

**FISHERY MANAGEMENT PLAN UPDATE  
BLACK DRUM  
AUGUST 2022**

**STATUS OF THE FISHERY MANAGEMENT PLAN**

**Fishery Management Plan History**

FMP Documentation:	June 2013	
	Addendum I	May 2018
Information Updates:	December 2021	
Comprehensive Review:	2022	

In June 2013, the Atlantic States Marine Fisheries Commission (ASMFC) adopted the Interstate Fishery Management Plan (FMP) for Black Drum and required all states to maintain their current regulations and implement a maximum possession limit and minimum size limit (of no less than 12 inches) by January 1, 2014 (ASMFC 2013). States were also required to further increase the minimum size limit (to no less than 14 inches) by January 1, 2016. In response to the ASMFC requirement, the North Carolina Marine Fisheries Commission implemented a 14- to 25-inch total length slot size limit (with one fish over 25 inches), 10-fish recreational bag limit, and a 500-pound commercial trip limit effective January 1, 2014 (Proclamation FF-73-2013). The FMP also includes an adaptive management framework to respond to future concerns or changes in the fishery or population. Concern about the increase in harvest by both recreational and commercial were alleviated by the findings of the 2015 stock assessment (ASMFC 2015). The ASMFC Interstate Fisheries Management Program Policy Board chose not to make any additional changes to the FMP at the time given the findings of the assessment. A benchmark stock assessment is currently underway and is set to be completed in late 2022.

In May 2018, ASMFC approved Addendum I to the Black Drum FMP to allow Maryland to reopen its black drum commercial fishery in the Chesapeake Bay with a daily vessel limit of up to 10 fish and a 28-inch minimum size (ASMFC 2018). The Black Drum Technical Committee noted reopening the fishery would not likely lead to overfishing due to the relatively small size of the fishery and recommended that biological monitoring be conducted in the commercial fishery.

To ensure compliance with interstate requirements, North Carolina also manages this species under the North Carolina Fishery Management Plan for Interjurisdictional Fisheries (IJ FMP). The goal of the IJ FMP is to adopt fishery management plans, consistent with N.C. law, approved by the Mid-Atlantic Fishery Management Council, South Atlantic Fishery Management Council, or the ASMFC by reference and implement corresponding fishery regulations in North Carolina to provide compliance or compatibility with approved fishery management plans and amendments, now and in the future. The goal of these plans, established under the Magnuson-Stevens Fishery Conservation and Management Act (federal council plans) and the Atlantic Coastal Fisheries Cooperative Management Act (ASMFC plans) are like the goals of the Fisheries Reform Act of 1997 to “ensure long-term viability” of these fisheries (NCDMF 2022).

## **Management Unit**

The ASMFC FMP includes all states from Florida to New Jersey. The management unit is defined as the black drum (*Pogonias cromis*) resource throughout the range of the species within U.S. waters of the northwest Atlantic Ocean from the estuaries eastward to the offshore boundaries of the U.S. Exclusive Economic Zone (ASMFC 2015).

## **Goal and Objectives**

- The goal of the Black Drum FMP is to provide an efficient management structure to implement coastwide management measures (ASMFC 2013). The objectives of the FMP include:
- Provide a flexible management system to address future changes in resource abundance, scientific information, and fishing patterns among user groups or area.
- Promote cooperative collection of biological, economic, and sociological data required to effectively monitor and assess the status of the black drum resource and evaluate the management efforts.
- Manage the black drum fishery to protect both young individuals and established breeding stock.
- Develop research priorities that will further refine the black drum management program to maximize the biological, social, and economic benefits derived from the black drum population.

## **DESCRIPTION OF THE STOCK**

### **Biological Profile**

Black drum is the largest member of the drum family (Sciaenidae), reaching sizes of over 46 inches and 120 pounds (Jones and Wells 1998). The range of black drum extends along the nearshore western Atlantic coast from the Gulf of Maine to Florida, into the Gulf of Mexico, and as far south as Argentina (Bigelow & Schroeder 1953; Simmons & Breuer 1962). Along the Atlantic Coast, black drum are thought to migrate northward and inshore each spring and southward and offshore by late fall (Jones & Wells 1998). Juvenile black drum can be found throughout the estuarine waters of North Carolina, while adults tend to congregate around structure including bridge and dock pilings. They are primarily bottom feeders; juvenile diets consist mainly amphipods, polychaetes, mollusks, crustaceans, and small fish, while the adult diet consists primarily of worms, bivalves, mollusks, crustaceans, and fish (Peters & McMichael 1990; Murphy and Muller 1995; Rubio et al. 2018). Spawning is thought to occur in the offshore waters of the mid-Atlantic during the winter and early spring (Richards 1973; Joseph et al. 1964; Wells & Jones 2002; Chesapeake Bay Program 2004). The number of juvenile fish entering the population annually (recruitment) is thought to be highly variable and dependent on natural environmental conditions (Murphy & Muller 1995). Females are sexually mature between the ages of 4 and 6 (25 to 28 inches) and spawn yearly through adulthood (Murphy & Taylor 1989). An average-sized female may spawn 32 million eggs each year (Fitzhugh et al. 1993). At ages 4 and 5 (22 to 25 inches) males are mature (Murphy & Taylor 1989). The species is long-lived, reaching up to 60 years of

age (Jones & Wells 1998; Chris Stewart, NCDMF, personal communication). Black drum are approximately 11 to 14 inches at age-1, 15 to 17 inches at age-2, and 19 to 21 inches at age-3 (Murphy & Taylor 1989; Murphy & Muller 1995; Jones & Wells 1998).

### **Stock Status**

The 2015 ASMFC Black Drum Stock Assessment determined that the stock is not overfished and not experiencing overfishing (ASMFC 2015).

