PAMLI	3.4	O	X	1	J
E12	0535030000	350521	763629	BRDCK	PAMLI	3.0	P	9	3	I
FC2	0506000000	353039	755829	ENGHE	HYDE	2.6	Q	S	4	I

Station	WaterBody	Lat	Long	Quad	County	Depth	Bottom Comp	Sediment Size	Alteration State	Allowed Activity
F14	0535080000	350132	764247	ORIENT	PAMLI	2.7	B	Y	4	J
G21	0535200000	345650	764003	MERRIM	CRAVEN	3.8	A	Y	1	E
HAT2	0500300102*	351815	753312	BUXTON	DARE	2.4	B	6	3	I
HAT3	0500300111*	351555	753759	HATTER	DARE	2.8	B	6	3	I
HAT5	0500300113*	351417	754231	HATTER	DARE	2.4	B	6	3	I
HAT7	0500300106*	351740	753612	HATTER	DARE	3.4	B	6	1	H
HI13A	0500300115*	354106	753151	PEAIS	DARE	1.5	B	6	1	I
H5	0535170000	345422	764536	CHERPT	CRAVEN	2.5	M	Y	1	E
JB2	0521000000	352220	761524	GRTIS	HYDE	2.1	P	S	1	J
JB5	0521000000	352124	761448	BLUFPT	HYDE	2.6	P	9	1	J
JB7	0521000000	352006	761408	BLUFPT	HYDE	3.4	Q	9	1	H
KHB1	0215000000	360240	754205	KHAWK	DARE	1.5	B	6	1	H
LSR10	0503000000	353440	755158	LGSHPT	HYDE	3.4	P	9	1	H
LSR2	0503000000	353611	755246	ENGHE	HYDE	1.7	P	S	1	J
LSR4	0503010000	353454	754951	LGSHPT	DARE	1.8	O	S	1	J
M20	0534000000	350834	764310	VANDEM	PAMLI	2.4	O	X	3	H
M3	0534000000	351026	763905	VANDEM	PAMLI	3.7	D	X	3	H
NR11	1201010000	343334	772054	NRIVIN	ONSLOW	1.5	H	P	1	I
NR3	1201030100	344301	772513	JKVLS	ONSLOW	3.7	O	6	3	I
NR5	1201030200	344145	772504	JKVLS	ONSLOW	1.8	O	9	1	I
NR7	1201020200	343801	772228	CLEJUN	ONSLOW	1.8	O	9	1	I

Station	WaterBody	Lat	Long	Quad	County	Depth	Bottom Comp	Sediment Size	Alteration State	Allowed Activity
NR8	1201020100	343619	772348	SNEDFY	ONSLOW	5.5	O	6	3	B
ORI1	0500300104	354551	753505	OREGIN	DARE	3.7	O	6	3	H
PAR14	0528371200	352037	764138	SCREEK	BEAUF	2.7	O	9	4	J
PAR17	0528000100	352117	763841	SCREEK	BEAUF	1.6	O	8	1	H
PAR28	0528070000	352523	763947	RANSVL	BEAUF	2.6	O	9	3	J
PAR48	0528370000	351948	764537	SCREEK	BEAUF	2.7	O	9	2	J
PAR49	0528370000	352110	764344	SCREEK	BEAUF	3.1	O	9	2	J
PAR6	0528350000	352405	764905	BATH	BEAUF	3.2	O	S	2	H
PUR2	0528063800	352454	763515	PAMLBH	BEAUF	2.9	O	S	4	I
PUR22	0528060100	352544	763158	PAMLBH	HYDE	4.0	O	9	1	H
PUR33	0528060200	352758	763037	PAMLBH	HYDE	2.1	O	9	2	I
PUR4	0528060100	352559	763132	PAMLBH	HYDE	2.3	O	S	1	J
PUR6	0528060200	352827	763218	PAMLBH	HYDE	3.0	O	T	2	J
RB13	0526000000	352437	762454	SCRANT	HYDE	2.7	O	9	1	C
RB14	0526000000	352253	762541	SCRANT	HYDE	4.7	O	9	1	C
RB2	0526000000	352553	762412	SCRANT	HYDE	1.8	O	P	1	J
RI2	0401000000	355428	753939	MANTEO	DARE	2.1	O	7	3	H
RI2A	0400000000	355516	753932	MANTEO	DARE	2.1	B	6	1	H
RI3	0400000000	355427	753811	MANTEO	DARE	3.0	O	7	3	H
RI5	0404000000	355149	753805	WANCHE	DARE	1.4	O	6	1	H
RS3	0400000000	354909	753540	RKISNE	DARE	1.5	O	7	3	H

Station	WaterBody	Lat	Long	Quad	County	Depth	Bottom Comp	Sediment Size	Alteration State	Allowed Activity
RS4A	0400000000	355320	753732	RKISNE	DARE	1.5	O	7	1	H
SB2	0527020000	352405	762727	SCRANT	HYDE	2.7	C	S	3	J
SPB2	0501000000	354059	754522	ENGHNE	DARE	2.4	O	P	3	H
SQB2	0522000000	352339	762015	SWANQU	HYDE	2.5	P	S	3	J
WB2	0514000000	352537	760307	MIDTN	HYDE	1.2	Q	S	1	J

*Location code change for GIS location layer, all records revised on BDB by George Joyner on still pending

July sampling of these stations was re-started in 2004 in order to improve the JAI for spotted seatrout.

"CORE" SPECK STATIONS:

(if month 6 & 7)

	STATION ID	STATION NAME	LAT / LONGS	DISTRICT	OFFICE
1	AB1	Box Creek	352424 / 763028	P	Washington
2	B10	Long Creek	351853 / 763004	P	Washington
3	B20	Porpoise Creek	351551 / 763007	P	Washington
4	B40	Upper Jones Bay Creek	351424 / 763529	P	Washington
5	B43	Ditch Creek	351254 / 763419	P	Washington
6	BB4	Buzzard Bay	36000 / 754050	N	Wanchese
7	CN6	Dump Creek	351205 / 763329	P	Washington
8	FC1	Far Creek	353044 / 755911	P	Washington
9	FC3	Middletown Creek	352827 / 760029	P	Washington
10	HAT1	Avon - Buxton grass flats	351753 / 753124	N	Wanchese
11	HAT4	Frisco grass flats	351435 / 753806	N	Wanchese
12	HI15A	Pea Island grass flats	354157 / 753224	N	Wanchese
13	JB1	Northwest Creek	352328 / 731518	P	Washington
14	KHB2	Kitty Hawk Creek	360203 / 754213	N	Wanchese
15	LSR1	Deep Creek	353727 / 755152	P	Washington
16	LSR3	Broad Creek	353605 / 755412	P	Washington
17	LSR5	Pains Bay	353552 / 754905	P	Washington
18	OC1	Harbor Creek	352131 / 760749	P	Washington
19	PUR34	Spring Creek	352737 / 763623	P	Washington
20	PUR5	Warner Creek	352644 / 763142	P	Washington
21	RB1	Unnamed Western Tributary	352630 / 762553	P	Washington
22	RB3	Tooley Creek	352530 / 762601	P	Washington
23	SB3	Striking Bay	352345 / 762632	P	Washington
24	SQB1	Shingle Creek	352450 / 762125	P	Washington
25	SQB3	Oyster Creek	352308 / 761844	P	Washington
26	WB1	Wysocking Bay	352546 / 760351	P	Washington
27	WB3	Douglas Bay	352449 / 760355	P	Washington

Pilot SAV stations used with program 637 Updated in 2008

Station	Location	Description	Office
WB3	0514030000	DOUGLAS BAY	Washington
AB1	0528030300	BOX CREEK	Washington
PUR34	0528063501	SPRING CREEK	Washington
PAR20	0528070200	EAST FORK	Washington
PAR27	0528370100	TOOLEY CREEK	Washington
CN6	0534020000	DUMP CREEK	Washington
D03C	0534100100	LONG CREEK	Washington
CN14	0534130000	CHAPEL CREEK	Washington
F12	0535080300	KERSHAW CREEK	Washington
LSR5	0503010000	PAINS BAY	Washington
LSR1	0503020000	DEEP CREEK	Washington
LSR3	0503030000	BROAD CREEK	Washington
FC1	0506000000	FAR CREEK	Washington
FC3	0509010000	MIDDLETOWN CREEK	Washington
WB1	0514000000	WYSOCKING BAY	Washington
OC1	0518010000	HARBOR CREEK	Washington
JB1	0521040000	NORTHWEST CREEK	Washington
SQB3	0522020000	OYSTER CREEK	Washington
SQB1	0522040000	SHINGLE CREEK	Washington
RB3	0526050000	TOOLEY CREEK	Washington
RB1	0526070000	UNNAMED WESTERN TRIBUTARY	Washington
SB3	0527010000	STRIKING BAY	Washington
PUR5	0528060107	WARNER CREEK	Washington
PUR7	0528060209	WOOD CREEK	Washington
PUR3	0528063803	BRADLEY GUT	Washington
PAR16	0528390101	EAST PRONG	Washington
A2	0528400201	BETTY CREEK(DOG CREEK)	Washington
A12	0528400702	MALLARD CREEK	Washington
A58	0528410300	CLARK CREEK	Washington
B10	0529010000	LONG CREEK	Washington
B20	0531010000	PORPOISE CREEK	Washington
B43	0533040000	DITCH CREEK	Washington
B40	0533050000	UPPER JONES BAY CREEK	Washington
CN3	0534050100	RIGGS CREEK	Washington
CN1	0534110000	SMITH CREEK	Washington
CS13	0534170000	MOORE CREEK	Washington
CS2	0534200200	SIMPSON CREEK	Washington
D5	0534210204	BRYAN CREEK	Washington
KHB2		KITTY HAWK BAY	Columbia
BB4		BUZZARD BAY	Columbia

RS2		EAST SPOIL ISLAND	Columbia
HI151		JACK SHOAL	Columbia
HAT1		AVON/BUXTON GRASS FLAT	Columbia
HAT4		FRISCO GRASS FLAT	Columbia
HAT8		OFF ODENS DOCK	Columbia
CC10	0601040200	E. THOROFARE CREEK	Morehead City
CB17	0602140000	HORSEPEN BAY (YELLOW SHOAL)	Morehead City
CB13	0601100100	GREAT ISLAND BAY	Morehead City
CC0	0601010000	HOG ISLAND (CEDAR ISLAND BAY)	Morehead City
CC21A	0908010000	TAYLOR BAY	Morehead City

HATTERAS / OCRACOKE CREEKS Station #'s and waterbody code	Depth	Sediment Size	Alter State	Allow Fish	Bottom Comp	LAT	LONG
HAT9 0500300101 Slash Creek #1	1.4	2	1	I	D	3513.10	7541.08
HAT10 0500300101 Slash Creek #2	0.9	7	1	I	D	3513.19	7540.93
HAT11 0500300101 behind Pelican's Roost	0.6	9	1	I	D	3513.01	7540.83
HAT12 0500300101 behind Quarterdeck Restaurant	0.8	2	1	I	D	3513.78	7538.13
HAT13 0500300101 up the creek from Frisco Rod & Gun	0.8	7	1	I	D	3514.01	7537.90
OI14 0500300201 Southward Creek; 1st creek past Oyster Cr.	0.8	8	1	I	D	3506.90	7557.96
OI15 0500300201 Dead Tree Creek; Hwy Creek #1	0.8	?	1	I	O	3508.10	7554.67
OI16 0500300201 Hwy Creek #2	1.1	2	1	I	O	3508.15	7554.53

B. Mapping

Station locations are maintained as part of the Division GIS program and are contained in the Program 120 GIS coverage that is maintained on the DMF LAN K drive. Station coverage is a component of the BIO-GIS Link Project funded as part of the F-75 federal aid project. IT GIS staff may be contacted for maps and other assistance with GIS products.

IV. Reference Material

Subject: Re: Documentation for Habitat & Water Quality Monitoring
From: Trish Murphey <Trish.Murphey@ncmail.net>
Date: Wed, 18 Jun 2008 09:01:34 -0400
To: Margaret Tyndall <margaret.tyndall@ncmail.net>
CC: Adam Kenyon <Adam.Kenyon@ncmail.net>, Beth Burns <Beth.Burns@ncmail.net>, charlton godwin <charlton.godwin@ncmail.net>, Clay Caroon <Clay.Caroon@ncmail.net>, Eric <Eric.Fitzpatrick@ncmail.net>, John Schoolfield <John.Schoolfield@ncmail.net>, Kathy Rawls <Kathy.Rawls@ncmail.net>, Katy West <Katy.West@ncmail.net>, Lee Paramore <Lee.Paramore@ncmail.net>, michael loeffler <michael.loeffler@ncmail.net>, Sean McKenna <Sean.McKenna@ncmail.net>, Stopher Slade <Stopher.Slade@ncmail.net>, Tina Moore <Tina.Moore@ncmail.net>, Craig Hardy <Craig.Hardy@NCMail.net>, Fritz Rohde <Fritz.Rohde@ncmail.net>, Mike Marshall <Mike.Marshall@ncmail.net>, Rich Carpenter <Rich.Carpenter@ncmail.net>, Sara Winslow <Sara.Winslow@ncmail.net>, Anne Deaton <Anne.Deaton@ncmail.net>

Hi Everyone,
Just want to remind you that this document provides guidance to you for updating your program documentations (those listed on the front) for the habitat and water quality sampling in those programs. Let me know if you have any questions.

Thanks
Trish

Margaret Tyndall wrote:

> Hi Gang!
>
> Just a short note to let you know that the documentation for Habitat information is now on the shared drive. It is in the same folder as active/approved documentation. Once you click on the approved folder you should see it. If you have a problem finding it or have questions please give me a call at 252-808-8110.
>
> Have a great evening!
>
> Mag

Subject:
Habitat data collection
From:
Trish Murphey <Trish.Murphey@ncmail.net>
Date:
Fri, 02 May 2008 12:04:00 -0400
To:
Kathy Rawls <Kathy.Rawls@ncmail.net>, michael loeffler <michael.loeffler@ncmail.net>, Katy West <Katy.West@ncmail.net>, Lee Paramore <Lee.Paramore@ncmail.net>, Eric <Eric.Fitzpatrick@ncmail.net>, Sean McKenna <Sean.McKenna@ncmail.net>, Clay Caroon <Clay.Caroon@ncmail.net>, Greg Allen <Greg.Allen@ncmail.net>, Craig Hardy <Craig.Hardy@ncmail.net>, Tina Moore <Tina.Moore@ncmail.net>, John Schoolfield <John.Schoolfield@ncmail.net>, Stopher <Stopher.Slade@ncmail.net>, Chris Batsavage <Chris.Batsavage@ncmail.net>, Lynn Henry <Lynn.Henry@ncmail.net>, Beth Burns <Beth.Burns@ncmail.net>, Charlton Godwin <Charlton.Godwin@ncmail.net>, Chip Collier <Chip.Collier@ncmail.net>
CC:
Anne Deaton <Anne.Deaton@ncmail.net>, Scott Chappell <Scott.Chappell@NCMail.Net>, Brian Conrad <brian.conrad@ncmail.net>, Benjamin Jones <Benjamin.C.Jones@NCMail.net>, Michelle Duval <Michelle.Duval@ncmail.net>, David Taylor <david.l.taylor@ncmail.net>, Mike Marshall <Mike.Marshall@ncmail.net>, Sara Winslow <Sara.Winslow@ncmail.net>, Fritz Rohde <Fritz.Rohde@ncmail.net>, Rich Carpenter <Rich.Carpenter@ncmail.net>, Louis Daniel <Louis.Daniel@ncmail.net>, Dee Lupton <Dee.Lupton@ncmail.net>, Margaret Tyndall <Margaret.Tyndall@ncmail.net>, George Joyner <George.Joyner@ncmail.net>

Hi Everyone,
The final habitat documentation is now available along with the final Format A that is attached. Maggie has both documents and will be combining them and placing it in the most appropriate place within the Bio_Pgms folder.

The documentation is also located at F:\SHARED\DMF\BRT\Habitat Program Documentation.doc as well as the format A.

At this point, it looks like PGM 100, and 120 will be doing some pilot SAV sampling. PGM 120 will be taking sediment samples for future quantification. PGM 100, 120, 150, and 160 will be doing some pilot Shoreline sampling. The rest of the programs involved should be recording variables listed in the format A unless other wise noted in the comments that are program specific.

Data sheets are being prepared by George and should be available to you next week. Everyone will be using these sheets because a lot of the variables are located in record type 8.

