

**Georgia Department of Natural Resources
Coastal Resources Division
Management Plan: Spotted seatrout
June 2017**

General Objective:

Manage Georgia's spotted seatrout fishery to ensure maximum aggregate social, economic, and ecological benefits to the citizens of Georgia.

Life History and Reproductive Biology:

The spotted seatrout is a resident species in estuarine and near-shore coastal waters along Georgia's coast. While not a truly migratory species, spotted seatrout do make seasonal movements within the estuarine and coastal zones based on climatic conditions and reproductive and feeding behaviors. The species exhibits fractional spawning from April through September. Young-of-year spotted seatrout utilize small upper estuarine tidal creeks as nursery habitat. At approximately 6-8 inches, juveniles recruit to larger tributary and lower estuary habitats. Fish begin to mature in their second year of life (age 1), and all fish become mature within the third year (age 2). Growth is sexually dimorphic, with females being generally larger than males, and fish may reach lengths in excess of 20 inches. The species is relatively short-lived having a maximum reported age of 8 in Georgia. Spotted seatrout are predacious, feeding on a variety of forage finfish species and crustaceans.

Description of the Fishery:

Recreational Fishery

Spotted seatrout is the most important recreational sportfish species in Georgia. Anglers consistently rate it as the most targeted species, based on the NOAA Fisheries Marine Recreational Information Program (MRIP). This fishery is active throughout the year by bridge, pier, private boat anglers, and for-hire anglers, with a distinct peak in effort and landings during the fall season. According to the MRIP, the overall trend in landings is variable, with an average Catch per Unit of Effort (CPUE) of 1.9 trout caught per angler trip, and an average Harvest per Unit of Effort (HPUE) of 0.6 trout harvested per angler trip (Figure 1). These averages are for the period 2002-2016 and only for the private/rental boat fishing mode, from which the majority of trout are caught and harvested.