### **Stock Assessment**

Variable catch history in state surveys and fisheries, coupled with complex migratory patterns, made the use of traditional statistical catch-at-age models difficult. A data-poor modeling approach was used for the first coastwide benchmark stock assessment (ASMFC 2015). Data-poor models estimate reference points based on historical catch data and life history information. A Depletion-Based Stock Reduction Analysis (DB-SRA) model was used to estimate biomass and maximum sustainable yield (MSY). Median MSY was estimated to be 2.12 million pounds and the median overfishing limit (OFL) is estimated to be 4.12 million pounds (see Management Strategy section below). While the median biomass has declined steadily from the 1900s, the median biomass in 2012 was well above the level needed to produce maximum sustainable yield (BMSY; 47.26 million pounds; Figure 1). The DB-SRA results determined that black drum is not overfished and not experiencing overfishing based on their life history, indices of abundance, and history of exploitation (ASMFC 2015).

A benchmark stock assessment is currently in development using the recalibrated Marine Recreational Information Program (MRIP) data. The benchmark assessment will provide updated reference points and is expected to be completed in late 2022.

## **DESCRIPTION OF THE FISHERY**

### **Current Regulations**

All harvest is limited to black drum between a 14-inch total length (TL) minimum size and 25-inch TL maximum size for both the recreational and commercial fisheries, except that one black drum over 25-inches TL may be retained. The recreational bag limit is ten fish per day. A daily commercial possession limit of no more than 500 pounds per trip is allowed for a commercial fishing operation, regardless of the number of persons, license holders, or vessels involved in the operation (Proclamation FF-73-2013).

### **Commercial Fishery**

Since 1994, the North Carolina Trip Ticket Program (NCTTP) has collected data on the commercial harvest of black drum. Black drum is primarily caught as bycatch in several North Carolina commercial fisheries; however, they are predominantly landed in the gill net (76%) and pound net (21%) fisheries (Figure 2). The annual commercial harvest of black drum has been highly variable (Table 1; Figure 3A). On average 118,514 pounds of black drum were landed annually from 1994 to 2021. Commercial landings have ranged from a low of 27,750 pounds in

1998 to a high of 497,479 pounds in 2002. Commercial landings increased 34% from 2020 to 2021. In 2021, 131,724 pounds of black drum were landed in the commercial fishery.

### **Recreational Fishery**

Recreational estimates across all years have been updated and are now based on the MRIP new Fishing Effort Survey-based calibrated estimates. For more information on MRIP see <https://www.fisheries.noaa.gov/topic/recreational-fishing-data>.

The recreational landings have been highly variable, ranging from a low of 164,280 pounds in 1998 to a high of 2,709,269 pounds in 2013 (Table 1; Figure 3B). In 2021, 359,481 pounds of black drum were harvested, below the time-series average of 768,856 pounds. The harvest (pounds of fish) decreased 41% from 2020 to 2021. Recreational releases (number of fish) decreased 3% from 2020 to 2021.

The NCDMF offers award citations for exceptional catches of black drum. Prior to 2021, citations were awarded for black drum greater than 35 pounds or fish released greater than 40-inches TL. Released black drum greater than 40 inches TL are now only eligible for an award citation. In 2021, 25 citations were awarded (Figure 4).

## **MONITORING PROGRAM DATA**

### **Fishery-Dependent Monitoring**

Commercial fishing activity is monitored through fishery dependent sampling conducted under Title III of the Interjurisdictional Fisheries Act ongoing since 1982. Biological samples (lengths, aggregate weights) are obtained from several NCDMF commercial fisheries dependent sampling programs. Black drum lengths and aging structures are collected at local fish houses. After sampling a portion of the catch, the total weight of the catch by species and market grade are obtained for each trip, either by using the trip ticket weights or some other reliable estimate.

Since the implementation of the 14- to 25-inch slot limit in 2014, as would be expected the mean total length (TL) of commercially harvested black drum has increased. The mean TL has ranged from 10-inches to 19-inches (Table 2). In 2021, the minimum TL was 8-inches, and the maximum TL was 23-inches (Table 2; Figure 5). Undersized black drum continue to be harvested since the implementation of the 14-inch TL minimum size limit established in 2014, likely due to fishermen confusing black drum with sheepshead (Figure 6). The minimum size limit of sheepshead is smaller than the minimum size limit for black drum at 10-inches fork length (FL).

The mean TL of recreational harvested black drum ranged from a low of 10-inches in 2011 and 2011 to a maximum of 17-inches in 2015 and 2016 (Table 3). In 2021, the minimum TL was 9-inches, and the maximum TL was 46-inches (Table 3; Figure 5). Similar to the commercial fishery, undersized black drum continued to be harvested in the recreational fishery since the implementation of the 14-inch TL minimum size limit established in 2014 (Figure 7).

## **Fishery-Independent Monitoring**

A fishery-independent gill net survey (Program 915) 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 and the Neuse, Pamlico, and Pungo rivers. By continuing a long-term database of age composition and developing a relative index of abundance for black drum this survey will help managers assess the black drum stocks without relying solely on commercial and recreational fishery dependent data. Additionally, data collected is used to help improve bycatch estimates, evaluate the success of management measures, and look at habitat usage. Sampling in this program was suspended in February 2020 due to COVID-19 restrictions and protected species interactions but resumed July 2021.

The annual weighted black drum relative index of abundance from the independent gill net survey has ranged from a high of 1.12 in 2016 to a low of 0.32 in 2013 (Table 4; Figure 8). Proportional Standard Error (PSE) has ranged from 12 to 39. In the latter half of 2021, 244 black drum were caught in survey. This survey is used in the 2022 ASMFC benchmark stock assessment for black drum as annual index of relative abundance for sub-adult and adult black drum.

Black drum age structures are collected from various fishery independent (scientific surveys) and dependent (fisheries) sources throughout the year. In 2021, 415 black drum were aged. Ages ranged from 0 to 5 years; however, a majority of the age structures were collected from independent sources and may not be representative of fish caught in North Carolina's recreational and commercial fisheries (Table 5). The oldest black drum harvested in North Carolina was age-60. Beyond age 3, there is significant overlap in the length at age for black drum (Figure 9).

