

**FISHERY MANAGEMENT PLAN UPDATE
SHEEPSHEAD
AUGUST 2018**

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption:	None
Amendments:	None
Revisions:	None
Supplements:	None
Information Updates:	None
Schedule Changes:	None
Next Benchmark Review:	None

Sheepshead (*Archosargus probatocephalus*) was initially managed as part the South Atlantic Fishery Management Council's (SAFMC) Snapper Grouper Fishery Management Plan (FMP). The plan restricted recreational anglers to an aggregate 20 fish bag limit; there was no commercial trip limit, and neither sector had a size limit. In state waters, North Carolina deferred to the Council and the same regulations were followed. In April 2012, sheepshead was officially removed from the SAFMC's snapper grouper management complex through the Comprehensive Annual Catch Limit Amendment (Amendment 25) (SAFMC 2011). Subsequently, North Carolina's proclamation authority for the management of the species was invalidated since sheepshead was no longer part of the North Carolina Fishery Management Plan for Interjurisdictional Fisheries or a Council managed species. In November 2012, the N.C. Marine Fisheries Commission (NCMFC) requested that a rule be developed for sheepshead; and in November 2013, approved the rule (15A NCAC 03M .0521) that specifies the Director's proclamation authority, including the ability to implement size, bag, and trip limits, as well as season and gear restrictions. In July 2014, N.C. Division of Marine Fisheries (NCDMF) began developing potential management measures for sheepshead to present to the NCMFC. In 2015, the Commission implemented new regulations that included size, bag, and trip limits in order to prevent overharvest, as well as to allow a greater number of individuals to spawn before being harvested. There currently is no state or federal FMP for sheepshead.

Management Unit

North Carolina manages sheepshead in state coastal waters (internal and 0 to 3 miles in Atlantic Ocean).

Goal and Objectives

None

STATUS OF THE STOCK

Life History

Sheepshead are a relatively large and long-lived member of the porgy family that ranges from Nova Scotia, Canada to Florida and the Gulf of Mexico south to the Atlantic coast of Brazil. They are generally found year-round in North Carolina's coastal waters ranging from inshore brackish waters to offshore rocky bottom. Juveniles are associated with shallow vegetated habitat as well as hard structures that offer protection. As sheepshead grow larger, they move to more typical adult habitat including oyster reefs, rocks, pilings, jetties, piers and wrecks. Migration patterns based on mark recapture studies have not documented large scale north-south movements. Movement instead tends to be towards inlets during the fall and winter when adult sheepshead migrate to ocean waters to spawn.

Sheepshead are omnivores, meaning they eat plant material as well as animals (barnacles, crabs, oysters). Sheepshead grow quickly up to age 6, and then their growth slows. After their first year, sheepshead average 10 inches, at which less than 50 percent of the individuals are sexually mature. Most sheepshead mature at age 2 (12 inches) and all sheepshead are mature by ages 3 to 5 (14 inches). In North Carolina, sheepshead commonly attain a length of 20 to 25 inches with weights ranging from 5 to 15 pounds. The maximum reported age in North Carolina is 29 years.

Stock Status

The Division is continuing to collect data from recreational, commercial, and independent sampling efforts to estimate trends in abundance of sheepshead; age structure, maturity, and other biological information is also being collected.

Stock Assessment

Currently, there is not a stock assessment for sheepshead in North Carolina.

STATUS OF THE FISHERY

Current Regulations

In 2015, the NCMFC implemented a 10-inch fork length (FL) minimum size limit for both recreational and commercial fisheries. There is a recreational bag limit of 10 fish per person per day or per trip (if a trip occurs over more than one calendar day). Commercial fishing operations are limited to 300 pounds per trip with two exceptions; gig and spear operations are limited to 10 fish per person per day or trip (if a trip occurs over more than one calendar day), and pound net operations are exempt from the commercial trip limits.

Commercial Landings

Sheepshead are primarily caught as bycatch in several of North Carolina's commercial fisheries (gill nets, pound nets, haul seines). A targeted spear fishery has developed in the last six years, and the gig fishery has also become more popular in this time (Table 1). Estuarine gill nets and pound nets have made up the majority of the landings in the last 10 years (Table 1). In 2017, the majority (84%) of the commercial landings came from pound nets (58%) and estuarine gill nets (26%); an additional 8% was landed by spears and gigs, combined (Table 1). Landings have fluctuated from year to year, with the highest landings occurring in 2013 and 2014 (Table 2; Figure 1). The landings for the last three years have been lower than the 10-year average (131,082 pounds) (Table 2; Figure 1).

