Atlantic Bluefish Advisory Panel Information Document[1]
June 2017

The information in this document provides a brief overview of the management system, biology, stock conditions, and fishery performance for Atlantic Bluefish with an emphasis on 2016, the most recent complete fishing year.

Management System

The Mid-Atlantic Fishery Management Council (MAFMC) and the Atlantic States Marine Fisheries Commission (ASMFC) work cooperatively to develop fishery regulations for bluefish off the east coast of the United States. The Council and Commission work in conjunction with the National Marine Fisheries Service (NMFS), which serves as the federal implementation and enforcement entity. This cooperative management endeavor was developed because a significant portion of the catch is taken from both state waters (0-3 miles offshore) and federal waters (3-200 miles offshore, also known as the Exclusive Economic Zone or EEZ). The management unit for bluefish (*Pomatomus saltatrix*) is the U.S. waters in the western Atlantic Ocean.

The Bluefish Fishery Management Plan (FMP) was implemented in 1990 and established the Mid-Atlantic Fishery Management Council's (MAFMC) management authority over the fishery in federal waters. Amendment 1, implemented in 2000, addressed stock rebuilding and created the Bluefish Monitoring Committee which meets annually to make management measure recommendations to the Council. Amendment 3 incorporated the development of annual catch limits (ACLs) and accountability measures (AMs) into the specification process and Amendment 4 modified recreational accountability measures to accommodate uncertainty in recreational management and catch estimation. The original FMP and subsequent amendments and frameworks are available at: http://www.mafmc.org/fisheries/fmp/bluefish.

For bluefish, the annual catch target (ACT) is split 83 percent and 17 percent into recreational and commercial ACTs, respectively, and the discarded component of that catch is deducted to arrive at recreational and commercial total allowable landings (TAL). Additionally, landings above the expected recreational harvest can be "transferred" from the recreational to the commercial fishery as long as the final commercial quota does not exceed 10.5 million pounds.

The Council's Scientific and Statistical Committee (SSC) reviews assessment results and the Advisory Panel's fishery performance report, and determines the allowable biological catch (ABC) for the upcoming year. The Council's Bluefish Monitoring Committee develops and recommends

[1] This document was prepared by the MAFMC staff. Data employed in the preparation of this document are from unpublished National Marine Fisheries Service (NMFS) Dealer, Vessel Trip Reports (VTRs), and Permit databases, unless otherwise noted.

specific coastwide management measures (commercial quota, recreational harvest limit) that will achieve the catch target and makes further adjustments to total catch as needed based on management uncertainty. Finally, the Council and Board meet jointly to develop recommendations to be submitted to the NMFS.

Bluefish Biology

Bluefish are found worldwide in tropical and subtropical waters, but in the western North Atlantic range from Nova Scotia and Bermuda to Argentina. Bluefish travel in schools of like-sized individuals and undertake seasonal migrations, moving into the Middle Atlantic Bight (MAB) during spring and then south or farther offshore during fall. Within the MAB they occur in large bays and estuaries as well as across the entire continental shelf. Juvenile stages have been recorded in all estuaries within the MAB, but eggs and larvae occur in oceanic waters (Able and Fahay 1998). Growth rates are fast and they may reach a length of 3.5 ft and a weight of 27 pounds (Bigelow and Schroeder 1953). Bluefish live to age 12 and greater (Salerno et al. 2001).

Bluefish eat a wide variety of prey items. The species has been described by Bigelow and Schroeder (1953) as “perhaps the most ferocious and bloodthirsty fish in the sea, leaving in its wake a trail of dead and mangled mackerel, menhaden, herring, alewives, and other species on which it preys."

Bluefish born in a given year (young of the year) typically fall into two distinct size classes suggesting that there are two spawning events along the east coast. Studies suggest, however, that spawning is a single, continuous event, but that young are lost from the middle portion resulting in the appearance of a split season (Smith et al. 1994). As a result of the bimodal size distribution, young are referred to as spring-spawned or summer-spawned. In the MAB, spring-spawned bluefish appear to be the dominant component of the stock.

Status of the Stock

The bluefish benchmark stock assessment was peer reviewed in June 2015 and approved for use by management at SAW/SARC 60. This benchmark assessment uses a forward-projecting statistical catch-at-age model called ASAP (Age Structured Assessment Program). For the most recent benchmark, the catch-at-age matrices were completely reconstructed to incorporate new age data, including archived historical samples that had not been processed at the time the last benchmark (SAW/SARC 41; 2005) was conducted, and to correct aging errors in the earlier years of the time series (NEFSC 2015).

The biological reference points estimated in the previous benchmark assessment (SAW/SARC 41) were MSY reference points for F and total biomass (F_{MSY}, B_{MSY}). However, MSY reference points require a reliable stock-recruitment relationship. The stock-recruitment relationship for bluefish is poorly defined, due to the lack of information on recruitment at small stock sizes, with steepness estimated to be close to one for most model runs (NEFSC 2015). Therefore, in SAW/SARC 60, SPR-based (spawn per recruit) reference points were used as a proxy for MSY reference points.

Results from the most recent benchmark stock assessment indicate that the bluefish stock is not overfished and overfishing was not occurring in 2014 relative to the biological reference points (BRPs) from the 2015 SAW/SARC 60. Modeling results indicated that the estimated SSB was 190.77 million pounds (86,534 mt) in 2014 (85 percent of the accepted reference point SSB_{MSY} proxy = $SSB_{35\%SPR}$ = 223.42 million pounds or 101,343 mt). Spawning stock biomass declined since the beginning of the time series, from a high of 340.90 million pounds (154,633 mt) in 1985 to a low of 116.34 million pounds (52,774 mt) in 1997, before increasing again. The stock spawning biomass average for the 1985-2014 time series is 175.15 million pounds (79,449 mt). Fully-selected fishing mortality in 2014 was estimated to be 0.157, below the F threshold ($F_{MSY\ proxy}$ = $F_{35\%SPR}$ = 0.19). Fully selected F peaked in 1987 at 0.477 and then declined gradually since then, with a time series average of 0.284.

