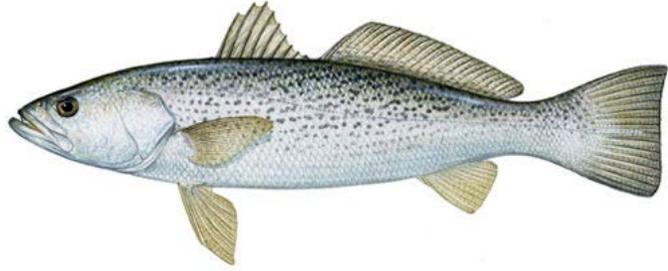


Weakfish*Cynoscion regalis*

Contributor (2013): Erin Levesque
(SCDNR)

**DESCRIPTION****Taxonomy and Basic Description**

The weakfish, *Cynoscion regalis* (Bloch and Schneider 1801), is a member of the Sciaenidae, or drum, family. Diagnostic characters include a rather large mouth with a pair of large canine teeth in the upper jaw, a silvery body with dark speckles along the dorsal surface, and yellowish pelvic and anal fins. In South Carolina, the weakfish is found predominantly in estuaries as juveniles and in shallow coastal waters as adults. The species may be confused with the closely related spotted seatrout (*C. nebulosus*), silver seatrout (*C. nothus*), and sand seatrout (*C. arenarius*). Weakfish can be clearly differentiated by the presence of only one marginal pore on the snout, while the three other species have two pores. However, hybridization between species may sometime occur (Tringali et al. 2011). The South Carolina state record weakfish was caught in 1981 near Parris Island and weighed 5.4 kg (11 lbs., 13 oz.) (SCDNR 2013).

Status

The most recent stock assessment for weakfish concluded that the stock was depleted, but not currently undergoing overfishing (ASMFC Weakfish Technical Committee 2009). Total mortality was determined to be increasing, but this was attributed to an increase in natural mortality over the last decade rather than fishing mortality. However, in order to account for changes in natural mortality, Addendum IV was added to Amendment 4 of the weakfish fishery management plan (ASMFC 2009). It put in place more restrictive catch regulations, both recreationally and commercially, by enacting the following measures:

Recreational fishery – “All states in the management unit (including those that are *de minimis*) may continue recreational fishing at current size limits, but are required to reduce the creel limit to one fish.”

Commercial fishery - “All states in the management unit (including those that are *de minimis*) must implement a 100 pound landings limit, per vessel, per day or trip (whichever is the longer period of time) for directed fisheries, with all other regulations maintained, in order to continue commercial fishing.”

“Reduce the bycatch limit to 100 pounds, per vessel, per day or trip (whichever is the longer period of time) for all non-directed fisheries (those harvesting weakfish during closed seasons, from closed areas, or not meeting gear restrictions; this includes the southern penaeid shrimp fishery).”

South Carolina has a recreational fishery for weakfish but no targeted commercial fishery. However, South Carolina does have a penaeid shrimp fishery in nearshore waters. The trawl gear and the areas where commercial shrimpers fish make weakfish a likely by-catch species. Currently, observer coverage on these vessels is insufficient to identify and quantify by-catch.

POPULATION SIZE AND DISTRIBUTION

Weakfish are found along the Atlantic Coast from southern New England to Florida, occurring in highest numbers in the mid-Atlantic area (New York to North Carolina) (Wilk 1979). Recreational catches have been on the decline coastwide since the mid-1980s (Fig. 1).

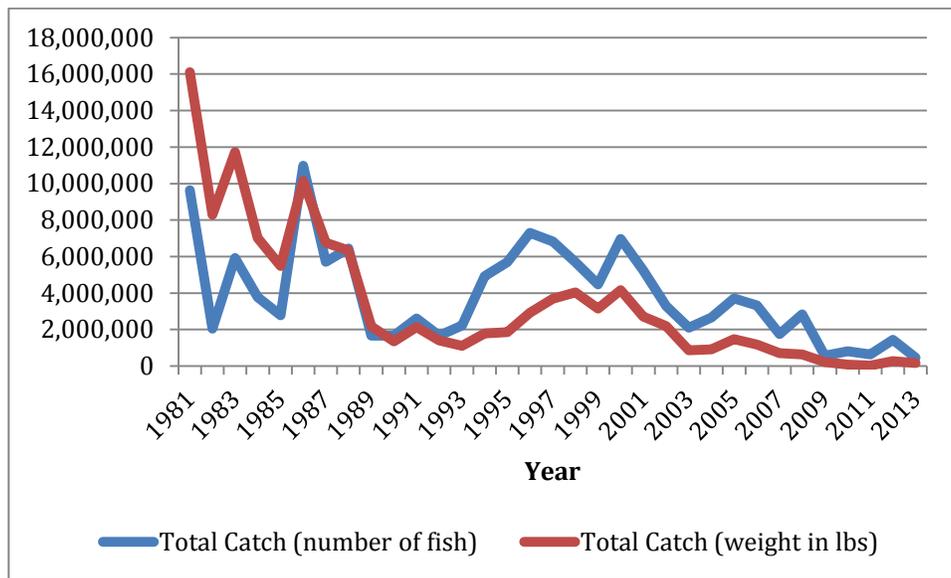


Figure 1. Total recreational catch of weakfish along the Atlantic coast by number and weight (MRIP NMFS <http://www.st.nmfs.noaa.gov/st1/index.html>).

