

## Sheepshead

### *Archosargus probatocephalus*

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## DESCRIPTION

### Taxonomy

The Sheepshead, *Archosargus probatocephalus* (Walbaum 1792), is a relatively large representative of the porgy family (Sparidae), most commonly found around hard bottom and structure occurring in South Carolina's estuarine and coastal waters.

### Basic Description

The Sheepshead is greenish-gray to silvery in color, with five to seven distinct vertical black bars and an oval shaped, laterally compressed, deep body (Manooch 1984; Smith 1997). The black bars remain very distinctive throughout the life of the fish. The mouth is of medium size, with prominent incisor-like teeth in the front and molars and grinding teeth in the rear. There are no barbels on the lower jaw. The posterior nostril is slit-like in appearance and the pectoral fins are long, extending beyond the anal opening when pressed close to the body (Böhlke and Chaplin 1993). The caudal fin is shallowly forked. The dorsal and anal fins possess strong spines, with the second spine of the anal fin being prominently enlarged (Robins and Ray 1986). Juvenile Sheepshead are sometimes confused with young Atlantic spadefish (*Chaetodipterus faber*) or black drum (*Pogonias cromis*) when encountered in estuarine waters.

Adult Sheepshead can attain a length of 76 cm (30 in.), and typically weigh from 2.3- 6.8 kg (5-15 lbs.). Fish in the 9-11.3 kg (20-25 lbs.) range are occasionally landed (Manooch 1984). The current recreationally landed record Sheepshead in South Carolina is 7.4 kg (16 lbs., 6 oz.) (SCDNR 2012).

Sheepshead can have a total lifespan of 20 to 25 years, and can begin to sexually mature as early as age 1 (McDonough et al. 2011). Through fishery-independent and fishery-dependent collection of 509 Sheepshead sampled for age-growth analysis in Georgia (Woodward et al. 2000), the maximum age through otoliths analysis was determined to be 17 years. In a similar effort conducted in South Carolina, the oldest individual Sheepshead captured and aged by examination of otoliths was 26 years of age (Wenner 2004). Age-length data acquired by Wenner (2004) and McDonough et al. (2011) for Sheepshead in South Carolina show that fish on average reach about 25 cm (10 in.) fork length (FL) at the end of their first year, where about half of the fish remain sexually immature. Nearly all of the members of the population are mature at about 35 cm (14 in.) in length (FL), or 3 to 5 years in age (Wenner 2004; McDonough et al. 2011). Sheepshead display a fairly rapid growth rate up to about age 6; size increases slowly thereafter with age.

Sheepshead are serial spawners; they spawn multiple times within a season. Females in South Carolina have been found to be capable of producing anywhere from 18,400 to 738,500 eggs per spawning event, depending on age and location (McDonough et al. 2011). This is much higher than the 1,100 to 250,000 per spawning event estimated in the Gulf of Mexico (Render and Wilson 1992; Tucker and Barbera 1987). Spawning has been documented to occur in coastal waters from late winter through early spring through the mid-Atlantic and Gulf of Mexico, with hatching of eggs occurring within 28 to 40 hours from time of fertilization, depending on water temperature. Estimates of spawning frequency determined by the presence of post-ovulatory follicles for Sheepshead in South Carolina ranged from 2.5 to 20 days with an average of 7 days or once a week. With an approximate spawning season of 14 weeks (February-early May), total annual fecundity could range from 250,000 to 10,339,000 eggs per female per year (McDonough et al. 2011).

Sheepshead are an omnivorous species, feeding on a wide range of items including invertebrates, small vertebrates, and some plant material. Large juveniles and adults have been known to prey on small crustaceans, oysters, clams, and even smaller finfish (Bester and Robins 2005). Sedberry's 1987 analysis of the stomach contents of Sheepshead taken from offshore hard bottom areas in the South Atlantic Bight demonstrated the importance of sessile invertebrates as an important dietary component for this species. Smaller Sheepshead were found to have been feeding heavily on bryozoans, while larger specimens also included bivalves, echinoderms and ascidians in their diet. Both large and small Sheepshead also feed to a lesser extent on barnacles, decapods, foraminiferans, cnidarians, polychaetes, gastropods and small arthropods as well.

The Sheepshead's ability to maintain such a wide-ranging diet is supported by its rather unique dentition, as well as physical changes that can occur developmentally within its oral-jaw crushing musculature (Hernandez and Motta 1997; Cutwa and Turnigan 2000). Older fish, or fish that are in an environment where hard-shelled prey items are abundant have a much better developed feeding apparatus, capable of significant crushing power.