Data Update

The NEFSC developed a bluefish data update through 2016. The update contains recent trends in the bluefish fishery, including commercial and recreational landings, updated trawl survey index and updated MRIP index, discards, and length frequency distributions. In addition, eight fishery-independent indices were updated through 2016. Age-0+ fishery-independent indices included the NEFSC fall Bigelow trawl survey, the New Jersey ocean trawl survey, the Connecticut Long Island Sound trawl survey, the NEAMAP fall inshore trawl survey, and the North Carolina Pamlico Sound independent gillnet survey. Young-of-year indices included the SEAMAP fall trawl survey and a composite index developed from state seine indices from New Hampshire to Virginia. All indices except the SEAMAP juvenile survey showed an increase from 2015 values. The update is available via the Mid Atlantic Fisheries Management Council Website. For more information visit: http://www.mafmc.org/council-events/2016/bluefish-advisory-panel-meeting.

Fishery Performance Relative to Management Measures

The recreational and commercial landings relative to specified management measures is provided in Table 1. Except for 2007, the bluefish fishery has never exceeded the TAL. In 2007, the recreational fishery exceeded the recreational harvest limit by about 2.69 million pounds, and although the commercial fishery underperformed by 1.18 million pounds, the combined landings (29.27 million pounds) were above the specified TAL (27.76 million pounds). In 2016, the recreational fishery landed 9.54 million pounds compared to the 11.58 million pounds RHL (a 2.04 million pound underage), and the commercial fishery landed 4.1 million pounds compared to the quota of 4.88 million pounds (a 0.78 million pounds underage). Combined landings for the recreational and commercial fisheries in 2016 (13.64 million pounds) resulted in an underage of 2.82 million pounds when compared to the TAL (16.46 million pounds). As of May 17, 2017, 1.14 million pounds of bluefish had been landed by the commercial fishery; this represents 13 percent of the 2017 commercial quota (8.54 million pounds). Commercial fishery landings in 2017 are slightly ahead the 2016 landings (Figure 1; as of May 17, 2017). Only preliminary Wave 1 (Jan-Feb) recreational landings for 2017 are available at this time.

Table 1. Summary of bluefish management measures, 2000 – 2018 (Values are in million pounds).

Management Measures	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
TAC[1]/ **ABC**[2]	n/a	n/a	29.1	39.5	34.22	34.22	29.15	32.03	31.89	34.08	34.38	31.74	**32.04**	**27.47**	**24.43**	**21.54**	**19.45**	**20.64**	**21.81**
TAL[3]	35.33	37.84	26.87	37.29	31.85	30.85	24.8	27.76	28.16	29.36	29.26	27.29	28.27	23.86	21.08	18.19	16.46	17.65	18.82
Comm. Quota[4]	9.58	9.58	10.5	10.5	10.5	10.5	8.08	8.69	7.71	9.83	10.21	9.38	10.32	9.08	7.46	5.24	4.88	8.54	7.24
Comm. Landings[5]	8.05	8.7	6.88	7.41	8.06	7.04	6.98	7.51	6.12	7.1	7.55	5.61	4.66	4.12	4.77	4.02	4.1	-	-
Rec. Harvest Limit[4]	25.75	28.26	16.37	26.79	21.35	20.35	16.72	19.07	20.45	19.53	18.63	17.81	17.46	14.07	13.62	12.95	11.58	9.65	11.58
Rec. Landings[6]	10.61	13.23	11.37	13.14	17.32	19.86	16.65	21.76	19.79	14.47	16.34	11.5	11.84	16.46	10.46	11.67	9.54	-	-
Rec. Possession Limit (# fish)	10	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Total Landings	18.66	21.93	18.25	20.55	25.38	26.9	23.63	29.27	25.91	21.57	23.89	17.11	16.5	20.58	15.23	15.69	13.64	-	-
Overage/Underage	-16.67	-15.91	-8.62	-16.74	-6.47	-3.95	-1.17	1.51	-2.25	-7.79	-5.37	-10.18	-11.77	-3.28	-5.85	-2.5	-2.82	-	-
Total Catch[7]	22.35	26.02	21.44	23.48	29.71	31.55	28.08	35.12	31.83	25.10	27.93	20.39	19.26	24.06	17.96	18.65	16.09	-	-
Overage/ Underage	n/a	n/a	-7.66	-16.02	-4.51	-2.67	-1.07	3.09	-0.06	-8.98	-6.45	-11.35	-12.78	-3.41	-6.47	-2.89	-3.36	-	-

[1] Through 2011. [2] 2012 fwd. [3] Not adjusted for RSA. [4] Adjusted downward for RSA. [5] Dealer and South Atlantic Canvass data used to generate values from 2000-2011; Dealer data used to generate values from 2012-2014. [6] MRIP. [7] Recreational discards were calculated assuming MRIP mean weight of fish landed or harvested.

