



Introduction

This document presents a summary of the 2015 benchmark stock assessment for scup. The assessment was peer-reviewed by an independent panel of scientific experts at the 60th Northeast Regional Stock Assessment Workshop/Stock Assessment Review Committee (SAW/SARC57) meeting in June 2015 with landings data through 2014. The assessment is the latest and best information available on the status of the coastwide Scup stock for use in fisheries management.

Management Overview

The scup management unit includes US waters in the western Atlantic Ocean from the US-Canadian Border southward to Cape Hatteras, North Carolina. The stock assessment includes data from both state (0 – 3 miles from shore) and federal waters (3 – 200 miles from shore). Scup are managed by the Atlantic States Marine Fisheries Commission (ASMFC) and the Mid-Atlantic Fishery Management Council (MAFMC) through Amendment 8 to the Summer Flounder, Scup, and Black Sea Bass Fishery Management Plan and its associated addenda.

What Data Were Used?

The benchmark stock assessment used both fishery-dependent and -independent data collected through state, federal and academic survey programs. Final catch and survey data for 2014 were used in the assessment.

Life History

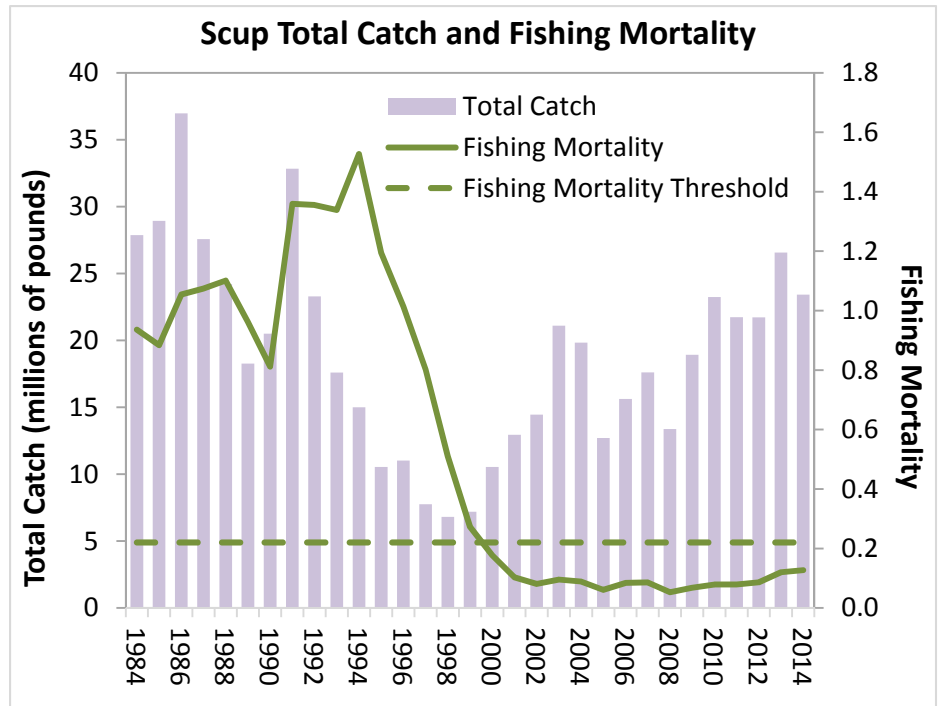
Scup are a migratory, schooling species found on the continental shelf of the Northwest Atlantic, commonly inhabiting waters from Cape Cod, Massachusetts to Cape Hatteras, North Carolina. The abundance in a specific area is frequently influenced by water temperature. Scup prefer temperatures greater than 45 degrees F and are most frequently encountered in water temperatures from 55 to 77 degrees F. Scup overwinter in offshore waters from southern New Jersey to Cape Hatteras. When water temperatures begin to rise in the spring and summer, scup migrate to more northern and inshore waters to spawn. Spawning areas include locations from southern New England to Long Island, New York. Large fish arrive to the spawning grounds first, followed by successive waves of smaller individuals, suggesting that scup school by size. Larval scup are pelagic and are found in coastal waters during warmer months. Juvenile scup use a variety of coastal habitats and can dominate the overall fish population in large estuarine areas during the summer months.

