

**FISHERY MANAGEMENT PLAN UPDATE
DOLPHIN
AUGUST 2020**

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption:	June 2004
Amendments:	Amendment 1 – July 2010 Amendment 2 – April 2012 Amendment 3 – August 2014 Amendment 5 – July 2014 Amendment 6 – January 2014 Amendment 7 – January 2016 Amendment 8 – February 2016 Regulatory Amendment 1 – March 2017
Revisions:	None
Supplements:	None
Information Updates:	None
Schedule Changes:	None
Next Benchmark Review:	None

The South Atlantic Fishery Management Council (SAFMC), in cooperation with the Mid-Atlantic and New England Councils, developed a Dolphin/Wahoo Fishery Management Plan (FMP) for the Atlantic in 2004. While dolphin was not overfished, the Council adopted a precautionary and risk-averse approach to management for this fishery. The original FMP established a 20-inch fork length (FL) minimum size limit off Georgia and Florida; identified allowable gears in the fishery; and prohibited the use of longline gear to harvest dolphin in areas closed to use of such gear for highly migratory species. Amendment 1 (2010) provided spatial information of Council-designated Essential Fish Habitat and Habitat Areas of Particular Concern relative to the dolphin wahoo fishery. Amendment 2 (SAFMC 2011) established Allowable Biological Catch (ABC), Annual Catch Limits (ACL), Accountability Measures (AM), and modified the allocations for both commercial and recreational sectors; established Annual Catch Targets (ACT) for the recreational sector; prohibited bag limit sales of dolphin from for-hire vessels; and established a 20-inch FL minimum size limit for South Carolina. Amendment 3 (SAFMC 2014, 79 F.R. 19490) required federal dealer permits, and changed the method and frequency of reporting harvest. Amendment 4 (in progress) would change the method of reporting commercial harvest of dolphin through the existing logbook program and is included under the Joint Generic Commercial Logbook Reporting Amendment. In 2013,

Amendment 5 (SAFMC 2013) was approved and adopted by the SAFMC and was the most comprehensive amendment to the Dolphin/Wahoo FMP, in terms of process updates. Amendment 5 updated the ACLs and AM for both sectors, as well as the ABC values and ACT for the recreational fishery as a result of improvements to the recreational catch estimation methods used by the Marine Recreational Information Program. This amendment also set up an abbreviated framework procedure whereby modifications to the ACLs, ACTs, and AMs can be implemented by the National Oceanic and Atmospheric Administration (NOAA) Fisheries without a full FMP amendment. Amendment 7 (SAFMC 2015a) allowed for dolphin and wahoo fillets to enter the U.S. EEZ after lawful harvest in the Bahamas. Amendment 8 (SAFMC 2015b) adjusted sector allocations and increased the commercial ACL to 10 percent of the total ACL. Regulatory Amendment 1 (SAFMC 2016), effective March 2017, establishes a commercial trip limit for vessels with an Atlantic dolphin/wahoo permit of 4,000 pounds for the dolphin commercial sector once 75 percent of the commercial ACL is landed. This regulatory change was pursued after the 2015 commercial ACL was met and commercial harvest was closed in late June of that year.

As of August 2020, Amendment 10 and Amendment 12 are in development. Amendment 10 is focused on accommodating revised MRIP data, revising sector allocations, and other miscellaneous management revisions for the dolphin and wahoo fisheries. Amendment 12 will add bullet and frigate mackerel to the Dolphin Wahoo Fishery Management Plan.

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, SAFMC, or the Atlantic States Marine Fisheries Commission 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 (Atlantic States Marine Fisheries Commission plans), are, like the goals of the Fisheries Reform Act of 1997, to “ensure long-term viability” of these fisheries (NCDMF 2015).

Management Unit

The management unit is the population of dolphin (common dolphin - *Coryphaena hippurus* and pompano dolphin - *Coryphaena equiselis*) from the U.S. South Atlantic, the Mid-Atlantic, and the New England coasts in the 3 to 200-mile Exclusive Economic Zone (EEZ).