Sheepshead are found in waters ranging from Nova Scotia to the Gulf of Mexico, and southward to Brazil (Manooch 1984). Populations of Sheepshead occurring in South America and in parts of the Gulf of Mexico are regarded as two separate subspecies. Sheepshead are year-round residents from about South Carolina through the Gulf of Mexico, and most abundant to the north between April through November. They are found in coastal waters, bays and estuaries, and are tolerant of low salinity brackish waters as well.

Sheepshead are most frequently encountered near some type of structure like pilings, jetties, oyster reefs, artificial reefs and coastal live bottom. Their close association with manmade reefs in South Carolina is documented as far back as the mid 1800s (Holbrook 1860). As a consistently popular species sought after by serious recreational anglers, their year-round presence in South Carolina waters can be documented through SCDNR creel survey data. These data indicate that the ten-year averages of the monthly percentage of annual Sheepshead landings from surveying private boat anglers at coastal boat landings is relatively constant year-round. The data were collected as part of South Carolina's State Recreational Fisheries Statistics Survey (SC SRFSS) program.

Table 1: Monthly percentages of total annual Sheepshead landings by recreational boat anglers in South Carolina averaged over the previous 10 years (2001 – 2011).

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
3.8%	4.6%	7.8%	7.1%	11.0%	10.2%	9.0%	7.4%	9.9%	12.3%	13.1%	7.1%

While fish are present in the fishery every month of the year, there are peaks in landings in the spring and fall months. Examination of National Marine Fisheries Service (NMFS) Marine Recreational Fisheries Statistics Survey (MRFSS) data for the South Carolina Sheepshead fishery shows clearly that the fishery is made up primarily of private boat anglers targeting the fish in inland and nearshore waters (NMFS 2005).

### Status

The exact status and health of Sheepshead populations in South Carolina's coastal waters is uncertain at this time. The species used to be federally managed as part of the South Atlantic Fishery Management Council's (SAFMC) Snapper Grouper Fishery Management Unit, but it was removed from this unit in April 2012 and is now managed by individual states.

While Sheepshead are targeted commercially to a limited degree in some areas, this species is typically recognized for its popularity among recreational anglers in coastal waters along the mid-Atlantic through Gulf of Mexico. In creel/angler surveys conducted by the South Carolina Department of Natural Resources (SCDNR) of saltwater recreational fishermen encountered at boat landings, Sheepshead is the fifth most sought after species mentioned and ranks sixth in occurrence in the creels examined among this group (SC SRFSS data, 1991 through 2011).

### POPULATION SIZE AND DISTRIBUTION

Sheepshead are found in South Carolina's estuarine, nearshore and offshore waters throughout the year. Juveniles, and sub-adults are commonly found in the state's estuaries, bays, brackish rivers and creeks, and adults are typically encountered in nearshore and coastal waters, associated with hard-bottom habitat of some type. Spawning occurs in the early spring in offshore waters (Moore and Barkley 2005; McDonough et al. 2011). Adults and sub-adults of the species are commonly found around the State's marine artificial reefs out to depths of 30 m (100 ft.) (M. Bell, pers. obs.).

### HABITAT AND NATURAL COMMUNITY REQUIREMENTS

Sheepshead commonly occur in estuarine, nearshore, and coastal waters throughout the southeastern United States (Jennings 1985). They are encountered throughout a diverse range of ecosystems including brackish mangroves, salt marshes and nearshore waters, particularly around pilings, jetties and other structures. Recreational anglers fishing on manmade and naturally occurring reefs in nearshore and offshore waters frequently target this species (Stanley and Wilson 2000). Juveniles are found predominately in estuaries and adults in offshore waters.

Sheepshead are taken in trawls, traps and other fishing gear used in tidal harbors, rivers and creeks in South Carolina waters. Their presence has been documented on subtidal and intertidal

oyster reef habitats and on intertidal flats in the southeastern United States (SAFMC 1998). Adults are found in nearshore and offshore waters along the entire coast where suitable bottom habitat and structure exists. Grimes et al. (1982) noted their presence on shallow water live bottom habitats off North Carolina and South Carolina where limited vertical relief and a rich invertebrate community often exist.

Sheepshead readily recruit to South Carolina's marine artificial reefs, from 5 to 56 km (3 to 35 miles) offshore, but are most commonly noted by divers on reefs in the 9-18 m (30-60 ft.) range. Larger fish seem to move offshore as water temperatures drop in the fall and winter months and remain closely associated with reef structure (M. Bell, pers. obs.). It is not uncommon for divers to encounter very large Sheepshead taking refuge or resting inside openings found in various reef structures.