If you have any questions please contact Katy or myself. As you sample, let me know any feedback or concerns that come up.

If I left anyone out of this email, please forward it on. I do not have the new guy in Washington on this email.

A

MEMORANDUM

TO: Louis Daniel

THROUGH: Katy West

FROM: Gregory Judy

DATE: 14 June 1996

SUBJECT: Program 120 Trawls

The specifications that I have for the 10 ½ ft trawl used in program 120 sampling are attached to this memo. The diagrams and specifications were first distributed to the technical staff in 1978 by Roma Salter. Mr. Salter was the Captain of the RV Rose Bay and made all, or most, of the Division's nets. When Captain Salter retired, Robert Guthrie, the former Captain of the Dan Moore and Carolina Coast, made the trawls needed by DMF. Upon his retirement, the task fell to Mike Guthrie and Lee Lawrence.

If there is a question about net specifications, Mike and Lee should be contacted first. If the question cannot be resolved, then I suggest a meeting be called that would include Morris Allison, Jack Guthrie, Mike Guthrie, Lee Lawrence, myself, and any biologists that are interested.

Jack Guthrie called me on 6/13/96 to discuss some discrepancies he had discovered concerning tickler chain settings, tailbag circumference and lengths, and extensions In some nets. The tickler chains are supposed to be set halfway between the headrope length and the footrope length. This computes to approximately 12 inches shorter than the footrope. The tailbag circumference should be the same as the body of the trawl at the aft end or the cod end. The net diagrams I have show an aft end circumference of 100 meshes of ½" stretched mesh (1/4" bar).

I have never seen a specification on the length of the tailbag. Whenever I have to replace one that has become rotten, I make it 5 or 6 ft long. I have never seen a specification on extensions in the program 120 nets. I, personally, feel that considering the small size of the fish we are trying to catch, extensions are not needed; as long as a 5 ft, or preferably, a 6 ft tailbag is used.

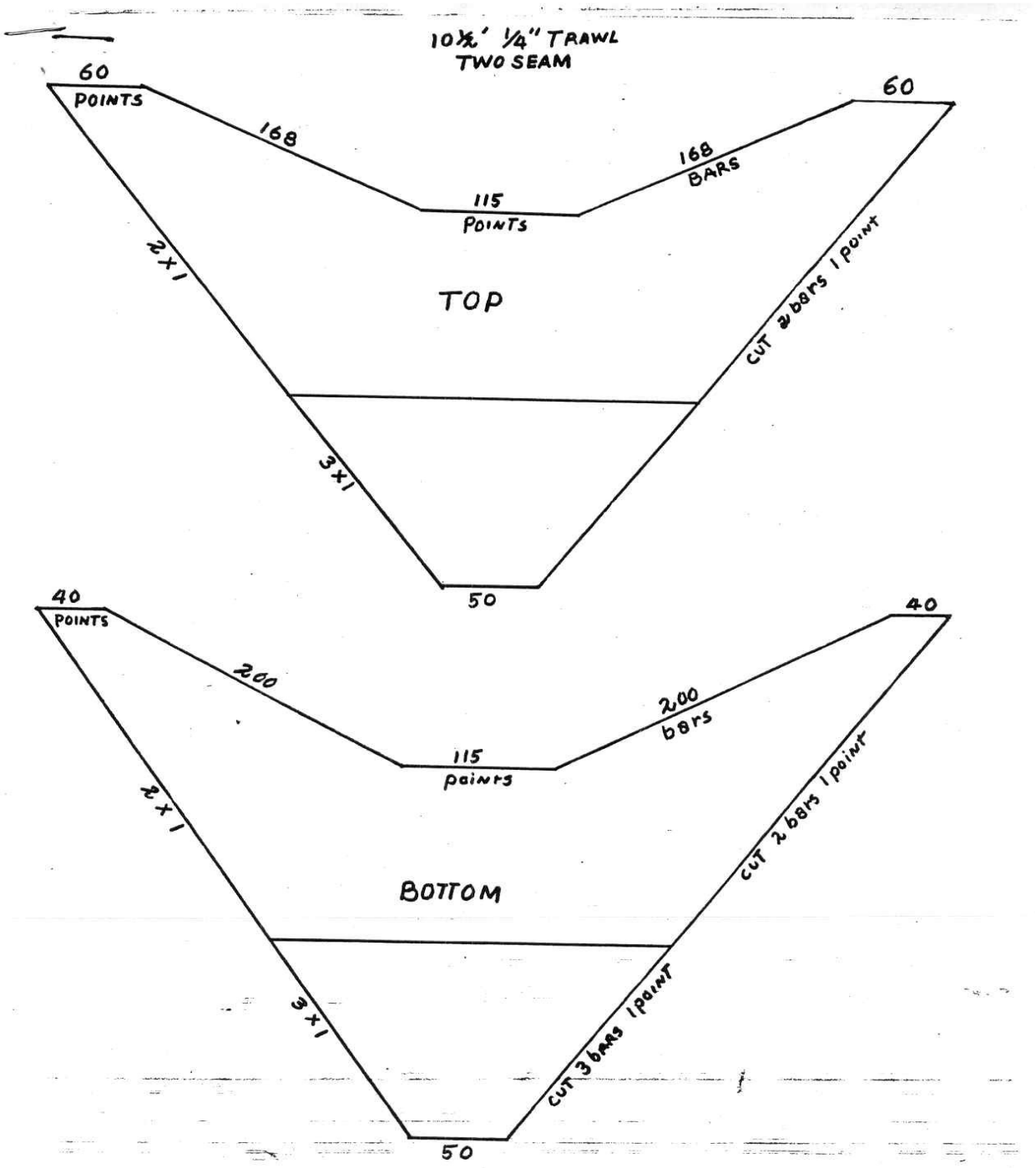
To determine the need of an extension, we could very easily run a series of tests using side by side tows on standard sampling boats.

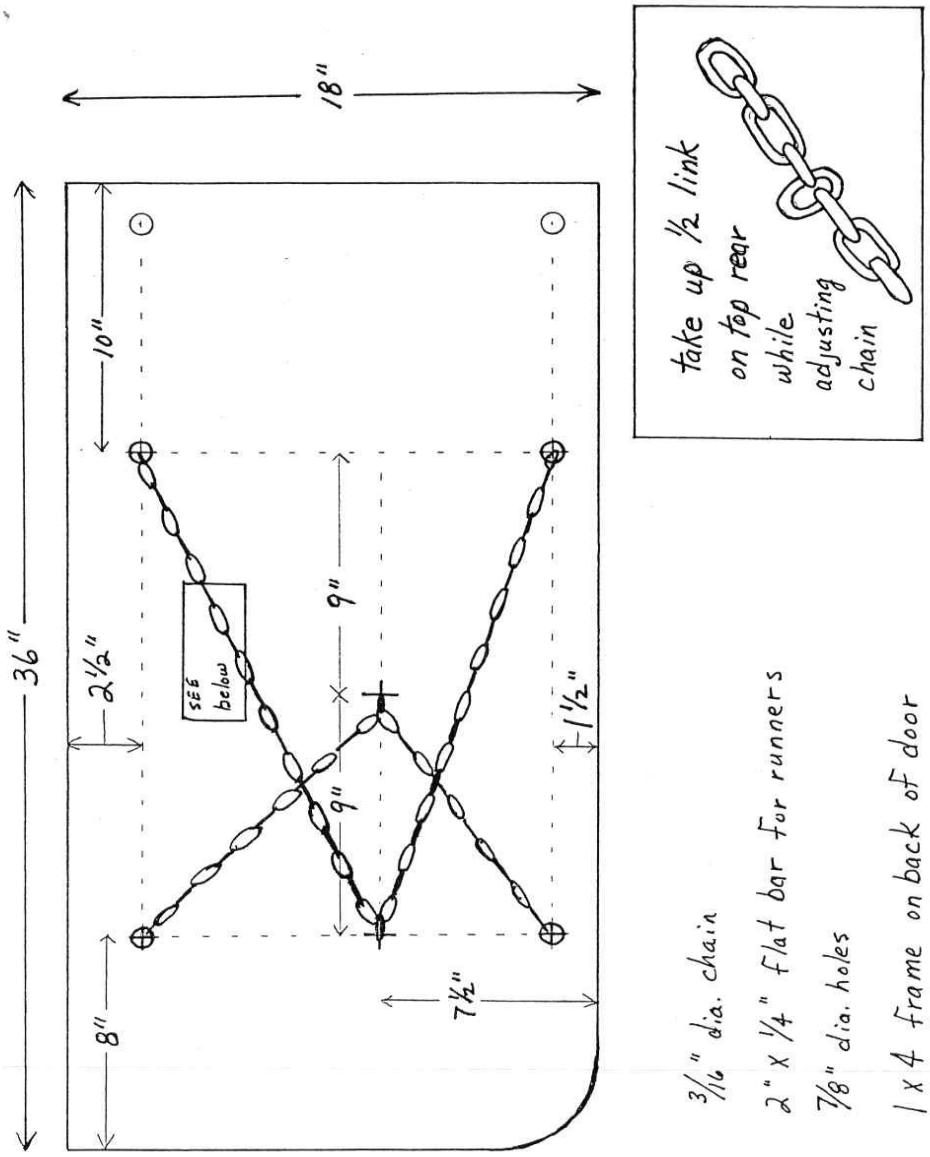
/pc

cc: Jess Hawkins
District Managers
Biologist Supervisors

10 ½ ft Headrope, 2-Seam Construction
1/4" Bar Mesh in Body of Net, 1/8" Knot-less Tailbag

Bars are hung straight in the lines - 15 in a 4 inch tie - skipping one under each tie knot.
Points are hung 12 in each 4 inch tie
Points at the headlines are hung 12 in a 3 inch tie
To chain, put 3 loops of 3/16 chain on each wing
2 loops at the corner where the bars and points meet
1 loop in the center - there are 13 links of chain to each loop - 13 links are hung in the distance of 10
Use 6 thread twine for sewing and 12 thread twine for hanging
One 6 inch float in center of top or two 3x4 net floats
Trawling speed is calibrated to cover 75 yards in one minute (2.25 knots)
Towing lines are 60 ft long


10½' ¼" TRAWL
TWO SEAM
60
POINTS
168
115
POINTS
168
BARS
60
2 X 1
TOP
CUT 2 BARS 1 POINT
3 X 1
50
40
POINTS
200
115
POINTS
200
BARS
40
2 X 1
BOTTOM
CUT 2 BARS 1 POINT
3 X 1
CUT 3 BARS 1 POINT
50


18"
36"
10"
2½"
8"
9"
9"
7½"
1½"
see below
take up ½ link on top rear while adjusting chain
3/16" dia. chain
2" x ¼" flat bar for runners
7/8" dia. holes
1 x 4 frame on back of door

M E M O R A N D U M

TO: Connell Purvis and Dennis Spitzbergen

FROM: Clifton Harvell, Manley Gaskill, Darrell Mumford, Paul Moore

SUBJECT: Standardized Trawling

DATE: April 3, 1978

On Thursday March 30, 1978 Darrell Mumford, Clifton Harvell, Manley Gaskill and Paul Moore met at Hobucken, N.C. to set a standard for sampling with trawl gear. The 1/4" and 3/4" trawl have both been constructed to a standard size. What we accomplished at this meeting was to set a standard towing speed (based on RPM's) and distance traveled in 1 minute of elasped time.

We first used the 20 ft. McKee craft with a 135 Johnson motor as a model boat. We took the 1/4 " trawl and put it overboard. When the doors had spread the net fully, that spot was marked and the time was started. The McKee pulled the 1/4" trawl at 2300 RPM's. After 1 minute the boat was stopped and the trawl doors were marked again. Then the 18 ft. Glassmaster with a 115 Johnson motor was used. The 1/4" trawl was put overboard, fully spread and when the doors were at the starting point, the time was started. The Glassmaster was set at 2050 RPM's to pull the 1/4" trawl. After 1 minute the boat stopped and the doors were with in 3 ft. of the ending mark. When the distance between the 2 points was measured, it came to 75 yards. We feel that 1 yard difference at 75 yards is not a bad standard.

The same procedure was used with the 3/4" trawl. The McKee pulled this net at 2800 RPM's and the Glassmaster pulled the same distance, in 1 minute, at 2400 RPM's. The distance for both boats towing the 3/4" trawl at the proper RPM is 77 yards.

A question was asked, if the length of tow lines were different would it effect the distance traveled. After the standard was set up, we shortened the tow lines on the 1/4" trawl, towed for 1 minute, and found no difference in the distance.

Two other things to be concerned about to assure that this standard of trawling is kept as accurate as possible are: (1) keep outboards running in proper order,and (2) the same propeller be used that was used to set up this standard.

13

MEMORANDUM

TO: Mike Tangedal
Teresa Gillikin
Juvenile Biologist

FROM: Jim Francesconi

DATE: July 24, 1992

SUBJECT: PROGRAM 120 DOCUMENTATION AND CODING: Use of variable field #2 for core stations sampled for index and non-index purposes.

This year the Morehead City office performed site specific juvenile sampling due to a marina proposal. Bi-monthly sampling started in March. Along with the one new station, the original station in the creek and two core stations were sampled bi-monthly.

The bi-monthly sampling will create a problem with the annual recruitment indices. One sample, per station, per month is used to calculate these indices. Separation of the index sampling from special needs sampling of core stations is needed if sampling occurs more than once per month. An approach is suggested by David Moye in a March 21, 1990 memo on core stations (attached). The memo suggest using variable field #1 for distinguishing between core stations and critical habitat stations.

However, variable field #1 is used by the Northern District for conductivity. This use is documented in Program 120 documentation. Variable field #2 which is used for barometric pressure is the next choice for a distinguishing field. A check of this field showed that it was used 45 times between 1982 and 1989. It was used nine times in 1982 and 33 times in 1983 for barometric pressure and used for something other than barometric pressure once each year in 1987 through 1989. Variable field #2 was not used 33,821 times. This indicates that a change in use of variable field #2 is acceptable.

Therefore, I am requesting that variable field #2 is filled with a one (1) for all core stations when they are sampled for juvenile recruitment indices. Since most of the Program 120 data has been turned in for this year, I will work with Data Management in making the needed changes in the mainframe for this year.