Goal and Objectives

The goal of the plan is to maintain the current harvest levels of dolphin and ensure that no new fisheries develop (SAFMC 2003). With the potential for effort shifts in the historical commercial longline fisheries for sharks, tunas, and swordfish, these shifts or expansions into nearshore coastal waters to target dolphin could compromise the historical (1994-1997) and current

allocation of the dolphin resource between recreational and commercial fishermen. To achieve these goals, the following management objectives were identified:

1. Address localized reduction in fish abundance. The Councils remain concerned over the potential shift of effort by longline vessels to traditional recreational fishing grounds and the resulting reduction in local availability if commercial harvest intensifies.
2. Minimize market disruption. Commercial markets (mainly local) may be disrupted if large quantities of dolphin are landed from intense commercial harvest or unregulated catch and landing by charter or other components of the recreational sector.
3. Minimize conflict and/or competition between recreational and commercial user groups. If commercial longlining effort increases, either directing on dolphin and wahoo or targeting these species as a significant bycatch, conflict and/or competition may arise if effort shifts to areas traditionally used by recreational fishermen.
4. Optimize the social and economic benefits of the dolphin fishery. Given the significant importance of dolphin to the recreational sector throughout the range of these species and management unit, manage the resources to achieve optimum yield on a continuing basis.
5. Reduce bycatch of the dolphin fishery. Bycatch is a problem in the pelagic longline fishery for highly migratory species. Any increase in overall effort, and more specifically shifts of effort into nearer shore, non-traditional fishing grounds by swordfish and tuna vessels, may result in increased bycatch of non-target species. In addition, National Standard 9 requires that: “Conservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.” Therefore, bycatch of the directed dolphin fishery must be addressed.
6. Direct research to evaluate the role of dolphin and wahoo as predator and prey in the pelagic ecosystem.
7. Direct research to enhance collection of biological, habitat, social, and economic data on dolphin and wahoo stocks and fisheries.

STATUS OF THE STOCK

Life History

Dolphin, also called mahi-mahi, dorado or common dolphin, are pelagic marine species and can be found worldwide in tropical and subtropical waters. They are sight feeders and usually live in the top 50 feet of the water column. They gather around floating debris and flotsam and prefer water temperatures ranging from 21 – 30 degrees Celsius (70 - 86 degrees Fahrenheit). Adult male and female fish are commonly referred to as ‘bulls’ and ‘cows’ respectively, because of their different shapes and appearance. Mature male dolphin have a high, flat forehead unlike females. The species is short lived (maximum age is 4) and grows rapidly, with some fish reaching lengths of 36 inches by age-1 (Schwenke et al. 2008). The state record for dolphin was

caught off Cape Hatteras in 1993 and weighed 79 pounds; however, most fish landed in North Carolina weigh between 5 and 25 pounds. Dolphin can become sexually mature by four months and as small as 14 inches FL with most fish maturing by 24 inches FL (Schwenke et al. 2008). They are considered batch spawners, meaning they will spawn many times throughout the spawning season, maximizing the survival of larval fish. Spawning occurs offshore of North Carolina around floating grass (brown algae known as Sargassum) and debris during the spring and summer months. In tropical areas, dolphin have been known to spawn year-round.

Stock Status

A surplus production model, as part of an exploratory stock assessment, was fit to abundance indices estimated from long line catches and total landings of the fisheries from years 1985 to 1997. It was concluded that the stock status, as of 1998, was above biomass at maximum sustainable yield (B_{MSY}) and the species can withstand a relatively high rate of exploitation (Prager 2000).

Stock Assessment

No formal assessment has been conducted on dolphin in the U.S. Atlantic due to uncertainties in the extent of the North Atlantic stock, the life history characteristics of the species, lack of fishery independent indices, and the jurisdictional cooperation necessary to characterize catch across the range of the species. An assessment of dolphin is not expected in the next five years through the Southeast Data, Assessment, and Review (SEDAR) process.

STATUS OF THE FISHERY

Current Regulations

The North Carolina Division of Marine Fisheries (NCDMF) currently complements the management measures of the Dolphin/Wahoo FMP through rule (15A NCAC 03M .0515) and proclamation (15A NCAC 03M. 0512). It is unlawful to possess more than 10 dolphin per person per day or more than 60 dolphin per vessel per day. Headboats are excluded from the vessel limit requirement. It is also unlawful to sell a recreational bag limit of dolphin harvested by a person on a vessel while it is operating as a charter vessel or headboat or to sell dolphin without a Federal Commercial Dolphin/Wahoo Vessel Permit. There is no trip limit for vessels that possess the Federal Commercial Dolphin/Wahoo Vessel Permit unless 75% of the commercial ACL is reached, at which time a 4,000-pound weight trip limit is implemented. Commercial vessels that are federally permitted in another fishery are allowed to land up to 200 pounds of dolphin and wahoo combined.

Commercial Landings

Commercial landings of dolphin are reported through the mandatory NCDMF Trip Ticket reporting program. Landings since 1986 have fluctuated with a low of 35,923 pounds in 1986 and a high of 611,962 pounds in 2009 (Table 1 and Figure 1). Commercial landings in 2019 (208,385 pounds) were approximately equivalent to the time series average (203,010 pounds).

Over 80 percent of dolphin landings were harvested using surface longlines with the remainder of the harvests coming from the pelagic troll and greenstick fisheries.