Recreational Landings

The recreational fishery tends to be more of a targeted fishery compared to the commercial. This fishery is primarily a hook and line fishery, but the species is becoming a favorite of spear fishermen. Recreational harvest accounted for 68% of North Carolina's total harvest (pounds) from 2008-2017 (Table 3). Like the commercial catch, landings have fluctuated from year to year with annual harvest ranging from 116,683 pounds in 2016 to a high of 500,096 pounds in 2013 (Table 3; Figure 1). In 2017, recreational landings were 74% of the total harvest and 30% above the 10-year average (284,527 pounds) (Table 3; Figure 1).

MONITORING PROGRAM DATA

Fishery-Dependent Monitoring

Commercial fishing activity is monitored through fishery dependent sampling programs conducted by NCDMF. Data collected in these programs allow the size and age distribution of sheepshead to be characterized by gear and fishery. In 2017, 401 lengths were measured at fish houses or on the water, the majority of which came from the estuarine gillnet, spear, and pound net fisheries. The mean size of commercial caught sheepshead was 14 inches FL (Table 4). This has varied slightly from year to year (12 to 15 inches FL), with the average and minimum sizes being smaller when there was no size limit.

Similar to the commercial fishery, average size varies little from year to year in the recreational fishery (Table 5). In 2017, the average size recreational sheepshead was 14 inches fork length (Table 5). In both fisheries, sublegal fish (<10 inches fork length) are still being harvested (Tables 4 and 5). This is most likely due to fishermen being unaware of changes in regulations, and/or confusing sheepshead and black drum regulations. While the size limits differ, black drum are measured for total length and sheepshead for fork length.

Fishery-Independent Monitoring

A fishery independent gill net survey was initiated by the NCDMF in May of 2001. The survey utilizes a stratified random sampling scheme designed to characterize the size and age distribution for key estuarine species in Pamlico Sound. By continuing a long-term database of age

composition and developing an index of abundance for sheepshead this survey will help managers assess the sheepshead stocks without relying solely on commercial and recreational fishery dependent data. The overall sheepshead Catch per Unit Effort (CPUE; Number of sheepshead per set) was 0.44 in 2017, 57% above the time series CPUE (Table 6; Figure 2).

In order to describe the age distribution of the harvest and indices, sheepshead age structures are collected from various fishery independent and dependent sources throughout the year. Otolith collection for sheepshead is relatively new; while there is age data going back to 2008, the sample size is low and ages have not yet been verified. The majority of sheepshead collected from 2015-2017 were ages 2 to 5 (Table 7). In 2017, 269 sheepshead were collected ranging in age from 1 to 28.

MANAGEMENT STRATEGY

See Table 8 for current management strategies and implementation status for sheepshead.

RESEARCH NEEDS

- Develop a tagging program to determine migration patterns as well as juvenile and adult abundance indices for use in the development of a stock assessment model to determine sustainability. The program should include methods to estimate tag retention, reporting rate, and tagging-induced mortality (needed)
- Continue monitoring of recreational and commercial catches (ongoing through NCDMF fisheries dependent sampling programs)
- Collect ageing structures, update maturity schedule (ongoing through NCDMF sampling programs and CRFL histology grant)
- Collect age and sex information from recreational and commercial fisheries (ongoing through NCDMF fisheries dependent sampling programs)
- Conduct spawning area surveys (needed; some work to be done by CMAST through CRFL)

LITERATURE CITED

SAFMC (South Atlantic Fishery Management Council). 2011. Comprehensive Annual Catch Limit (ACL) Amendment (Amendment 25 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region). South Atlantic Fishery Management Council, 4055 Faber Place, Ste 201, North Charleston, S.C. 29405. (Available online at: https://www.dropbox.com/s/iz8wn5vec36hpis/CompACLAm_101411_FINAL.pdf?dl=0)

TABLES

Table 1. North Carolina's commercial sheepshead landings (pounds) by gear type, 2008-2017 (N.C. Trip Ticket Program).

Year	Landings (pounds) by Gear						
	Pound net	Estuarine gill net	Diving spears and gigs	Long haul	Ocean gill net	Trawls	Other
2008	41,107	26,347	2,909	10,495	2,662	5,585	623
2009	49,164	57,668	3,178	15,803	1,107	4,250	1,220
2010	49,205	59,271	2,998	37,974	1,345	5,604	1,235
2011	55,729	40,653	5,946	13,143	1,594	2,015	1,897
2012	46,233	32,565	15,916	9,780	1,974	2,140	1,274
2013	94,780	48,194	15,259	12,497	3,055	3,940	2,501
2014	92,988	39,524	21,886	11,777	3,253	2,581	1,367
2015	73,035	27,254	13,695	337	5,741	3,998	776
2016	36,839	30,844	14,761	262	2,509	7,068	1,223
2017	73,933	33,750	10,720	411	1,677	7,047	738

Table 2. North Carolina commercial sheepshead landings (pounds), number of dealers and ex-vessel value, 2008-2017 (N.C. Trip Ticket Program).