Catch data from the SEAMAP fishery-independent survey in South Carolina's waters during summer and fall (when weakfish are most abundant in nearshore waters) were examined to determine whether they followed the same trends as harvest in the recreational fishery, as reported by the MRIP (Marine Recreational Information Program, NMFS). These data, however, do not appear to follow similar trends. This can partially be explained by the size distribution of those weakfish caught in the SEAMAP survey, which are largely made up of smaller, younger fish. Fish that are legal to harvest—at least 12 inches in length—may have a greater chance of escaping a trawl net or may select different habitats. Still, even if the SEAMAP survey is considered as a juvenile index, a lag time of 1 year could be expected until those fish are large enough to recruit to the recreational fishery; however, MRIP data has peaked and dipped out of sync with high and low CPUEs experienced in the SEAMAP survey (Fig. 2).

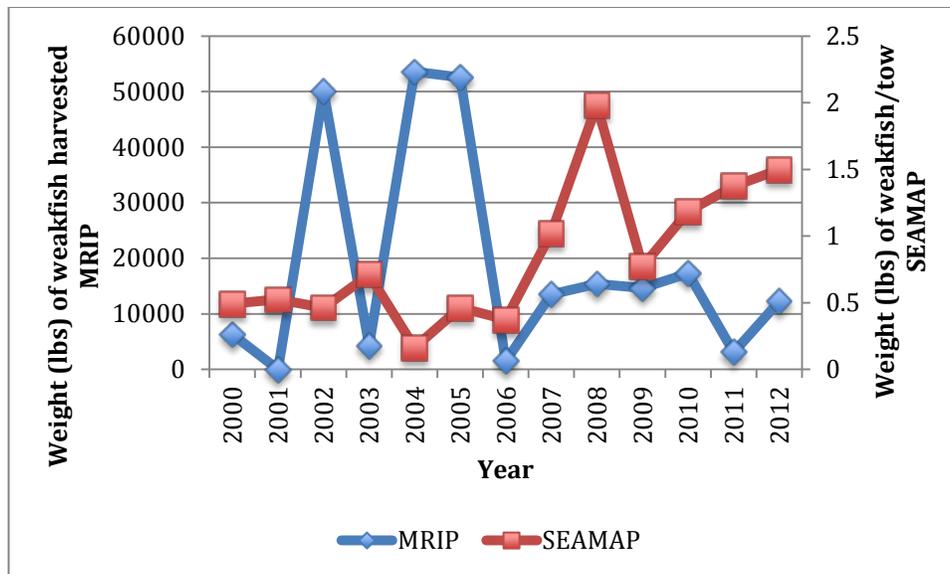


Figure 2. Harvest of weakfish in pounds from the MRIP and mean catch of weakfish in pounds by tow from the SEAMAP survey.

HABITAT AND NATURAL COMMUNITY REQUIREMENTS

During warmer months of the year, weakfish adults live in nearshore coastal waters and inside bays and estuaries. In the winter, they aggregate and move farther offshore and possibly south to warmer, more stable water temperatures (Bigelow and Schroeder 1953; Mercer 1985; Wilk 1979). In South Carolina, the recreational fishery for weakfish begins in the late fall and continues through winter and early spring, taking advantage of the large schools that form offshore, often associated with live-bottom.

Weakfish have a protracted spawning season from spring through late summer. Males attract females with sounds produced by vibrating their swim bladder using adjacent musculature. Larval and juvenile weakfish make their way from nearshore spawning grounds to shallower, lower salinity nursery habitats inside of estuaries. Weakfish mature at approximately one-year old, the first spring/summer after they are spawned (Lowerre-Barbieri et al. 1996).

Diet of juvenile weakfish consists mostly of shrimp and anchovies and shifts in adults to larger fish including clupeids, sciaenids, carangids, and other locally abundant fishes that inhabit the mid-water column where weakfish tend to feed (Merriner 1975; Wilk 1979; Bowman et al. 2000).

CHALLENGES

Recreational harvests of weakfish have been in a precipitous decline along the entire Atlantic Coast (Fig. 1). The South Carolina harvest typically makes up a very small proportion of the entire harvest and has declined at a slower rate than areas further north. As a result, however, the South Carolina weakfish fishery now comprises a larger portion of the total Atlantic Coast harvest, even though the pounds of weakfish harvested annually in South Carolina have been below the long-term mean of 20,422 pounds since 2006 (before the bag limit decrease in 2010).