Recreational Landings

Recreational landings of dolphin are estimated from the Marine Recreational Information Program (MRIP). Recreational estimates across all years have been updated and are now based on the Marine Recreational Information Program (MRIP) new Fishing Effort Survey-based calibrated estimates. For more information on MRIP see <https://www.fisheries.noaa.gov/topic/recreational-fishing-data>.

After peaking in 2009 (6,380,552 pounds), landings of dolphin declined to low of 2,223,509 pounds in 2017 (Table 1 and Figure 2). Landings increased slightly to 3,318,532 pounds in 2018 and remained stable in 2019 at 3,147,384 pounds. Directed effort in the fishery and recreational harvest show similar trends and most likely contributes to the variable landings observed in the fishery.

The NCDMF offers award citations for recreational fishermen who land dolphin greater than 35 pounds. The number of citations awarded annually since the program started for dolphin has been variable, with a declining trend observed from 2013-2018 (Table 2; Figure 2). The total number of citations awarded through the North Carolina Saltwater Fishing Tournament increased in 2019 to 181 citations, to the highest number awarded since 2014 (273 citations).

MONITORING PROGRAM DATA

Fishery-Dependent Monitoring

Fishery dependent length-frequency information for the commercial dolphin fishery in North Carolina is collected by fish house samplers, specifically through NCDMF programs 438 and 439. Lengths collected from fishery-dependent sampling ranged from 10.3 to 58.1 inches fork length in 2019 (Table 3; Figure 3). The average size of dolphin sampled from the commercial fishery increased slightly in 2019 (29.3 inches fork length) from the previous year (28.8 inches fork length), remaining above the time series average (27.6 inches fork length; Table 3; Figure 4). The maximum size of dolphin sampled from the commercial fishery decreased in 2019 (45.3 inches fork length) from the previous year (47.2 inches fork length; Table 3; Figure 4). The modal length for the commercial fishery (19 inches fork length) was slightly greater than the recreational fishery (18 inches fork length; Figure 5). However, the recreational fishery harvests larger dolphin than the commercial fishery (Figure 3; Figure 5); the maximum length of dolphin sampled from the recreational fishery was 67.9 inches fork length in 2010, compared to 56.7 inches fork length by the commercial fishery in 2013 (Table 3; Figure 5).

Length and weight information for the recreational fishery are collected through the MRIP dockside sampling. The average size of dolphin sampled from the recreational fishery remained nearly the same in 2019 (25.7 inches fork length), and overall has remained relatively constant throughout the time series (Table 3; Figure 5). The maximum size of dolphin sampled from the recreational fishery increased in 2019 (58.1 inches fork length) and was the largest observed since 2013 (Table 3).

Fishery-Independent Monitoring

Currently, NCDMF does not have any fishery-independent sampling programs that target or catch dolphin in great numbers.

MANAGEMENT STRATEGY

In North Carolina, dolphin is included in the North Carolina Fishery Management Plan for Interjurisdictional Fisheries, which defers to management under the South Atlantic Fishery Management Council Fishery Management Plan requirements. The South Atlantic Fishery Management Council approved a Fishery Management Plan for dolphin in 2004 and it is currently managed under Amendment 5 (SAFMC 2013), Amendment 7 (SAFMC 2015a), Amendment 8 (SAFMC 2015b) and Regulatory Amendment 1 (SAFMC 2016).

RESEARCH NEEDS

The following are research and management needs as determined by the council and outlined in the FMPs for pelagic *Sargassum* habitat and the dolphin/wahoo fishery (SAFMC 2002; SAFMC 2003).

Essential Fish Habitat research needs for dolphin in order of priority from highest to lowest:

1. What is the areal and seasonal abundance of pelagic *Sargassum* off the southeast U.S.?
2. Develop methodologies to remotely assess *Sargassum* using aerial or satellite technologies (e.g., Synthetic Aperture Radar)
3. What is the relative importance of pelagic *Sargassum* weedlines and oceanic fronts for early life stages of dolphin?
4. Are there differences in dolphin abundance, growth rate, and mortality?
5. What is the age structure of all fishes that utilize pelagic *Sargassum* habitat as a nursery and how does it compare to the age structure of recruits to pelagic and benthic habitats?
6. Is pelagic *Sargassum* mariculture feasible?
7. Determine the species composition and age structure of species associated with pelagic *Sargassum* when it occurs deeper in the water column.
8. Additional research on the dependencies of pelagic *Sargassum* productivity on the marine species using it as habitat.
9. Quantify the contribution of nutrients to deepwater benthic habitat by pelagic *Sargassum*.
10. Studies should be performed on the abundance, seasonality, life cycle, and reproductive strategies of *Sargassum* and the role this species plays in the marine environment, not only as an essential fish habitat, but as a unique pelagic algae.
11. Research to determine impacts on the *Sargassum* community, as well as the individual species of this community that are associated with, and/or dependent on, pelagic *Sargassum*. Human induced (tanker oil discharge; trash) and natural threats (storm events) to *Sargassum* need to be researched for the purpose of protecting and conserving this natural resource.
12. Develop cooperative research partnerships between the Council, NOAA Fisheries Protected Resources Division, and state agencies since many of the needs to a) research pelagic *Sargassum*, and b) protect and conserve pelagic *Sargassum* habitat, are the same for both managed fish species and listed sea turtles.