## **RESEARCH NEEDS**

The 2015 Benchmark Stock Assessment and Peer Review Report (ASMFC 2015) outlines research needs for black drum. The research recommendations 2015 Benchmark Stock Assessment and Peer Review Report for black drum include:

### **High**

- Age otoliths that have been collected and archived. — Ongoing)
- Collect information to characterize the size composition of fish discarded in recreational fisheries. — Ongoing
- Collect information on the magnitude and sizes of commercial discards. Obtain better estimates of black drum bycatch in other fisheries, especially juvenile fish in south Atlantic states. — Ongoing
- Increase biological sampling in commercial fisheries to better characterize the size and age composition of commercial fisheries by state and gear. — Ongoing
- Increase biological sampling in recreational fisheries to better characterize the size and age composition by state and wave. — Ongoing

- Obtain estimates of selectivity-at-age for commercial fisheries by gear, recreational harvest, and recreational discards. — Ongoing
- Continue all current fishery-independent surveys and collect biological samples for black drum on all surveys. — Ongoing
- Develop fishery-independent adult surveys. Consider long line and purse seine surveys. — Ongoing
- Collect age samples, especially in states where maximum size regulations preclude the collection of adequate adult ages. — Ongoing
- Conduct reproductive studies, including age and size-specific fecundity, spawning frequency, spawning behaviors by region, and movement and site fidelity of spawning adult. — Needed
- Conduct a high reward tagging program to obtain improved return rate estimates. Continue and expand current tagging programs to obtain mortality and growth information and movement at size data. — Needed
- Conduct tagging studies using implanted radio tracking tags that are compatible with coastal tracking arrays along the Atlantic coast in order to track movement and migration of adults. — Needed
- Conduct studies to estimate catch and release mortality rates in recreational fisheries. — Needed

## **Medium**

- Improve sampling of nighttime fisheries. — Needed
- Collect genetic material (i.e., create “genetic tags”) over a long-time span to obtain information on movement and population structure, and potentially estimate population size. — Needed
- Obtain better estimates of harvest from the black drum recreational fishery, especially in states with short seasons. — Ongoing

The ASMFC Black Drum Plan Review Team (PRT) annually reviews and prioritizes the research needs as part of the ASMFC FMP review process. The 2021 Review of the ASMFC FMP for black drum further cites the need to continue and expand the biological collection of age and size composition data, fecundity data, as well as tagging programs (ASMFC 2021). Updated research needs will be available once the 2022 benchmark assessment is complete.

## **MANAGEMENT STRATEGY**

The management program currently in place for black drum has resulted in a stock that has met ongoing management targets. Each year the ASMFC Black Drum PRT monitors each states’ compliance with the FMP during its annual review. States must demonstrate that the compliance criteria of the FMP are satisfied and submit an annual report concerning its fisheries and management programs. Following the review of the 2020 fishing year, the PRT determined that all states were compliant with the FMP (ASMFC 2021).

Data poor models such as the one used for 2015 ASMFC Black Drum Stock Assessment are designed to estimate reference points based on historical catch data and the life history of a particular species. Due to the uncertainty of the inputs and the nature of data poor methods the ASMFC Stock Assessment Subcommittee (SAS) recommended that a precautionary MSY estimate of 2.12 million pounds with an interquartile range of 1.60 to 3.05 million pounds as the recommended target reference point (Figure 1). The threshold MSY or OFL was set at 4.12 million pounds. The SAS also noted that the stock assessment could be improved by incorporating a more complex, data-rich assessment method such as a statistical catch-at-age model once several data limitations are met (ASMFC 2021).

Additional biological sampling (length and age) of recreational and commercial fisheries and the development of a fishery-independent survey to track abundance and age structure of the mature stock are needed to make this transition. Estimates of commercial discards and movement patterns along the coast would further improve the assessment.

See Table 6 for current management strategies and implementation status of the ASMFC Black Drum FMP.

## LITERATURE CITED

- ASMFC (Atlantic States Marine Fisheries Commission). 2013. Interstate Fishery Management Plan for Black Drum. Arlington, VA. 72 pp.
- ASMFC. 2015. Black Drum Stock Assessment and Peer Review Reports. Atlantic States Marine Fisheries Commission, Stock Assessment Report. 352 ASMFC. 319 pp.
- ASMFC. 2018. Addendum I to the Black Drum Interstate Fishery Management Plan. Atlantic States Marine Fisheries Commission. Arlington, VA. 4 pp.
- ASMFC. 2021. Review of the Atlantic States Marine Fisheries Commission Fishery Management Plan for Black Drum (*Pogonias cromis*) 2020 Fishing Year. Arlington, VA. December 2021. 14 pp.
- Bigelow, H.B., and W.C. Schroeder. 1953. Fishes of the Gulf of Maine. U.S. Fish Wildl. Serv. Fish. Bull. 53. 577 pp.
- Chesapeake Bay Program. 2004. Chesapeake Bay Black Drum Fishery Management Plan Review. Annapolis, MD.
- Fitzhugh, G.R., B.A. Thompson, and T.G. Snider. 1993. Ovarian development, fecundity, and spawning frequency of black drum *Pogonias cromis* in Louisiana. Fishery Bulletin, 91:244-253.
- Jones, C., and B.K. Wells. 1998. Age, growth, and mortality of black drum, *Pogonias cromis*, in the Chesapeake Bay region. Fishery Bulletin, 96: 451-461.
- Joseph, E.G., W.H. Massman, and J.J. Norcross. 1964. The pelagic eggs and early larval stages of the black drum from Chesapeake Bay. Copeia 2:425-434.
- Murphy, M.D., and R.G. Muller. 1995. A stock assessment of black drum *Pogonias cromis* in Florida. Florida Marine Research Institute, In-house Report Series IHR 1995-005.
- Murphy, M.D., and R.G. Taylor. 1989. Reproduction and growth of black drum, *Pogonias cromis*, in northeast Florida. Northeast Gulf Science 10(2):127-137.
- NCDMF (North Carolina Division of Marine Fisheries). 2022. North Carolina Fishery Management Plan for Interjurisdictional Fisheries, 2022 Information Update. North Carolina Division of Marine Fisheries, Morehead City, North Carolina. 19 pp.
- Peters, K.M., and R.H. McMichael, Jr. 1990. Early life history of the black drum *Pogonias cromis* (Pisces: Sciaenidae) in Tampa Bay, Florida. Northeast Gulf Sci. 11(1):39-58.