If factors contributing to natural mortality (predation, competition) decrease again in future years, South Carolina may serve as a source population for areas where there have been more significant population declines.

Although recreational catches are currently limited to 1 weakfish/person/day, fishery managers have no data on weakfish by-catch by the shrimp trawl fishery; therefore, it is not known whether discard mortality has significantly contributed to weakfish population declines.

Since weakfish use waters off the coast of South Carolina as winter habitat, any dredging activity that adversely affects water quality or live bottom habitat where weakfish aggregate could negatively impact adults. Dredging activity that increases suspended sediment and reduces oxygen levels in shallow estuarine habitats could also impact the survival of larval and juvenile stages.

CONSERVATION ACCOMPLISHMENTS

The State of South Carolina lost its *de minimis* management status for weakfish in 2009 because its combined recreational and commercial catch exceeded 1% of the total Atlantic Coast catch. Therefore, the State is now subject to the ASMFC Weakfish Management Plan regulations of 1 fish per angler per day with a 12 inch total length limit (reduced from 10 fish per angler per day prior to 2010).

CONSERVATION RECOMMENDATIONS

- Collect catch and effort data including size and age composition of the catch (harvested and released).
- Derive alternative estimates of discard mortality rates and the magnitude of discards; in particular, quantify trawl by-catch and refine estimates of mortality for below minimum size fish.
- Identify stocks and determine coastal movements and the extent of stock mixing, including characterization of stocks in over-wintering grounds.
- Develop latitudinal/seasonal/gear-specific age length keys for the Atlantic Coast. Increase sample sizes to consider gear specific keys.
- Initiate monitoring of weakfish diet, and potential competitors/predators.
- Examine geographic and temporal differences in growth rate (length and weight at age).
- Compile data on larval and juvenile distribution from existing databases in order to obtain preliminary indications of spawning and nursery habitat location and extent.
- Conduct hydrophonic studies to delineate weakfish spawning habitat locations and environmental preferences (temperature, depth, substrate, etc.) and enable quantification of spawning habitat.

MEASURES OF SUCCESS

Currently, South Carolina supports a small, directed, recreational fishery for weakfish during colder months of the year. Continued angler support of the decreased bag limit is vital in order to

allow stock to increase in response to changes in natural mortality. Furthermore, investigations of discard mortality, migration habits, identification of predators and competitors in South Carolina, and juvenile recruitment will greatly benefit the future success of the species.

LITERATURE CITED

- ASMFC. 2009. Addendum IV to amendment 4 of the weakfish fisheries management plan. Atlantic States Marine Fisheries Commission. <http://www.asmfc.org/uploads/file/weakfishAddendumIV.pdf>
- ASMFC Weakfish Technical Committee. 2009. Weakfish stock assessment report. <http://www.nefsc.noaa.gov/publications/crd/crd0915/pdfs/weakfish.pdf>
- Bigelow, H. B., and Schroeder, W. C. 1953. Fishes of the Gulf of Maine. Fisheries Bulletin. US Fish and Wildlife Service. 53:417-423.
- Bowman, R. E., Stillwell, C. E., Michaels, W. L., and Grosslein, M. D. 2000. Food of Northwest Atlantic Fishes and Two Common Species of Squid. NOAA Technical Memorandum NMFS-NE-155. 149 p.
- Lowerre-Barbieri, S. K., Chittenden, M. E., and Barbieri, L. R. 1996. The multiple spawning pattern of weakfish, *Cynoscion regalis*, in the Chesapeake Bay and Middle Atlantic Bight. Canadian Journal of Fisheries and Aquatic Sciences 55: 2244-2254.
- Mercer, L. P. 1985. Fishery management plan for weakfish. Washington (DC): Atlantic States Marine Fisheries Commission. Fishery Management Report NO. 7. 140 p.
- Merriner, J. V. 1975. Food habits of the weakfish, *Cynoscion regalis*, in North Carolina waters. Chesapeake Science 16:74-76.
- Merriner, J. V. 1976. Aspects of the reproductive biology of weakfish, *Cynoscion regalis* (Sciaenidae), in North Carolina. Fisheries Bulletin US 74:18-26.
- South Carolina Department of Natural Resources (SCDNR). 2004. Saltwater Game Fish Records for South Carolina. Available <http://www.dnr.state.sc.us/marine/saltrecs/saltrec.html> (Accessed: January 2005).
- Tringali, M. D., Seyoum, S., Higham, M. & Wallace, E. M. 2011. A dispersal-dependent zone of introgressive hybridization between weakfish, *Cynoscion regalis*, and sand seatrout, *C. arenarius*, (Sciaenidae) in the Florida Atlantic. Journal of Heredity, 102: 416-432.
- Wilk, S. J. 1979. Biological and fisheries data on weakfish (*Cynoscion regalis*). Highlands (NJ): NMFS James J Howard Marine Sciences Laboratory. Technical Services Report No. 21. 49 p.