13. Direct specific research to further address the association between pelagic *Sargassum* habitat and post-hatchling sea turtles

Biological research needs for dolphin in order of priority from highest to lowest:

1. In the short-term, effort should be directed at examining all existing seasonality (effort and landings), mean size, and life history data for dolphin from the northern area.
2. Additional data are needed to develop and/or improve estimates of growth, fecundity, etc. Research in this area is encouraged.
3. There are limited social and economic data available. Additional data need to be obtained and evaluated to better understand the implications of fishery management options.
4. Trophic data should be considered in support of an ecosystem management approach.
5. Essential fish habitats for dolphin and wahoo need to be identified.
6. An overall design should be developed for future tagging work. This could be done by the Working Group. In addition, existing tagging databases should be examined.
7. Long-term work should continue and expand on current research investigating genetic variability of dolphin populations in the western central Atlantic.
8. Observer programs should place observers on longline trips directed on dolphin. Catch and bycatch characterization, condition released (alive or dead), etc. should be collected. Observers could also be used to collect bioprofile data (size, sex, hard parts for aging, etc.).
9. High levels of uncertainty in inter-annual variation in abundance of dolphin should be investigated through an examination of oceanographic and other environmental factors.
10. Release mortality should be investigated as a part of the evaluation of the effectiveness of current minimum size limits in the dolphin fishery.
11. Establish a list serve for dolphin and wahoo which would facilitate research and the exchange of information.

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ASMFC AND FEDERALLY-MANAGED SPECIES WITHOUT N.C. INDICES – DOLPHIN

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 dolphin from North Carolina, 1986 - 2019.

Year	Recreational		Commercial		
	Numbers		Weight (lb)	Commercial	Total
	Landed	# Released	Landed	Weight (lb)	Weight (lb)
1986	49,810	589	478,136	35,923	514,059
1987	92,582	79	489,338	70,516	559,854
1988	81,487	31,103	205,599	56,098	261,697
1989	231,953	1,696	1,653,574	98,899	1,752,473
1990	209,476	1,452	986,307	96,207	1,082,514
1991	254,975	6,565	1,298,933	140,837	1,439,770
1992	167,690	6,936	927,165	72,119	999,284
1993	291,297	3,190	1,527,078	149,043	1,676,121
1994	268,417	9,402	1,791,880	160,742	1,952,622
1995	294,100	9,620	2,324,560	354,188	2,678,748
1996	213,861	2,154	1,514,866	128,586	1,643,452
1997	372,989	6,320	3,400,820	229,791	3,630,611
1998	241,733	9,249	1,792,198	149,990	1,942,188
1999	395,167	10,406	3,280,273	209,488	3,489,761
2000	516,491	17,396	4,631,849	197,259	4,829,108
2001	344,865	4,781	4,669,172	160,546	4,829,718
2002	400,736	3,699	4,853,768	168,429	5,022,197
2003	245,651	13,985	3,029,205	186,262	3,215,467
2004	323,140	6,905	2,445,482	255,805	2,701,287
2005	634,260	3,264	5,664,028	139,761	5,803,789
2006	551,924	32,911	4,300,459	159,452	4,459,911
2007	591,835	6,908	5,729,879	369,472	6,099,351
2008	362,023	2,393	3,227,899	289,548	3,517,447
2009	595,967	4,480	6,380,552	611,962	6,992,514
2010	615,081	5,759	3,754,430	239,551	3,993,981
2011	638,543	16,217	4,950,235	94,210	5,044,445
2012	426,877	4,800	3,335,644	249,020	3,584,664
2013	322,769	5,315	2,277,519	178,035	2,455,554
2014	403,203	6,731	2,933,166	422,496	3,355,662
2015	740,023	73,872	5,610,008	320,961	5,930,969
2016	480,860	2,520	5,099,647	356,061	5,455,708
2017	279,932	3,035	2,223,509	198,038	2,421,547

ASMFC AND FEDERALLY-MANAGED SPECIES WITHOUT N.C. INDICES – DOLPHIN

Year	Recreational			Commercial	
	Numbers		Weight (lb)	Commercial Weight (lb)	Total Weight (lb)
	Landed	# Released	Landed		
2018	495,435	27,959	3,318,532	144,660	3,463,192
2019	458,086	35,286	3,147,384	208,385	3,355,769
Average	370,389	11,088	3,036,856	203,010	3,239,866

Table 2. Total number of awarded citations for dolphin (>35 pounds landed) annually from the North Carolina Saltwater Fishing Tournament, 1991-2019.