- Richards, C.E. 1973. Age, growth, and distribution of black drum (*Pogonias cromis*) in Virginia. Transactions of the American Fisheries Society 3:584-590.
- Rubio, K.S., M. Ajemian, G.W. Stunz, T.A. Palmer, B. Lebreton, and J. Beseres Pollack. 2018. Dietary composition of black drum *Pogonias cromis* in a hypersaline estuary reflects water quality and prey availability. Journal of fish biology, 93(2), 250–262. <https://doi.org/10.1111/jfb.13654>
- Simmons, E.G., and J.P. Breuer. 1962. A study of redfish, *Sciaenops ocellata* Linnaeus, and black drum, *Pogonias cromis* Linnaeus. Publ. Inst. Mar. Univ. Tex. 8:184-211.
- Wells, B.K., and C.M. Jones. 2002. Reproduction of black drum, *pogonias cromis*, from Chesapeake Bay region. Virginia Journal of Science. 53(1):3-11.



## TABLES

Table 1. Recreational harvest (number of fish landed and weight in pounds) and releases (number of fish) and commercial harvest (weight in pounds) of spotted seatrout from North Carolina for the period 1991–2021.

Year	Recreational			Commercial	Total Weight (lb)
	Numbers Landed	Numbers Released	Weight Landed (lb)	Weight Landed (lb)	
1994	132,517	9,122	272,820	33,536	306,356
1995	931,269	227,608	713,652	128,221	841,873
1996	468,766	176,061	608,460	122,837	731,297
1997	106,854	62,498	277,316	86,610	363,926
1998	105,349	95,834	164,280	27,750	192,030
1999	374,245	267,723	561,678	122,771	684,449
2000	293,983	112,470	685,687	98,784	784,471
2001	400,983	325,234	446,202	77,892	524,094
2002	846,855	215,810	1,791,703	497,479	2,289,182
2003	1,265,995	481,742	1,926,671	148,785	2,075,456
2004	296,531	255,753	566,484	62,445	628,929
2005	465,076	376,363	509,328	44,989	554,317
2006	276,257	265,369	431,212	125,214	556,426
2007	876,178	832,132	697,822	148,231	846,053
2008	925,963	548,931	1,232,589	301,998	1,534,587
2009	449,901	411,358	421,788	148,994	570,782
2010	650,010	427,577	812,699	69,194	881,893
2011	1,259,216	711,755	823,423	56,083	879,506
2012	556,482	397,155	879,401	94,352	973,753
2013	1,511,995	497,334	2,709,269	127,170	2,836,439
2014	109,307	1,964,749	230,834	51,217	282,051
2015	276,126	1,791,758	780,876	51,097	831,973
2016	459,078	2,530,596	1,322,547	90,055	1,412,602
2017	355,544	2,336,352	856,081	182,989	1,039,070
2018	134,624	1,450,855	428,273	109,781	538,054
2019	156,401	756,749	404,452	80,049	484,501
2020	213,320	704,357	612,932	98,143	711,075
2021	121,454	681,121	359,481	131,724	491,205
Mean	500,724	675,513	768,856	118,514	887,370

Table 2. Mean, minimum, maximum total length (TL; inches), and total number of black drum measured from North Carolina commercial fish house samples, 1994–2021.

Year	Mean Fork Length	Minimum Fork Length	Maximum Fork Length	Total Number Measured
1994	15	9	18	46
1995	10	8	42	190
1996	14	8	26	203
1997	16	9	23	91
1998	17	6	24	73
1999	14	7	47	645
2000	15	7	29	836
2001	15	7	36	426
2002	14	7	46	2,068
2003	16	7	49	605
2004	16	8	37	203
2005	14	4	44	304
2006	13	6	47	1,402
2007	14	7	50	2,012
2008	14	7	49	2,777
2009	15	7	47	1,044
2010	16	8	48	611
2011	12	7	32	1,300
2012	14	5	37	1,028
2013	15	5	35	777
2014	17	10	47	334
2015	18	9	43	293
2016	17	12	47	750
2017	17	10	29	463
2018	19	14	45	396
2019	17	12	43	405
2020	17	10	31	432
2021	16	8	23	513

Table 3. Mean, minimum, maximum total length (TL; inches), and total number of black drum measured from Marine Recreational Information Program recreational samples, 1989–2021.

Year	Mean Total Length	Minimum Total Length	Maximum Total Length	Total Number Measured
1989	12	26	18	1
1990	7	28	10	6
1991	9	22	11	22
1992	9	19	13	7
1993	8	25	11	61
1989	12	26	18	1
1990	7	28	10	6
1991	9	22	11	22
1994	15	9	32	121
1995	11	7	30	390
1996	12	7	25	339
1997	15	9	33	144
1998	12	7	26	167
1999	13	8	31	248
2000	15	8	24	178
2001	11	8	25	173
2002	14	8	30	219
2003	11	7	52	198
2004	14	8	27	127
2005	11	7	34	89
2006	13	9	33	104
2007	11	7	20	191
2008	12	7	48	363
2009	11	8	25	191
2010	11	7	29	258
2011	10	7	24	567
2012	13	7	26	237
2013	13	7	26	154
2014	15	7	24	33
2015	17	11	25	75
2016	17	10	28	116
2017	16	9	27	162
2018	16	8	26	128
2019	16	10	44	106
2020	16	10	44	215
2021	16	9	46	155

Table 4. Annual weighted black drum index of relative abundance (number per set, all ages combined) from the NCDMF Independent Gill Net Survey (Program 915) in the Pamlico Sound and Neuse, New, Pamlico, and Pungo river systems from 2003–2021. N=number of samples; Index=black drum per gill net set; SE=Standard Error; PSE=Proportional Standard Error. \*Sampling in this program was suspended in February 2020 due to COVID-19 restrictions and protected species interactions but resumed July 2021.