Year	Dealers	Ex-Vessel Value	Pounds
2008	130	\$53,053	89,726
2009	136	\$82,340	132,390
2010	130	\$99,666	157,631
2011	136	\$90,068	120,976
2012	149	\$92,837	109,881
2013	148	\$145,794	180,225
2014	139	\$159,274	173,376
2015	130	\$139,237	124,836
2016	130	\$116,501	93,506
2017	139	\$154,923	128,275

Table 3. North Carolina recreational sheepshead harvest pounds, harvest number and number released and PSE=Proportional Standard Error, 2008-2017 (Marine Recreational Information Program).

Year	Harvest Weight		Harvest Number		Released	
	Pounds	PSE	Number	PSE	Number	PSE
2008	381,995	28.7	175,412	24.2	69,537	23.4
2009	220,237	23.8	124,328	21.6	99,500	24.8
2010	420,108	17.3	145,873	16.3	63,557	18.7
2011	180,145	26.9	66,689	23.7	22,623	27.8
2012	293,570	19.6	119,899	16.3	79,668	18.7
2013	500,096	14.5	273,211	18.1	154,083	23.4
2014	143,782	22.8	61,379	21.0	72,520	20.3
2015	217,148	22.0	76,496	22.3	34,908	21.9
2016	116,683	24.6	42,137	22.2	75,865	30.0
2017	371,503	17.7	128,083	17.1	200,301	16.8

Table 4. Sheepshead length (fork length, inches) data from commercial fish house samples, 2008-2017.

Year	Mean Length (inches)	Minimum Length (inches)	Maximum Length (inches)	Total Measured (number)
2008	13	5	24	1,527
2009	12	6	23	1,491
2010	13	7	24	1,811
2011	14	5	24	1,317
2012	13	5	37	1,236
2013	13	7	24	1,426
2014	14	7	23	1,327
2015	15	8	24	1,001
2016	15	8	24	987
2017	14	9	23	401

Table 5. Sheepshead length (fork length, inches) data from Marine Recreational Information Program samples, 2008-2017.

Year	Mean Length (inches)	Minimum Length (inches)	Maximum Length (inches)	Total Measured (number)
2008	13	7	21	108
2009	12	7	21	159
2010	14	8	26	221
2011	14	7	25	160
2012	13	6	23	254
2013	12	6	24	351
2014	13	8	25	99
2015	14	9	23	134
2016	14	8	25	106
2017	14	4	22	272

Table 6. Annual weighted sheepshead Catch Per Unit Effort (Number per set all ages combined) from the North Carolina Pamlico Sound Independent Gill Net Survey, 2001-2017. N=number of samples; CPUE=Catch per unit effort; SE=Standard Error; PSE=Proportional Standard Error.

Year	N	CPUE	SE	PSE
2001	237	0.13	0.06	46
2002	320	0.14	0.04	29
2003	320	0.08	0.02	25
2004	320	0.13	0.03	23
2005	304	0.08	0.02	25
2006	320	0.08	0.02	25
2007	320	0.11	0.03	27
2008	320	0.11	0.03	27
2009	320	0.30	0.05	17
2010	320	0.18	0.04	22
2011	298	0.16	0.06	38
2012	308	0.12	0.03	25
2013	308	0.30	0.07	23
2014	308	0.45	0.09	20
2015	306	0.26	0.06	23
2016	308	0.20	0.04	20
2017	308	0.44	0.10	23

Table 7. Summary of sheepshead age samples collected from both dependent (commercial and recreational) and independent (survey) sources, 2015-2017.

Year	Modal Age	Minimum Age	Maximum Age	Total Number Aged
2015	4	1	10	135
2016	5	0	29	215
2017	2	1	28	269

Table 8. Summary of management strategies and their implementation status for sheepshead.

Management Strategy	Implementation Status
HARVEST MANAGEMENT	
Implement a size limit, recreational bag limit, and commercial trip limit by June 1, 2015	Proclamation authority through Rule 15A NCAC 03M .0521

