

Species Profile: Red Drum

Stock Assessment Finds Resource Relatively Stable with Overfishing Not Occurring

Introduction

Attempts to regulate the Atlantic coast red drum fishery date back to the Commission's first Annual Meeting in 1942. At the meeting, a Delaware Commissioner urged that red drum be made a sport fish or be protected by adequate size limits and daily catch limits, and that its use as fertilizer be prohibited. While this request and later management recommendations were unsuccessful in preventing the overexploitation of red drum, the 2017 benchmark stock assessment indicates that interstate management has made significant strides in improving the population's condition since 1990. At that time, the stability of the stock was uncertain, with an exploitation level that was jeopardizing future recruitment. Through the implementation of more stringent regulations in the 1990s and 2000s, the stock is no longer subject to overfishing and sufficient numbers of young fish are surviving to become breeding adults.

Despite this achievement, managers still face challenges with red drum. Due to data deficiencies regarding the adult population, it cannot be determined whether the stock is overfished or rebuilt. This is because there is limited information on fish older than age four as a result of the fish's life history and regulations that restrict the harvest of fish larger than 27 inches. Due to these unknowns, managers are holding the course on red drum management for the time being, while continuing research efforts seek to provide missing data for future stock assessments.

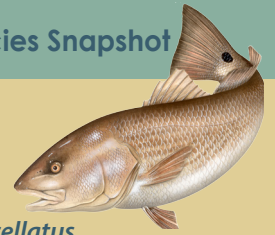
Life History

The historic distribution of red drum on the Atlantic coast is from Massachusetts through Florida, though few fish have been reported north of the Chesapeake Bay in recent years. Juveniles are most abundant in estuarine waters and inlets, while fish older than age four inhabit deeper waters. The adult fish migrate seasonally, moving offshore or south in the winter and inshore or north in the spring. Spawning occurs at night in the nearshore waters during the summer and fall. Prolific spawners, large females may produce up to two million eggs in a season. Eggs hatch within 24 to 36 hours of being spawned and the larvae are carried by wind and tidal action into shallow, low salinity estuarine nursery areas. Juveniles and sub-adults stay in estuarine areas, feeding on zooplankton and invertebrates such as small crabs and shrimp. Gradually, red drum expand their diet to include fish and larger invertebrates. Depending on the area, males mature between ages one and four (20-28 inches in length), while females mature between ages three and six (31-36 inches in length). Red drum may reach 60 years of age and 60 inches in length (corresponding to greater than 90 pounds in weight).

Commercial & Recreational Fisheries

Atlantic coast commercial landings have been reported as early as the 1880s. Since 1960, landings have fluctuated around 240,000 pounds, with a high of 627,800 pounds in 1950 and a low of 54,748 pounds in 2004. No directed commercial fishery currently exists for Atlantic red drum. Fish are landed as bycatch in several states, predominantly North Carolina where gillnets take the vast majority of the state's harvest. Landings in North Carolina are restricted by an annual quota and low daily possession limit. Commercial harvest and sale in New Jersey through Virginia is restricted to recreational limits, while Georgia, South Carolina and Florida prohibit commercial harvest. A harvest moratorium and Presidential Executive Order, enacted in 2007, prevents any harvest or sale of red drum from federal waters.

Species Snapshot



Red Drum

Sciaenops ocellatus

Management Unit: New Jersey to Florida

Interesting Facts

- The name is derived from their color and the fact that during spawning time males produce a drum-like noise by vibrating a muscle in their swim bladder.
- Due to their unusual growth pattern, a 36" red drum may be anywhere from 6 - 50 years old.
- Red drum have been successfully reared in hatcheries and released into South Carolina, Georgia and Florida estuaries in stock enhancement programs.
- Some scientists believe the purpose of the spot(s) near the tail is to mimic an eye. This fools predators into attacking the wrong end of the fish and gives the red drum a chance to escape.