Year	N	Index	SE	PSE
2003	476	0.83	0.21	25
2004	640	0.35	0.07	19
2005	608	0.37	0.09	24
2006	640	0.71	0.07	10
2007	640	0.63	0.13	20
2008	640	1.02	0.14	13
2009	640	0.59	0.11	19
2010	640	0.40	0.13	32
2011	618	0.62	0.10	17
2012	628	0.39	0.06	14
2013	628	0.32	0.05	16
2014	628	0.59	0.12	20
2015	626	0.80	0.29	36
2016	628	1.12	0.15	14
2017	628	0.92	0.18	20
2018	628	0.37	0.05	14
2019	628	0.76	0.12	15
2020*				
2021*	344	0.83	0.17	20

Table 5. Summary of black drum age samples collected from both dependent (commercial and recreational fisheries) and independent (surveys) sources from 2011–2021. Samples collected from partial carcasses were not included.

Year	Modal Age	Minimum Age	Maximum Age	Total Number Aged
2011	0	0	60	235
2012	1	0	3	324
2013	2	0	4	190
2014	1	0	31	407
2015	0	0	2	397
2016	1	0	13	667
2017	1	0	42	742
2018	1	0	46	429
2019	1	0	32	444
2020	1	1	4	104
2021	1	0	5	415

Table 6. Summary of ASMFC management strategies and their implementation status for Black Drum Fishery Management Plan.

Management Strategy	Implementation Status
<i>HARVEST MANAGEMENT</i>	
Implement a maximum possession limit and size limit (of no less than 12 inches) by January 1, 2014	Accomplished (other states)
Implement a maximum possession limit and size limit (of no less than 14 inches) by January 1, 2016	Proclamation FF-73-2013
Implement a 10 fish and 28-inch minimum size limit for Maryland's commercial fishery by February 25, 2019	Accomplished (Maryland)

## FIGURES

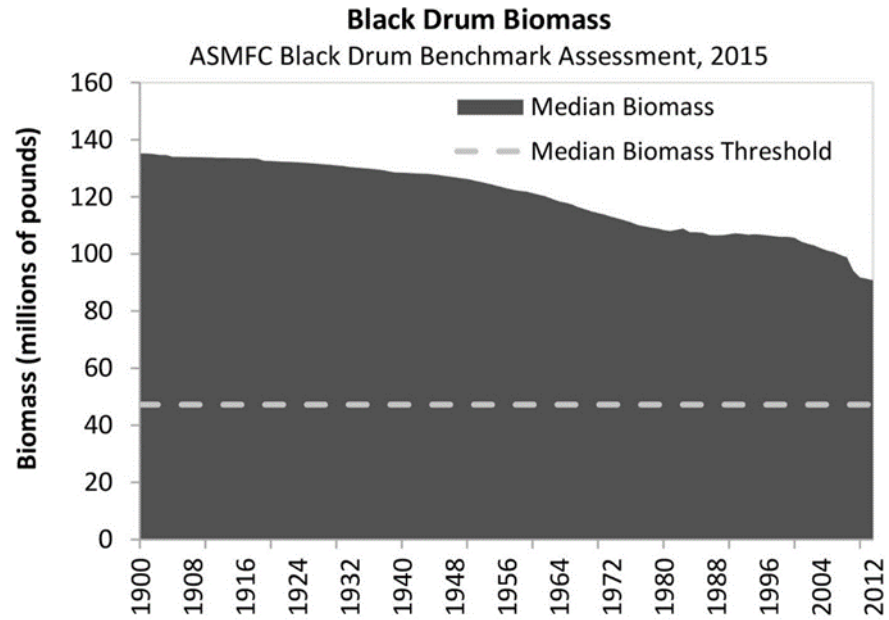


Figure 1. Depletion-Based Stock Reduction Analysis (DB-SRA) median biomass and threshold, 1900–2012 (ASMFC 2015).

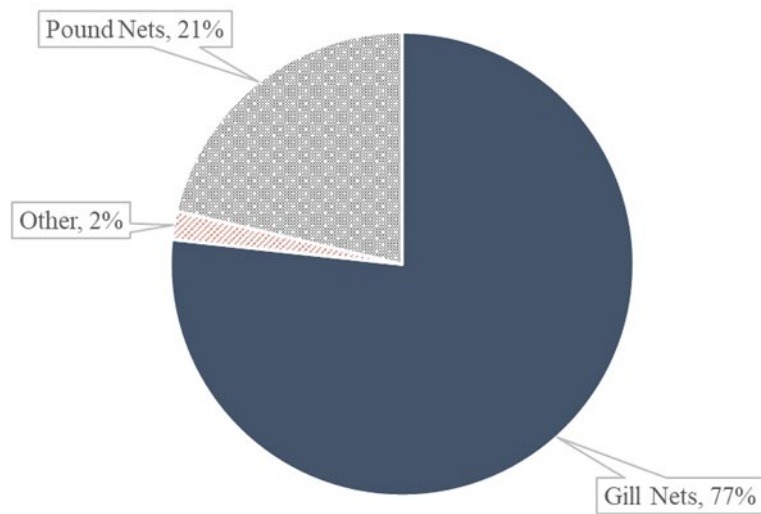


Figure 2. Black drum commercial harvest in 2021 by gear type. “Other” includes haul seines, crab pots, channel nets, and fyke nets.