Year	Total Citations
1991	191
1992	266
1993	221
1994	334
1995	354
1996	248
1997	262
1998	412
1999	249
2000	315
2001	457
2002	409
2003	409
2004	155
2005	164
2006	202
2007	218
2008	426
2009	209
2010	157
2011	113
2012	147
2013	284
2014	273
2015	171
2016	124
2017	115
2018	125
2019	181

ASMFC AND FEDERALLY-MANAGED SPECIES WITHOUT N.C. INDICES – DOLPHIN

Table 3. Mean, minimum, and maximum lengths (fork length, inches) of dolphin collected from the commercial and recreational fisheries, 1986-2019.

Year	Commercial				Recreational			
	Mean Length	Minimum Length	Maximum Length	Total Number Measured	Mean Length	Minimum Length	Maximum Length	Total Number Measured
1986	26.9	16.1	45.3	46	28.7	13.8	47.8	101
1987	23.4	5.9	50.4	113	22.8	7.1	50.4	1,038
1988	24.4	14.8	43.3	104	23.8	12.4	52.0	691
1989	25.4	16.1	47.2	229	25.3	13.4	65.7	1,581
1990	23.9	13.0	49.6	201	23.1	13.8	60.0	1,956
1991	28.9	16.1	47.2	99	23.0	8.7	49.2	2,468
1992	32.6	18.1	47.6	30	22.7	7.5	55.9	1,721
1993	24.9	15.7	43.9	154	22.9	12.5	57.0	2,796
1994	27.7	16.1	50.6	136	25.5	11.0	59.1	4,469
1995	28.5	17.5	48.4	156	27.4	11.0	62.0	3,929
1996	26.1	17.5	42.1	57	26.3	12.6	59.0	2,873
1997	29.1	16.1	48.0	30	28.8	13.8	65.7	3,250
1998	23.6	15.0	46.5	143	27.0	9.4	60.0	3,287
1999	33.0	13.6	53.1	454	28.3	7.9	51.3	2,886
2000	26.4	14.6	48.8	208	28.3	15.9	58.0	3,740
2001	26.5	14.6	45.7	93	31.9	10.9	58.2	2,617
2002	25.8	15.7	52.8	100	30.5	15.7	58.0	3,538
2003	27.5	15.7	48.8	190	31.9	13.9	58.0	1,185
2004	25.2	15.6	47.2	146	27.6	18.2	48.6	1,341
2005	25.7	16.5	44.9	229	29.2	16.9	49.0	1,834
2006	27.9	16.8	52.8	172	27.8	11.8	47.8	1,659
2007	29.9	13.7	43.2	232	30.4	17.0	55.3	1,662
2008	26.2	16.3	44.7	231	29.2	12.2	55.3	1,759
2009	32.1	5.5	51.0	555	32.0	15.4	50.8	1,963
2010	24.7	13.6	43.9	451	25.2	15.2	67.9	1,532
2011	26.2	16.1	44.1	269	27.7	11.1	51.0	2,022
2012	29.8	16.9	49.0	579	28.3	15.0	53.5	1,918
2013	27.6	18.8	56.7	176	26.5	11.8	57.8	601
2014	31.0	15.4	53.2	339	27.0	10.6	51.7	896
2015	32.3	19.6	53.5	78	27.0	11.3	52.1	956
2016	33.1	18.2	40.7	125	31.1	7.5	52.2	1,152
2017	25.0	16.9	37.3	161	28.0	12.8	47.4	722
2018	28.8	12.0	47.2	117	25.6	13.1	57.2	1,313
2019	29.3	14.1	45.3	143	25.7	10.3	58.1	877

