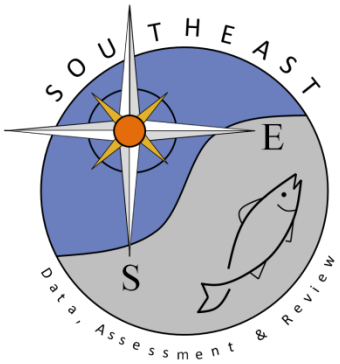
SCDNR Crustacean Monitoring Trawl Sampling

Larry DeLancey

SEDAR-PW6-WP01

Submitted: 25 April 2014



This information is distributed solely for the purpose of pre-dissemination peer review. It does not represent and should not be construed to represent any agency determination or policy.

Please cite this document as:

DeLancey, L. 2014. SCDNR Crustacean Monitoring Trawl Sampling. SEDAR-PW6-WP01. SEDAR, North Charleston, SC. 5 pp.

DESCRIPTION OF CRUSTACEAN MONITORING TRAWL SAMPLING

METHODS: A 20' headrope flat otter trawl with tickler chain, 1" stretch mesh, is towed for 15 minutes parallel to the shore. The direction of the tow may be with or against the tidal flow, depending on stage of tide, depth, and wind speed and direction. The success of the trawl effort is much better if the tidal velocity is low. After retrieval with the electric winch, the catch is deposited in a standard shrimp basket. The contents may be weighed if the quantity is sufficient to subsample (a sample size of a few pounds of shrimp). The excess sample is returned to the water alive, after target organisms such as blue crab and horseshoe crab are removed.

The shrimp sample is then sorted to shrimp species, weighed, and up 50 specimens are measured for total length, with gross disease symptoms noted. White shrimp in spawning condition are sexed and female ovarian development stage is noted. A quantity of shrimp up to five pounds are counted and headed. Shrimp are added or removed to achieve a tail count average (three pounds), which is an industry standard. Any remaining shrimp are counted to yield the total number in the subsample (estimated total number in catch = (total weight of catch/subsample weight) X number in subsample). Blue crab are sexed, measured (carapace width), with molt sign and maturity stage recorded. Horseshoe crab are sexed, measured (prosoma width), and weighed.

At the conclusion of the cruise, catch rates of shrimp and blue crab compared to decadal means are reported internally within DNR to staff with an interest in the fishery. Individual station and catch data are entered into an Access data base. The annual data is retrieved and converted to ASCII format for comparison to the 30+ year data set using SAS.

LOCATION OF STATIONS AND FREQUENCY OF SAMPLING

Charleston Harbor Because of its location adjacent to the Marine Center, Charleston Harbor has been sampled extensively since the 1970s. It was first sampled in the 1960's by MRD's predecessor, Bears Bluff Laboratories, at Wadmalaw Is. Many of the locations currently sampled by CMS were originally trawled by the Bears Bluff lab to manage the shrimp fishery. Sampling locations are fixed. A list of stations and brief description follow. Salinity in the system increased substantially following rediversion of the Cooper River in 1985. The area offshore is an important shrimping area. Fort Johnson (CH09) Depth 20-35', mud-sand. A key indicator station for shrimp and blue crab, generally productive.+

Anchorage (CH07) Depth 25-50', mud-sand, occasional sea whip. A staging area for shrimp before moving offshore into commercial shrimping areas. A key location for overwintering white shrimp.+

Lower Ashley River (CH10) Depth 20-25', mud. Nursery area for all species. Often moderate to heavy detritus, a good refuge for small shrimp and blue crab.+

Upper Ashley R. (CH18) Depth 12-15' mud. Contains a sand tube polychaete reef in the last decade, probably reflective of higher salinities. When first consistently sampled in 1988, salinity was much lower, and still drops to <5 ppt. after heavy rain.

The previous four stations are currently sampled at least on a monthly basis. Sampling dates are chosen so that the R/V Silver Crescent may pass under the Highway 17 bridge on the Ashley River around low-mid tide. Dates are chosen in late April and early May to assess the spawning condition of white shrimp prior to season opening, so that an estimate of percentage of spawning can be made. Increase in size of brown shrimp is noted in June to predict size in the commercial fishery. Dates at other times of the year are chosen to assess white shrimp stocks prior to the predetermined opening of shrimp baiting season, and to monitor effects of cold temperatures in winter. March and April catch rates of white shrimp are combined with data from locations south of Charleston to predict spring commercial harvest (Whitaker, unpubl. rep.).

Rebellion Reach (CH08). Depth 30-50'. Sand-mud, live, shell. Deepest station sampled in state. Generally sampled for brown shrimp in June; overwintering and prespawning white shrimp.

Wando R. (CH17). Depth 10-20'. Sand-mud, some "live" bottom. Adjacent to State Ports Authority. Productive for white shrimp in fall.