Commercial and Recreational Data

Scup are highly sought after by commercial and recreational fishermen throughout southern New England and the Mid-Atlantic. Scup support commercial fisheries from Massachusetts to North Carolina. Commercial landings peaked in 1960 at 48.9 million pounds, and then ranged between 11.02 and 22.04 million pounds until the late 1980s. From the 1987-1996, commercial landings averaged 10.8 million pounds, and then declined to an average of 8.8 million pounds from 1997-2014. Since 1979, commercial landings have largely come from Rhode Island (38%), New Jersey (26%), and New York (16%). Commercial discards have been high during most of the past 3 decades, averaging 43% of the total commercial catch during 1989-2000. Since the

implementation of gear restricted areas in 2001, estimated discards as a proportion of the total commercial catch have decreased, averaging about 33%.

Recreational catch, effort, and length frequency data were obtained from the Marine Recreational Fisheries Statistics Survey/Marine Recreational Information Program (MRFSS/MRIP) for 1981-2014. Recreational harvest during this time averaged 5.07 million pounds. Recreational live discards in weight from 1984-2011 ranged from a low of 94,000 pounds in 1999 to a high of 4.67 million pounds in 2010. The assessment used a discard mortality rate of 15% based on past assessments. This rate equates to an estimated average of 277,782 pounds of scup discarded per year.



Fishery-Independent Surveys

Several fishery-independent indices of abundance were used in the 2015 assessment model. These include NOAA Fisheries Northeast Fisheries Science Center Bottom Trawl Surveys (winter and fall), the Massachusetts Division of Marine Fisheries Fall Trawl Survey, the Rhode Island Industry Cooperative Trap Survey, University of Rhode Island School of Oceanography Trawl Survey Connecticut Department of Energy and Environmental Protection Trawl Surveys (spring and fall), New York State Department of Environmental Conservation Peconic Bay Small Mesh Trawl Survey, New Jersey Division of Fish and Wildlife Trawl Survey, Northeast Monitoring and Assessment Program (NEAMAP) Spring and Fall Surveys, and Virginia Institute of Marine Science Juvenile Fish Trawl Surveys.

How Were the Data Analyzed?

Statistical catch-at-age (SCAA) model

The accepted model for use in scup assessments is a forward projecting statistical catch-at-age model (ASAP SCAA), which uses catch-at-age data and fishery-dependent and -independent survey indices to estimate annual population size and fishing mortality. Indices of abundance track relative changes in the population over time while catch data provide information on the scale of the population size. Age structure data (numbers of fish by age) provide additional information on recruitment (number of age-0 fish entering the population) and trends in mortality.

What is the Status of the Stock?

In 2014, the scup stock was not overfished or experiencing overfishing relative to the new reference points defined in the 2015 SAW 60 assessment (see below). Spawning stock biomass (SSB) was estimated at 403.6 million pounds about two times the SSB target of 192.47 million pounds. Fishing mortality on age 3 fish and older in 2014 was estimated at 0.127, below the new fishing mortality threshold of 0.22.

Recruitment

Since 1984, recruitment (e.g., the number of fish entering the population) estimates are influenced mainly by the fishery and survey catches-at-age, and averaged 109 million fish during 1984-2014. The 1999, 2006, and 2007 year classes are estimated to be the largest of the time series, at 222, 222, and 218 million age 0 fish. Below average recruitment occurred in 2012 and 2013. The 2014 year class is estimated to be above average at 112 million age 0 fish.

Projections

Three-year projections of SSB and fishing mortality were made with the following assumptions: 75% of the acceptable biological catch (ABC) is caught annually (based on recent harvest patterns) and the current fishing mortality rate of 0.220 is maintained during 2016-2018. Under this scenario, the probability of the stock being overfished (SSB less than the SSB threshold) is unlikely.

