



Atlantic Bluefish Advisory Panel Information Document¹

June 2015

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 2014, 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 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 83/17% 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 M lb.

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

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.

(ABC) for the upcoming year. The Council's Bluefish Monitoring Committee develops and recommends 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. Table 1 illustrates how the management measures for 2015 were calculated.

Table 1. Derivation of alternative bluefish management measures for 2015.

	lb	mt	Basis
Overfishing Limit (OFL)	34,220,152	15,522	Determined by SSC
Acceptable Biological Catch (ABC)	21,543,572	9,772	Determined by SSC
Annual Catch Limit (ACL)	21,543,572	9,772	Defined in FMP as equal to ABC
Management Uncertainty (Mgmt Uncert)	0	0	Determined by Monitoring Committee
Commercial Discards	0	0	Value used in assessment
Recreational Discards	3,351,026	1,520	2011-2012 average from MRIP
Commercial Annual Catch target (ACT)	3,662,407	1,661	(ACL - Mgmt Uncert) x 17%
Recreational ACT	17,881,165	8,111	(ACL - Mgmt Uncert) x 83%
Commercial Total Allowable Landings (Commercial TAL)	3,662,407	1,661	Commercial ACT – Commercial Discards
Recreational Total Allowable Landings (Recreational TAL)	14,530,139	6,591	Recreational ACT – Recreational Discards
TAL (combined)	18,192,546	8,252	Commercial TAL + Recreational TAL
Expected Recreational Landings	13,073,412	5,930	2011-2013 average from MRIP
Maximum Transfer	1,456,726	661	Calculated so that the Recreational Harvest Limit (RHL) will equal expected recreational landings
Commercial Quota	5,119,134	2,322	Commercial TAL + transfer
RHL	13,073,412	5,930	Recreational TAL - transfer

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 lb (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 Atlantic bluefish stock assessment was peer reviewed and approved for use by management at Stock Assessment Workshop 41 (SAW 41; 2005). A statistical catch at age model called ASAP (Age Structured Assessment Program) was used in this assessment to derive stock status and biological reference points. Overfishing is defined as occurring when the fishing mortality rate (F) is above its threshold level (defined as $F_{MSY} = 0.19$). The target stock size in weight (biomass or B), and B_{MSY} is currently estimated to be 324 M lb. The level below which the stock is defined as being overfished is $\frac{1}{2} B_{MSY}$ which is 162 M lb.

The latest bluefish stock assessment update indicates that the stock is not overfished and overfishing is not occurring (Wood 2014). The estimate of fishing mortality in 2013 ($F = 0.10$) remains well below F_{MSY} (0.19; Figure 1). Model estimates of fishing mortality have been below the F_{MSY} threshold since 1995 (dashed line in Figure 1), consistent with catches that support growth in population biomass. The estimate of total biomass for 2013 (273 M lb) is below B_{MSY} but well above the $\frac{1}{2} B_{MSY}$ threshold (Figure 2).

Apparent Declines in Abundance

Declines in model estimates of abundance (solid line in Figure 1) since around 2006 appear to be driven by weak year classes estimated by the model for that timeframe. A retrospective pattern is evident for model estimates of recruitment through 2012, meaning that the model had a tendency to underestimate the number of fish born in the most recent years. This bias has minimized and flipped with the 2014 model update. A projection of the abundance through 2016, under five different fishing scenarios between $F=0.10$ and $F=0.19$, suggest that biomass will continue to decline due to poor incoming year classes.