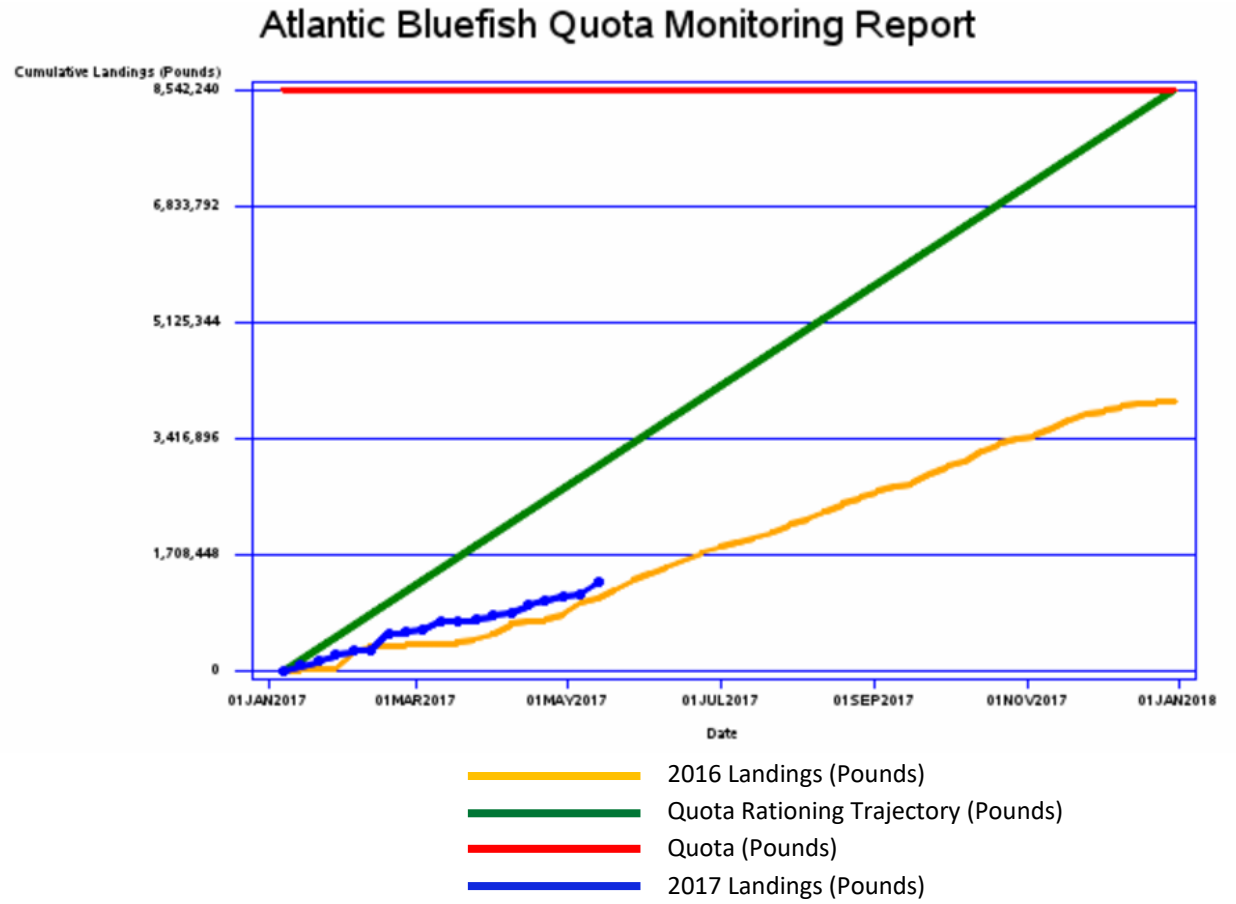

Figure 1. Atlantic bluefish commercial landings for 2017 fishing year to date (through June 1, 2017). http://www.nero.noaa.gov/ro/fso/reports/reports_frame.htm.

Landings History

Bluefish catches were estimated via the Marine Recreational Fisheries Statistic Survey (MRFSS) starting in 1981 thought 2003. Recreational data for years 2004 and later are available from the Marine Recreational Information Program (MRIP), the data collection that followed MRFSS.

From the early 1980s to the early 1990s, recreational landings declined by factor of about 70% (avg. 1981-1983 = 89.14 million pounds; avg. 1991-1993 = 25.85 million pounds). Recreational landings continued to decline at a somewhat slower rate until reaching their lowest level at 8.25 million pounds in 1999, but since have grown to a peak of 21.70 million pounds in 2007. There has been an overall decline of approximately 10 million pounds in recreational landings since 2007 to 11.50 and 11.84 million pounds in 2011 and 2012, respectively. According to MRIP, recreational landings increased to 16.46 million pounds in 2013 and decreased to 10.46 million pounds in 2014 even though total catch in numbers was stable. For 2015, recreational landings were estimated at 11.67 million pounds while 2016 landings were estimated at 9.54 million pounds. Recreational discards have increased from less than 10% of the catch in the 1980s to more than 20% of the catch in the early 2000s.

Commercial landings have been relatively stable throughout the landings history (Figure 2). Commercial discards are treated as insignificant and are not estimated in the current assessment.