In the future, additional codes may be applied for variable field #2.

cc: Linda Mercer
Paul Phalen

JF/sh

MEMO TO: Juvenile Biologists

FROM: David Moye

DATE: March 21, 1990

SUBJECT: Program 120 Core Stations

During the bio-tech meeting in February, it was decided that program 120 sampling would be cut back to the months of May and June. A set of core stations was defined from which long term data will continue to be collected and juvenile indices will be calculated. These core stations are listed below and are divided by districts. Additional stations are left to the needs of each district. It is anticipated that critical habitat designation will facilitate the need for additional stations on a time limited basis. In order to distinguish between core stations and critical habitat stations, use variable field #1 on the data sheet as follows:

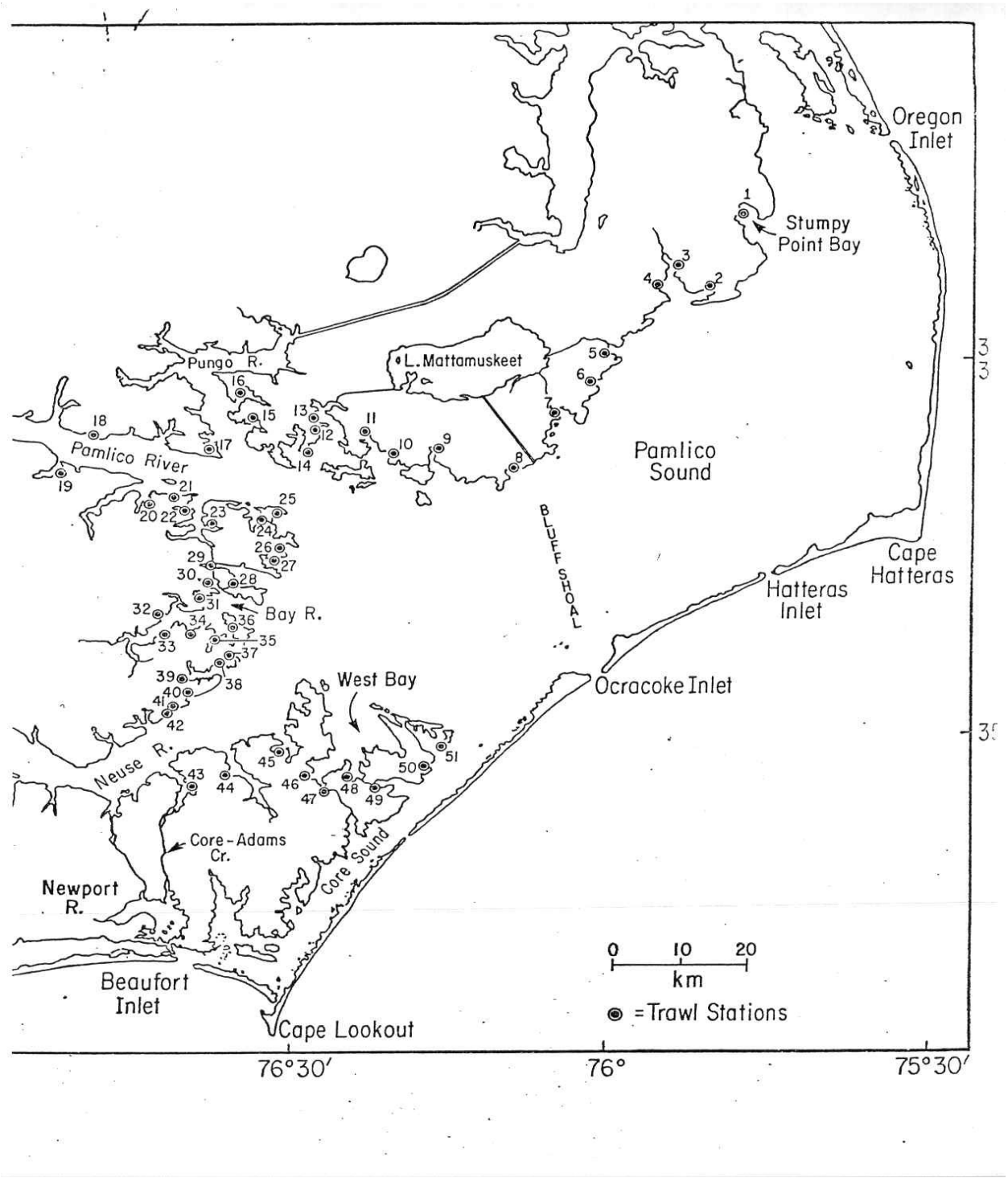
Variable Field #1
Purpose of sample:
1 - core stations (juvenile index)

Core Stations

District	Stations
Elizabeth City	
Manteo	SPB1, KHB2, BB4, CR22, CR23, RI6, RS2, RI10, RI1, RI11, HAT1, HAT4, BI1A, HAT8, HI15A
Washington	AB1, A12, A2, A58, B10, B20, B40, B43, CN1, CN14, CN3, CS13, CS2, D5, D8, E10, E15, FC1, FC3, F1, F12, F3N, CN6, JB1, LSR1, LSR3, LSR5, OC1, PAR11, PAR13, PAR16, PAR7, PAR8, PAR9, PUR3, PUR5, PUR7, RB1, RB3, SB3, SQB1, SQB3, WB1, WB3, SB5, PAR20, LSR11, PAR31, D03C, PAR27, PUR34
Morehead City	CC10, CC11, CC3, CC5, CC6, CC7, CC9, G19, G3, H2, J10, J2, G16, G14, 46, CB19, CB13, CB17
Wilmington	CFR11, CFR1, CFR2, CFR4, CFR5, NR10, NR1, NR13, NR2, NR4, NR6, SSI1, SSO1, VC1, SSI6, SSO11, UCF1, SR1, SR12, SR4, SR9

cc: Paul Phalen
Biologist Supervisors

Station number	DMF station name	Station number	DMF station name
1	SPB1	26	B20
2	LSR5	27	B30
3	LSR1	28	B43
4	LSR3	29	B40
5	FC1	30	CN5
6	FC3	31	CN3
7	WB1	32	CN1
8	OC1	33	CS13
9	JB1	34	CS2
10	SQB3	35	D5
11	SQB1	36	D8
12	RB3	37	E3
13	RB1	38	E15
14	SB3	39	E10
15	PUR5	40	F1
16	PUR7	41	F3N
17	PUR3	42	F3D
18	PAR9	43	G19
19	PAR7	44	G16
20	PAR13	45	G3
21	PAR16	46	J2
22	A2	47	CC9
23	A12	48	J10
24	A58	49	CC10
25	B1D	50	CC11
		51	CC0


Oregon Inlet
Stumpy Point Bay
Pungo R.
L. Mattamuskeet
Pamlico River
Pamlico Sound
BUCK SHOAL
Cape Hatteras
Hatteras Inlet
Bay R.
West Bay
Ocracoke Inlet
Neuse R.
Core-Adams Cr.
Core Sound
Newport R.
Beaufort Inlet
Cape Lookout
0 10 20
km
= Trawl Stations
76°30′
76°
75°30′

ıble 2. Sampling dates and physicochemical characteristics of stations surrounding Pamlico Sound, N.C. For sediment size classification cs = course silt, cl = clay, and f = fine sand. D = distance from nearest inlet (see footnote for inlet) in kilometers.

).	Location	Sample 1981	Dates 1982	Mean bottom salinity[1] ±1SE of mean 1981	1982	Mean depth (m)	D	Mean sediment parameters: Size $1^0/2^0$	Total N (%)	Total C (%)	C/N Ratio	Ash free dry wt basis N (%)	Ash free dry wt basis C (%)	Organic matter (%)	No. cores
1.	Stumpy Point Bay	Mar-Nov	Apr-Nov Jan-Feb*	15.5±1.2	14.9±0.8	3.7	26[a]	cs/cs	0.45	9.96	22.04	2.32	51.41	20.00	3
2.	Pains Bay	Mar-Nov	Mar-Nov Jan-Feb*	15.3±1.3	13.8±1.4	0.9	46[b]	cs/f	0.47	9.02	19.20	2.12	40.77	22.02	3
3.	Deep Cr.	Mar-Nov	Mar-Nov Jan-Feb*	16.6±1.7	14.5±0.9	0.8	52[b]	cs/cs	0.32	4.97	15.70	2.33	36.51	13.66	3
4.	Broad Cr.	Mar-Nov	Mar-Nov Jan-Feb*	14.9±1.4	15.0±0.7	1.1	50[b]	cs/cs	0.46	6.96	15.23	2.40	36.45	19.09	3
5.	Far Cr.	Mar-Nov	Mar-Nov Jan-Feb*	19.6±1.1	17.1±0.7	1.0	44[b]	cs/f	0.28	3.37	12.42	2.53	31.31	10.67	3
6.	Middletown Cr.	Apr-Nov	Mar-Nov Jan-Feb*	16.6±1.6	17.5±0.7	0.9	41[b]	cs/cs	0.29	3.93	14.35	2.20	30.31	12.97	3
7.	Wysocking Bay	Apr-Nov	Mar-Nov Jan-Feb*	16.4±1.4	15.6±1.3	0.8	39[b]	cs/f	0.24	4.44	18.67	2.19	40.64	10.91	3
8.	East Bluff Bay	Apr-Nov	Mar-Nov Jan-Feb*	19.1±0.8	16.9±0.8	0.8	35[c]	cs/f	0.06	1.57	20.71	2.01	29.30	4.23	3
9.	Juniper Bay	Mar-Nov	Mar-Nov Jan-Feb*	15.9±1.1	14.9±0.8	1.2	43[c]	cs/cs	0.75	12.27	16.47	2.82	46.45	26.42	1
0.	Oyster Cr.	Mar-Nov	Apr-Nov Jan-Mar*	16.0±1.4	14.8±0.7	0.9	48[c]	cs/f	0.41	5.89	14.37	2.86	41.06	14.35	1
1.	Swanquarter Bay	Mar-Nov	Mar-Nov Jan-Feb*	16.4±1.2	13.8±0.7	0.9	52[c]	cs/f	0.76	12.34	16.23	2.82	45.83	26.92	1
2.	Tooley Cr.	Mar-Nov	Mar-Nov Jan-Feb*	16.1±0.7	13.8±1.0	0.9	61[c]	cs/cs	0.31	3.43	11.29	2.87	32.42	10.56	3
13.	Rose Bay	Mar-Nov	Mar-Nov Jan-Feb*	14.6±1.3	12.7±1.1	0.8	63[c]	cs/f	0.33	4.09	12.57	3.07	38.65	10.57	1
14.	Striking Bay	Mar-Nov (No Aug)	Mar-Nov Jan-Feb*	17.2±1.0	14.1±0.8	1.2	57[c]	cs/f	0.01	0.69	19.88	0.53	29.64	2.31	3
15.	Warner Cr.	Mar-Nov	Mar-Oct Jan-Feb*	14.6±2.3	11.0±0.5	0.9	70[c]	cs/cl	0.39	5.50	14.71	2.47	34.86	15.74	3
16.	Wood Cr.	Mar-Nov	Mar-Oct Jan-Feb*	15.6±0.8	10.0±0.4	1.5	74[c]	cs/f	0.49	5.80	11.97	3.42	40.99	14.34	3
17.	Wright Cr.	Mar-Nov Dec*	Mar-Oct Jan-Feb*	15.7±0.8	10.7±0.7	1.2	69[c]	cs/cl	0.54	6.27	11.57	3.01	34.79	18.04	3
18.	Mixon Cr.	Mar-Nov Dec*	Mar-Oct Jan-Feb*	12.5±0.9	7.1±0.7	1.7	93[c]	cs/cl	0.79	10.98	13.94	3.22	44.82	24.45	3

ble 2. (continued).

Location	Sample 1981	Dates 1982	Mean bottom salinity +ISE of mean 1981	1982	Mean depth (m)	D	Mean sediment parameters Size $\phi_{/2\phi}$	Total N (%)	Total C (%)	C/N Ratio	Ash free dry wt basis N (%)	C (%)	Organic matter (%)	No. cores
Porter Cr.	Mar-Nov (No Jun) Dec*	Mar-Oct Jan-Feb*	12.3±1.1	5.7±0.8	1.7	81[c]	cs/cl	0.56	6.56	11.81	3.06	36.14	18.15	3
Muddy Cr.	Mar-Nov Dec*	Mar-Oct Jan-Feb*	13.2±1.0	8.3±0.7	1.8	74[c]	cs/cl	0.73	8.94	12.34	3.19	39.38	22.72	3
East Prong	Mar-Nov Dec*	Mar-Oct Jan-Feb*	12.3±1.9	8.9±0.7	1.2	70[c]	cs/cl	0.34	4.40	13.45	2.34	34.58	13.90	3
Betty Cr.	Mar-Nov Dec*	Mar-Oct	16.3±0.9	10.4±0.7	1.0	69[c]	cs/cl	0.44	4.92	12.00	2.66	31.11	15.40	3
Hallard Cr.	Mar-Nov	Mar-Oct	16.0±0.8	11.8±0.9	1.3	70[c]	f/cs	0.27	3.79	14.12	2.73	38.45	9.85	3
Clark Cr.	Mar-Nov	Mar-Oct	16.0±0.8	12.2±0.6	1.4	57[c]	cl/f	0.54	7.50	13.83	2.85	36.53	20.42	3
Long Cr.	Mar-Nov	Mar-Nov	18.0±0.5	13.6±0.9	1.2	56[c]	cl/f	0.56	6.90	12.30	3.14	38.59	17.82	3
Porpoise Cr.	Mar-Nov	Mar-Nov	18.4±0.7	13.9±0.7	1.2	52[c]	cl/cs	0.46	5.78	12.71	2.83	36.00	16.11	3
Little Oyster Cr.	Mar-Nov	Mar-Nov	18.8±0.5	14.7±0.7	1.2	52[c]	cs/cs	0.25	3.13	12.30	2.79	34.40	9.10	3
Ditch Cr.	Mar-Nov	Mar-Nov	18.3±0.6	13.8±0.6	1.2	54[c]	cl/f	0.57	6.77	11.99	2.98	35.66	19.00	3
Head Jones Bay	Mar-Nov	Mar-Oct	17.3±0.7	12.5±1.2	1.1	57[c]	cl/f	0.71	9.65	13.65	2.71	36.92	26.14	3
Gale Cr.	Jan-Dec	Jan-Oct	17.6±0.6	14.4±1.0	1.8	57[c]	cl/cs	0.50	6.65	13.46	2.72	36.58	18.47	3
Riggs Cr.	Jan-Dec	Feb-Nov Jan*	17.1±1.6	15.4±0.8	1.1	57[c]	cs/cs	0.25	3.18	13.62	2.20	29.39	10.93	6
Smith Cr.	Jan-Dec	Feb-Nov (No Jul) Jan*	16.1±1.6	14.5±0.8	0.9	67[c]	cs/cs	0.51	6.37	12.55	2.44	30.56	20.87	6
Moore Cr.	Jan-Dec	Feb-Nov Jan*	15.9±1.6	13.2±0.9	0.9	65[c]	cs/f	0.71	9.22	13.05	2.79	36.39	25.35	6
Simpson Cr.	Jan-Dec	Feb-Nov Jan*	16.2±1.9	13.6±0.9	0.9	61[c]	cs/cs	0.45	5.73	12.81	2.42	30.91	18.57	6
Bryan Cr.	Jan-Nov	Jan-Oct	17.2±1.7	13.8±1.1	1.2	57[c]	cl/f	0.24	3.24	15.81	3.00	45.20	8.18	4
Dipping Vat Cr.	Jan-Dec	Jan-Oct	17.9±1.1	13.6±1.1	0.9	57[c]	cl/cs	0.31	4.18	14.43	2.67	37.65	11.30	4
Swan Cr.	Mar-Nov	Mar-Nov	17.1±0.7	12.7±1.4	1.2	52[c]	cl/f	0.36	5.05	13.86	2.53	35.02	14.42	3
Green Cr.	Mar-Nov	Mar-Oct	16.7±0.7	12.6±1.4	1.2	56[c]	cl/f	0.49	5.94	12.08	2.83	34.18	17.40	3
Head Broad Cr.	Mar-Nov	Mar-Oct	16.3±0.8	11.4±1.4	1.1	59[c]	cl/f	0.73	11.24	15.57	2.70	41.81	26.78	3

ıble 2. (continued).

).	Location	Sample Dates 1981	1982	Mean bottom salinity† ±1SE of mean 1981	1982	Mean depth (m)	D	Mean sediment parameters Size 10/20	Total N (%)	Total C (%)	C/N Ratio	Ash free dry wt basis N (%)	C (%)	Organic matter (%)	No. cores
0.	Orchard Cr.	Mar-Nov	Mar-Nov	15.9±0.7	12.7±1.1	1.2	44[d]	cl/f	0.38	4.57	12.09	2.57	30.96	14.76	3
1.	Pierce Cr.	Mar-Nov	Mar-Nov	16.7±0.7	12.3±1.2	0.9	43[d]	cl/f	0.25	4.06	18.00	2.11	34.57	11.70	3
2.	Pierce Cr.	Mar-Nov	Mar-Nov	15.6±0.6	12.1±1.2	2.0	43[d]	cl/cs	0.44	4.66	10.62	2.70	28.52	16.24	3
3.	Jonaquin Cr.	Mar-Nov	Mar-Nov	16.8±0.6	11.9±1.4	1.2	30[d]	cl/cs	0.76	9.16	12.13	3.23	39.05	23.44	2
4.	Big Cr.	Mar-Nov	Mar-Oct	15.7±0.6	11.8±1.5	1.5	50[d]	cl/cs	0.63	8.52	13.60	2.95	40.14	21.25	3
5.	Parson's Cr.	Mar-Nov	Mar-Oct	16.5±1.2	14.3±1.3	1.4	56[d]	cs/cs	0.47	6.16	13.17	2.67	35.27	17.71	3
6.	Fur Cr.	Mar-Nov	Mar-Oct	18.7±1.4	16.5±1.2	1.6	48[c]	cl/f	0.58	8.54	14.68	2.69	39.49	21.65	3
7.	Golden Cr.	Mar-Nov	Mar-Oct	24.5±2.4	16.5±2.2	2.1	50[c]	cl/f	0.30	6.17	20.69	2.17	44.82	13.76	3
8.	Cudduggen Cr.	Mar-Nov	Mar-Oct	23.6±2.2	16.5±1.2	1.4	46[c]	cs/f	0.23	3.43	15.36	2.62	40.08	8.90	6
9.	Merkle Hammock Cr.	Mar-Nov	Mar-Oct	28.6±1.4	24.1±1.5	1.1	41[c]	cs/f	0.17	2.44	15.36	2.65	39.71	6.15	6
0.	Southwest Prong	Mar-Nov	Mar-Oct	27.8±1.4	22.6±2.0	0.8	33[c]	——	0.89	16.44	18.45	2.63	48.43	33.56	6
1.	Hog Is.	Mar-Nov (No Apr)	Mar-Oct	28.0±1.9	22.3±2.3	1.2	30[c]	f/f	0.01	0.22	13.67	0.83	21.40	1.05	6

Environmental data only.