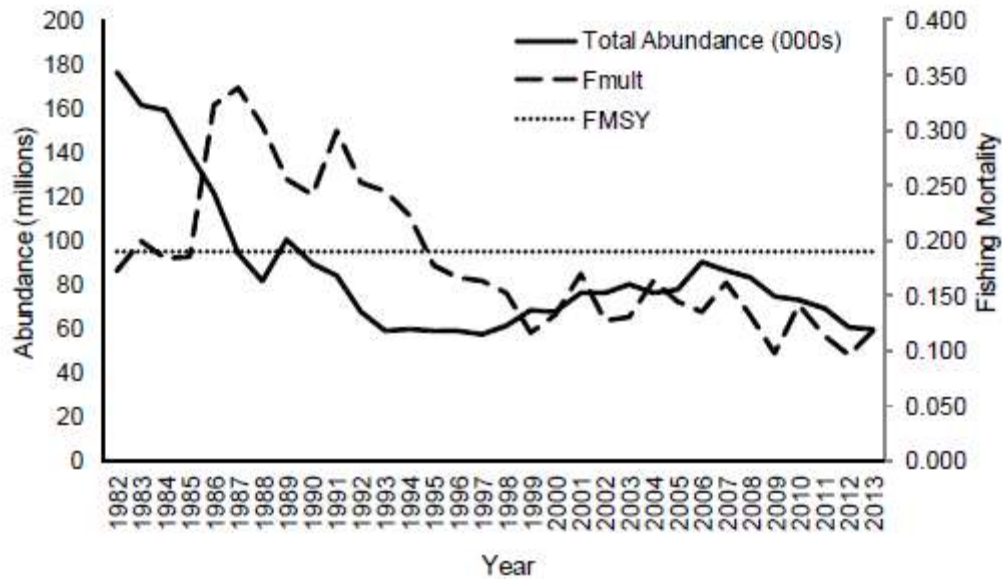


Figure 1. Total bluefish abundance and fishing mortality, 1982-2013. (Source: Wood 2014)

The time series of estimated total stock biomass and spawning stock biomass have both generally increased since a low in the mid-1990s (Figure 2). A rebuilding plan was implemented in 2000 when the assessment model at the time indicated that biomass was below $\frac{1}{2} B_{MSY}$. Note that the current assessment shows that the biomass of bluefish never dropped below the $\frac{1}{2} B_{MSY}$ threshold, although it was very close in the mid-1990s. Additionally, according to the model, biomass has not been above the B_{MSY} target since the late 1980s.

The Northeast Fisheries Science Center and Atlantic States Marine Fisheries Commission are in the process of conducting a benchmark stock assessment for Atlantic bluefish (SAW/SARC 60) and the final assessment report is expected to be available in July 2015.

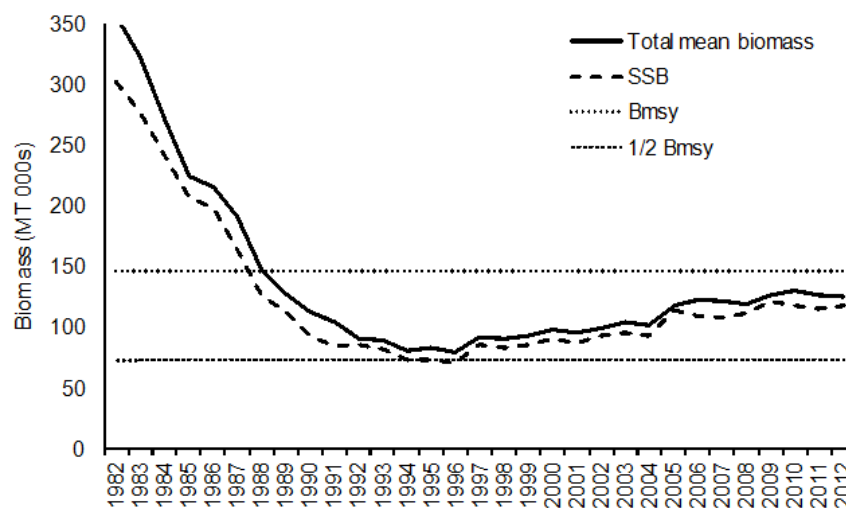


Figure 2. Bluefish total mean and spawning biomass (000s mt) relative to B_{MSY} target and threshold. (Source: Wood 2014)

Fishery Performance Relative to Management Measures

The recreational and commercial landings relative to specified management measures is provided in Table 2. 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 M lb, and although the commercial fishery underperformed by 1.18 M lb, the combined landings (29.27 M lb) were above the specified TAL (27.76 M lb). In 2014, the recreational fishery landed 10.46 M lb compared to the 13.18 M lb RHL (a 2.72 M lb underage), and the commercial fishery landed 4.58 M lb compared to the quota of 7.27 M lb (a 2.69 M lb underage). Combined landings for the recreational and commercial fisheries in 2014 (15.04 M lb) resulted in an underage of 6.04 M lb when compared to the TAL (21.08 M lb). Commercial fishery landings in 2015 are lagging behind 2014 landings (Figure 3; as of week ending May 30, 2015). Only preliminary Wave 1 (Jan-Feb) recreational landings for 2015 are available at this time.

Table 2. Summary of bluefish management measures, 2000 – 2015 (Values are in M lb).