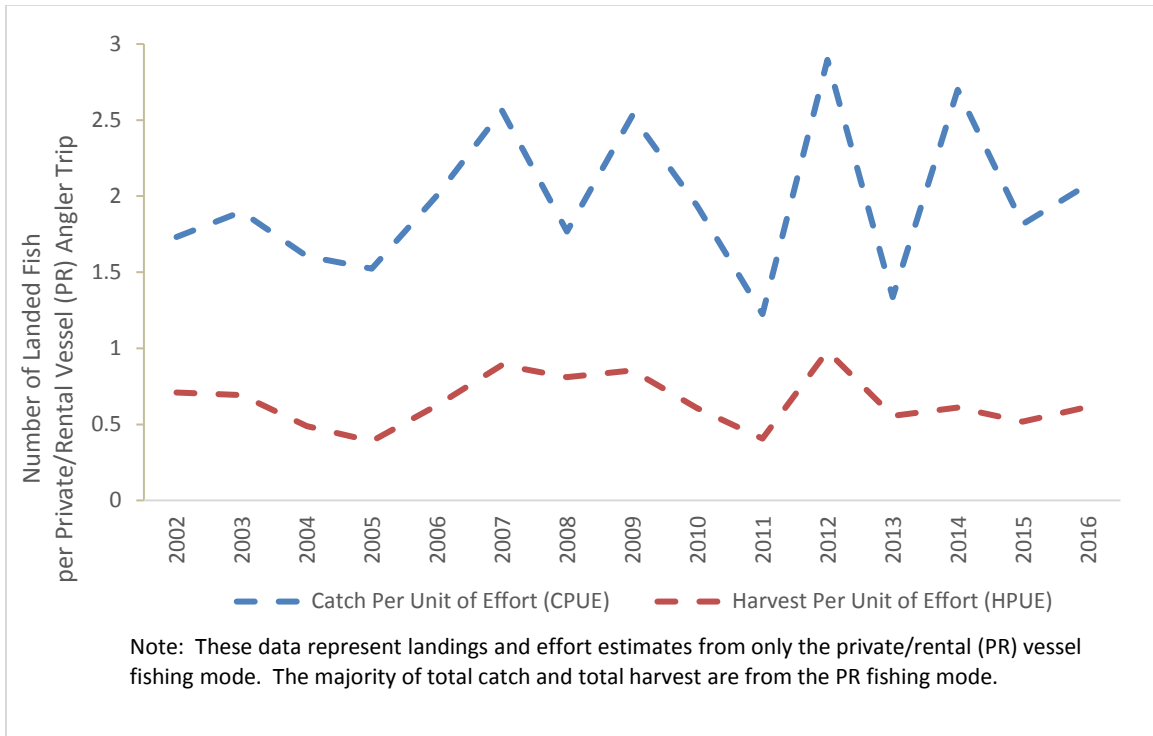


Figure 1. Annual Spotted Seatrout landing per unit of effort in Georgia (2002 – 2016).

Commercial Fishery

A directed commercial fishery does not exist for spotted seatrout in Georgia; however, commercial landings do appear for this species. Fishers who sell their spotted seatrout are restricted to recreational creel and size limits and must have a commercial license as well as a commercial fishing vessel license, if a boat is used. Reported landings have decreased, overall, from 7,897 pounds in 1997 to less than 100 pounds in 2014. There were no reported landings in 2015 and 2016. From 2001 through 2014, the annual value of the commercial catch has not exceeded \$2,500 (Julie Califf GADNR, personal communication).

Current Regulations with Chronology:

Georgia Regulations

DNR Board Rule 391-2-4-.04 (3)(w) Spotted Seatrout

Minimum-size:	14-inch TL
Daily creel limit:	15 fish per person per day
Season:	Open year-round

Federal Regulations

Exclusive Economic Zone (3-200 miles offshore) – None

Chronology of Spotted Seatrout Management Actions in Georgia:

- 1957 Prohibition of the use of gill nets in Georgia's estuarine waters (except for shad and diamond back terrapins)
- 1986 State of Georgia Game and Fish Law: 27-4-10
Spotted Seatrout
12-inch minimum-size
- 1989 State implements authority of Board of Natural Resources to establish open/closed seasons, daily creel limits, and minimum-size requirements for designated marine species. (O.C.G.A. 27-4-130.1)
Spotted Seatrout
Season: All year
Minimum-size: 12-inches
Daily creel limit: 25 fish
- 1998 Legislature rescinds authority of Board of Natural Resources to establish harvest regulations for spotted seatrout, but makes the following changes:
Minimum-size: 13-inches
Daily creel limit: 15 fish
- 2012 Georgia General Assembly reformed/amended Title 27 - Game and Fish Code (HB869). Among the amendments, regulatory authority to establish harvest regulations for all managed saltwater species, including spotted seatrout, was given back to the Board of Natural Resources within specified parameters (O.C.G.A. 27-4-10)
- 2015 The Board of Natural Resources increased the minimum size for spotted seatrout to 14 inches total length (Board Rule 391-2-4-.04(3)(w))

Prioritized Issues of Concern:

1. As the population of Coastal Georgia continues to increase, so will the number of saltwater anglers and fishing pressure on spotted seatrout.
2. The population of coastal Georgia continues to increase with concomitant urbanization of areas adjacent to the estuary.
3. Inland land and water use patterns are changing such that the quality and quantity of freshwater entering the estuaries may be altered to the point of comprising ecosystem function.
4. Spawning potential ratio (SPR) has been selected as a biological reference point to manage spotted seatrout by the Atlantic States Marine Fisheries Commission as stated in the Interstate Fisheries Management Plan for spotted seatrout. There is no current reliable estimate of SPR, or any other commonly used biological reference point (e.g. stock size, fishing mortality), with which to

determine stock status and evaluate the impact of harvest controls modified in 1998. Estimates of SPR made in the 2002 GA Spotted Seatrout Assessment are unreliable due to data deficiencies.