Mean salinity based on Mar-Oct data.

Oregon Inlet

Hatteras Inlet

Ocracoke Inlet

Beaufort Inlet

Katy

MEMORANDUM

TO: Teresa Gillikin

FROM: Lele Judy

DATE: 16 July 1993

SUBJECT: Program 120 Weakfish Stations

In July 1993 the Washington Office sampled 23 weakfish stations (program 120). Two stations were dropped this year, RB1 & E10. The following stations were sampled:

Station	Water Body Code
LSR5	0503010000
LSR1	0503020000
LSR3	0503030000
FC1	0506000000
FC3	0509010000
WB1	0514000000
WB3	0514030000
OC1	0518010000
JB1	0521040000
SQB3	0522020000
SQB1	0522040000
SB3	0527010000
AB1	0528030300
PUR5	0528060107
PUR3	0528063803
B10	0529010000
B20	0531010000
B43	0533040000
CN6	0534020000
CN3	0534050100
CN1	0534110000
E15	0535031100
F1	0535050200

Department of Environment,
Health and Natural Resources
Division of Marine Fisheries

James B. Hunt, Jr., Governor
Jonathan B. Howes, Secretary
William T. Hogarth, Ph.D., Director

DEHNR

c

DOC

MEMORANDUM

TO: Mike Cruze

THROUGH: Jim Francesconi

FROM: Katy West KW

DATE: 04 November 1993

SUBJECT: Seagrass coding in Program 120

The attached 1989 memo expanded the codes for Bottom Composition (BTMCOMP). We have at times had stations so full of grass that they were untrawlable. In these instances the field crew moved a short distance from the grass and made the tow.

We request this be coded as follows:

1. Bottom Composition coded as 'X' which is defined as tow relocated due to grass conditions.

2. Grass caught in the tow coded as normal (Replicate 01, Record Type 3's).

3. Grass blocking station identified and coded in Replicate 00, Record Type 3's.

Data management needs to update Appendix D with these new codes (Moye memo and this request). Also from a recent check (90-92) of the data, it appears only Manteo and Washington have stations with grass.

cc: Paul Phalen
Biologist Supervisors

1424 Carolina Avenue, Washington, North Carolina 27889 Telephone 919-946-6481 FAX 919-946-3716
An Equal Opportunity Affirmative Action Employer

Post-it® Fax Note 7671	Date 5/10/89 # of pages 1
To Lee Judy	From Francesconi
Co./Dept.	Co.
Phone #	Phone #
Fax #	Fax #

MEMO TO: John Schoolfield
Stephanie Spence
Jeff Ross
Sara Winslow

FROM: David Moye

SUBJECT: Program 120 Coding

DATE: April 20, 1989

At the juvenile program meeting in Morehead on February 6, it was decided that bottom composition was to become a mandatory coding field in 1989. Some confusion has arisen over the codes in appendix D. To help alleviate confusion, the combination codes G through M will no longer be used.

The following codes are to be used for bottom composition:

A. shell
B. grass
C. algae
D. detritus
E. sponge
F. coral
N. cinder
O. no bottom composition
P. tunicate
Q. bryozoan

In the event that a combination of any two or more of these occurs, use the one that is the most abundant for the bottom composition field. Use O when none of the above are found in the sample.

All living material (i.e. – grass, algae, sponge, coral, tunicate and bryozoan) is to be coded in Record Type 3 information using 9___9 or . for number present. Use the biospecies code 0800000000 for all algae.

If you see material other than what I have listed and you think it should be noted, or if you have any comments about this, pro or con, please let me know by May 1, 1989. If you have sent in data sheets from March sampling, these will need to be updated with this information so please let Terry know ASAP.

cc: Katy West
Terry Henley

MEMORANDUM

TO: BIOLOGISTS

FROM: DON FREEMAN

DATE: SEPTEMBER 25, 1987

SUBJECT: USE OF PROGRAM 120 FIELD FOR SEAGRASS DATA

A revised use of existing program 120 fields of seagrass data is proposed. Increasing concern over the integrity of seagrass beds and their functional attributes has led to greater emphasis on research of seagrass bed ecology. A prime example of such projected research is the recently approved APES investigation of seagrass beds through aerial survey. The N.C. Division of Marine Fisheries has a wealth of historical information regarding probable inhabitants of seagrass beds, but in most cases their association with such bottom type has not been noted. In an attempt to maximize benefits from our own and others' efforts the following revisions/additions are proposed:

(1) Record Type 1
Column 81: Bottom Composition - category B. will still represent presence of grass but category O. will be added to the list of composition types and will indicate absence of grass. This will permit us to distinguish between cases where seagrass data is not collected and those where presence of grass is not observed. For the sake of consistency, however, bottom composition should be coded for every collection.

(2) Record Type 3
If code "B." is used in Record Type 1, indicating presence of grass, species data may be entered regarding the type of grass present. For instance - eel grass would be entered as species - Zostera marina and species code - 3306080201. At this point in time, no size or weight data is proposed for collection.

Any comments regarding the proposed revisions/additions should be expressed as soon as possible. Changes in any program documentation or procedure will be coordinated with Data Management.

DF/csw

ENVIRONMENTAL AND STATION DATA

1	SEQUENCE NUMBER	PROGRAM	DATE	STATION NUMBER
	1	1 2 0		

STARTING LOCATION	ENDING LOCATION	GRID	QUAD.

B - grass O. - not grass

TIME GEAR OVER	TIME GEAR BEGAN FISHING	TIME GEAR ENDED FISHING	TIME GEAR ONBOARD	DURATION OR AREA	LENGTH WARP	PITCH	RPM
				5			

GEAR	GEAR PARAMETER #1	GEAR PARAMETER #2	GEAR PARAMETER #3	RIG	TYPE OF TOW	SED SIZE	BOTTOM COMP	BOTTOM PROFILE	DEPTH (m)
5 5 6	2	0 0 ● 7 5	0 ● 2 5	1	3		B		

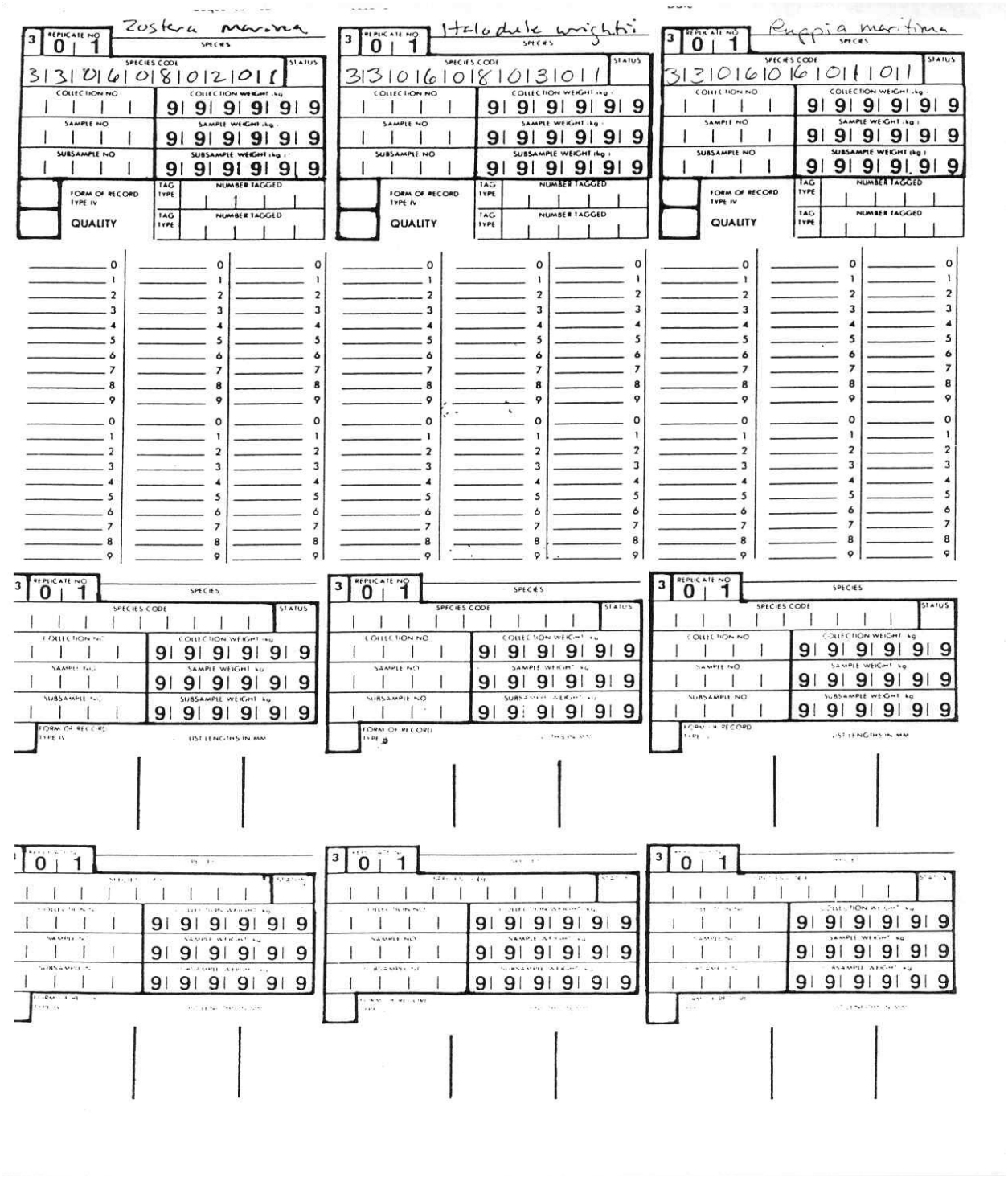
AIR TEMPERATURE	SURFACE TEMP	BOTTOM TEMP	SURFACE SALINITY	BOTTOM SALINITY	VARIABLE FIELD #1	SURFACE DO	BOTTOM DO

pH	WEATHER ELEMENT	VARIABLE FIELD #2	WIND DIR	WIND SPEED	CURR DIR	CURRENT SPEED	WATER LEVEL	ALTER STATE	ALLOW FISH	NO. OF REPL

RECORD TYPE	REPLICATE NUMBER	COLLECTION SIZE	SAMPLE SIZE	NUMBER OF RECORD TYPE IN \	QUALITY
2	0 0	9 9 9 9 9 9	9 9 9 9 9 9		
2	0 1	9 9 9 9 9 9	9 9 9 9 9 9		
2	0 2				
2	0 3				
2	0 4				
2	0 5				
2	0 6				
2	0 7				
2	0 8				
2	0 9				
2	1 0				

PERSONS TAKING SAMPLE (INITIALS)

COMMENTS:


Zostera marina
Halodule wrightii
Ruppia maritima
REPLICATE NO
SPECIES
SPECIES CODE
STATUS
COLLECTION NO
COLLECTION WEIGHT (kg)
SAMPLE NO
SAMPLE WEIGHT (kg)
SUBSAMPLE NO
SUBSAMPLE WEIGHT (kg)
FORM OF RECORD TYPE IV
QUALITY
TAG TYPE
NUMBER TAGGED
LIST LENGTHS IN MM

FLOWERING-RUSH,
Butomus umbellatus

Not pictured.

A native of Europe which was discovered along the tidal St. Lawrence River about 1900 and now grows in fresh water in Idaho; and Michigan to Quebec, Illinois, and Vermont.

Usually stands above shallow water or mud, with knee-high or higher narrow, upright leaves surrounding a stalk topped with a loose cluster of pink, 6-parted flowers. These are about 3/4 inch across.

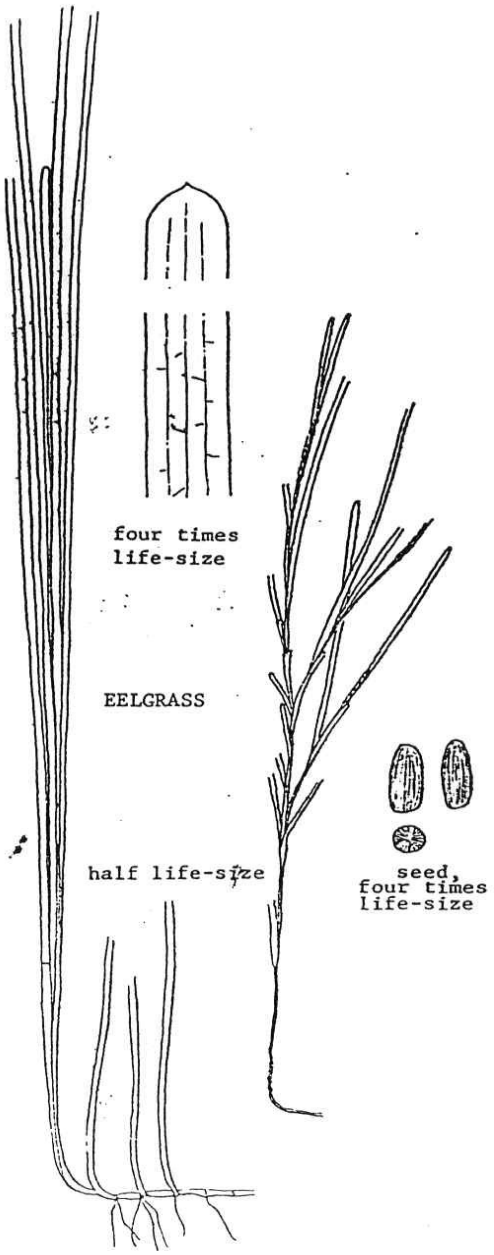
In deeper water, has only limp leaves which do not reach above the surface. These resemble the leaves of Burreeds and Wildcelery, but are usually narrower and less translucent and appear less veiny (see the piece-of-leaf pictures on pages 6 and 10).

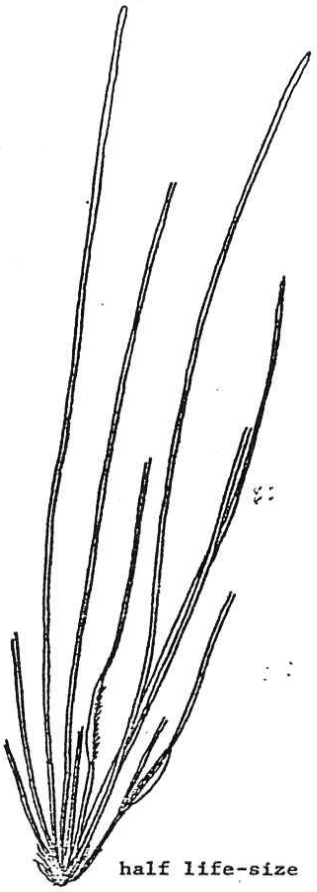
EELGRASS, (Zostera marina)
North - round tip

Salt water; Alaska to California; and Hudson Bay to North Carolina.

Often in dense beds in soft-bottomed bays. Some bays are so shallow that most of the water drains out at low tide; and for a while the ribbonlike foliage is left sprawling on the mud. Seeds are half-hidden in a long row in leaf sheaths.

Narrow-leaved plants resemble Shoalgrass (page 12), with which it grows in North Carolina; but Eelgrass leaves have a roundish tip.



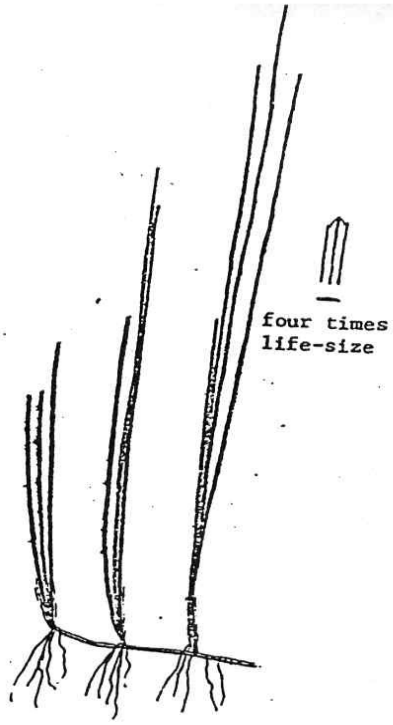


half life-size

SURFGRASS, Phyllospadix scouleri
(Phyllospadix torreyi)

Salt water; British Columbia to California.