Management Measures	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
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
TAL ³	35.33	37.84	26.87	37.29	31.85	30.85	24.80	27.76	28.16	29.36	29.26	27.29	28.27	23.86	21.08	18.19
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	7.27	5.12
Comm. Landings ⁵	8.05	8.70	6.88	7.41	8.06	7.04	6.98	7.51	6.12	7.10	7.55	5.61	4.66	4.10	4.58	-
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	13.18	13.07
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	11.50	11.84	15.28	10.46	-
Rec. Possession Limit (# fish)	10	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	19.38	15.04	-
Overage/Underage	-16.676	-15.91	-8.62	-16.74	-6.47	-3.95	-1.17	1.51	-2.25	-7.79	-5.37	-10.18	-11.77	-4.48	-6.04	-
Total Catch ⁷	22.35	26.02	21.44	23.48	29.71	31.55	28.08	35.12	31.83	25.1	27.93	20.39	19.26	22.71	17.76	-
Overage/Underage			-7.66	-16.02	-4.51	-2.67	-1.07	3.09	-0.06	-8.98	-6.45	-11.34	-12.78	-4.76	-6.67	-

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.

Atlantic Bluefish Quota Monitoring Report

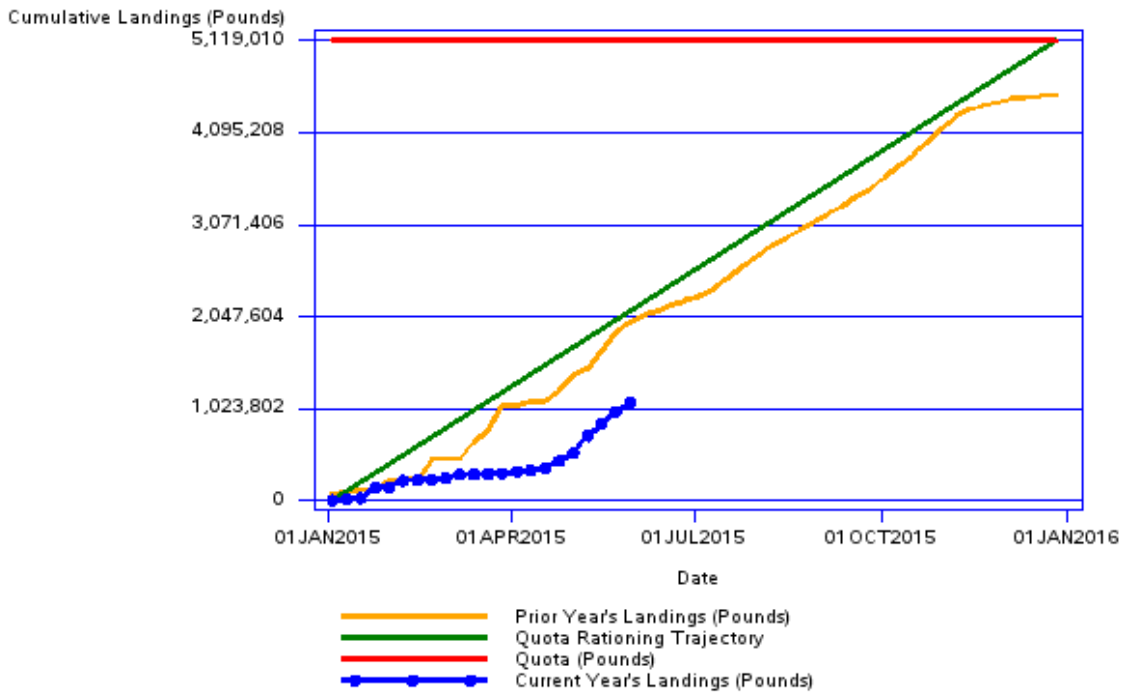


Figure 3. 2015 commercial landings from the NMFS quota monitoring website:
http://www.nero.noaa.gov/ro/fso/reports/reports_frame.htm.

Landings History

Bluefish catches were estimated via the Marine Recreational Fisheries Statistic Survey (MRFSS) starting in 1981 through 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 = 89.34 M lb; avg. 1991-1993 = 25.50 M lb). Recreational landings continued to decline at a somewhat slower rate until reaching their lowest level at 7.30 M lb in 1999, but since have grown to a peak of 22.50 M lb in 2007. There has been an overall decline of approximately 10 M lb in recreational landings since 2007 to 12.61 and 12.93 M lb in 2011 and 2012, respectively. According to MRIP, recreational landings increased to 15.57 M lb in 2013 and decreased to 10.52 M lb in 2014 even though total catch in numbers was stable. 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 4). Commercial discards are treated as insignificant and are not estimated in the current assessment.