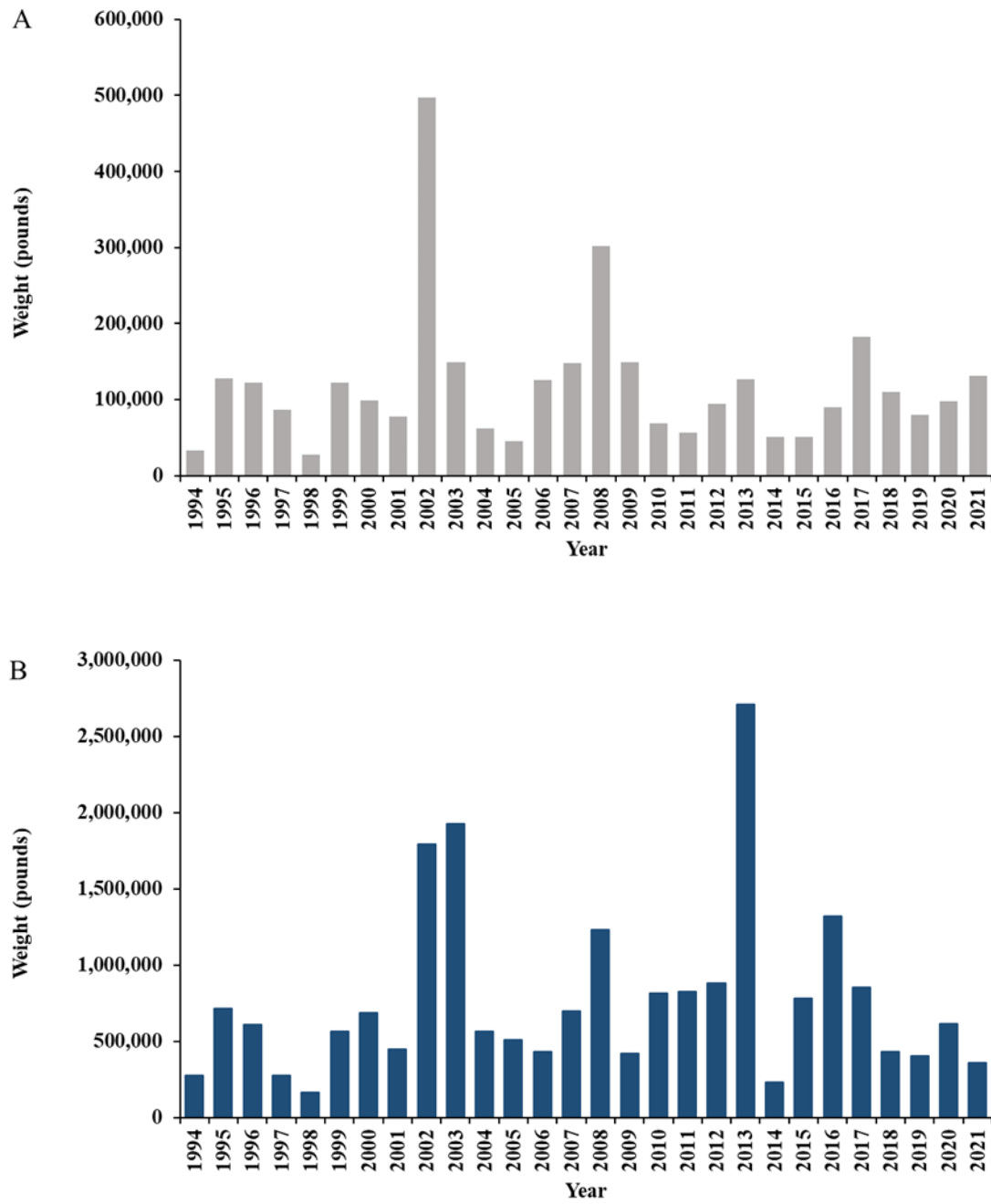


Figure 3. Annual commercial (A) and recreational (B) landings in pounds for black drum in North Carolina from 1994 to 2021.

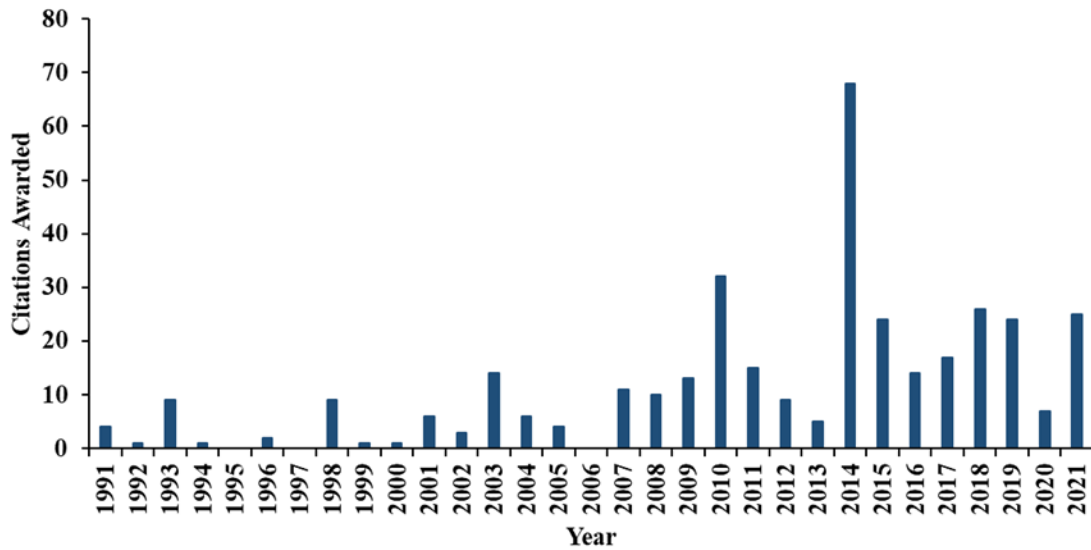


Figure 4. North Carolina Saltwater Fishing Tournament citations awarded for black drum from 1991 to 2021. Citations are awarded for released black drum greater 40 inches total length.