Flowers are sometimes in several clusters on a much longer stalk than the ones pictured.



four times life-size

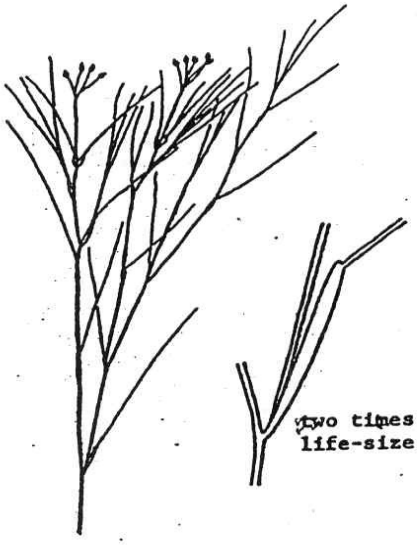
half life-size

SHOALGRASS, (Halodule wrightii)
Southern - pointed tip

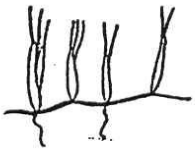
Salt water; North Carolina; and Texas to Florida.

Leaves flat in cross-section. Flowers scarce.

Resembles narrow-leaved plants of Eelgrass (page 11), with which it grows in North Carolina; but has a 3-pointed leaf tip which could be mistaken for a broken end. Resembles Manateegrass (page 13); but has flat leaves with a 3-pointed tip.



half life-size



WIDGEONGRASS, Ruppia maritima
(Ruppia occidentalis)

Salt to fresh coastal water and alkali to fresh inland water; Alaska to Newfoundland, California, and Florida (but very rare inland in the eastern half of the continent).

When not in seed, resembles non-seeding Sago Pondweed (page 72); but the leaves are usually in less-bushy clusters, the sheathing base of the leaves has a rounded, firm tip, and the root-stocks are short and zigzag and have no tubers.

zone on rocks or wood. Fades on drying to yellow-brown. Winter–late spring, waning in summer; whole coast.

Pink to Red: All belong to Phylum Rhodophyta. (1) *Rhodochorton purpureum* is as thick as cotton fiber; to almost 1 in. (25 mm) tall. Forms mounds or turf in shallow water. Long Island to Arctic. (2) *Antithamnion* and related genera are usually *thicker*, to width of #40 sewing thread or more; cells barely or not visible with hand lens. Epiphytic or on rocks in *lower* intertidal pools or shallow water. Whole coast. Thicker parts of *Seirospora*, *Callithamnion*, and *Pleonosporium* have a structure similar to tubed weeds (see Plate 9).

Seed Plants: Phylum Spermatophyta

The two aquatic marine seed plants found on this coast are related to the pondweeds and are variously placed with them in the family Zosteraceae, Potamogetonaceae, or Najadaceae.

EELGRASS *Zostera marina* **Fig. 9**

Identification: Leaves ¼–½ in. (6–12 mm) wide, up to 3 ft. (900 mm) long. Grows from a creeping runner that sends up leafy stems at intervals. Flowers and fruit inconspicuous in 2 rows on a 1-sided spike.

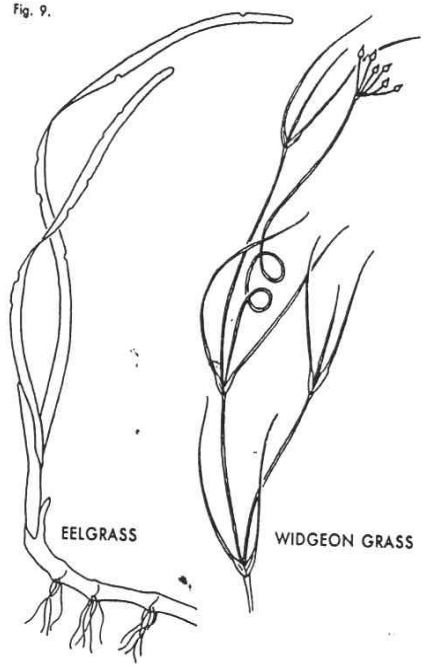
Season: Perennial; requires several years to mature. Older leaves die off, turn black, and are washed ashore in windrows. Flowers in late spring to early summer.

Where found: S.C. to Arctic. Also Pacific Coast.

Remarks: An ecologically important plant. At full growth Eelgrass may cover acres of shallow bottom in bays and sounds, stabilizing soft sediments and often playing a role in the successional development of coastal marshes. It is a principal winter food of the Brant, a small sea goose, and it supports and gives shelter to a host of small animals. Numerous invertebrates and epiphytic algae grow on the plant; others creep or burrow about the roots, and the floating leaves make a hiding place for sticklebacks and other small fish and swimming invertebrates. Dried Eelgrass was once important as mattress and upholstery stuffing.

Periodically Eelgrass is stricken by a blight whose causes are still only partly understood. The last such episode began in the 1930s and recovery is still incomplete in some places. Among the side effects of this ecological disaster was a tremendous decline in Brant, as well as Bay Scallops, whose young cling to Eelgrass to avoid suffocation in bottom muck.

Fig. 9.



WIDGEON or DITCH GRASS **Fig. 9**

Ruppia maritima

Identification: Leaves narrow, needle-like, 2 in. (50 mm) long, growing from a slender stem. Flowers and fruit small, in clusters of 2–4 on a slender stalk.

Season: Perennial.

Where found: Whole coast to Texas, in brackish bays; also widely distributed *inland* west of the Mississippi R. in alkaline waters.

From: A Field Guide to the Atlantic Seashore
Kenneth L. Gosner

MEMORANDUM

To: Beth Burns
John Schoolfield
Jim Francesconi
Chris Wilson

From: Katy West KW

Date: June 17, 1999

Subject: Program 120 alternate station location coding

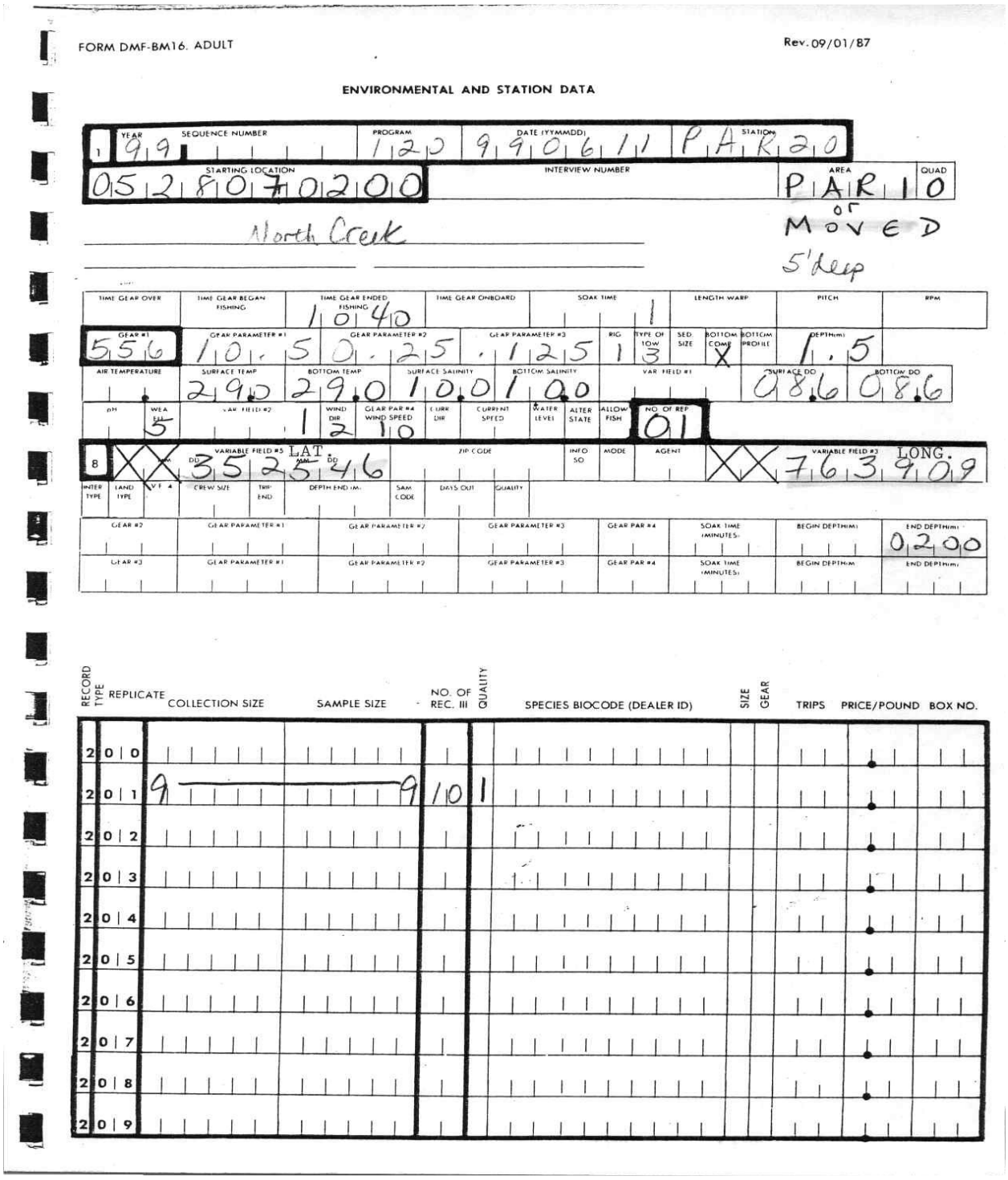
Due to extensive grass at certain station locations this spring, we have had to pull the trawl at locations more than a "short distance" from the designated station. A previous 04 November 1993 memo describes how to code data when a crew moves a short distance from the "grassed" station and makes a tow. A core tow should always be made, regardless of the amount of grass. Code as follows when the **exact station can not be pulled due to grass and when the towed site is more than 200yds** from the designated station:

Record type 1 -	In the station field	Code the designated station name.
	In the location field	Code waterbody of the designated station.
	In the quad and grid field	Code the alternate station name (if there is one) **or** Code as "MOVED"
	The environmental data such as temp, salinity, depth, etc. should be for the site actually towed. Bottom comp should be coded with an X.	
Record type 8	In the variable field #5	For the "moved site" code the latitude in degree, minutes, seconds. Right justify (ie. the first two spaces are blank).
	In the variable field #3	For the "moved site: code the longitude in degree, minutes, seconds. Right justify (ie. the first two spaces are blank).
	In the gear2 depth end field	Code the last 4 digits of the "moved

		site" location code, even if the same as original station location code.
Record type 2	In the quality field, rep 01	Code as 1 (problems incurred but can be used quantitatively).

(See attached example sheet, the cover sheet will have to have record type 8 fields).

cc: Denise Russell
Maggie Tyndell
George Joyner
Lele Judy
(Please share with Program 120 staff)



FORM DMF-BM16. ADULT

Rev. 09/01/87

ENVIRONMENTAL AND STATION DATA

1	YEAR	SEQUENCE NUMBER	PROGRAM	DATE (YYMMDD)	STATION
	99		120	990611	PAR20

STARTING LOCATION: 0528070200 | INTERVIEW NUMBER: | AREA: PAR | QUAD: 10

North Creek

or MOVED 5' deep

TIME GEAR OVER	TIME GEAR BEGAN FISHING	TIME GEAR ENDED FISHING	TIME GEAR ONBOARD	SOAK TIME	LENGTH WARP	PITCH	RPM
		1040		1			

GEAR #	GEAR PARAMETER #1	GEAR PARAMETER #2	GEAR PARAMETER #3	RIG	TYPE OF TOW	SED. SIZE	BOTTOM COVE	BOTTOM PROFILE	DEPTH(m)
556	10.5	0.25	.125	1	3		X		1.5

AIR TEMPERATURE	SURFACE TEMP	BOTTOM TEMP	SURFACE SALINITY	BOTTOM SALINITY	VAR. FIELD #1	SURFACE DO	BOTTOM DO
	29.0	29.0	10.0	10.0		08.6	08.6

pH	WEA. FIL.	VAR. FIELD #2	WIND DIR.	GEAR PAR #4 WIND SPEED	CURR. DIR.	CURRENT SPEED	WATER LEVEL	ALTER STATE	ALLOW FISH	NO. OF REP.
	5	1	2	10						01

8			VARIABLE FIELD #5 LAT DD MM		ZIP CODE	INFO SO.	MODE	AGENT		VARIABLE FIELD #3 LONG.
	XX	XX	35 25 46						XX	76 39 09

INTER TYPE	LAND TYPE	VT #	CREW SIZE	TRIP END	DEPTH END (M.)	SAM CODE	DAYS OUT	QUALITY

GEAR #2	GEAR PARAMETER #1	GEAR PARAMETER #2	GEAR PARAMETER #3	GEAR PAR #4	SOAK TIME (MINUTES)	BEGIN DEPTH(m)	END DEPTH(m)
							0200

GEAR #3	GEAR PARAMETER #1	GEAR PARAMETER #2	GEAR PARAMETER #3	GEAR PAR #4	SOAK TIME (MINUTES)	BEGIN DEPTH(m)	END DEPTH(m)

RECORD TYPE	REPLICATE	COLLECTION SIZE	SAMPLE SIZE	NO. OF REC. III	QUALITY	SPECIES BIOCODE (DEALER ID)	SIZE	GEAR	TRIPS	PRICE/POUND	BOX NO.
200											
201	9		9	10	1						
202											
203											
204											
205											
206											
207											
208											
209											

MEMORANDUM

TO: Biologist Supervisors

FROM: Jess Hawkins

DATE: 21 March 1996

SUBJECT: Critical Habitat Sampling and Program Computer Documentation

I want to reaffirm two issues I discussed at the 4 March 1996 Biological Review Team (BRT) meeting:

1. Each District needs to review creeks/tributaries in their District for possible nursery area designation. The Director and myself discussed with Roger Schecter, Director of Coastal Management, and Preston Pate the need to document additional primary nursery areas in both Coastal and Inland waters. Sampling in these areas should begin this spring with the Program 120 sampling in order to provide data for designation. Please provide me a list of these areas by 15 April 1996. Also each District should review the latest date designated nursery areas were sampled. We need to continue to document the productivity of these areas.

2. The importance of current and correct program documentation was discussed. Each program lead needs to insure their documentation is accurate. All data collected by the Fisheries Management Sections are to be stored on the biological master files and documented according to the procedures outlined in the Biological Database Reference Manual. It is each Supervisor's responsibility to make new employees aware of these procedures and to see they are adhered to. Documentation for new projects should be drafted prior to field work and submitted to Paul Phalen for review.

JHH:pc

cc: Paul Phalen
Preston Pate

E

MEMO TO: Biologists

FROM: Sean McKenna

SUBJECT: Blue Crab Sampling

DATE: April 1, 1987

It was decided on March 30, 1987 that the heavily chained 20 foot stock assessment trawl will be used by Morehead, Washington and Manteo field offices. This decision allowed the merger of the Juvenile and Blue crab programs. By doing away with the 26 foot crab trawl stations, we will be able to increase our coverage with the 20 foot net and hopefully get a better understanding of blue crab abundance and distribution.

The following is a list of biological data (record type 4) that I would like all offices to collect for blue crabs. All crabs caught should be measured to the nearest millimeter spike to spike (CW). Exceptionally large samples of crabs <20 mm can be subsampled by measuring 30-60 individuals and the remainder counted. However, all crabs ≥20 mm should be measured. All crabs ≥20 mm CW are to be sexed, 1 = male, 2 = female and 3 = undetermined and female maturity noted. For female maturity use only the following codes: 1 = immature, 3 = mature and 7 = sponge crab. This year we will start collecting information on the approximate ages of blue crab egg masses (sponges). If the egg mass is yellow to orange in color, code as 1, if brown to black code as 2. This information should be coded in the Parameter B box under record type four. Generally, hatching occurs between 14 and 17 days following egg extrusion, egg masses that are yellow to orange in color are approximately 1 to 7 days old and brown to black egg masses are 8 to 15 days old. Additionally, I am asking each office to collect CW - weight data. Crabs should be randomly selected to represent all size ranges and sampling should be spread throughout all stations in your respective areas including both 10.5 and 20 foot stations. Try to get data for 30 to 60 crabs each month. Either the 800 or 1000 gram spring dial scale can be used, with weight recorded to the nearest gram.