FIGURES

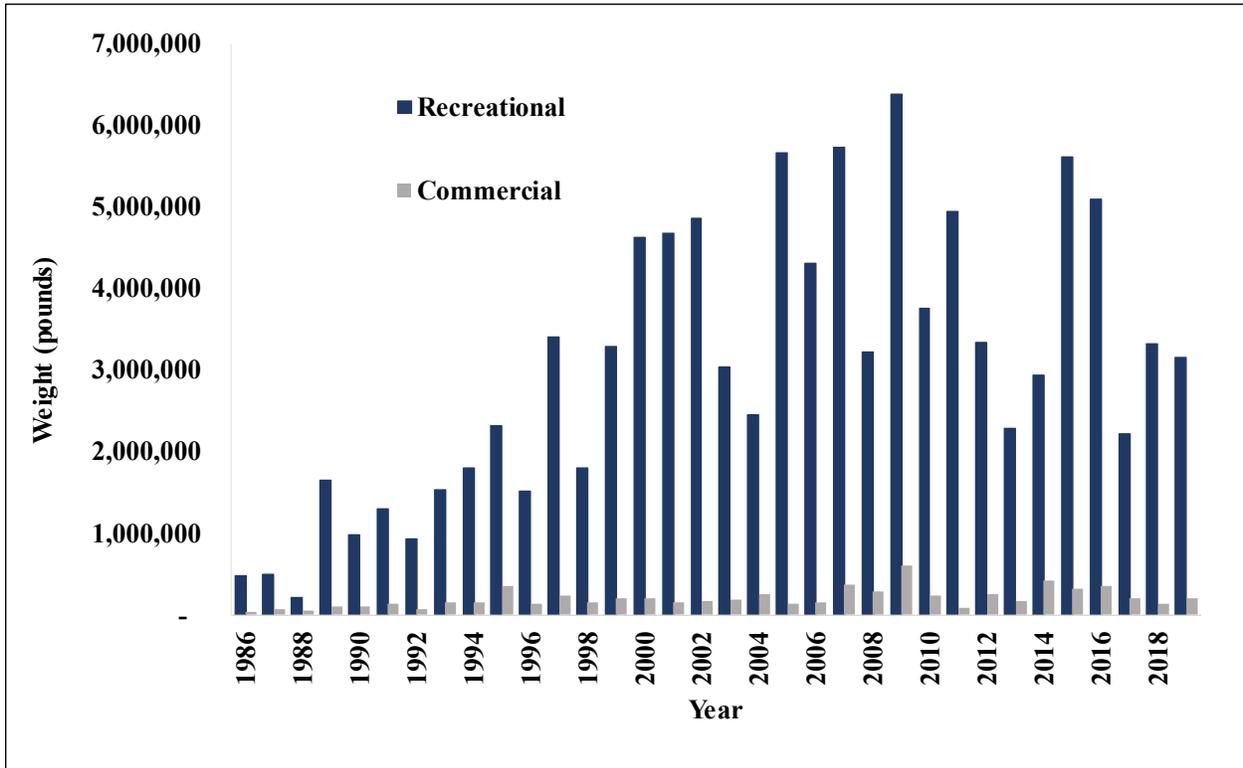


Figure 1. Annual commercial and recreational landings in pounds of dolphin in North Carolina, 1986 - 2019.