Bluefish Total Catch 1985 to 2014

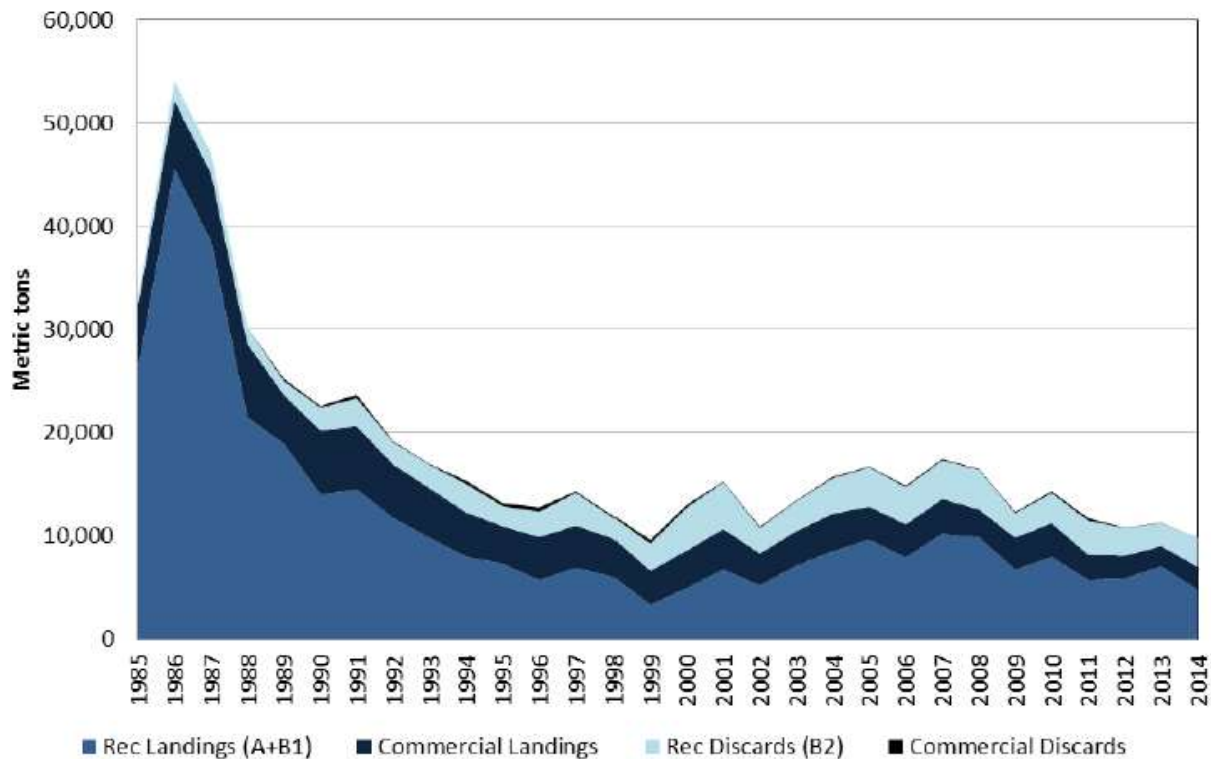


Figure 4. Bluefish catch (landings and discards), 1985-2014. (Source: Anthony Wood, Personal Communication 2015)

Recreational Fishery

Trends in recreational trips associated with targeting or harvesting bluefish from 1991 to 2014 are provided in Table 3. The lowest annual estimate of bluefish trips was 1.73 M trips in 1999. The highest annual estimate of bluefish trips in this timeframe was 5.95 M trips in 1991. For the last 5 years (2010-2014), bluefish trips have ranged from 1.73 M trips in 2013 to 2.47 M trips in 2010. In 2014, it was estimated that 2.4 M trips targeted or harvested bluefish. Relative to total angler effort in 2014, bluefish were the primary target or harvested in 6.2% of all recreational angler trips.

Table 3. Number of bluefish recreational fishing trips, recreational harvest limit, and recreational landings from 1991 to 2014.

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	1,733,408	5,464,623	3.2
2014	2,400,008	5,870,009	2.4

^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 fwd).