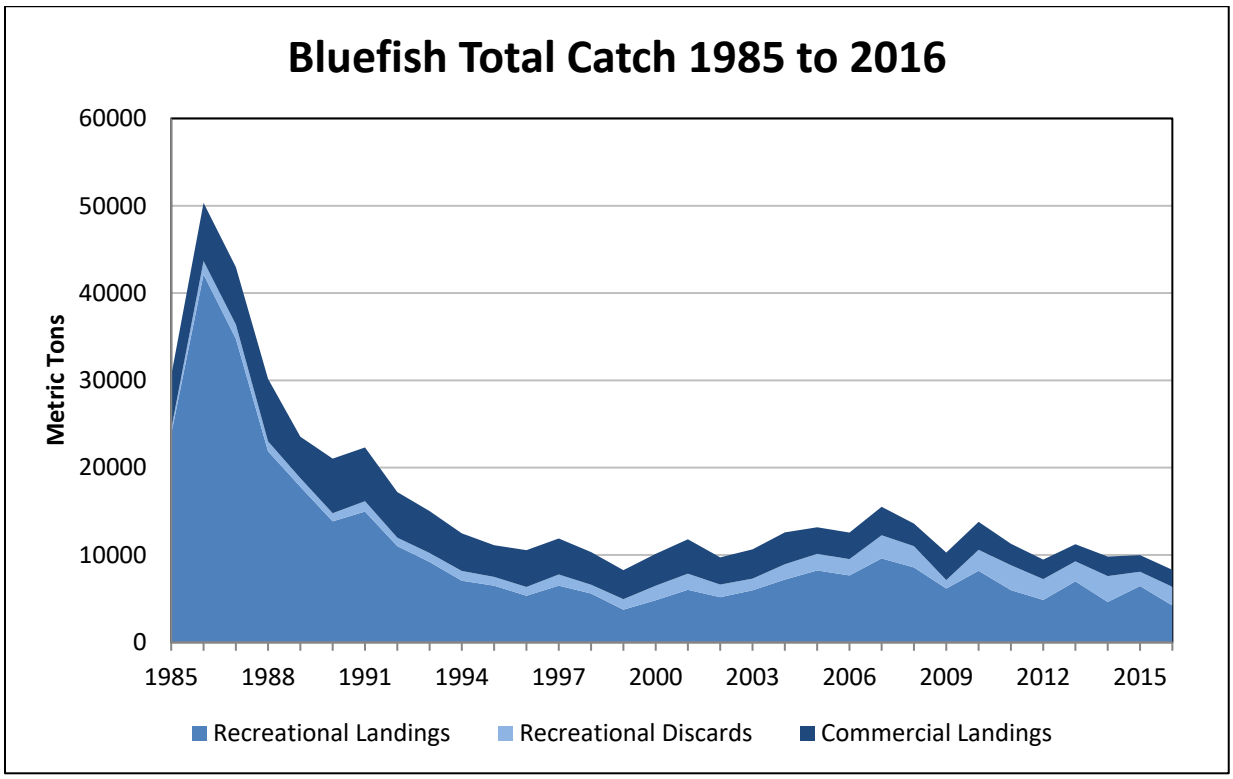

Figure 2. Bluefish catch (landings and discards), 1985-2016. (Source: Anthony Wood, Personal Communication 2017)

Recreational Fishery

Trends in recreational trips associated with targeting or harvesting bluefish from 1991 to 2016 are provided in Table 2. The lowest annual estimate of bluefish trips was 1.71 million trips in 2015. The highest annual estimate of bluefish trips in this timeframe was 5.95 million trips in 1991. For the last 5 years (2012-2016), bluefish trips have ranged from 1.71 million trips in 2015 to 2.40 million trips in 2014. Relative to total angler effort in 2016, bluefish were the primary target or harvested in 5.9 percent of all recreational angler trips.

Table 2. Number of bluefish recreational fishing trips, recreational harvest limit, and recreational landings from 1991 to 2016.

Year	Number of bluefish trips[a]	Recreational landings (N)	Recreational landings per "bluefish" trip
1991	5,948,808	11,942,608	2.0
1992	4,549,536	7,157,754	1.6
1993	4,269,162	5,725,355	1.3
1994	3,587,131	5,767,953	1.6
1995	3,608,325	5,167,979	1.4
1996	2,820,059	4,205,103	1.5
1997	2,384,133	5,413,036	2.3
1998	2,180,471	4,202,111	1.9
1999	1,727,175	3,681,841	2.1
2000	2,041,450	4,897,008	2.4
2001	2,661,032	6,663,237	2.5
2002	2,324,253	5,300,189	2.3
2003	2,647,840	6,045,062	2.3
2004	2,901,956	7,250,407	2.5
2005	3,240,410	7,949,179	2.5
2006	2,800,204	7,035,179	2.5
2007	3,620,374	8,373,899	2.3
2008	3,024,787	6,664,150	2.2
2009	2,088,857	5,194,242	2.5
2010	2,468,273	6,090,830	2.5
2011	2,128,166	5,061,391	2.4
2012	2,394,988	5,523,282	2.3
2013	1,811,087	5,743,970	3.2
2014	2,401,822	5,875,773	2.4
2015	1,710,020	3,996,803	2.3
2016	2,166,975	4,301,220	2.0

[a] Estimated number of recreational fishing trips where the primary target was bluefish or bluefish were harvested regardless of target, Maine – Florida's East Coast. Source: MRFSS (1991-2003)/MRIP (2004 forward).

Recreational Landings by State

Recreational catch and landings by state for 2016 are provided in Table 3. The greatest overall catches (includes discards) were in North Carolina with 2.97 million fish, New Jersey with 2.60 million fish, New York with 1.53 million fish, and Florida with 1.45 million fish.

The greatest harvest (retained catch) of bluefish by weight occurred in New Jersey with 3.50 million ponds, followed by New York (2.03 million pounds), Connecticut (0.97 million pounds), and North Carolina (0.86 million pounds). According to MRIP only 31 and 5 bluefish were caught in Maine and New Hampshire, respectively. Average weights, based on dividing MRIP landings in weight by landings in number for each state, suggest that bluefish size tends to increase toward the north along the Atlantic coast.

Table 3. MRIP estimates of 2016 recreational harvest and total catch for bluefish.