Largest Recorded: 94 lbs. and 2 oz., Hatteras Island, North Carolina

Oldest Recorded: 62 years old

Age at Maturity:

Females - Between the ages of one and four (20-28 inches in length)

Males - Between the ages of three and six (31-36 inches in length)

Stock Status: Overfishing not occurring



Photo (c) Malcolm Rhodes

The recreational fishery is a nearshore fishery, targeting small “puppy drum” in shallow estuarine waters and large trophy fish along the Mid- and South Atlantic barrier islands. Harvest is restricted by minimum and maximum size limits and a daily trip limit. Due to strict commercial measures, the establishment of gamefish status in some states, and the great popularity of red drum by anglers, recreational fishing has accounted for over 87% of all Atlantic coast red drum landings (by pounds) since 1982. Anglers from Florida through Virginia take most, if not all, of the coastwide annual recreational harvests. Annual harvests have historically ranged between 300,000 and 550,000 fish per year, with the exception of some larger harvests in the mid-1980s. However, from 2010-2015, recreational harvests have exceeded 600,000 fish in three years (2010, 2013, and 2014). Meanwhile, recreational catch (harvest and releases) has increased over time, meaning that the percentage of fish that are caught and released has increased from about 4% in 1982 to more than 83% in 2015. Based on studies of mortality rates following release from gears common to the red drum recreational fishery, the most recent assessment assumed that 8% of fish released by the recreational fishery die.

Stock Status

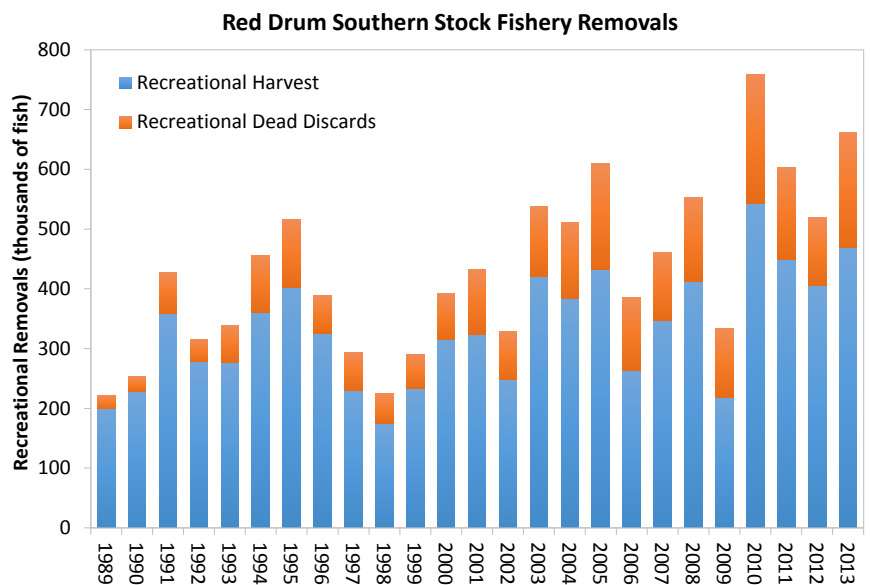
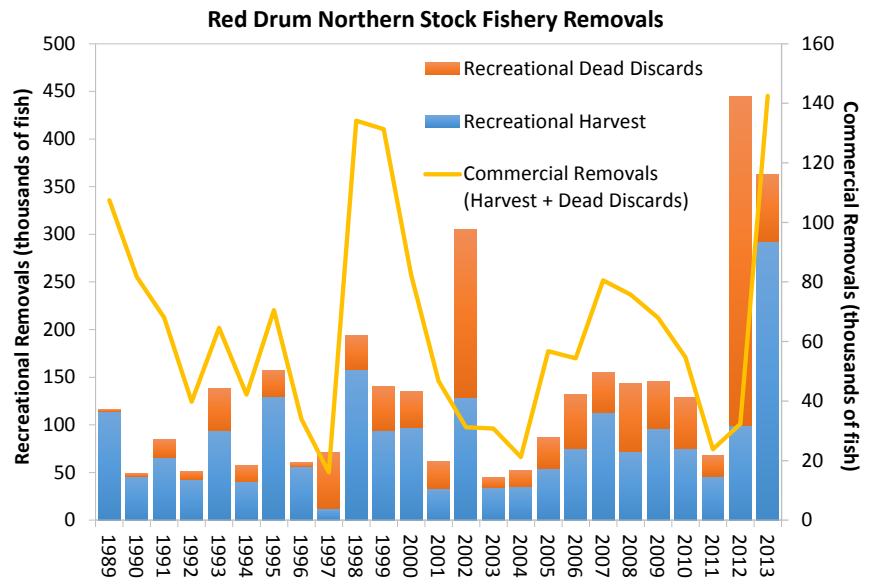
The 2017 Red Drum Stock Assessment and Peer Review Report indicate overfishing is not occurring for red drum in either the northern (North Carolina-New Jersey) or southern (South Carolina-Florida) stocks. The assessment was unable to determine an overfished/not overfished status because population abundance could not be reliably estimated due to limited data for the older fish (ages 4+) that are not typically harvested due to the current fishery measures (slot-limits).