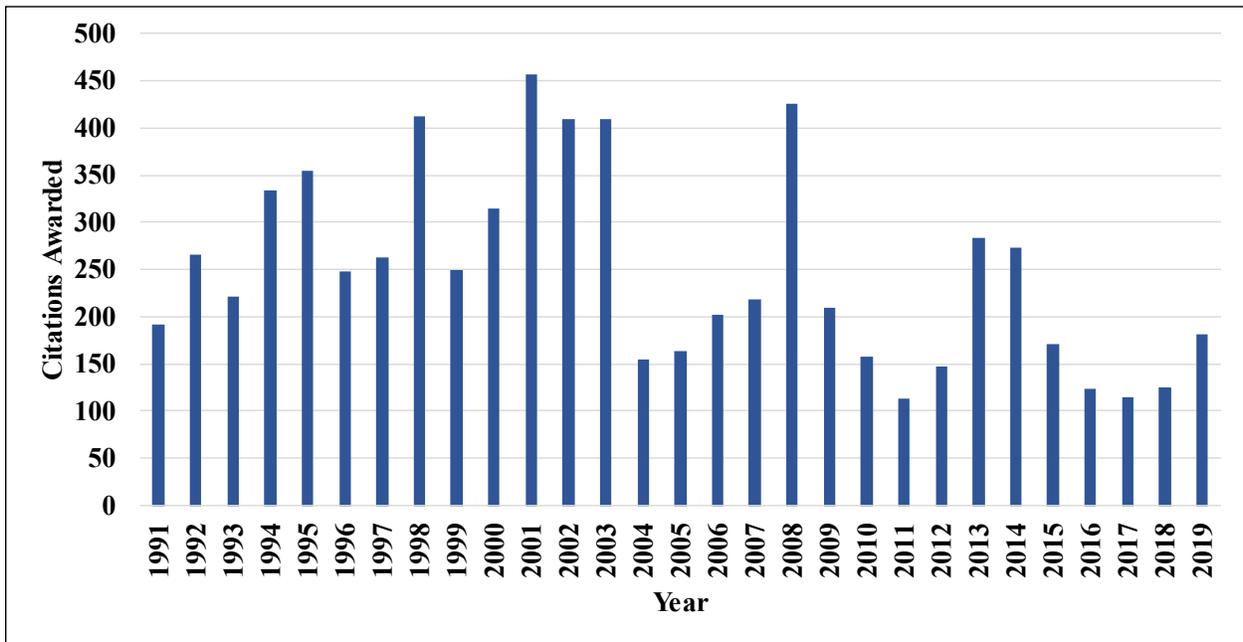


Figure 2. Total number of awarded citations for dolphin (>35 pounds landed) annual from the North Carolina Saltwater Fishing Tournament, 1991-2019.

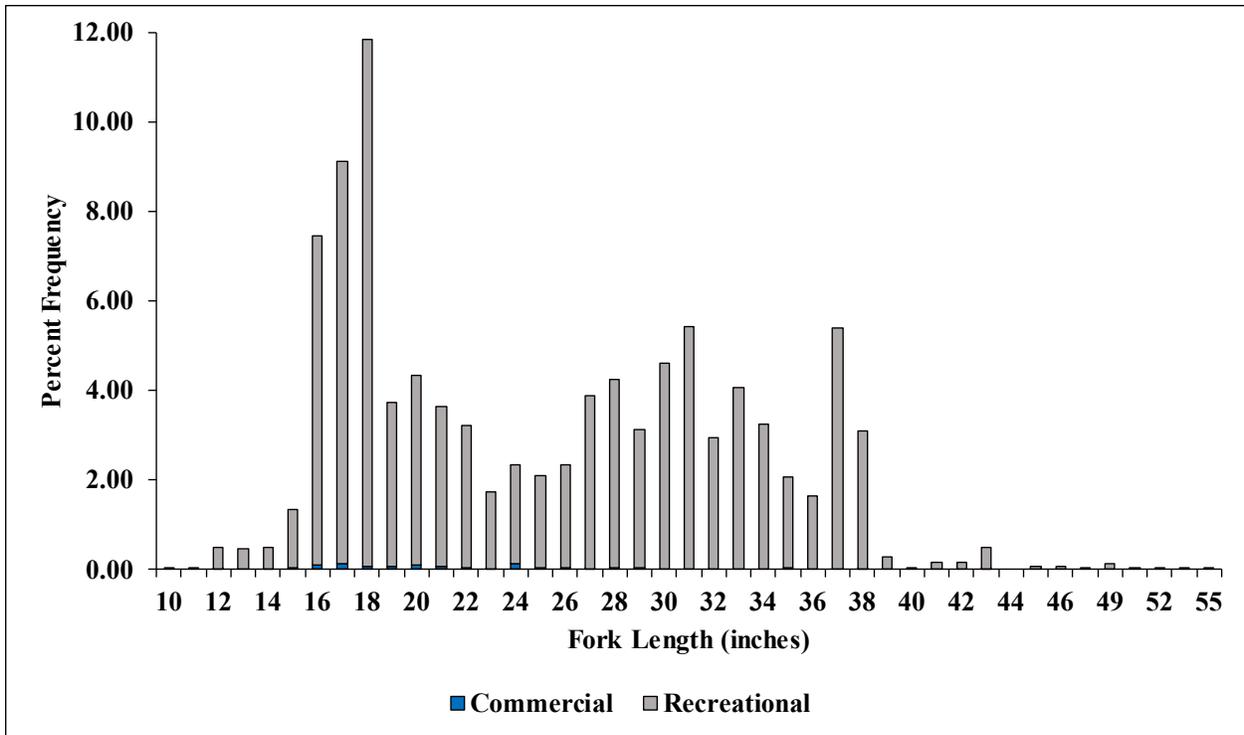


Figure 3. Commercial and recreational length frequency distribution for dolphin harvested in 2019.