## CHALLENGES

Challenges for this species would most likely occur in the form of over-fishing, loss or degradation of essential fish habitat, degradation of estuarine water quality, or a combination of factors. Any of these problems, if materialized, could be initiated by multiple causative factors introduced in specific locales along the South Carolina coast, coast-wide, or even along larger spans of coast within the South Atlantic region.

While no directed commercial fishery for Sheepshead currently exists in South Carolina, the species is popular with skilled recreational fishermen in inland and nearshore waters. Although the fishery is somewhat specialized and technique-dependent, anglers who know where and how to target the species may be very successful. Over-harvest of Sheepshead that have yet to reach maturity in state waters could result in population problems for this species if the current harvest practices remain unchecked.

South Carolina NMFS-MRIP catch data for Sheepshead from 2000 through 2011 indicate that 92% of the catch occurs in state waters, with an overall catch and release rate of only about 28% (NMFS 2012). With removal of Sheepshead from the snapper-grouper complex in 2012, new state regulations are currently pending to protect the species from overharvesting.

Any impacts to the health of South Carolina's estuarine habitats, or degradation of water quality in these areas, could also have negative consequences for the success of larval recruitment and settlement from coastal spawning populations of Sheepshead or the health of juveniles and sub-adults inhabiting estuarine waters and bottoms. Alterations to water quality parameters can impact the health of many marine-spawning species like Sheepshead that can only be successful if they are physiologically, thermally and salinity adapted (Sea Grant 1976). Introduction of toxins and pollutants such as PCBs into coastal waters can also have a disruptive effect on juvenile fishes with potentially long-term impacts on life cycles (Thomas 1990).

## CONSERVATION ACCOMPLISHMENTS

Sheepshead rely on a wide range of habitats throughout their life history, including estuarine oyster reefs, tidal flats, nearshore and offshore hard bottom reefs, manmade reefs, and other

structure. In developing a comprehensive habitat plan essential to the health and success of all managed marine fishery species within the entire South Atlantic region, the South Atlantic Fishery Management Council (SAFMC) has characterized and documented the importance of the various habitat types essential to all managed finfish species within the region, including Sheepshead (SAFMC 1998). In 2012, new size and bag limits were implemented in response to the removal of Sheepshead from the snapper/grouper complex regulations. Currently, Sheepshead must be a minimum of 14 inches total length to land, and there is a bag limit of 10/perspn/day, not to exceed 30/boat/day.

## CONSERVATION RECOMMENDATIONS

- Quantify fishing mortality and catch per unit effort for the recreational Sheepshead fishery off South Carolina.
- Determine age frequency, population trends, and significance of spawning activities of Sheepshead occurring within the State's fishery.
- Examine the extent to which Sheepshead occur as by-catch in commercial gear.
- Examine larval distribution, settlement and recruitment of Sheepshead to estuarine systems and the importance of estuarine habitats in supporting Sheepshead populations in South Carolinas coastal waters.
- Better define seasonal movement patterns and habitat utilization of Sheepshead adults.
- Examine ability to use juvenile Sheepshead as a finfish indicator species in monitoring the health of estuarine habitat.
- Examine possible impacts of degraded estuarine water quality on Sheepshead.
- Determine emigration patterns of young Sheepshead adults and recruitment to near/offshore habitats.
- Understand environmental factors that affect abundance and health of Sheepshead stocks.
- Work with appropriate federal, state and local partners and stakeholders to better protect water quality by implementing better coastal planning policies, assessing current policies/regulations involving the introduction of various biocides and other potentially harmful chemicals into estuarine and coastal waters and requiring stricter monitoring and tighter restrictions on storm water runoff and wastewater treatment effluents.
- Work with appropriate federal agencies and others to develop realistic strategies, plans and policies to protect limited areas of essential fish habitat (EFH) as designated by the SAFMC Essential Fish Habitat Management Plan.
- Manage the use of marine artificial reefs in South Carolina's coastal and offshore waters to provide additional EFH where most appropriate to improve the chances of reaching fishery management and conservation goals established for applicable finfish species.

## MEASURES OF SUCCESS

By protecting habitat, improving water quality, and actively managing the effects of recreational angler harvest on Sheepshead populations, SCDNR will be able to encourage stable Sheepshead populations within in the State's coastal waters, which will be documented by continuing current fishery-dependent and fishery-independent monitoring programs

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