Data and Research Priorities

The SAW/SARC 60 Peer Review identified concerns over the amount of sampling of scup at older ages in the surveys and landings; the productivity of the stock under different scenarios of selectivity by gear type at age; and the absolute magnitude of the stock size estimates in recent years from the SCAA model. These comments were echoed by the MAFMC Science and Statistical Committee when it considered the assessment and peer review when making catch limit recommendations for 2016-2018 fishing seasons. At their joint meeting in August 2015, the Commission and Council approved an ABC limit of 31.11 million pounds for 2016. After accounting for projected discards in the commercial and recreational fisheries, this ABC is divided into a commercial quota of 20.47 million pounds and a recreational harvest limit of 6.09 million pounds for the 2016 fishing year.

Glossary

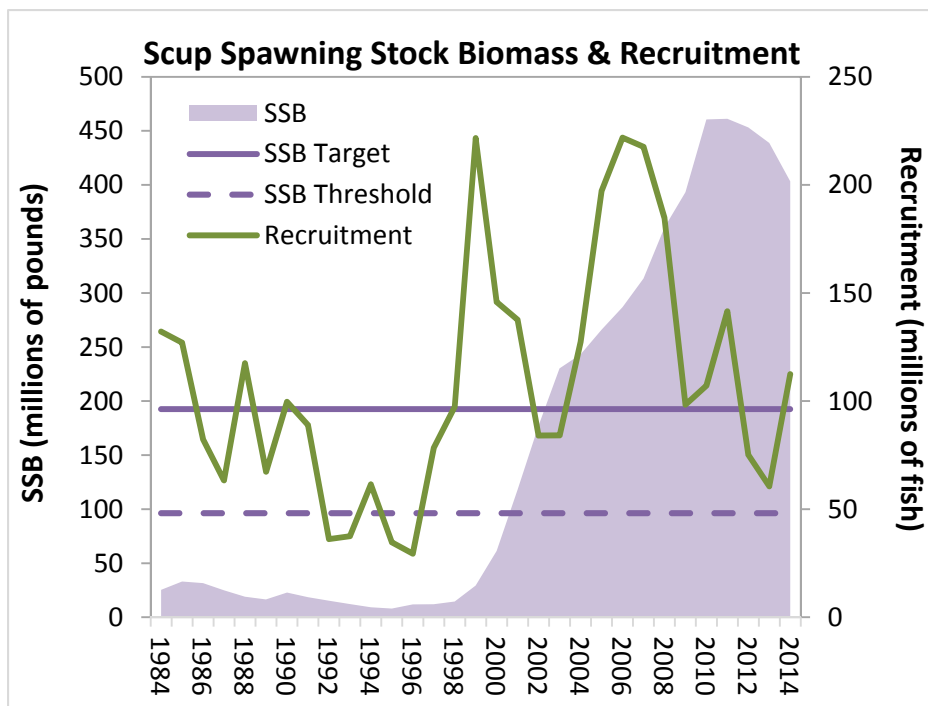
Age structure: the separation of a fish population into distinct age groups

Catch-at-age: the number of fish of each age that are removed in a year by fishing activity

Fishing mortality: the instantaneous rate at which fish are killed by fishing

Natural mortality (M): the instantaneous rate at which fish die because of natural causes (predation, disease, starvation, etc)

Spawning stock biomass: the total weight of the mature females within a stock of fish; frequently used instead of total biomass as a better measure of the ability of a stock to replenish itself.



Statistical catch-at-age (SCAA) model: an age-structured stock assessment model that works forward in time to estimate population size and fishing mortality in each year.

Recruitment: a measure of the weight or number of fish that enter a defined portion of the stock, such as the spawning stock or fishable stock. For this stock assessment, recruitment refers to the number of age-1 fish entering the population.

References

ASMFC. 2009. Guide to Fisheries Science and Stock Assessments. Arlington, VA.
<http://www.asmfc.org/uploads/file/GuideToFisheriesScienceAndStockAssessments.pdf>

NEFSC. 2015. Summary Report of the 60th Northeast Regional Stock Assessment Review Committee (SARC 60), Northeast Fisheries Science Center, Woods Hole, Massachusetts. 47p.