The assessment estimates annual static spawning potential ratios (sSPR) measured against previously established reference points for red drum. Overfishing is occurring if the three-year average sSPR is less than a threshold of 30%. sSPR is a measure of spawning stock biomass survival rates when fished at the current year’s fishing mortality rate (to limit impacts of extremely productive or unproductive individual years, this assessment used 3-year averages rather than single years) relative to the spawning stock biomass survival rates if no fishing mortality was occurring. In 2013 (the last year for which data were available), the three-year (2011-2013) average sSPR was 43.8% for the northern stock and 53.5% for the southern stock, both above the target and threshold values.

Age-1 recruitment, or the number of fish spawned the previous fall, has fluctuated around averages of 476,579 and 1.57 million fish in the northern and southern stocks, respectively. In more recent years, the largest recruitment occurred in 2012 for the northern stock and 2010 for the southern stock.

Atlantic Coastal Management

For close to two decades, red drum were jointly managed by the Atlantic States Marine Fisheries Commission (state waters, 0-3 miles from shore) and the South Atlantic Fishery Management Council (federal waters, 3-200 miles from shore). The first interstate plan was developed in 1984. In 1990, the Council’s plan closed federal waters to red drum harvest, and a 1998 amendment revised definitions



for optimum yield and overfishing. Amendments to the interstate plan occurred in 1991 and 2002, partly in response to the Council plan and amendment. Following the implementation of Amendment 2 in 2003, the Council recommended transferring the authority for managing red drum in federal waters to the Commission. Two reasons for this decision were that all harvest is taken in state waters and that, due to data deficiencies, a rebuilding schedule for the federal plan could not be set as required by law. The transfer of authority became effective in late 2008. It did not affect the red drum harvest prohibition in federal waters. The primary management goal of Amendment 2 is to achieve and maintain the stock's spawning potential at a level capable of sustaining