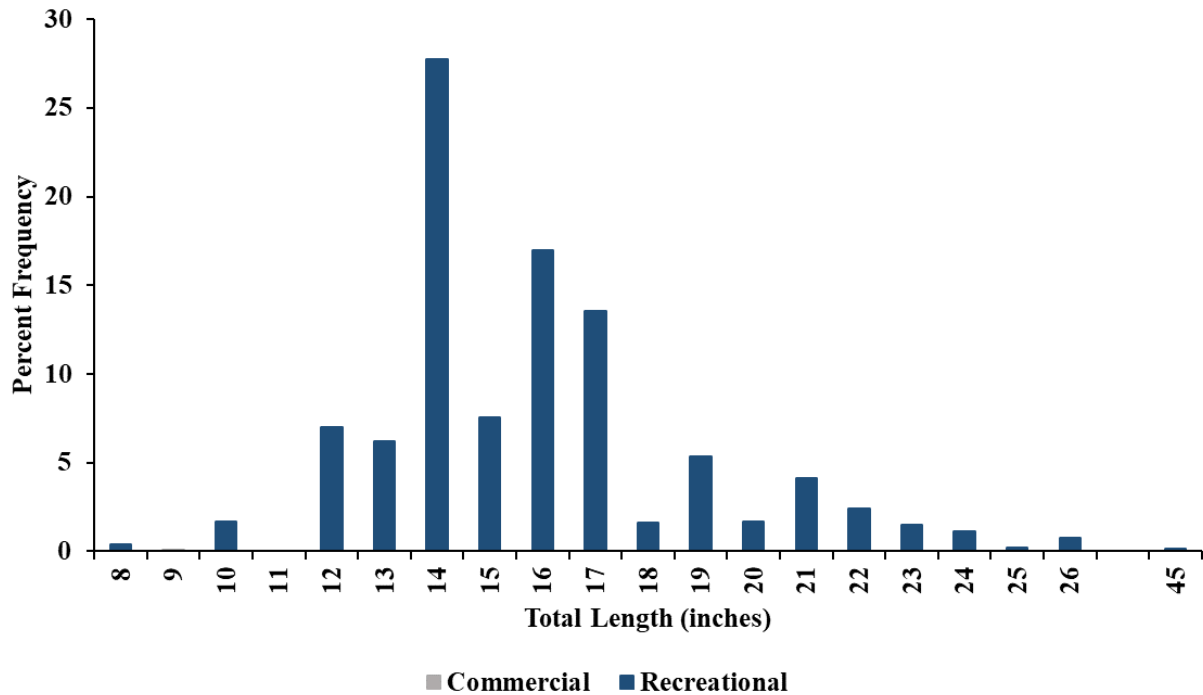


Figure 5. Commercial and recreational length frequency (total length, inches) of black drum harvested in 2021.



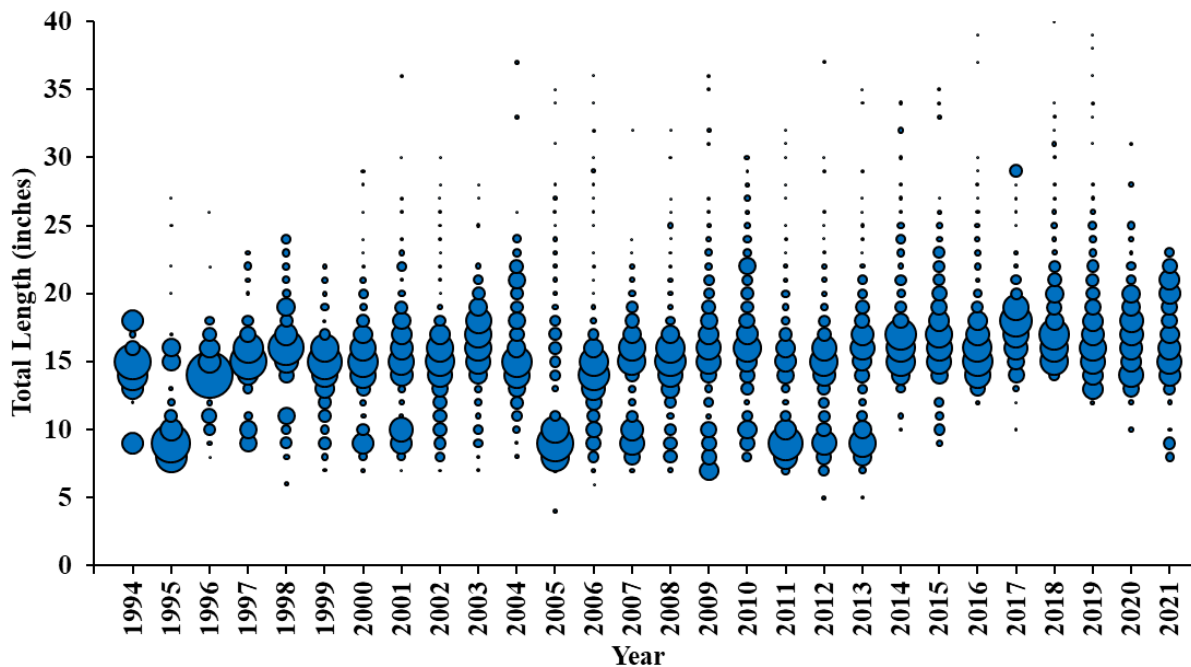


Figure 6. Commercial length frequency (total length, inches) of black drum harvested from 1994 to 2021. Bubbles represent fish harvested at length and the size of the bubble is equal to the proportion of fish at that length.