FIGURES

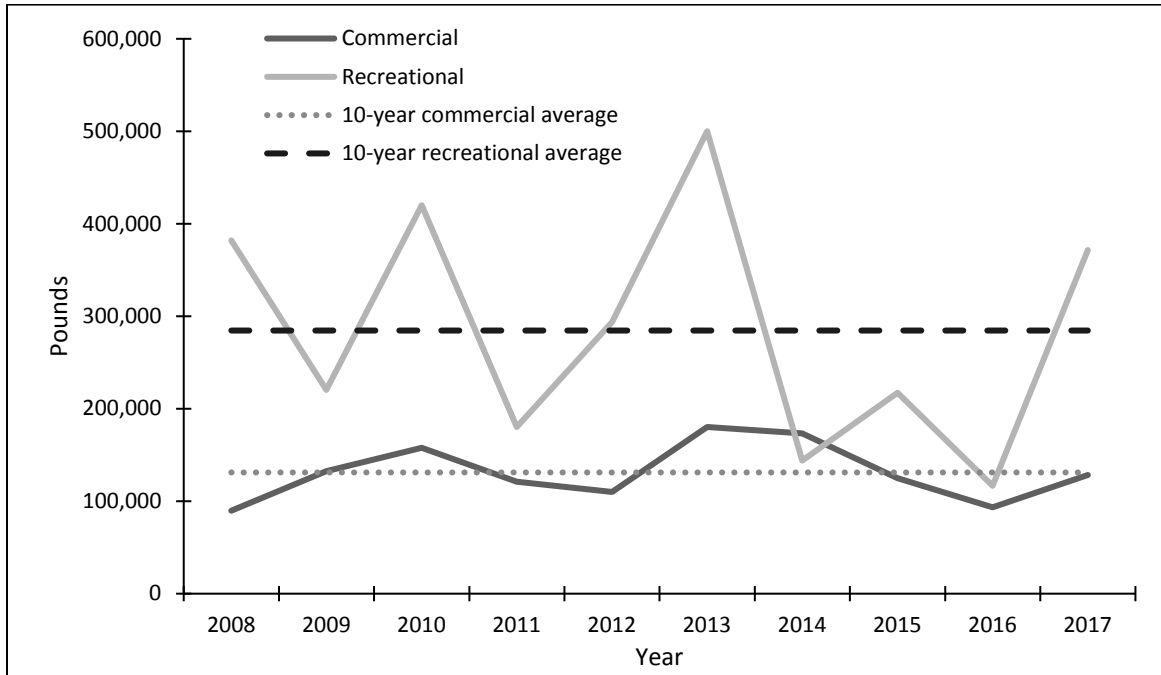


Figure 1. North Carolina commercial (N.C. Trip Ticket Program) and recreational (Marine Recreational Information Program) sheephead landings (pounds), 2008-2017.

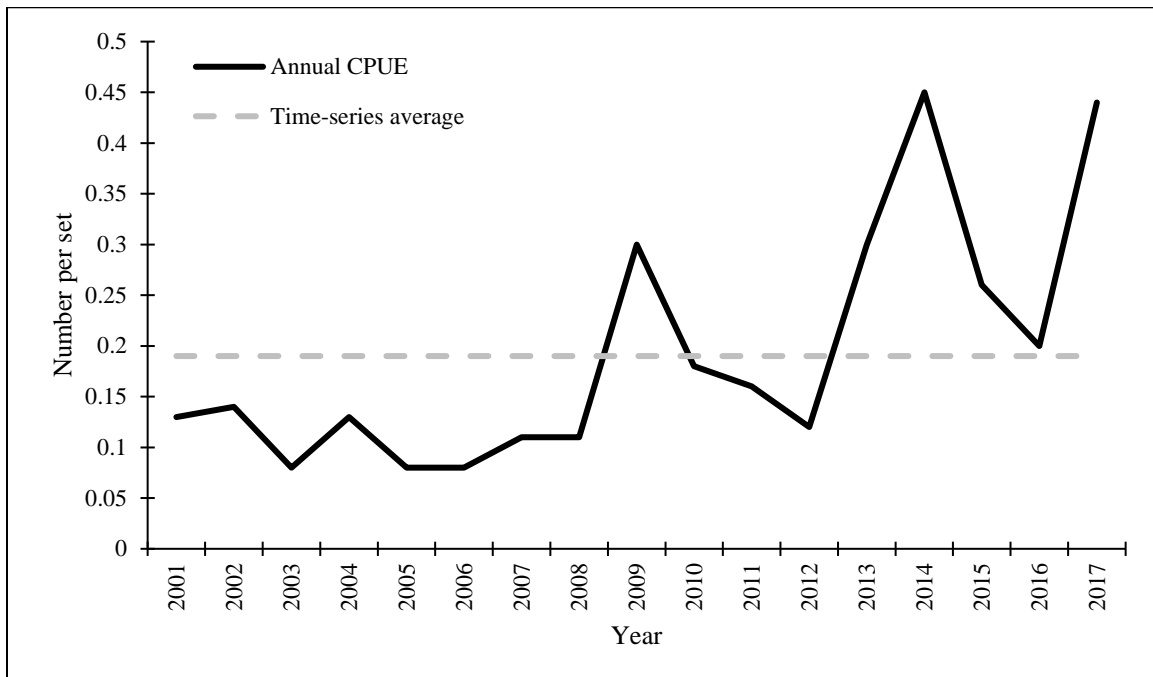


Figure 2. Annual index of abundance of sheephead in the NCDMF Pamlico Sound Independent Gill Net Survey, 2001-2017.