State	Harvest			Catch
	Pounds of fish	Number of fish	Average wt of fish (pounds)	Number of fish
ME	57	31	1.8	65
NH	16	5	3.2	5
MA	697,834	272,869	2.6	733,523
RI	421,797	73,039	5.8	358,971
CT	966,241	311,249	3.1	651,313
NY	2,025,744	686,315	3.0	1,531,805
NJ	3,493,997	924,144	3.8	2,599,216
DE	93,402	41,607	2.2	192,552
MD	157,161	112,855	1.4	248,561
VA	156,836	162,939	1.0	341,219
NC	855,631	1,178,529	0.7	2,970,903
SC	145,961	240,455	0.6	551,381
GA	2,880	3,308	0.9	26,351
FL (East Coast)	520,365	293,881	1.8	1,451,257
Total	9,537,922	4,301,226	2.2	11,657,122

Recreational Landings by Mode

Figure 3 reflects MRFSS/MRIP-based estimates of landings by mode (1991 through 2016) and indicates that the primary landing modes for bluefish are private boats followed by the for-hire

mode. About 53 percent of the landings of bluefish on a coastwide basis came from private/rental boats, followed by for-hire boats (25 percent) for the 1991 to 2016 period. Shore mode is only about 22 percent of the total landings. For the last five years (2012-2016), 39 percent of the total bluefish landings came from private/rental boats, 34 percent from shore mode, and 27 percent from for-hire boats.

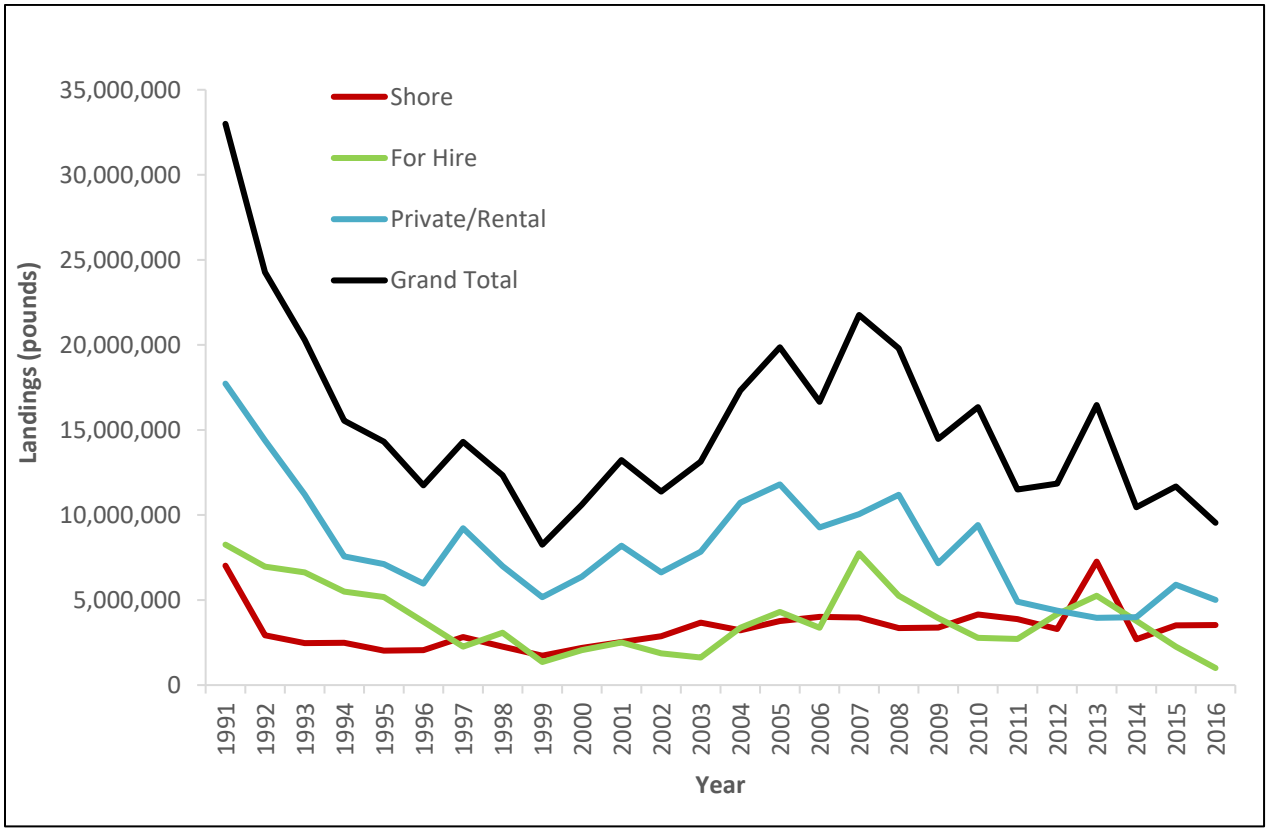

Figure 3. Bluefish landings (pounds) by recreational fishermen by mode, Atlantic Coast, 1991-2016.

Recreational Landings by Area

MRIP classifies catch into three fishing areas, inland, nearshore ocean (< 3 mi), and offshore ocean (> 3 mi). About 51 percent of the landings of bluefish on a coastwide basis came from inland waters, followed by nearshore ocean (32 percent) for the 1991 to 2016 period (Figure 4). Offshore ocean is only about 17 percent of the total landings. For the last five years (2011-2016), 58% of the total bluefish landings came from inland waters and 11 percent from offshore ocean, and nearshore ocean was 31 percent of the total.