5. Reproductive output has not been accurately estimated for this species. As the species is a fractional spawner, fecundity estimates based on total egg counts from whole ovaries are inaccurate.
6. While some information exists regarding general spawning areas, specific spawning locations have not been identified in Georgia. It is important to locate and protect these areas to help sustain the reproductive potential of the species.
7. There is little information on specific habitat requirements, actual locations, and residence times of the early life history stages. As human coastal populations and development increase it is imperative that these habitats be identified and protected to minimize negative impacts on recruitment.
8. Mark recapture experiments indicate that a generally separate stock of spotted seatrout exists along the Georgia coast. However, results do not indicate if multiple sub-populations exist within the borders or even within individual sound systems. The accuracy of assessments and the efficacy of management strategies will be directly impacted if sampling designs are based on an inappropriate stock structure.
9. There is no estimate of post-hooking mortality for spotted seatrout in Georgia. Estimates have been reported for other locations, but their applicability to spotted seatrout along the Georgia coast is not clear. The effectiveness of existing or proposed harvest regulations can only be fully evaluated with accurate estimates for fish in this area.

Current Data Sources:

Fishery Dependent Data Sources

Marine Recreational Information Program (MRIP)

Since March of 2000, biologists with the Coastal Resources Division of the Georgia Department of Natural Resources (CRD) have been working in conjunction with the NOAA Fisheries to conduct a survey of recreational saltwater anglers in coastal Georgia. The MRIP survey, entitled Access Point Angler Intercept Survey (APAIS), produces estimates of recreational finfish catch (including fish released as well as those retained as harvest). Additionally, the NOAA Fisheries conducts surveys to estimate numbers of recreational saltwater anglers (participation) and numbers of fishing trips (effort). These data are necessary for determining appropriate regulations (e.g., creel and length limit laws), providing catch data for fishery management plans, and tracking trends in angler participation and landings.

Carcass Recovery Project (CRP)

Discarded fish carcasses provide invaluable data for fishery managers. Recognizing this opportunity, staff with the Marine Fisheries Section developed a project (CRP) to gather these fish carcasses. The information provided by fish carcasses is used in a variety of analyses, all of which help us better understand the status of Georgia's coastal fish populations. These data can be used in a descriptive manner to examine trends in the size and age structure of a population. Since the autumn of 1997 chest freezers have been placed and maintained near the fish cleaning stations at selected locations along the Georgia coast. Each freezer is marked with an identifying sign and a list of target fish species. Inside the freezer is a supply of plastic bags, information cards, and pens. Cooperating anglers can place the filleted carcasses, with head and tail intact, in a bag, drop in a completed angler information card, and then place the bag in the freezer. Participants are given an incentive award for each three bags of fish carcasses.

Since 1997, more than 43,000 spotted seatrout have been processed by GA DNR staff (Figure 2).