Recreational Landings by State

Recreational catch and landings by state for 2014 are provided in Table 4. The greatest overall catches (includes discards) were in New Jersey with 3.22 M fish, New York with 2.93 M fish, North Carolina with 2.62 M fish, Massachusetts with 2.57 M fish, and Florida with about 1.98 M fish. The greatest harvest (retained catch) of bluefish by weight occurred in Connecticut and New York with 3.11 and 1.88 M lb, respectively. According to MRIP only 112 bluefish were caught in Maine. 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 4. MRIP estimates of 2014 recreational harvest and total catch for bluefish.

State	Harvest			Catch
	Pounds of fish	Number of fish	Average wt of fish (lb)	Number of fish
ME	636	112	5.7	112
NH	5,390	950	5.7	2506
MA	1,656,139	385,754	4.3	2,571,712
RI	348,216	136,089	2.6	250,311
CT	1,211,769	315,788	3.8	752,392
NY	1,876,469	1,419,801	1.3	2,926,764
NJ	3,111,247	1,350,919	2.3	3,215,408
DE	123,451	129,813	1.0	455,170
MD	241,660	170,228	1.4	314,970
VA	85,692	161,233	0.5	348,851
NC	961,222	1,080,853	0.9	2,618,206
SC	105,375	172,561	0.6	470,169
GA	12,221	20,277	0.6	138,823
FL (East Coast)	720,463	525,631	1.4	1,982,319
Total	10,459,950	5,870,009	1.8	16,047,713

Recreational Landings by Mode

Figure 5 reflects MRFSS/MRIP-based estimates of landings by mode (1991 through 2014) and indicates that the primary landing modes for bluefish are private boats and for-hire mode. Approximately 20% of the landings came from shore-based fishing over the same time period. For the last three years (2012-2014) bluefish landings from private and for-hire boats have been relatively similar.

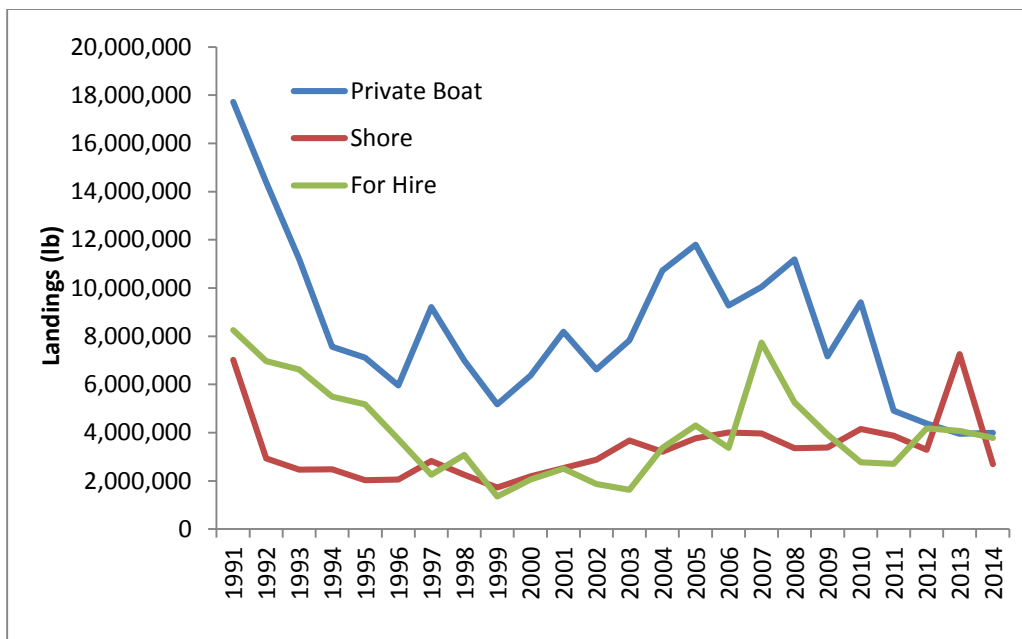


Figure 5. Bluefish landings (lb) by recreational fishermen by mode, Atlantic Coast, 1991-2014.

Recreational Landings by Area

MRIP classifies catch into three fishing areas, inland, nearshore ocean (< 3 mi), and offshore ocean (> 3 mi). About 51% of the landings of bluefish on a coastwide basis came from inland waters, followed by nearshore ocean (32%) for the 1991 to 2014 period (Figure 6). Offshore ocean is only about 17% of the total landings. For the last five years (2012-2015), 59% of the total bluefish landings came from inland waters and 14% from offshore ocean, nearshore remained at 27% of the total.