Code all CW - weight on yellow record type four sheets. This information will become a permanent part of the Juvenile data base. In addition, I would like the CW - length data sent to me monthly. This will require coding the data twice, and I apologize for the inconvenience, but it will enable me to work the data up monthly.

See enclosed data sheet for information requested. If you have any questions be sure to contact me.

Washington, Manteo and Morehead offices will increase their sampling of grass beds and all offices will sample around inlets for sponge crabs. Once you decide on your new station locations could you please send me and data management a map showing the location and station number.

Thanks for your time and cooperation.

Program 120

Data for Blue Crabs 1987

FORMAT A

The following should be completed to reflect current activities. Please note in written descriptions any deviations from the current activities listed below.

Record Type	Field Name	Units	Limits	Mandatory (M) vs. Desired (D)	Comments
4	Length	Millimeters	NA	M	Spike to spike width for blue crabs
	Weight	Grams	NA	M	30-60 individuals per month for each office
	Sex	NA	1 - 3	M	
	Maturity	NA	1,3,7	M	Maturity required for females only
	Parameter A	NA	1 - 8	D	Peeler stage: 1 = Green, no peeler sign 2 = Hair line 3 = White line 4 = Pink line 5 = Red line 6 = Buster 7 = Soft 8 = Paper Only taken at Washington Office
	Parameter B	NA	1 - 2	M	For sponge crab only 1 = sponge yellow to orange in color 2 = sponge brown to black in color

Katy

July 9, 1986

MEMORANDUM

TO: Biologists, District Managers, and other interested parties

FROM: Fritz Rohde FR

SUBJECT: 3/4" trawl and monitoring

The Wilmington office has gone back to using the lightly-chained net (gear code 556) for secondary nursery area monitoring. There were too many problems encountered using the heavily-chained net (code 558), particularly tearing of the net due to excessive amounts of shell collected. The final straw was the capture of 726 adult blue crab (and subsequent tearing of the tail bag) at a Cape Fear River station. It was either drop long-term core stations or change gear.

We did some comparison testing of the two gears in the Atlantic Intracoastal Waterway (AIW) prior to dropping the 558 net. The data are attached. The first two sets of replicates probably should be ignored because we feel that the 556 net was fishing improperly. The latter two sets are interesting - both gears caught a good diversity of species.

Critical Habitat and Juvenile Stock Assessment Program Plan

Long Term Goals:

1) Develop criteria to adequately define primary nursery areas and anadromous fish spawning and nursery areas and use these criteria to re-examine existing areas and areas which have not been designated in the past.
2) Afford protection to Inland Waters when they can be shown to function as either primary nursery areas and/or anadromous fish spawning and nursery areas.
3) Define and map critical fisheries habitats such as beds of submerged vegetation and protect these areas from bottom alteration.
4) Develop a statewide network of salinity-temperature monitors to obtain continous hydrographic data.
5) Maintain a statewide estuarine monitoring program to collect biological data on finfish and invertebrate stocks.

Objectives-Annual

1) Develop criteria to define nursery areas with assistance from other agencies and OCM.
2) Continue juvenile stock assessment at approximately 150 stations to obtain data on relative abundance, growth and distribution of finfish and invertebrate stocks.
3) Establish a network of salinity-temperature monitors around Pamlico Sound. Enough monitors may be available to include other areas of the State.

4) Collect data on substrate type, vegetation type, water depth and bottom profile at existing juvenile stock assessment stations and any new stations sampled for possible designation as nursery areas.

5) Provide recommendations to the M.F.C. on designating submerged beds of vegetation as critical fisheries habitat. This is dependent on mapping the beds by OCM.

6) Review latitude and longitude descriptions of primary nursery areas in the regulation book and provide any revisions to the MFC by June 1982. Mapping nursery areas on acetate overlays should provide this information.

7) Promote a review of coastal, joint and inland boundary lines by the MFC and WRC.

Procedures

Development of nursery area criteria has been initiated with input from Division staff and personnel from N.C. State and NMFS. A combination of physical parameters and abundance of commercially important species will probably be used as criteria. This may be a longer process than originally anticipated.

Juvenile stock assessment activities will be conducted from March through November with much the same methodology as in the past:

1. Gear - use of the 10.5 ft. trawl with $\frac{1}{4}$" bar body and 1/8" tail bag pulled for one minute and the 20 ft. trawl with 3/4" bar body and $\frac{1}{4}$" bar tail bag pulled for 5 minutes will continue. The tows for both nets are to be made at a speed necessary to cover 75 yards in one minute.

2. Sample work up - all samples will be worked up as in the past with the following changes: number of bay anchovies, mysids and grass shrimp will be estimated as rare (10), common (100's) and abundant (1000's). Blue crabs will be measured to the nearest mm and individuals 20mm will be sexed and maturity recorded. Exceptionally large samples of finfish will be subsampled by measuring a random sample of 30-60 individuals of each species to the nearest mm and this sample will be weighed. Total weight of the remainder of the sample will be taken and the total number will be computed by expansion. Substrate samples will be worked up following the methodology distributed by S. P. Epperly.

Any sampling conducted for nursery area surveys will follow the same procedures as stock assessment. The number of new sampling sites will be determined by each regional coordinator.

Recommendations for designating grass beds as critical habitat will be based upon maps provided by OCM. These maps cover Core and Bogue Sounds and the central area coordinator will be responsible for seeing that the Regulations Task Force provides a recommendations to the MFC.

Reports

An annual report will be prepared following the format of annual federal aid reports. The report will cover the sampling period March through November and will be completed by the following March.

Management

Results of this program will be utilized by the Division as a basis for updating nursery areas and assessing fluctuations in enviromental conditions and juvenile populations of finfish and invertebrates. Data will be used for evaluation of dredge and fill applications by OCM and other agencies. Management of fisheries taking place in critical habitats is an issue which will involve

this program. Information obtained will be available to make management recommendations and recommendations to the MFC for proposed regulations concerning fisheries being conducted in these areas. Data from the juvenile stock assessment program will be used by other programs being conducted by the Division to aid in management decisions.

HISTORICAL PERSPECTIVE

INTRODUCTION

The juvenile sampling program began in 1970 in the southern portion of the state. The major objective of the program was to delineate estuarine nursery areas of economically important species. Waterbodies sampled July through December 1970 included Middle, Wrightsville, Masonboro, and Myrtle Grove Sounds, and also the Cape Fear River. Bogue Sound was sampled in October and November of 1970. In 1971 and 1972 Core, Back and part of Pamlico Sound were added. This intensive survey was completed by the fall of 1972, funded entirely with state money.

The sampling methodology initiated in 1970 has remained essentially the same through out the program's history. There have been some significant changes, however, and these are carefully noted in this documentation. Generally the sampling methods were as follows:

1. Monitor environmental conditions - data was recorded at each station on temperature (surface and bottom), salinity (surface and bottom), tide stage, visibility (secchi disk), bottom type, and water depth.

2. Standard sampling gear - Otter trawls with a 10.5 and/or 20.0 ft. headrope length and seines with a 20.0 and/or 60.0 ft. bag. Mesh size of both the trawls and seines varied.

3. Sampling procedures - Duration and distance of trawl tows and seining varied.

4. Handling of field samples - Target species changed throughout the programs history, however, commercially important finfish and crustaceans were always identified, counted and measured. During the first 10 years of the program only modal lengths were recorded. Subsampling procedures varied.

5. Data compilation - Data was compiled on standard summary sheets and filed by area in existing files.

From 1972 to 1975 the same approach was used to conduct a basic fishery resources inventory at the Outer Banks and the estuaries of western and northern Pamlico Sound to determine and delineate those critical areas which serve as estuarine nurseries for economically important finfishes and crustaceans (Spitzbergen and Wolff 1974, Wolff 1976, Purvis 1976). Three projects (Z-175-R, 2-222-R, 2-230-R) were funded during this period by the U.S. Department of Commerce NMFS through the Commercial Fisheries Research and Development Act. In some areas preliminary state-funded studies had been conducted.

During 1976 and 1977 sampling effort was reduced considerably. Monitoring of core stations was conducted in Pamlico, Core, Back, Middle, Wrightsville and Masonboro Sounds, and also Beaufort Inlet and Cape Fear River.

In April of 1978 a statewide juvenile stock assessment survey was established. This survey through September 1980 was funded by the Office of Coastal Zone Management's Fisheries Assistance Program Grant (Street 1978, Carpenter 1979, Carpenter and Ross 1979, Ross 1980, Ross and Carpenter 1983). In 1980, the OCZM trawl effort was stable at approximately 140 tows statewide.

Changes to the sampling strategies and methodology which occurred during this period were:

1979

1. The addition of intensive sampling stations.

2. Fork lengths to nearest mm to be taken of all individuals of spot, croaker, weakfish, both species of flounders, crabs and penaeid shrimp.

3. A sample of at least five individuals of each species were returned to the lab for scale samples. These fish were to cover all sizes taken at the station. If specimens were lacking at the intensive station, individuals from other stations were substituted.

4. Tow times and distances were standardize for 1/4" and 3/4" trawls. These were for 1 minute (75 yards) and 5 minutes respectively.

5. In the summer and fall, fish abundance dropped at the intensive stations. At this time additional stations were treated as intensive stations to ensure adequate numbers for length-frequency data.

6. Seine stations in the central district were dropped in November to be replaced by trawl stations.

7. Outer Banks stations in the Northern area and some stations in the Southern Region were deleted.

8. Unit of effort for the 3/4" stations in calculating CPUE was changed from catch per minute to catch per five minutes.

From October-November 1980 and March-June 1981, monitoring and investigations of estuarine nursery areas continued under the Commercial Fisheries Research and Development Act (Hawkins, 1982). One hundred and thirty-eight stations were sampled monthly.

Beginning in 1981, all specimens of blue crabs and all species of fish were researched to the nearest mm at all stations. Subsamples of larger catches were taken, expanding the length frequency of the subsample to represent the entire catch.

Under state funding, juvenile stock assessment and estuarine nursery area monitoring continued as a permenent long term DMF program. A total of 119 fixed stations from Pamlico Sound to Cape Fear River were sampled monthly March-November during 1979-1984 (DeVries 1985). The total number of stations sampled each year during 1979-1984 were 141, 145, 152, 172, 187, and 192. The 119 fixed stations were sampled each of the six years and are regarded as core stations. Seventy-nine of these core stations were in primary nursery areas and 40 were in secondary nursery areas (DeVries, 1985).

From 1982 through 1987 the following deviations and/or additions have been made to the program.

1982

1. Bay anchovies were no longer measured. Numbers were estimated qualitatively.

2. For nursery area evaluation and designation, additional stations will be sampled in each area each year.

3. Comparison tests to be done of chained 20 ft. 3/4" bar mesh trawl vs the unchained 20 ft. trawl.

4. Sediment analysis and C:N samples

1984

1. Exact total lengths were taken on Penaied shrimp.

2. Specieas list of finfish to be measured for juvenile stock assessment was prepared. Data on all species not included on the list was to be recorded, but not measured.

1986

1. A chain was added to the bottom line on the 20 ft. trawl in order to increase blue crab and flounder catches in secondary nursery area stations. This change in gear was significant. Not all offices used the gear in all secondary stations (See User Beware Section).

2. Night sampling was initiated in Core Sound by the Morehead office to determine if species composition/diversity and/or length frequencies would be different than day samples taken in similar areas.

3. Monthly sampling schedules were changed. Some offices discontinued March sampling and/or dropped primary stations after July.

4. Fish disease sampling was incorporated into juvenile program.

SPECIFIC PROJECTS: 1972 - 1981

PROJECT TITLE:	Survey of Nursery Areas in Western Pamlico Sound
PROJECT NO.:	2-175-R
FUNDING:	Commercial Fisheries Research and Development Act PL 88-309
PERIOD COVERED:	April 1972 - December 1973
PERSONNEL:	Spitzbergen and Wolff
STUDY AREA:	Wetsren Pamlico Sound from Pamlico River to Cedar Island
JOB 1:	April - June 1972: intensive area survey
JOB 2:	July 1972 - June 1973: base year study of 153 stations monthly
SEGMENT 2:	June 1973 - December 1973: comparison fo nursery and non nursery areas

In April 1972, a 21 month study (2-175-R) was initiated in western Pamlico Sound, Funded by Act (PL 88-309), the project objective was to identify nursery areas for economically important species of finfish and crustaceans. Two thousands six hundred severty-two (2,672) samples collected included 78 species of finfish and nine species of invertebrates. Nursery areas were designated on maps for six species of commercially important finfish and three species of commercially important invertebrates.

The study area included the Neuse and Bay rivers and their tributarues, and numerous creeks and bays extending from Jones Bay on Pamlico Sound to Goose Creek at the mouth of the PamlicoRiver. During the first 15 months of the study 143 trawl stations were sampled monthly. During the last six months of the study only 48 of these were sampled (monthly). In addition, nine trawl stations were sampled on a quarterly basis utilizing a 1/4" mesh trawl in waters contiguous with those under the Division's control. All stations remained permanent throughout the study. Figure 2 shows station locations.

Standard gear and sampling procedures were used in this study and were based on previously initiated studies of the North Carolina estuaries. The basic gear and its use was standard for all the estuarine areas of the state under study at that time so that quantitative data could be compared.

Gear Types

(1) A 13-ft. (3.96 meter) headrope, flat otter trawl with 1/4" bar bar mesh (.64cm) knotted wings and body, and 1/4" bar mesh knitted tail bag and extension;

(2) A 20-ft (6.01 meter) headrope otter trawl with 3/4" (1.91 cm) bar mesh knotted webbing throughout;

(3) A 20-ft. beach seine, 4' (1.22 m) deep and 4' bag with 1/4" bar knitted mesh;

(4) A 6-ft (1.83 m) by 6-fy. modified Cobb trawl with 1/4" bar knotted mesh throughout.

The 20-ft. beach seine and the Cobb trawl were used only during preliminary work and were found impractical for the area being studied.

Sampling Methods and Procedures

The trawls were towed by 16-18 ft. outboard skiffs for one to five minutes at approximately three knots. At the large river stations, a 48-ft. boat towed both nets five minutes at the same speed.

A minimum of 30 specimens of commercial and/or sports imporatnce were measured in 10 mm size groups, weighed, and a count made of the remainder. A size range and total count was made of those species not considered of commercial or sport importance in North Carolina.

Fork length, from the tip of the snout to the posterior edge of the caudal fork, was used to measure finfish collected. On fishes without a forked tail (e.g. Atlantic Croaker), total length was recorded. For shrimp, total length measurement was taken from the anterior tip of the rostrum to the posterior tip of the telson. Carapace width between the tips of the lateral spines was used on all crabs. All length measurements were in millimeters and weights were recorded in grams.

At each station, surface and bottom salinity and temperature were recorded using a hand held refractometer and Centigrade mercury filled thermometer. Bottom type and vegetation was also noted.

All samples were made at permanent stations located throughout the study area. There were 143 trawl stations sampled monthly in the study. In addition, nine trawls stations were sampled on a quarterly basis utilizing a 1/4" mesh trawl in waters contiguous with those areas under Division's control. This was reduced to 48 stations per month during the last six months of the study.

Results

During the 21-month study period from April 1972 through December 1973, two thousand six hundred seventy-two (2,672) samples were collected. Of this total, 15 samples were taken by seine, 13 by Cobb trawl, 282 by 3/4" otter trawl, and the remainder by 1/4" otter trawl.

Seventy-eight species of finfish and 9 species of invertebrates were collected during the study. Twenty-six species of finfish and four species of invertebrates were considered to be of economic importance.

Nursery areas for some of the economically important species were designated. The basic criteria used to designate nursery areas was the catch-effort relationship of different habitat types and the percent of juveniles per catch and area.

Results

During the 21-month study period from April 1972 through December 1973, two thousand six hundred seventy-two (2,672) samples were collected. Of this total, 15 samples were taken by seine, 13 by Cobb trawl, 282 by 3/4" otter trawl, and the remainder by 1/4" otter trawl.

Seventy-eight species of finfish and 9 species of invertebrates were collected during the study. Twenty-six species of finfish and four species of invertebrates were considered to be of economic importance.

Nursery areas for some of the economically important species were designated. The basic criteria used to designate nursery areas was the catch-effort relationship of different habitat types and the percent of juveniles per catch and area.