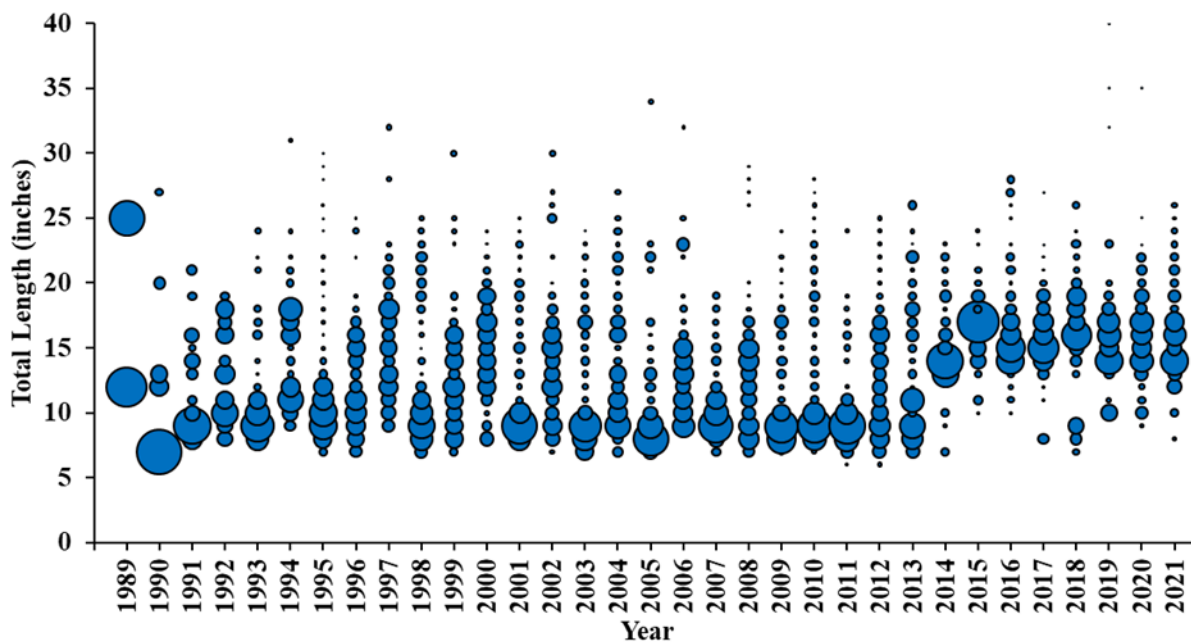


Figure 7. Recreational length frequency (total length, inches) of black drum harvested from 1989 to 2021. Bubbles represent fish harvested at length and the size of the bubble is equal to the proportion of fish at that length.

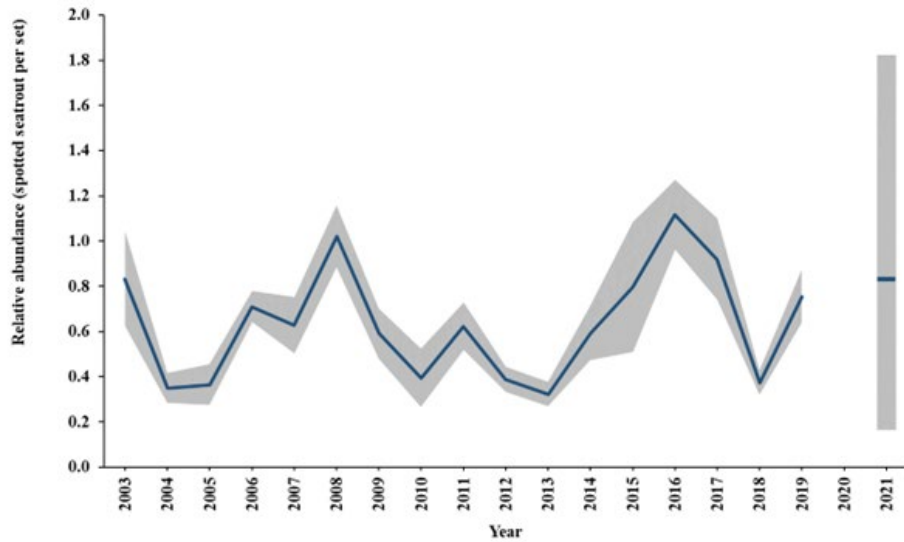


Figure 8. Annual weighted black drum index of relative abundance (number per set) from the NCDMF Independent Gill Net Survey (Program 915) in the Pamlico Sound and Neuse, New, Pamlico, and Pungo river systems from 2003–2021. Shaded area represents + one standard error. Sampling in this program was suspended in February 2020 due to COVID-19 restrictions and protected species interactions but resumed July 2021.

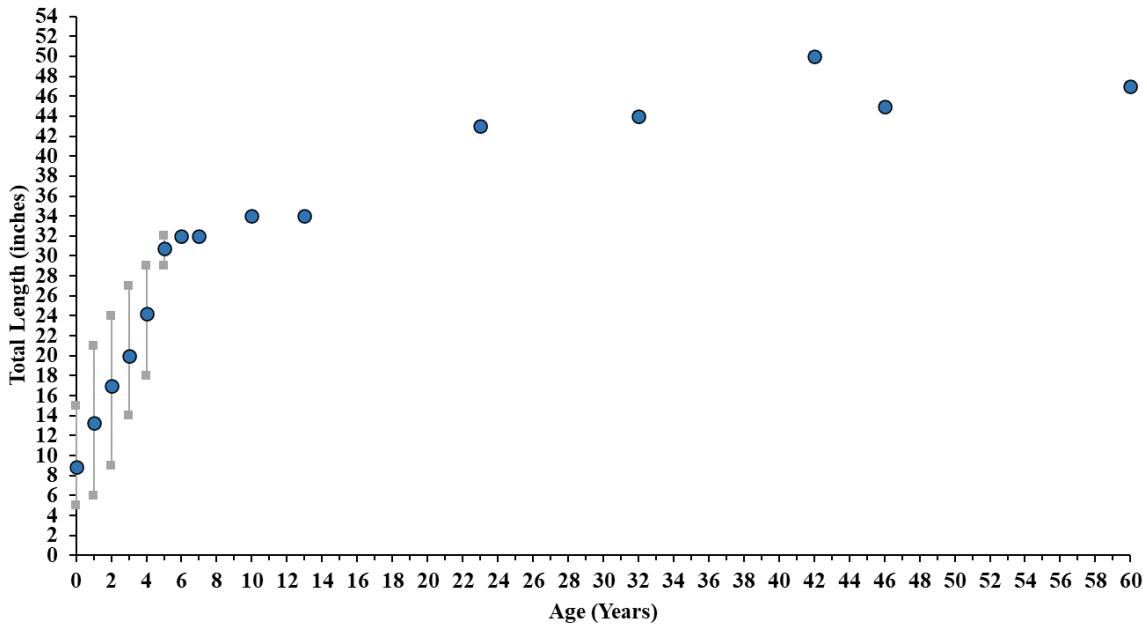


Figure 9. Black drum length (total length, inches) at age based on all age samples collected from 2011 to 2021. Blue circles represent the mean size at a given age while the grey squares represent the minimum and maximum observed size for each age. Samples collected from partial carcasses were not included.