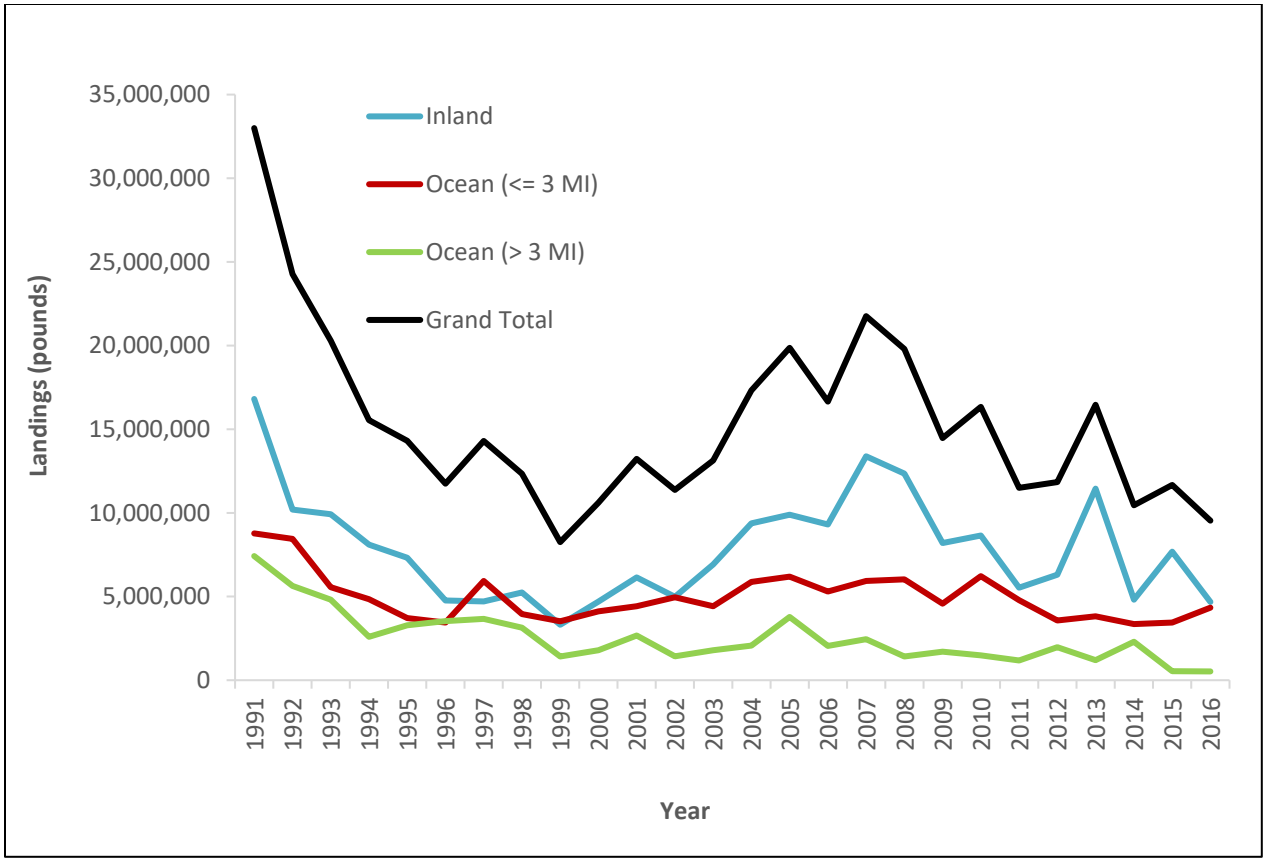

Figure 4. Bluefish landings (pounds) by recreational catch by area, Atlantic Coast, 1991-2016.

Commercial Fishery

Vessel and Dealer Activity

Federal permit data indicate that 2,562 commercial bluefish permits were issued in 2016.[2] A subset of federally-permitted vessels was active in 2016 with dealer reports identifying 648 vessels with commercial bluefish permits that actually landed bluefish. Of the 412 federally-permitted bluefish dealers in 2016, there were 167 dealers who actually bought bluefish.

Landings by Gear

Dealer data for 2016 indicate that the bulk of the bluefish landings were taken by gillnet (47 percent), followed by unknown gear (31 percent), handline (7 percent), otter trawl, bottom fish (10 percent), and pound net (3 percent).

[2]In addition, there were 908 party/charter bluefish permit issued in 2016. A subset of federally-permitted party/charter vessels was active in 2016 with VTR reports identifying 295 vessels with party/charter bluefish permits that actually landed bluefish.

Landings by Area

VTR data were also used to identify all NMFS statistical areas that accounted for 5 percent or more of the Atlantic bluefish catch or areas which individually accounted for 5 percent or greater of the trips which caught bluefish in 2016 (Table 4). Seven statistical areas accounted for approximately 72 percent of the VTR-reported catch in 2016. Statistical area 612 was responsible for the highest percentage of the catch, with statistical area 611 having the majority of trips that caught bluefish (Table 4). A map of the statistical areas that accounted for 5 percent or more of the Atlantic bluefish catch is shown in Figure 5.

Table 4. Statistical areas that accounted for at least 5 percent of the total Atlantic bluefish or 5 percent or greater of the trips which caught bluefish in 2016, with associated number of trips.