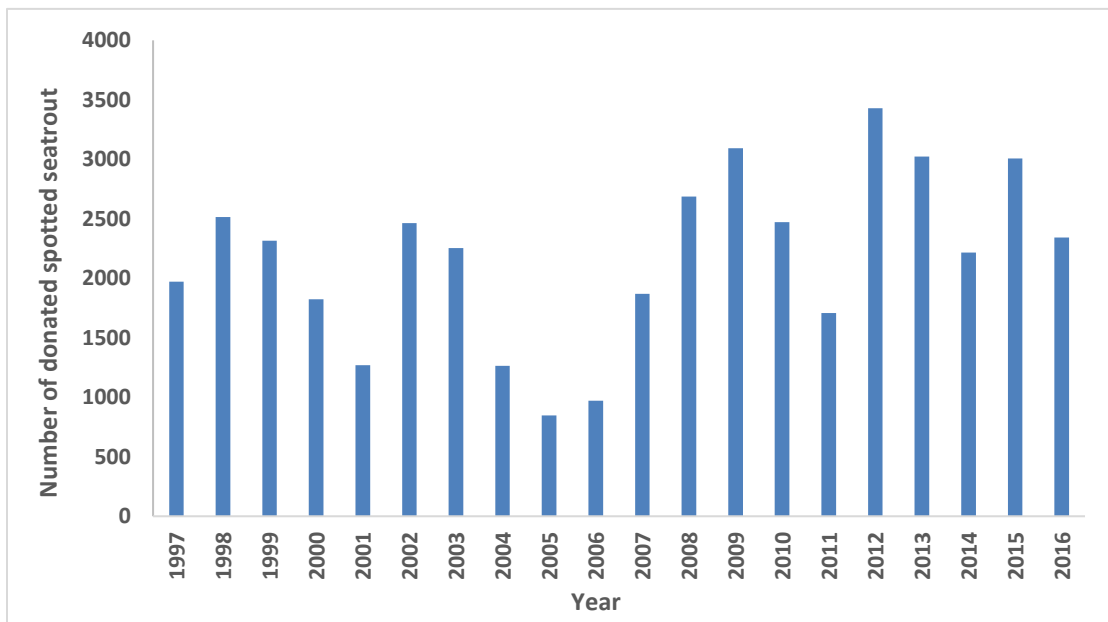


Figure 2. Number of spotted seatrout donated through Carcass Recovery Project. (1997 – 2016)

Fishery Independent Data Sources

Marine Sportfish Population Health Surveys (Trammel)

The Georgia Department of Natural Resources (GADNR) has management responsibility for more than 40 species of saltwater fish. Although federal agencies such as the National Marine Fisheries Service provide the information used to manage some of these species, the responsibility for determining the health of

Georgia's populations of spotted seatrout, red drum, sheepshead, tripletail, and rests solely on GADNR.

The Wassaw, Altamaha River Delta, and Cumberland systems have been identified as the estuaries that should be surveyed annually. A biologist/technician team is required for each system. They conduct field operations, fish sample processing, fish age determination, and data analysis/interpretation. Federal Aid in Sportfish Restoration is used for the Altamaha River Delta and Wassaw system activities. Originally, the Wassaw system sampling activities were funded by State monies; however, budget cuts required the shift to Federal funds. The Cumberland estuary cannot be surveyed until additional funding is made available.

In an attempt to improve the sampling efficiency of the program, a net comparison study was conducted in 2007 using both the traditional 600' net and a shorter 300' net. It was determined that net length did not have an effect on catch rates and the 300' net was implemented fully at the start of the 2008 netting season. In 2009, station selection was modified and the survey area was restratified to focus on sites with better habitat suitability. In the long term, it appears these changes may have affected CPUEs (Figure 3). Staff plan to use a generalized linear model (GLM) to account for the changes in gear types and sampling design.

The following tasks are accomplished through the trammel net surveys: (1) utilizing entanglement gear, collect biological data from estuarine fishes of recreational importance; (2) characterize the essential habitats needed by the various life history stages of these fishes; (3) analyze these data to determine the health of marine sportfish populations; and (4) summarize this information for use in stock assessments and other status reports which will be available to fishery managers, policymakers, and the public.

