

Appendix S. Acoustic sampling to identify red drum, spotted seatrout, and black drum spawning locations in South Carolina and Georgia.

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Over the past few years, we have used underwater microphones to investigate spawning activities of the spotted seatrout (*Cynoscion nebulosus*), the red drum (*Sciaenops ocellatus*) and the black drum (*Pogonias cromis*). All of these species are members of the family Sciaenidae (the drums); these species in particular have been found to make species-specific sounds positively correlated with active spawning aggregations.

Since these species have seasonally distinct spawning seasons, our yearly efforts have begun as early as late March (black drum spawning occurs throughout April), and continued through late September (spotted seatrout spawn from May through August; red drum from August through September). Of special interest is the fact that even though spotted seatrout and black drum spawn in many locations distinct from those of red drum, all three species are found to utilize the few documented areas where red drum spawn (see chronology below). Our only plans for 1998 are to further investigate red drum spawning activity in Port Royal Sound. If red drum are found in this area, we will have confirmed only three locations in the coastal regions of South Carolina; all along the southern part of our coast.

We believe that red drum must spawn in more than the three locations found within the confines of our estuaries and coastal inlets, especially since no spawning locations have been identified north of the Charleston Harbor entrance. We believe that spawning activity must be occurring in offshore waters (possibly in the nearshore shoals near Cape Romain) but presently do not have the resources to effectively investigate such a phenomenon.

Listed below is a brief history of our fish sound detection.

Chronologically:

South Carolina waters:

1990 -surveyed for red drum and found only spotted seatrout aggregations (verified by capturing spawning females in noisy fish group) in Charleston Harbor and all coastal inlets to and including Bulls Narrows at the north end of Bulls Island. 1991 surveyed Charleston Harbor and found Black Drum sounds in the harbor entrance during the spring, spotted seatrout noises in many discrete spots within the estuary (including the harbor entrance), and one incidence of red drum spawning, once again in the harbor entrance.

1992 - surveyed for black drum in Harbor area, paid little attention to spotted seatrout, focused on red drum near Ft. Sumter. All three of these species were found in spawning aggregations in the Charleston Harbor entrance.

1993 -conducted extensive surveys throughout the local region, beginning in the Charleston Harbor entrance for each, and ending well away from the ocean up major rivers and along the Intercoastal Waterway north of Charleston. Found incidence of all three species: - Black drum restricted to lower estuary in deep holes - Spotted seatrout all over, in every system

investigated - Red drum ONLY in the one spot at the entrance to Charleston Harbor. No effort was made to venture past the end of the Charleston Harbor jetties.

1994 - delays in remote hydrophone construction, plus design problems, caused little extended remote sampling, primarily in preplanned areas offshore of inlets and near artificial reefs.

We have made efforts to survey inlets along the SC coast from Winyah Bay to Calibogue Sound. During the time of day during which we knew red drum activity was occurring in the Charleston Harbor entrance, we listened in:

- Winyah Bay
- Santee River mouth
- Cape Romain
- Capers Inlet
- Deweese Inlet
- Breach Inlet
- Charleston Harbor Inlet
- Stono Inlet
- North Edisto Inlet
- South Edisto Inlet
- St. Helena Sound and inlet Port Royal Sound Inlet
- Calibogue Sound Inlet

The only places in which red drum activity was detected, other than the Charleston Harbor entrance, was inside St. Helena Sound in about 35 - 50 feet of water. The inlet area of St. Helena produced no red drum noise.

1996, 1997 Efforts to expand into the lower part of South Carolina to investigate red and black drum spawning sound production was spotty. An additional potential red/black drum spawning location requiring future investigation is in the Port Royal Sound immediately north of Hilton Head Island. Black drum were found in this spot, but technical difficulties precluded the establishment of red drum utilizing this location.

Georgia waters:

1995, 1996, 1997 - Drs. Louiz and Susan Barbieri of the Sapelo Marine Institute investigated red drum spawning locations in Georgia coastal waters. Their only positive identification of red drum spawning activity was in Cumberland Inlet near the Florida state border. Additional information from the Georgia research is pending.