Statistical area	Pounds of bluefish caught	Percent of 2016 commercial bluefish catch	Number of trips	Percent of 2016 commercial bluefish trips that caught bluefish
612	386,282	19%	646	8%
539	271,031	14%	1,286	17%
636	198,747	10%	93	1%
611	193,580	10%	1,779	23%
613	149,293	8%	1,048	14%
614	146,886	7%	204	3%
537	74,957	4%	803	10%

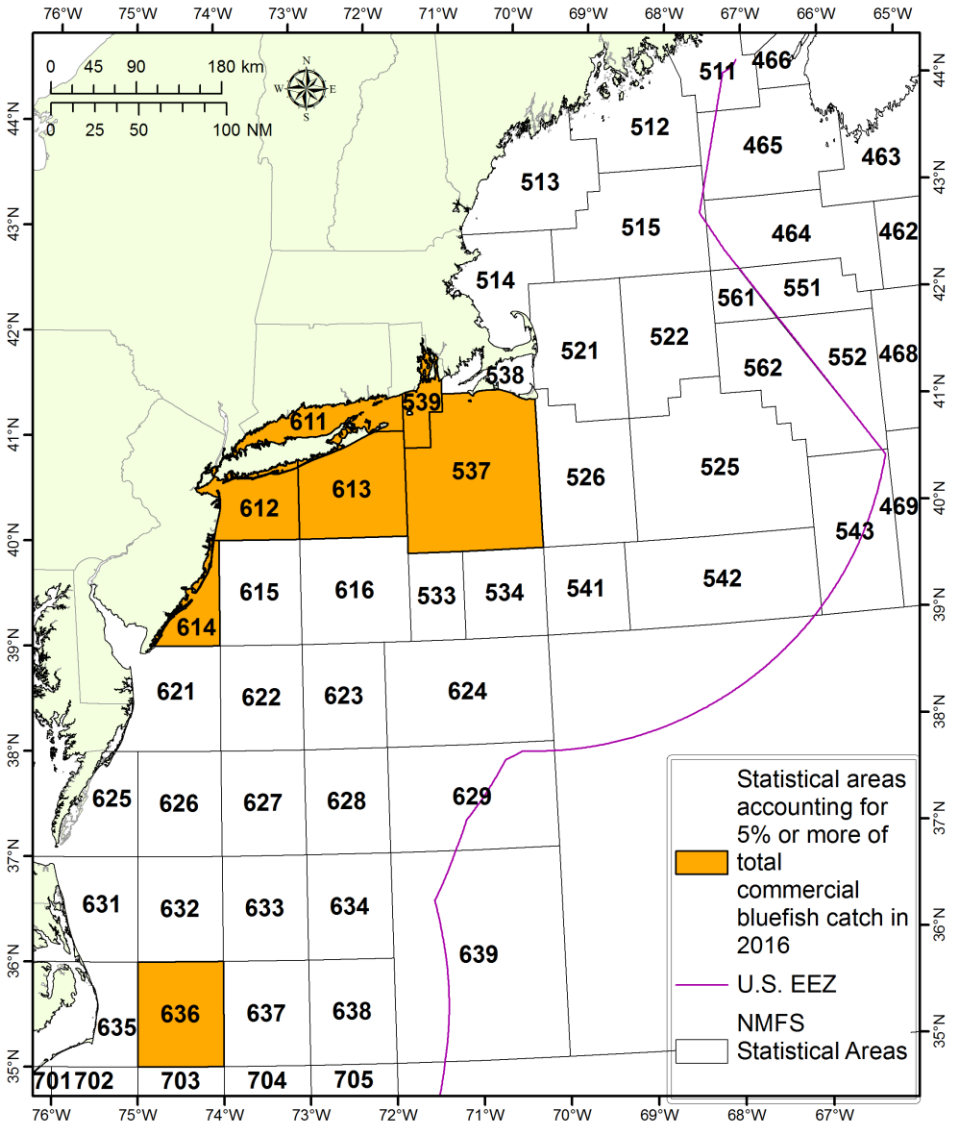

Figure 5. NMFS Statistical Areas, highlighting those that each accounted for 5% or more of the commercial bluefish catch in 2016.

The top commercial landings ports for bluefish in 2016 are shown in Table 5. Twelve ports qualified as "top bluefish ports," i.e., those ports where 100,000 pounds or more of bluefish were landed. Wanchese, NC was the most important commercial bluefish port with 500,000 pounds landed. The ports and communities that are dependent on bluefish are described in Amendment 1 to the FMP (available at http://www.mafmc.org/fisheries/fmp/bluefish). Additional information on "Community Profiles for the Northeast US Fisheries" can be found at http://www.nefsc.noaa.gov/read/socialsci/community_profiles/.

Table 5. Top ports of bluefish landings (in pounds), based on NMFS 2016 dealer data.

Port[a]	Pounds	% of total commercial bluefish landings	# vessels
Wanchese, NC	533,792	13%	43
Montauk, NY	464,677	11%	94
Point Judith, RI	329,748	8%	118
Barnegat Light / Long Beach, NJ	298,845	7%	21
Hatteras, NC	273,163	7%	13
Point Pleasant, NJ	194,140	5%	29
Greenport, NY	138,388	3%	3
Belford, NJ	121,597	3%	17
Providence, RI	121,194	3%	10
Little Compton, RI	104,733	3%	10
Amagansett, NY	101,964	3%	4
Hampton Bays, NY	101,047	2%	30

[a] Since this table includes only the "top ports" (ports where landings of bluefish were > 100,000 pounds), it does not include all of the landings for the year. An additional port with top landings was not disclosed due to confidentiality issues.

Revenue

According to Dealer data, commercial vessels landed about 4.07 million pounds of bluefish valued at approximately $2.87 million in 2016. Average coastwide ex-vessel price of bluefish was $0.70 per pound in 2016, a 5% decrease from the previous year (2015 price = $0.74 per pound). The relative value of bluefish is very low among commercially landed species, less than 1% of the total value, respectively of all finfish and shellfish landed along the U.S. Atlantic coast in 2016. A time series of bluefish revenue and price is provided in Figure 6.