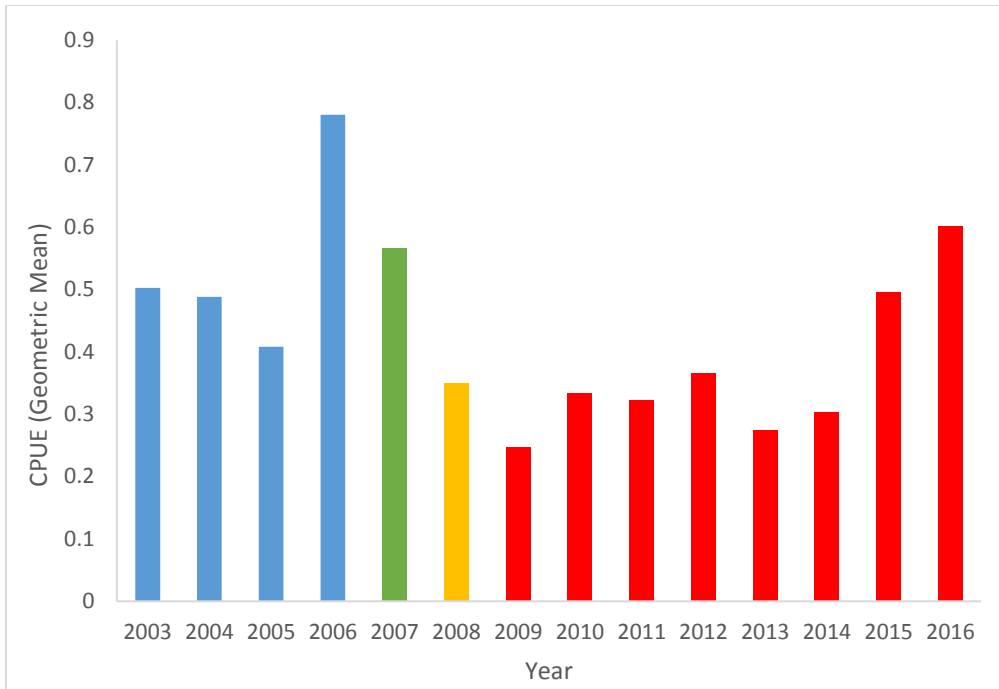


Figure 3. Catch per unit of effort (geometric mean) 2003 -2016. Blue represents old site selection and 600' net. Green represents old site selection and mix of 600' net and 300' net. Yellow represents old site selection and 300' net. Red represents new site selection and 300' net.

Goals and Objectives for Management:

1. Manage the recreational fishery for Optimum Sustainable Yield (OSY), which is defined as that level of fishing mortality which produces a 20% static spawning potential ratio (sSPR).
2. Identify and protect Essential Fish Habitat (EFH) and Habitat Areas of Particular Concern (HAPC).

Prioritized Research and Monitoring Needs:

1. Estimate age-specific mortality and abundance, and static spawning potential ratio (SPR).

Field Methods

Partial implementation of the fishery independent Marine Sportfish Population Health Survey began in 2003. Age determinations are made for a statistically appropriate subsample. Currently, the survey is conducted in and adjacent to the Altamaha River Delta and in Wassaw Estuary. Complete implementation of the Marine Sportfish Population Health Survey will require funding and personnel to include Cumberland Estuary in the survey design.

Conduct a mark-recapture study in conjunction with post tagging mortality, tag retention, and recapture non-reporting investigations. Each year a sufficiently large number of estimated age individuals based on age-length key will be marked with external tags. Fish collection and tagging effort will be distributed on a spatial scale sufficient to represent the coast as a whole.

Analytical Methods

The fishery independent survey and subsequent age determinations will be used to develop an age-based annual index of relative abundance of adults. This index of relative abundance could be used in conjunction with virtual population analysis (VPA) methods (SCA or ADAPT) to estimate age-specific F, static SPR, and absolute abundance. Mark-recapture data will be analyzed using appropriate models and combined with recreational catch data to estimate age-specific mortality and absolute abundance.

2. Determine economic impact of the recreational spotted seatrout fishery.

Methods

Contract with an appropriate service provider to conduct an economic impact analysis of recreational spotted seatrout fishing to determine an overall value of the fishery in the economy of Georgia.

Analytical Methods

The methods will be chosen as appropriate to provide a thorough understanding of the socio-cultural and economic aspects of recreational fishing in the coastal waters of Georgia.

3. Estimate post-hooking mortality.

Field Methods

Catch spotted seatrout using hook and line gear representative of the recreational fishery. Live specimens would be held for observation to determine short-term mortality. Collections should represent the fishery with regards to geographic, seasonal, and gear-related variation.

Analytical Methods

Post hooking mortality will be reported as the proportion of animals that have died within the predefined time period following release. This estimate could be used to tune mortality estimates in catch-at-age assessment methods (e.g. VPA).

4. Identify spawning area.

Field Methods

Develop and implement sampling design to locate spawning aggregations and characterize habitat. Survey methodologies include hydroacoustics and/or traditional collection methodologies employing trammel, gill, or trawl nets. Sampling effort should be distributed spatially and temporally to sufficiently identify all substantial spawning aggregations and their locations along the coast. All relevant abiotic parameters will be recorded when spawning groups are located.