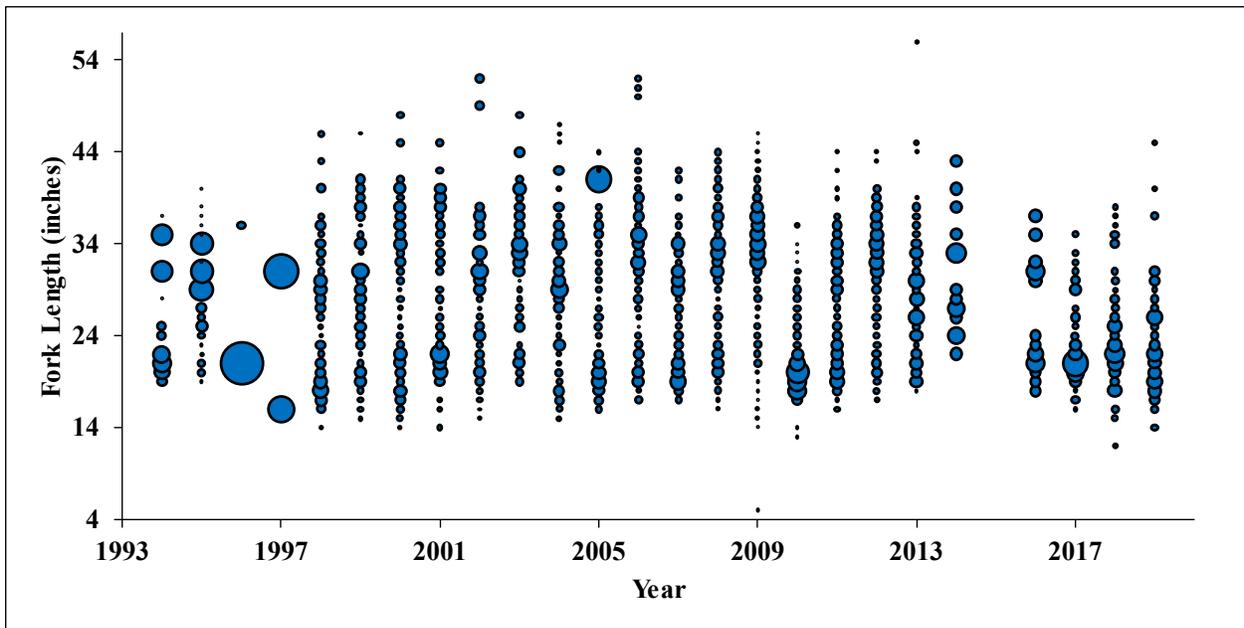


Figure 4. Commercial length frequency (fork length, inches) of dolphin harvested from 1994 to 2019. Bubbles represent fish harvested at length and the size of the bubble is equal to the proportion of fish at that length in that year.

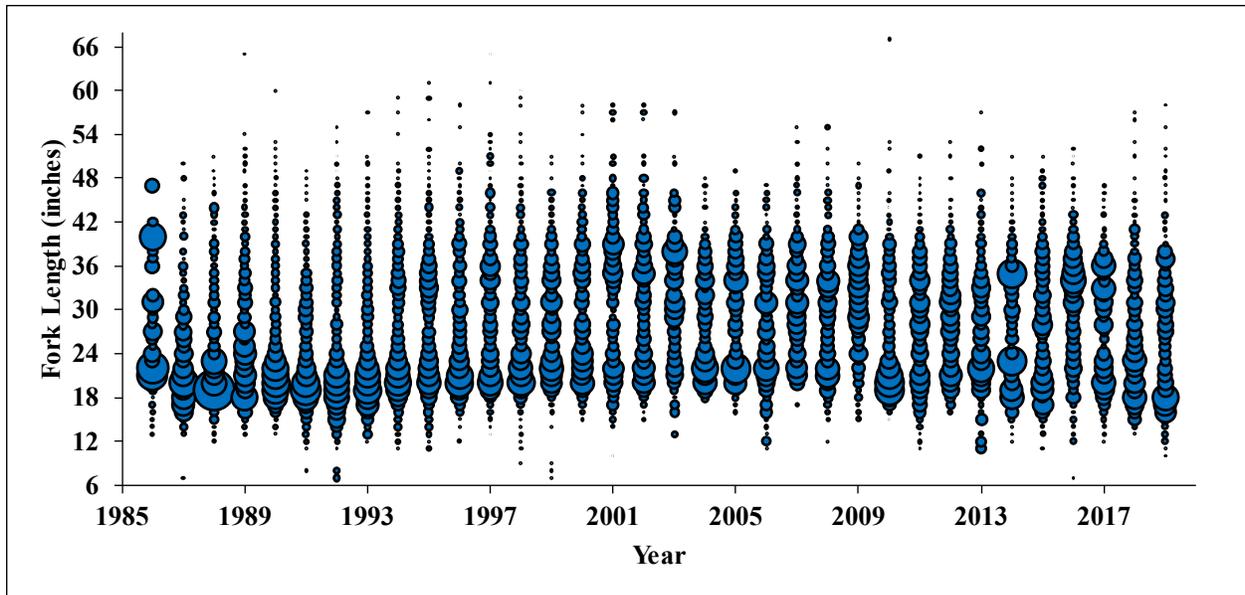


Figure 5. Recreational length frequency (fork length, inches) of dolphin harvested from 1986 to 2019. Bubbles represent fish harvested at length and the size of the bubble is equal to the proportion of fish at that length in that year.