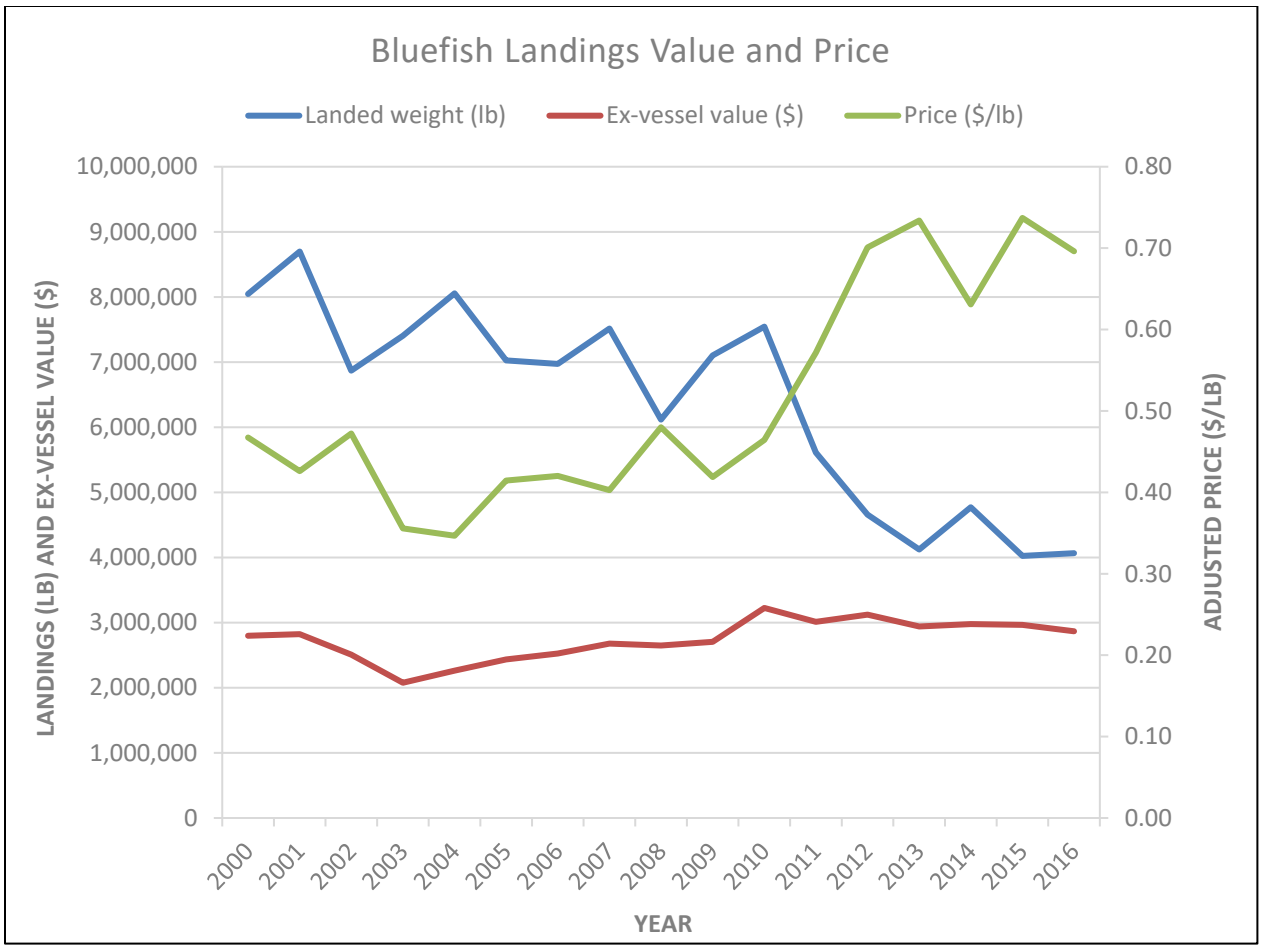

Figure 6. Landings, ex-vessel value, and price (adjusted to 2015 real dollars) for bluefish, 2000-2016.

Bycatch

The commercial fishery for bluefish is primarily prosecuted with gillnets and handlines, although there are other small localized fisheries, such as the beach seine fishery that operates along the Outer Banks of North Carolina that also catch bluefish. Many of these fisheries do not fish exclusively for bluefish, but target a combination of species including croaker, mullet, Spanish mackerel, spot, striped bass, and weakfish. Given the mixed-species nature of the bluefish fishery, incidental catch of non-target species is not directly attributable to the bluefish fishery.

References

Able, K.W. and M.P. Fahay. 1998. The first year in the life of estuarine fishes in the Middle Atlantic Bight. Rutgers University Press, New Brunswick, NJ. 342 p.

Bigelow, H.B. and W.C. Schroeder. 1953. Fishes of the Gulf of Maine. U.S. Fish Wildl. Serv., Fish. Bull. 53. 577 p.

Salerno, D.J., J. Burnett, and R.M. Ibara. 2001. Age, growth, maturity and spatial distribution of bluefish, *Pomatomus saltatrix* (Linnaeus), off the northeast coast of the United States, 1985-96. J. Northwest Atl. Fish. Sci., 29: 31-39.

Smith, W., P. Berrien, and T. Potthoff. 1994. Spawning patterns of bluefish, *Pomatomus saltatrix*, in the northeast continental shelf ecosystem. Bull. Mar. Sci. 54(1): 8-16.

NEFSC (Northeast Fisheries Science Center). 2015. 60th Northeast Regional Stock Assessment Workshop (60th SAW) Assessment Report. NEFSC Reference Document 15-08; 870 pp.

Wood, T. 2014. Bluefish 2014 Stock Assessment Update Data and Model Update Through 2013. Coastal/Pelagic Working Group, Northeast Fisheries Science Center, National Marine Fisheries Service, Woods Hole, MA. 37 p.

Wood, A. 2017. Personal communication. Atlantic bluefish assessment lead. NMFS/NEFSC/READ/PDB. Woods Hole, MA.