Analytical Methods

Locations of spawning areas will be stored in a GIS database and spatially analyzed to investigate the potential relationships with abiotic factors and spawning area locations.

5. Develop relative abundance index for age-0 spotted seatrout.

Field Methods

Design and conduct a relative abundance survey of juvenile spotted seatrout in Georgia estuaries. A depth stratified trawl survey, employing small gear, may be the only available methodology if functional beach seine sites cannot be located. Survey design should be spatially sufficient to characterize relative abundance of young-of-year while in upper estuary habitats and as they transition to middle and lower estuary. Work done by Armstrong Atlantic State University demonstrated the utility of using hoop nets for collecting younger trout. This method may be applicable as a juvenile sampling approach and should be investigated for potential use.

Analytical Methods

The juvenile abundance index (JAI) would be calculated as appropriate to the survey design. A JAI would be useful in tracking recruitment trends over time, making forecasts about cohort strength, and providing a tuning index for age-0 fish in a stock assessment.

6. Estimate fecundity.

Field Operations

Collections of females for fecundity estimates could be made as part of an adult abundance survey or spawning area identification project. As spotted seatrout are fractional spawners, both batch fecundity and spawning periodicity must be estimated to produce an accurate fecundity estimate. Estimating batch fecundity and spawning periodicity would require supplemental sampling effort to current and proposed surveys. Ovaries would be removed, weighed, and fixed using a method appropriate for histological analysis.

Analytical Methods

Estimates of total fecundity could be used in measuring reproductive output. Appropriate analytical techniques include egg per recruit and production models that use egg production rather than the normal proxy of female biomass.

Activities for FYs 2017 – 2022:

Collection of catch/harvest/effort data from the recreational spotted seatrout fishery.

Purpose

To describe the size distribution and quantity of spotted seatrout caught and landed by recreational anglers.

Method

Continue participation in NOAA Fisheries MRIP.

Collection of age/abundance/habitat preference data through the Marine Sportfish Population Health Survey and investigate options for including Cumberland Estuary.

Purpose

To produce an unbiased relative age composition, by sex, of spotted seatrout populations in the Altamaha system and Wassaw Sound to be used in tuning age structured assessment models.

Method

During the period of September through November, personnel will deploy 300' (91.44m) trammel nets constructed of a 2.75" (69.85mm) stretch mesh inner panel and 14" (355.60mm) stretch mesh outer panels at predetermined fixed and random stations in Wassaw and Altamaha estuaries. During the fall portion of the survey, size-stratified subsampling of spotted seatrout and subsequent processing for age determinations will be conducted.

Investigate potential funding and personnel options for including Cumberland Estuary into the spatial coverage of the Marine Sportfish Population Health Survey.

Process spotted seatrout carcasses collected through the Carcass Recovery Project (CRP).

Purpose

To collect biological data from spotted seatrout harvested by recreational anglers.

Method

Encourage angler participation by depositing properly documented filleted carcasses of spotted seatrout in program chest freezers located at selected public access points along the Georgia coast.

Perform age determinations on archived CRP samples.

Purpose

To continue to develop fishery-dependent age-length keys for spotted seatrout.

Method

Utilize image analysis system to evaluate sagittal otoliths removed from spotted seatrout.

Address inconsistencies in CPUEs due to changes in gear type and survey design.

Purpose

To address questions about previous sampling changes.

Method

Create a generalized linear model (GLM) to standardize CPUEs across all years.

Investigate options for fixed site beach seine survey.

Purpose

To produce an index of abundance of mature spotted seatrout populations along Georgia's barrier islands.

Method

Explore feasibility of a fixed site beach seine survey to target spotted seatrout along Georgia's barrier islands. Investigate potential sites that can be sampled with 300' (91.44m) beach seine. Sampling would be conducted during March through May, with personnel deploying a 300' (91.44m) long by 9' (2.74m) deep beach seine constructed of a 2.5" (63.5mm) stretch mesh panel at preselected sites. All biological data on captured seatrout will be measured and environmental data will be collected.