PROJECT TITLE: Nursery Area Survey of the Outer Banks Region

PROJECT NO.: 2-222-R

FUNDING: Commercial Fusheries Research and Development Act PL 88-309

PERIOD COVERED: January 1974 - June 1975

PERSONNEL: Maury Wolff

STUDY AREA: Outer Banks

North Carolina project 2-22-R began in January 1974, as a PL 88-309 project in cooperation with NMFS. This followed a preliminary period of state-funded study from July through December, 1973. The objectives of this project were to conduct a basic fishery resources inventory of the Outer Banks and to determine and delineate those critical areas which serve as major nursery areas for economically-important finfishes and crustaceans. Prior to this study, a basic nursery inventory had not been conducted for this area, and it was not known to what extent this estuarine complex contributed to the fishery resources of Pamlico Sound and North Carolina.

Sampling Methods, Materials, and Procedures

Standard gear and sampling procedures used in this study were based on previously-initiated studies of North Carolina's estuaries by the Division of Marine Fisheries. The basic gear and its use is standard for all the estuarine areas of the State now under study in order that quantitative data may be compared.

The following types of gear were utilized throughout this study. The primary sampling gear was a 4.0 m (headrope) flat otter trawl with 6.4 mm (bar mesh) knotted wings and body, and 6.4 mm (bar mesh) knitted extensions and tailbag. Two sizes of beach seine were used to sample shorelines. The larger was 18.3 m long and 1.8 m deep with a 1.8 m x 1.8 m x 1.8 m bag. The smaller seine was 6.1 m long and 1.2 m deep with a 1.2 m x 1.2 m x 1.2 m bag. Both seines were constructed of 6.4 mm (bar mesh) knotted material in the wings and 3.2 mm (bar) knitted mesh material in the bags. Another trawl 6.0 m on the headrope made up of 19 mm (bar) knotted mesh throughout was used periodically to sample channel areas.

The trawls were towed by a 5.7 m outboard-powered skiff for one to five minutes at approximately 4 to 5 km/hr. The large seine was used in deeper areas where a cove or creek could be effectively blocked as the seine was pulled toward the head of the area. The larger seine was

pulled over the area once per sample. The smaller seine was used along shallow shorelines and was pulled two or three times per sample.

A minimum of 25 specimens of commercial and/or recreational importance were measured in 10 mm size groups and a count made of the remainder. A size range and total count was made of those species not considered of commercial or recreational value in North Carolina.

Fork length, from the tip of the snout to the posterior edge of the caudal fork, was used to mwasure finfish collected. For species without a caudal fork, such as Atlantic Croaker, total length was recorded. For shrimp, total length measurements was taken from the anterior tip of the rostrum to the posterior tip of the telson. Carapace width between the tips of the lateral spines was used on all crabs. All measurements were in millimeters.

At each station surface and bottom salinity and temperature were recorded using a Yellow Springs Instruments model 33 Salinity-Conductivity-Temperature meter. Bottom type, vegetation, and depth was also noted.

All samples were taken at or as close to permanent stations as tide conditions would allow.

The study area was 15,185 hectare of estuarine flats and creeks extending 185 km from Cape Lookout and Barden Inlet in the south to Bodie Island Lighthouse.

PROJECT TITLE: Nursery Area Survey of Northern Pamlico Sound and Tributaries

PROJECT NO: NC 2-230-R

FUNDING: Commercial Fisheries Research and Development Act PL 88-309

PERIOD COVERED: July 1974 - June 1975

PERSONNEL: C. Purvis

STUDY AREA: Abel Bay to Stumpy Point Bay on Albemarle-Pamlico Peninsula

This project was initiated to continue the survey of important nursery areas to include the northern Pamlico Sound region during July 1974 - June 1975. It attempted to enumerate the importance of northern Pamlico Sound to the species that contribute to North Carolina's fisheries. The study area (Figure 1.) consisted of all waters in Pamlico Sound located between Abel's Bay and Stumpy Point Bay. Stations were to be representative of the ecological and hydrological conditions which existed in the area. The study area totaled approximately 17,485 hectare of estuarine waters Figure 2 shows station locations. There were 60 trawl stations.

Standard gear and sampling procedures used in this study were based on previously-initiated Division studies of the North Carolina estuaries. The basic gear and its use is standard for all the estuarine areas of the State now under study so that quantitative data may be compared.

The basic gear was a 3.96 m (13 ft) headrope, flat otter trawl with 6.4 mm (1/4 in) bar mesh knotted wings and body, and 6.4 mm (1/4 in) bar mesh knitted tail bag and extension.

The trawl was towed by a 17 ft outboard skiff for one to five minutes at approximatley three knots.

A minimum of 30 specimens of economically-important species were measured in 10 mm size groups, weighed, and a count made of the remainder. A size range and total count was made of those species not considered of commercial or recreational importance in North Carolina.

Fork length (FL) from the tip of the snout to the posterior edge of the caudal fork, was used to measure most finfish collected. On fishes without a fork tail (e.g. Atlantic croaker), total length (TL) was measured. For shrimp, total length measurement was taken from the anterior tip of the rostrum to the posterior tip of the telson. Carapace width between the tips of the lateral spines was used on all crabs. All length measurements were in millimeters (mm) and weights were recorded in grams (g).

At each station, surface and bottom salinity and temperature were recorded using a YSI Model 33 S-C-T meter. Bottom type and vegetation were also noted. There were 60 trawl stations sampled monthly during the study.

Nursery areas were designated based on catch-effort relationship of juveniles inhabitat types and the proportion of juveniles per catch in each type of area.

PROJECT TITLE: Juvenile Stock Assessment and Nursery Area Monitoring

PROJECT NO:

FUNDING: Office of Coastal Zone Management

PERIOD COVERED: April 1978 - September 1980

PERSONNEL:

STUDY AREA: Pamlico Sound South, with Croatan and Roanoke Sounds Sampled in 1978

The proposed sampling methodology for field work on the juvenile stock assessment program to begin April 1978.

Stations will be sampled monthly by trawls and seines during March through December. Environmental data will be collected during all months. Three types of standard gear will be utilized: a 6 mm bar mesh, 3.6 m headrope two seam otter trawl in primary nursery areas; a 19 mm bar mesh, 6 m headrope, two seam otter trawl in secondary nursery areas; and on 18 m, 6mm bar mesh bag seine. Seine stations have already been established in the southern area and will be established if necessary, in other areas, depending on preliminary sampling.

Trawl samples will be collected according to standarized procedures, either by trawling a set amount of time at a pre-determined engine speed or by trawling a specific distance at each station. The method to be utilized will be established by field testing all equipment to be used on the monitoring program during spring, 1978.

For each station sampled, a collection time in minutes and surface and bottom salinity and temperature will be recorded. Depth and bottom type will be recorded for all stations during the first month of sampling.

All species in a sample, (except blue crabs and penaeid shrimp) will be visually seperated into size classes based on previous Division sampling. The total number of specimens (finfish only) in each size class will be recorded, and a number of specimens will be measured to determine modal size groups for each size class. A minimum of 50 shrimp from each sample will be measured to 10 mm size groups. Blue crabs will be seperated into males and females for all specimens over 35 mm; it will also be noted whether females are immature or mature. All samples taken with the 6 mm bar mesh net will be collected in permanently closed nursery areas. Nineteen millimeter bar mesh trawl samples will be collected in secondary nursery areas which are occasionally opened to shrimp and/or crab trawling. Whether or not the area is opened to trawling at the time of sampling will be noted on the data sheet.

After gear testing in the field, in March 1978, D. Mumford, C. Harvell, M. Gaskill and P. Moore determined standard towing speed (based on RPM's) and distance traveled in 1 minute to be used by Program 120 when sampling with trawl gear. For the boats in use at that time the following standards were set:

BOAT	MOTOR	TRAWL	RPMs	DISTANCE IN 1 MINUTE
20 ft. McKee craft	135 Johnson	1/4"	2300	75 yards
18 ft. Glassmaster	115 Johnson	1/4"	2050	74 yards
20 ft. McKee craft	135 Johnson	3/4"	2800	77 yards
18 ft. Glassmaster	115 Johnson	3/4"	2400	77 yards

No difference in distance traveled in one minute was found when length of the tow lines on 1/4" trawl were shortened. To assure that this standard of trawling was kept as accurate as possible biologists and technicians were instructed to keep outboards running in proper order and to use the same propeller used in the field test.

April - November 1978

Sampling for juvenile stock assessment began in April and extended through November 1978. Only results for April-September 1978 are included in this record.

Samples were collected monthly from 213 stations extending from the South Carolina line to the norther side of Pamlico Sound (Figure 1). Three standard gears were used: a 1/4 in (.64 cm) bar mesh, 12 ft (3.66 m) head rope otter trawl; a 3/4 in (1.90 cm) bar mesh, 20 ft (6.10 m) head rope otter trawl; and a 60 ft (18.29 m) 1/4 in bar mesh bag seine. Trawling was standardized by towing at a speed necessary to cover 75 yd (68.58 m) in one minute. The following information was recorded for each station: date, tow time in minutes, type of gear used, top and bottom salinities and temperatures, and whether the area sampled was opened or closed to commercial trawling at the time of the sampling. Stations sampled with the 1/4 in bar mesh trawl were in primary nursery areas, and stations sampled with the 3/4 in bar mesh trawl were in secondary nursery areas which may be opened to commercial trawling.

Individuals of each species captured except shrimp and blue crabs were divided into size classes and individuals in each size class were counted and measured to determine a modal size. Blue crabs were measured in ten millimeter (mm) increments and all crabs larger than 35 mm were sexed and immature and mature females were noted. A maximum of 50 shrimp from each sample was measured in ten mm increments.

All data were recorded on species data sheets. The state was divided into six water bady areas for tabulation of a species list as follows: Norther Pamlico Sound from Stump Point Bay to Abel's Bay; Pamlico and Pungo Rivers; Western Pamlico Sound and Neuse River from Pamlico Point to Cedar Island; the Outer Banks from Roanoke Island to Ocracoke Inlet; Core and Bogue Sounds from Cedar Island to Bogue Inlet; and the Southern Area from Bogue Inlet to the South Carolina line.

October 1978 - February 1979

Trawl sampling was conducted only in October and November, while salinity and temperature was obtained for all months. Stations and most of the methodology were the same as described in the first OCZM report (Carpenter 1979. p. 2-23. In: A Plan for Management of North Carolina's Estuarine Fisheries - Phase I. Semiannual Report for North Carolina's Office of Coastal Zone Management Fisheries Assistance Program Grant, March - September, 1978, 88 p.). Deviations in methods are explained below.

The state was divided into three areas for data tabulation as follows: Northern area = Northern Pamlico Sound from Stumpy Point Bay to Pamlico Point, Pamlico and Pungo Rivers, upper portions of the Neuse River and the Outer Banks; Central area = Western Pamlico Sound from Pamlico Point to Cedar Island, lower Neuse River, Core and Bogue Sounds, and the White Oak River; Southern area = from the White Oak River to South Carolina, including the New and Cape Fear Rivers. Previously the state was portioned into six areas.

Following completion of the 1978 sampling season several modifications in sampling procedures were made for the 1979 sampling period. Intensive sampling stations were selected to gather additional information on spot, croaker, weakfish and both species of flounder. At these stations fork lengths will be measured to the nearest millimeter for all individuals of the above species. A sample of at least five individuals of each species from these intensive stations will be returned to the lab for scale sample and to be weighed. These stations will be returned to the lab for scale samples and to be weighed. These fish will cover all sizes taken at the station. If specimens are lacking at the intensive stations, individuals from other stations will be substituted. This data will be used to generate length frequency curves and age growth data which will establish definitive limits for each year class of these commercial finfish. This information will be combined with that of the adult work.

Sampling Strategies for 1979 Sampling Season

At a March 1979 OCZM sampling meeting it was decided that more concentrated and detailed sampling would occur in selected areas. Nine stations in Bay River and two in Jarret Bay were selected for intensified effort (Table). At these selected stations all crabs, penaeid shrimp, croaker, spot, grey trout and southern flounder were counted and measured to the nearest mm (FL). If the sample was too large to work up in the field, it was returned to the lab on ice for counts and measurements. Also, a sample of 5 sepcimens of each of the four fish species (if present) were saved from each of the intense stations and returned to the lab. These fish were to cover all sizes present in the catch. If enough fish were not captured at each station, fish were to be added from other stations. Samples were taken as close to one month apart as possible. If there were not enough individuals of a certain species captured during a particular month at the intensive stations, then fish were tobe included from other stations. The purpose of this intensive sampling was to obtain nearest mm FL, nearest 0.1 gram

weight, and scales to perform length-frequency and age-growth analyses. The length-frequencies were compiled from field data and all age and growth work was combined with adult data from commercial haul seine, pound net and gill (sink) net samples. Except as noted below all OCZM stations and salinity (surface and bottom) was recorded at all stations, and tow lengths were standardized to one minute for 1/4" stations and five minutes for 3/4" stations.

Table . Program 120 (OCZM) Stations Selected for Intensified Effort in 1979.

Bay River		Jarrett Bay	
Chapel Creek	1/4" trawl	Smyrna Creek	1/4" trawl
Smith Creeek	1/4" trawl	Middle Jarrett Bay	1/4" trawl
Ball Creek	1/4" trawl		
Bear Creek	1/4" trawl		
Bear Creek	1/4" trawl		
Dump Creek	1/4" trawl		
Upper Bay River	3/4" trawl		
Middle Bay River	3/4" trawl		
Mouth Bay River	3/4" trawl		

Instructions for haul seine were as follows:

1. Pull seine 500 yards.
2. Morehead and Washington area were to make 2 "standard" hauls/month.
3. Take as many fish basket subsamples as possible.
4. Weigh each basket, count all fish, measure to nearest mm FL all of the 4 "important" species.
5. Take weight/species from each subsample.
6. Length - frequencies were to be taken from fish basket samples.
7. Identify all species in catch.
8. Determine average weight/basket of fish to estimate total catch (count # of fish baskets in catch, estimate CPUE)
9. Take subsample of 30 fish/species/haul for a total of 60 fish/species/month/area (of the 4 species).
10. Subsample did not have to be random and should have included all sizes present.
11. Fish were to be returned to the lab for length-weight analysis and scale samples.
12. Gonads of large sciaenids were to be preserved for study later in the year and to take gonad weights of females.

Other additions to the program or collaboration with other DMF projects included:

(1) Exact lengths from P. lethostigma encounted at all stations with length-weight data from specimens 30 mm Fl and blind side scales and both otoliths from specimens 100? 150? mm FL.

(2) Scale samples, length-weight data, and length-frequency data for individual species were returned to the following people from all state collections:

D. DeVries, R. Carpenter - spot
T. Sholar - weakfish
D. DeVries - southern flounder
S. Ross - croaker

(3) If enough fish were not obtained from the intensive stattions for the length-frequency and age-growth analysis , fish were to be included from other stations, irregular trawl sampling, and in the winter (Hatteras-north) from commercial trawlers and Dan Moore samples.

(4) Irregular trawl samples were to be conducted from Beaufort Hatteras Inlet in an attempt to fill in gaps from the haul seine work. Trawling was to be conducted from late fall through early spring utilizing the Dan Moore university boats.

(5) Accessory projects recommended but not funded (as of March 1979) included a sciaenid tagging program and a recreatonal fishery survey.

March - November 1979

Procedures: Present methods and modifications of former methods were explained by Carpenter and Ross (1979). To facilitate sampling and data analysis the state was divided into three areas as delineated in Figure 1.

Deviations: The major deviations occurred in the summer and fall when fish abundance droppedd at the intensive stations. At this time additional stations in the central and southern areas were treated as intensive to ensure an adequate number of specimens for length-frequency data. Seine stations in the central area were dropped in November as a prelude to excluding them premanently. They probably will be replaced by more productive and useful trawl stations. Outer Banks stations in the Northern area were deleted as well as a number of stations in the Southern Region.

The unit of effort was changed for the 3/4" stations in calculating catch per unit effort data is not readily comparable to that in the last report (Carpenter and Ross 1979).

Sampling Strategies for 1980 Sampling Season

In 1980 the OCZM trawl effort was stable at approximately 140 tows statewide. There were no major problems with the intensive station concept and each area was to keep the same number of intensive stations and the same methodology. Intensive sampling modifications were:

1. Maximum size of flounder to be used for otolith sampling was increased to 150 mm TL.

2. Maximum size of spot and croaker for scale analysis was increased to 100 mm FL.

3. Length-weight data can be reduced with reasonable subsampling if necessary.

4. After peak recruitment (April-June) numbers of target species may be do low that additional intensive stations will have to be sampled to obtain enough length-frequency data.