Red Drum Assessment Q & A

Introduction

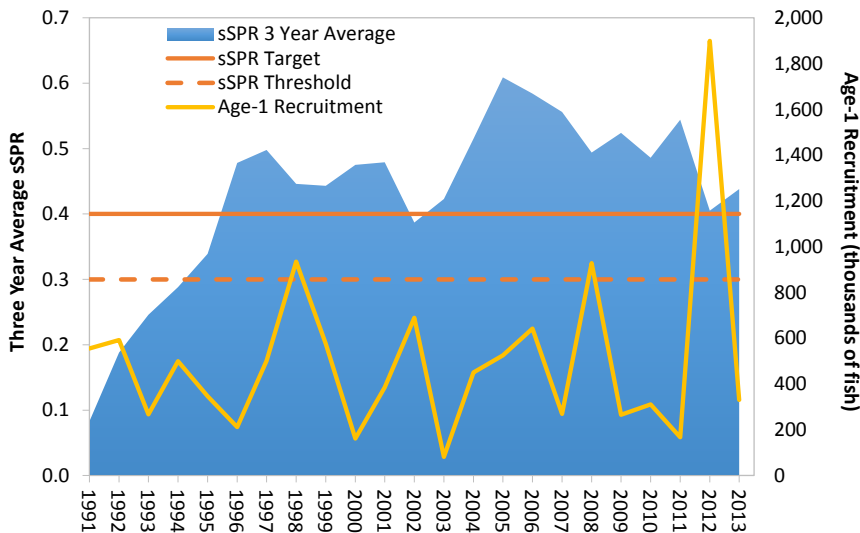
Following is a brief overview of the 2017 stock assessments for red drum. These assessments were initially conducted through the Southeast Data, Assessment and Review (SEDAR) process using Stock Synthesis (SS3) models. However, after further review by the Red Drum Technical Committee and Stock Assessment Subcommittee (TC/SAS), the TC/SAS expressed concern over certain assumptions made in the SS3 model. The Committee recommended reverting to the Statistical Catch-at-Age (SCA) model used in the 2009 benchmark assessment as the base model for these new assessments, with the inclusion of updated and additional data collected since the 2009 assessment.

The revised assessments were peer-reviewed by an independent panel of scientific experts through the Commission's peer review process. The assessment represents the latest and best information on the status of Atlantic coast red drum stocks and provide the scientific basis for continued management of the species. South Atlantic State/Federal Fisheries Management Board, which oversees red drum management, accepted the assessments for management use in February 2017.

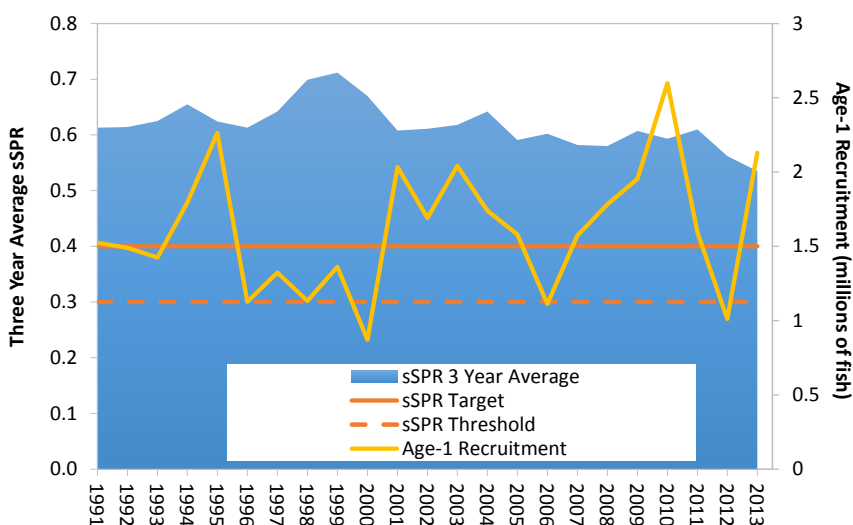
What Data Were Used?

The red drum stock assessment used both fishery-dependent and -independent data, including information on red drum biology and life history. Fishery-dependent data come from recreational and commercial fisheries, while fishery-independent data are collected through scientific research and surveys. Red drum are divided into two management areas or stocks along the Atlantic coast, a northern stock (from New Jersey to North Carolina) and a southern stock (from South Carolina to Florida). The stock units are based on differences in life history traits between the two stocks (such as growth rates and maximum observed ages) and information from genetic and tagging studies indicating red drum rarely move between the two regions. Separate assessments were performed for each stock.