Beresford (Nowell) Creek (CH11). Depth 10-35'. Sand-mud, live bottom, shell. Good habitat for pink shrimp, can be productive for all species.

Morris Island Slough and Beach (CH05,06). Depth 15-25' Sand. Sampled primarily in spring for spawning white shrimp. Part of the General Trawling Area (not sampled during shrimp season).

South of Charleston These stations are currently sampled in March, April, August, and December. Although the original purpose was to sample for white shrimp, blue crab and horseshoe crab (required by ASMFC) information is also collected. In the most recent decade, blue crab are present Dec.-April. Other cruises may be scheduled to meet specific needs: documentation of cold kills, presence of exotic shrimp, composition of bycatch, shrimp tagging, etc. The locations are close to the Intercoastal Waterway, allowing for rapid assessment and reporting.

North Edisto R. The offshore area is a major shrimping area, characterized by Pleistocene mud deposits.

Martin's Point (NE09) Depth 25-30'

Toogoodoo Cr. (NE07) Depth 15-25'. Sand-mud, sponge. Good habitat for pink shrimp.

Dawho River (NE06) Depth 10-15' mud. Generally productive

Point of Pines (NE04) Depth 25'. Spring for mature blue crab.

South Edisto R. (SE02) Single station. Mud. 25-30'. A low salinity station, whereas most are high salinity in the sampling regime.

St. Helena Sound One of the more historically productive white shrimping areas, the lower portions of which are open to commercial shrimp trawling, as are the other lower sounds.

Ashepoo R. (SH01) Depth 20-25'. First station in ACE Basin.

Rock Creek (SH03) Depth 20'

Combahee Slough (SH15) Depth 10-15'. Sand, live. This shallow station is sampled on mid-high tide, as is the next. Tidal stage here determines the sequence of remaining stations in a given cruise and the date of the cruise.

Bottleneck (SH07), Coosaw R. Depth 10-20' Mud, detritus. These two stations were former commercial trawl locations, when the "Sound and Bay" fishery was prosecuted until 1986.

Morgan Is. (SH08) Depth 15-25'. Mud-sand

Other stations in this area are sampled occasionally to provide additional observations on white shrimp or blue crab.

Port Royal Sound The highest salinity water body sampled. No large freshwater input.

Fort Fremont (PR13) Depth 25'. Mud-sand, live. Former commercial trawl location.

Inside Middle Marsh, Beaufort R. (PR01) Depth 20'. All these station bottoms mud-sand, live.

Station Cr. (PR03) Depth 25'. A true creek; usually smallest shrimp in system.

Mackay Creek (Mouth)(PR08) Depth 25-35'.

Foot Point, Colleton R. mouth (PR06) Depth 25-35'.

Callawassie Is., upper Colleton R. (PR07) Depth 25-30'.

Dolphin Head (PR09), Hilton Head shoreline closest to Intercoastal Waterway. 30'. In General Trawling Zone

Calibogue Sound High salinity, similar bottom type to Port Royal Sound. Lower Sound stations were near the original Bears Bluff sampling sites in 1953.

May River, near mouth (CS08). Depth 25-30'.

Inside Middle Marsh Is. (CS07). Depth 20-30'. Generally largest white shrimp tow.

Outside Middle Marsh Is. (CS06). Depth 25-35'.

Daufuskie Is. (CS01). Depth 20-30'. Closest to commercial shrimping grounds.

Many of the above locations are adjacent to popular shrimp baiting areas. The August cruise data for white shrimp is used to give a general season outlook combined with weather caveats.

North of Charleston- Bulls Bay and Winyah Bay These areas have been sampled seasonally in the past. With current budget and manpower restrictions, D. Cain (Georgetown Regional Bio.), samples occasionally. 4-5 stations in each system.

DATA SUMMARY Charleston Harbor is currently sampled monthly for crustaceans and finfish, and two-four additional days in May and June. **Four core stations**: **Upper and Lower Ashley River, Fort Johnson, and Anchorage. Wando River** stations and **Rebellion Reach** are sampled occasionally. The latter stations were sampled more frequently until 2010. **Total trawl samples/year = 48~54.**

Stations **south of Charleston** are sampled in **March, April** to assess spring white shrimp stocks, and **August, December** to assess fall white shrimp. **Total trawl samples/year = ~80.**

Prior to the early 2000's budget cuts, trawl sampling was more frequent, often **totaling 200+ trawl samples.**

Changes in trawl sampling include: reduction in tow time from 30 to 15 minutes (mid 1980s) and change in vessel and number nets (twin trawls to single trawl; 2002). Catches

have been standardized to 15 min. tow time, two net totals. CH18, Upper Ashley River, was added in 1988.