It was determined that the numbers data from seine stations was not producing enough information to be useful for management purposes. The seine data was apparently more useful to the anadromous sampling program than to OCZM. Morehead office dropped their 3 seine stations to be reported by 3-5 trawl stations to yield red drum and spotted sea trout. The Wilmington and Washington offices were to make decisions appropriate for their areas and personnel concerning future seine sampling.

At a February 1980 OCZM meeting the following were decided:

1. The sampling technique and data of the shrimp and OCZM project were to remain as separate sampling programs.

2. Trawl collections were to remain standard throughout the state at 1 minute for 1/4" trawls and 5 minutes for 3/4" trawls.

3. Unit of effort was defined as catch per tow and was to be separate for each year.

4. The majority of temperature/salinity sampling during December-February was dropped, except for a few stations in each area. From these, environmental parameters would be followed throughout the year. By obtaining this data correlation work could be done for spot, croaker, pint shrimp, ect.

5. Every effort would be made to keep sampling dates one month apart, and to ensure standardize tow times and distances.

6. Efforts were to be made to delineate new trawl stations in different habitats to obtain information on summer flounder and weakfish.

7. Blue crab data was collected from OCZM stations.

Station changes included the following:

SEINE STATIONS:

Morehead office dropped their 3 seine stations to be replaced by 3-5 trawl stations in different areas to yield species of red drum and spotted sea trout.

INTENSIVE STATIONS:

Morehead office dropped 2 intensive stations in Core Sound and will add 5 intensive stations in Bay River and maybe in Core Sound.

PROJECT TITLE:

PROJECT NO.: 2-372-R

FUNDING: Commercial Fisheries Research and Development Act

PERIOD COVERED: October-November 1980 and March-July 1981

PERSONNEL: J. Hawkins

STUDY AREA: Pamlico Sound South

Sampling Strategies for 1981 Sampling Season

Juvenile stock assessment methodology in 1981 included the following:

1. Primary nursery area stations were sampled with the same gear and techniques used in 1980
   - 1/4" trawl
   - 75 yards in 1 minute
   - stations in same locations

2. Blue crabs, penaeid shrimp, and all fish species were to be counted and measured. Fish measured to the nearest mm FL or TL.

3. The subsampling technique was reiterated to ensure collection of consistent data. Large piles of certain species were weighed. If more than 30-40 individuals of a particular species were present in any sample, a randomly selected subsample of 30-60 fish was to be measured, weighed and counted. By weighing both the large pile and subsample and counting the subsample and using an expansion factor, all the numbers in the pile could be estimated. The procedures were to be as follows

   - tailbag dumped
   - fish sorted by species
   - piles containing more than 30 fish would be well mixed
   - cut out a group of fish from the pile that visually seem to include 30-60 fish.
   - measure all fish in subsample, do not discard any.
   - If there is only one fish of a very different size than the rest of the individuals in a species pile, then measure that one fish in addition to the selected subsample.

- If there are several individuals of an odd size, mix there in with the whole pile of fish, so they have an opportunity to be sampled in the subsample.

In April it was decided that because of the two very different size groups of spot and croaker that were present in large samples they would be treated as separate entities. Each size group of spot and croaker (no other species) was to be subsampled, counted and measured separately if the catch of that species was large.

"Rare" species and non-numerous groups were all counted and measured.

Subsample of 30-60 bay anchovies would be measured.

Changes to the juvenile stovk assessment methodology in 1981 included:

1. Discontinued sampling of intensive sampling stations.

Beginning with March 1981 sampling season, the intensive station sampling was dropped.

Sampling Gear

The primary nursery area stations (92) were sampled witha 3.0 m Head rope flat trawl composed of 6.3 mm bar mesh knotted wings and body, with a 3.2 mm bar mesh knitted tail bag (1/4" trawl). Secondary nursery area stations (46) were sampled with similar gear, except the head rope measured 6.4 mm and the bar mesh was 19.2 mm in the wings (3/4" trawl). The secondary nursery area trawl was originally fitted with a 19.2 mm bar mesh tail bag; however, 1 6.3 mm bar mesh tail bag was installed in October, 1980 for the central area, in March, 1981 for the southern area, and in May, 1981 for the northern area. Both trawls were fitted with bottom towing doors and a tickler chain.

The primary and secondary nursery area trawls were standardized by towing at a speed necessary to cover 68.8 m in one minute. The primary stations were pulled for one minute and the secondary stations for five minutes. The following data were recorded at each station: data, location, tow time, gear type, and surface and bottom salinities and water temperatures.

All fish and crustaceans were identified and counted, with a maximum of 60 randomly-selected individuals per species measured during 1981. Most fishes were measured in fork length; however, total length was taken on species without a forked tail (Atlantic croaker, summer flounder, etc.). Disk width was recorded for skates and rays. Carapace width was recorded for all crabs, in addition to sex and maturity state for blue crabs. Exact lengths were taken on blue crabs during 1981 from the northern and central areas, and 10mm modal groups were recorded in the southern area. Shrimp were measured in total length and usually placed in 10 mm modal groups. Length frequency data were presented as moving averages of three, with frequencies rounded to a minimum value of

one if specimens were captured. Species abundance data were log transformed prior to seasonal abundance analysis to decrease the effect of extreme values.

10

PROGRAM 120 - JUVENILE STOCK ASSESSMENT
ELIZABETH CITY OFFICE

OBJECTIVES:

1. Develop juvenile indices of, and create a long term data base on economically important species.
2. Monitor seasonal abundance of economically important species.
3. Monitor size and species composition of economically important species.
4. Identify primary and secondary nursery areas.

HISTORY:

Juvenile work has been conducted under this program in other areas of the state for quite some time. Anadromous juvenile sampling (Program 100) in the Albemarle area has been the key juvenile program since the early 1970's. In 1982 a preliminary juvenile survey was conducted in Currituck Sound and its tributaries (61 samples were taken). Various sampling gears were used and the 3/4" stock assessment trawl (Gear 556) proved to be the most effective.

Twenty-two stations were selected from the preliminary survey to be sampled monthly June-October of each year. (5 seine stations and 17 trawl stations). Sampling procedures with Gear 556 were the same as those utilized in Program 120 being conducted in other areas, but this work was being funded under the anadromous project and thus, the data was entered in Program 100. (Project AFCS-16).

During 1984, eight of the trawl stations were dropped due to lack of catch or Eurasian watermilfoil had made it impossible to trawl in an area. (Project AFCS-22). (10 trawl stations and 5 seine stations).

Currituck Sound area data are available from 1982-June 1987 with the lightly chained net in Program 100. Near the end of June 1987, Gear 556 was changed (after Currituck Sound sampling) to the heavily chained net (Gear 558) to enable incorporation of crab sampling and juvenile sampling.

5587 Gear Code

During June preliminary sampling was conducted in North and Pasquotank River with Gear 558.

Beginning 1 July 1987, all trawl data collected with Gear 558 in Currituck Sound will be entered into Program 120 (all seine data will continue to be entered in Program 100). (10 trawl stations). One station (305), dropped in 1984, will be included in August 1987 sampling and there on monthly. Juvenile assessment stations added during June in Pasquotank and North Rivers, 7 and 8 respectively will be entered as Program 120. Stations that began during July in Alligator River and Albemarle Sound area will also come under this program.

Sampling methods and procedures will remain the same for all old and new stations as those in previous years (see Format A attached). Thirty to sixty individuals will be randomly selected from sorted species piles for length frequencies. See attached memo from Mike Street on appropriate species for measurements. A range and count will be recorded for all other species of fish. Penaeid shrimp and blue crabs will be counted and measured.

Sampling will occur monthly March/April-November of each year. Prior to first sample each year gear will be calibrated (75 yd/per min).

Initial Currituck Sound area sampling in 1982, was conducted by biologist and technicians, Sara Winslow (project leader), Nancy Sanderlin, Beth Burns, and R.C. Harriss, Jr. under AFCS-16 (Anadromous Fish Project), from the Elizabeth City office. Sara Winslow continues to head up the sampling project, both Currituck and new work out of that office.

PROGRAM 120:

Currituck Sound	11 stations
Pasquotank River	7 stations
North River	8 stations
Alligator River/Albemarle Sound	7 stations
	33

Program 120-Juvenile Stock Assessment

FORMAT A

The following should be completed to reflect current activities. Please note in written descriptions any deviations from the current activities listed below.

Record Type	Field Name	Units	Limits	Mandatory (M) vs. Desired (D)	Comments
1	Sequence No.	N/A	N/A	M	Assigned by Statistics Sec.
	Program	N/A	N/A	M	120
	DATE	N/A	N/A	M	
	Station No.	N/A	N/A	M	
	Starting Location	N/A	N/A	M	
	Time Gear ended fishing	N/A	0000-2400	M	
	Duration	minutes	5	M	
	Gear	N/A	558	M	on leg line-every 10"/13 links 3/16" galvanized chain
	Gear Param. #1	feet	20	M	
	Gear Param. #2	inches(bar)	.75	M	
	Gear Param. #3	inches	.25	M	
	Rig	N/A	1	M	
	Type of Tow	N/A	3	M	
	Depth	meters	N/A	D	
	Surface temp.	^{o}C	0-40	M	
	Bottom temp.	^{o}C	0-40	M	
	Surface salinity	PPT	0-40	M	
	Bottom salinity	PPT	0-40	M	

Program 120-Juvenile Stock Assessment

FORMAT A

The following should be completed to reflect current activities. Please note in written descriptions any deviations from the current activities listed below.

Record Type	Field Name	Units	Limits	Mandatory (M) vs. Desired (D)	Comments
	Variable Field #1 (Conductivity	N/A	N/A	D	Conductivity
	Surface DO	ppm	N/A	D	
	Bottom DO	ppm	N/A	D	
	weather element	N/A	N/A	D	
	wind direction	N/A	N/A	D	
	wind speed	N/A	N/A	D	
	alteration state	N/A	N/A	D	
	allowed fishing	N/A	N/A	D	
	No. of replicates	N/A	N/A	M	
2	collection size	N/A	N/A	M	Code as 9's
	sample size	N/A	N/A	M	Code as 9's
	No. of record type III's	N/A	N/A	M	
	quality	N/A	N/A	D	Record only if problem incurred Blank denotes 0
3	replicate No.	N/A	N/A	M	
	species code	N/A	N/A	M	
	species status	N/A	0-2	M	0 - all age groups 1 - young of the year 2 - yearling

Program 120-Juvenile Stock Assessment

FORMAT A

The following should be completed to reflect current activities. Please note in written descriptions any deviations from the current activities listed below.

Record Type	Field Name	Units	Limits	Mandatory (M) vs. Desired (D)	Comments
	collection No.	N/A	N/A	M	
	sample No.	N/A	N/A	M	
	subsample No.	N/A	N/A	M	
	collection wt.	kg	N/A	D	- for blue crabs only
	sample wt.	kg	N/A	D	- for blue crabs only
	subsample wt.	kg	N/A	D	- for blue crabs only
	form of record type IV	N/A	N/A	M	
4	line No.	N/A	N/A	M	
	frequency	N/A	N/A	M	
	length	mm	N/A	M	
	weight	kg	N/A	D	- for blue crabs only
	sex	N/A	1-3	D	- for blue crabs only
	maturity	N/A	1-9	D	- for blue crabs only

MEMORANDUM

TO: Katy West, John Gillikin and Terry Henley

FROM: Sara E. Winslow

SUBJECT: PROGRAM 120-Juvenile Stock Assessment-Elizabeth City Office

DATE: 2 MARCH 1988

The Elizabeth City Office will continue to sample the same juvenile stock assessment stations during 1988. We will begin sampling in March and continue through November. Samples will be worked up and coded as last year.

State of North Carolina
Department of Environment, Health, and Natural Resources
Division of Marine Fisheries
P.O. Box 769 • Morehead City, North Carolina 28557-0769

James G. Martin, Governor
William W. Cobey, Jr., Secretary

William T. Hogarth, Director
(919) 726-7021

MEMORANDUM:

TO: Paul Phalen and Teresa Gillikin

FROM: Sara E. Winslow, Biologist Supervisor

SUBJECT: Program 120 - Currituck Sound Area

DATE: 13 February 1992

Eleven Program 120 stations were sampled as follows in the Currituck Sound area:

1988	March - November
1989	June - November
1990	June - August
1991	June - October

The 1992 proposed sampling schedule will be May through October. Sampling methods and procedures will remain the same as in previous years.

Station numbers:		
	300	314
	301	315
	302	316
	303	318
	305	320
		321

Program 120 - Albemarle Sound Area

NAME	Water Body Code	Station #
Pasquotank River @ Marker 7	0202000000	PA1
New Begun Cr. @ mouth	0202060000	PA2
Pasquotank River @ Marker 1	0200150000	PA3
Alb. S - Pasq. R. entrance	0200150000	PA4
Pasquotank River @ Marker 2	0202000000	PA5
Texaco Beach	0202000000	PA6
Pasq. R. - off Whitehall Shore	0202000000	PA7
North R - mouth Broad Creek	0201120000	N01
North R @ mouth Camden Pt.	0201000000	N02
North R - marker 161	0201000000	N03
Lutz Creek	0201030000	N04
Deep Creek	0201050000	N05
North R - marker 154/153	0201000000	N06
North R - off Green Is.	0201000000	N07
North R @ marker 133	0201000000	N08
Albemarle S - off Durants Is.	0200160000	162
Albemarle S - Alligator R marker 1	0200160000	AL1
Alligator R @ marker 10	0214000100	AL2
Alb. S - @ AS Buoy	0200150000	161
East Lake - off Barge	0214060000	AL3
Alb. S - Long Shoal Pt / Pledges Land.	0200140000	163
Little Alligator R.	0214010000	AL4

Program 120 - Currituck Sound Area

	NAME	Water Body Code		Station #
	Dean Gwite Creek	0101000000		300
	Mid-Sound off Martin Pt.	0100010000		301
	N-side of Bridge	0100010000		302
	South of Throttle Is.	0100010000		303
*	North of Duck	0100010000	Add effective 8-87	305
	Knotts Is. Bay	0111000000		314
	Coinjock Bay - off Long Pt.	0113000000		315
	Marker #99	0100050000		316
	South of Launch	0114000000		318
	Tulls Bay	0114020000		320
	Off Troublesome Pt.	0114000000		321

(11)

NCDENR
North Carolina Department of Environment and Natural Resources
Division of Marine Fisheries
Michael F. Easley, Governor
William G. Ross Jr., Secretary
Preston P. Pate Jr., Director

MEMORANDUM

To: Program 120 Documentation File

From: Sara E. Winslow, Northern District Manager

SUBJECT: Elizabeth City Office Program 120 Sampling

Date: June 14, 2004

Elizabeth City staff continued Program 120 sampling in various areas in the Northern District through 1992. Due to the loss of personnel as a result of federal aid budget cuts sampling ceased.

However, based on DMF sampling and areas meeting the nursery area criteria the following areas were designated by the NC Wildlife Resources Commission as Inland Primary Nursery Areas:

North River
Broad Creek- Camden County- Entire stream
Deep Creek- Currituck County- Entire stream
Lutz Creek- Currituck County- Entire stream

Alligator River
East Lake- Dare County- Entire stream
Little Alligator River- Tyrrell County- Entire stream

Currituck Sound
Martin Point Creek (Jean Guite Creek)- Dare County- Entire stream
Tull Creek and Bay- Currituck County- Tull Bay to mouth of Northwest River; Tull Creek from mouth upstream to SR 1222 bridge.

Subject: program 120 water level
From: Katy West <Katy West@ncmail.net>
Date: Fri, 13 Feb 2009 11:19:17-500
To: Margaret Tyndall <margaret.tyndall@ncmail.net>
CC: Roxanne Russell <roxanne.russell@ncmail.net>, Carol Etheridge <carol.etheridge@ncmail.net>

Maggie,

Please update the program 120 documention waterlevel field as follows

123	Water Level	(WaterLvl)	N/A	A-G, I-M	D	Lunar:

A= High Ebb, B= Mid Ebb, C= Low Ebb, D= Low Slack

E= Low Flood, F= High Flood, G= Mid Flood

Wind :

I= High, J= Normal , K =Low , L= Flood, M= Ice

V. Reference Resources

Information not available at this time.

Funding Information

Program Number	Status	Program Description	Grants Associated with Program
Program 120	Active	North Carolina Estuarine Trawl Survey	State; CZM; PL88-309;