Red Drum Northern Stock Three Year Average Static Spawning Potential Ratio (sSPR) & Age-1 Recruitment



Red Drum Southern Stock Three Year Average Static Spawning Potential Ratio (sSPR) & Age-1 Recruitment



the population. To achieve this goal, the plan further restricted the recreational fishery and maintained existing commercial regulations. The management approach is intended to increase the escapement of inshore juvenile fish to the offshore adult population, and protect the adult population from exploitation. Atlantic coast states from Florida through New Jersey implemented appropriate bag and size limits as required, including a maximum size limit of 27 inches total length. The Amendment also encourages those states outside the management unit (i.e., New York through Maine) to implement supportive measures to protect the red drum resource. In 2013, Addendum 1 to Amendment 2 described red drum spawning habitats and designated several areas that are important spawning and nursery grounds for red drum as habitats of concern. This Addendum helps states identify important areas that require monitoring to preserve red drum stocks.

While the Board accepted the 2017 stock assessment and peer review report for management use, further action to revise the interstate management plan was not initiated in response to the assessment. Although the stock is not subject to overfishing, managers were hesitant to liberalize any regulations without knowing if the stock is rebuilt. Several surveys that collect data on abundance of adult red drum were established following recommendations from the 2009 stock assessment. These surveys were considered for use in the 2017 assessment, but the short length of time that they have been in effect limits their ability to convey trends in adult abundance with an adequate amount of certainty. Therefore, they were not used to determine whether the stocks are overfished. Continuation of these surveys will be vital for determining overfished status for the red drum stocks in a future assessment.

For more information, please contact Mike Schmidtke, FMP Coordinator, at mschmidtke@asmfc.org.

Fishery-independent Data

The red drum assessments used a number of different fishery-independent surveys that provide information on trends in relative abundance for different age classes. In the northern stock, the assessment used three fishery-independent surveys from North Carolina: a seine survey that catches young-of-year, a gillnet survey that catches ages one and two, and a longline survey that catches ages seven and older. In the southern stock, the assessment used eight fishery-independent surveys: a Florida small seine survey, a Georgia gill net survey, and a South Carolina stop net survey that catches age one fish; a South Carolina trammel net survey that catches fish up to age two; a Florida haul seine survey that catches age two and three fish; and longline surveys from Georgia (1 mile sets) and South Carolina (1 mile and 1/3 mile sets) that catches adult red drum ages seven and older.

Tagging Data

In the southern stock, tag-recapture data from South Carolina were used to describe the age composition of fish released alive by anglers in South Carolina and Georgia. A previously published tagging study from North Carolina was used to estimate age composition for fish released alive by anglers in Florida, as the North Carolina study was conducted when regulations were similar to Florida's regulations

In the northern region, a 2008 study provided important information used in the assessment about fishing mortality and the age composition of the fish released alive by recreational anglers.

What Models Were Used?

An SCA model was used to assess the red drum stocks. The model combines the catch-at-age data from commercial and recreational fisheries with information from fishery-independent surveys and biological information such as growth rates and natural mortality rates to estimate the abundance and fishing mortality rates of each age class. Because of the limited data on adults, the model groups all fish ages seven and older into a single "plus group." The model, which estimates static spawning potential ratios (sSPR), determines if current fishing mortality rates will likely lead to sustainability over the long-term. For the purposes of these assessments, sSPR is a measure of spawning stock biomass survival when fished at the current year's fishing mortality rate relative to the spawning stock biomass survival if no fishing mortality was occurring. Due to high variability in red drum recruitment between years, a three-year average sSPR was used to determine the status of the stock.

Data and Research Needs

More information on the abundance and age composition of the adult population (ages four and older) is critical to improving the red drum stock assessments. Several fishery-independent surveys have been developed since the last assessment. However, longer time series for the surveys are needed, most notably to improve the abundance estimation for adult (ages four and older) red drum that are not susceptible to the fishery. Additionally, tagging data were very important to the northern assessment, and similar analyses by tagging programs covering the southern stock could prove beneficial.

A more detailed overview of the assessment can be accessed at http://www.asmfc.org/uploads/file/58b5c1eaRedDrumAssessmentOverview_Feb2017.pdf.