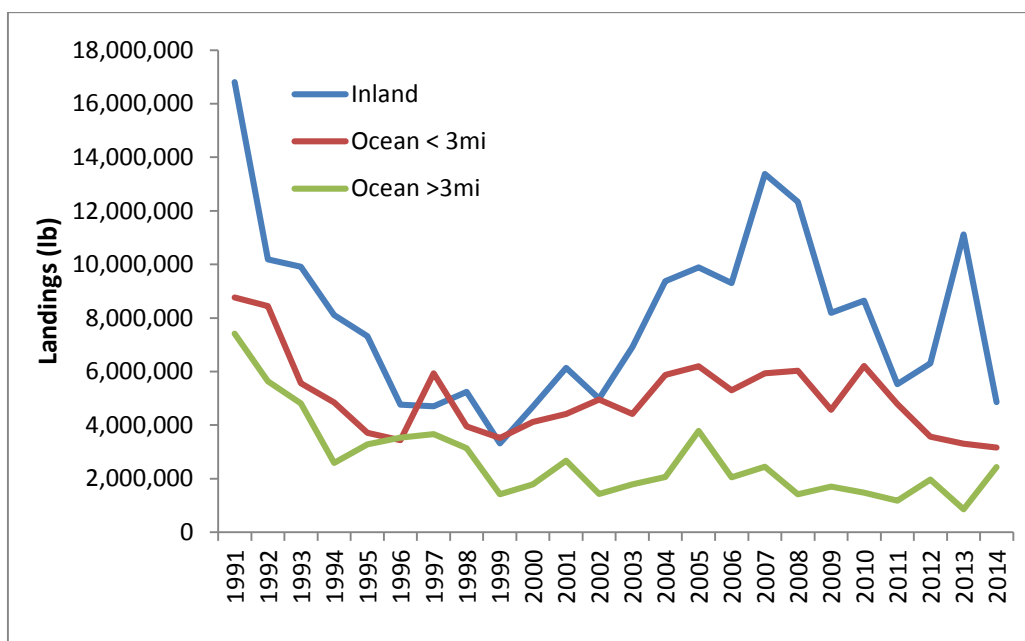


Figure 6. Bluefish landings (lb) by recreational catch by area, Atlantic Coast, 1991-2014.

Commercial Fishery

Vessel and Dealer Activity

Federal permit data indicate that 2,841 commercial bluefish permits were issued in 2014. A subset of federally-permitted vessels was active in 2014 with dealer reports identifying 686 vessels with commercial bluefish permits that actually landed bluefish. Of the 401 federally-permitted bluefish dealers in 2014, there were 165 dealers who actually bought bluefish.

Effort/Landings by Gear

NMFS VTR data indicate that a total of 1,426 commercial trips targeted bluefish (bluefish \geq 50 % of total harvest) in 2014 (Table 5). Landings from directed trips (1.90 M lb) are approximately 76% of commercial bluefish landings reported in the VTR system for 2014 (2.50 M lb). Gillnets accounted for 84% of the directed landings while hook gear accounted for 8%.

Table 5. Commercial gear types associated with bluefish landings in 2014.

Commercial gear type	Trips	Landings (lb)	Percent of total
Gill net	733	1,594,574	84%
Hook and line	664	156,254	8%
Pots and traps	22	124,936	7%
Other	6	21,060	1%
Total	1,426	1,896,824	100%

Effort/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 2014 (Table 6). Six statistical areas accounted for approximately 80% of the VTR-reported catch in 2014. Statistical area 636 was responsible for the highest percentage of the catch, with statistical area 611 having the majority of trips that caught bluefish (Table 6). A map of the statistical areas that accounted for 5 percent or more of the Atlantic bluefish catch is shown in Figure 7.

Table 6. 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 2014, with associated number of trips.

Statistical area	Pounds of bluefish caught	Percent of 2014 commercial bluefish catch	Number of trips	Percent of 2014 commercial bluefish trips that caught bluefish
636	560,934	22%	129	2%
612	405,238	16%	662	9%
539	354,329	14%	1,178	16%
632	284,417	11%	44	1%
613	240,889	10%	1,079	15%
611	131,003	5%	1,585	22%
537	55,365	2%	499	7%

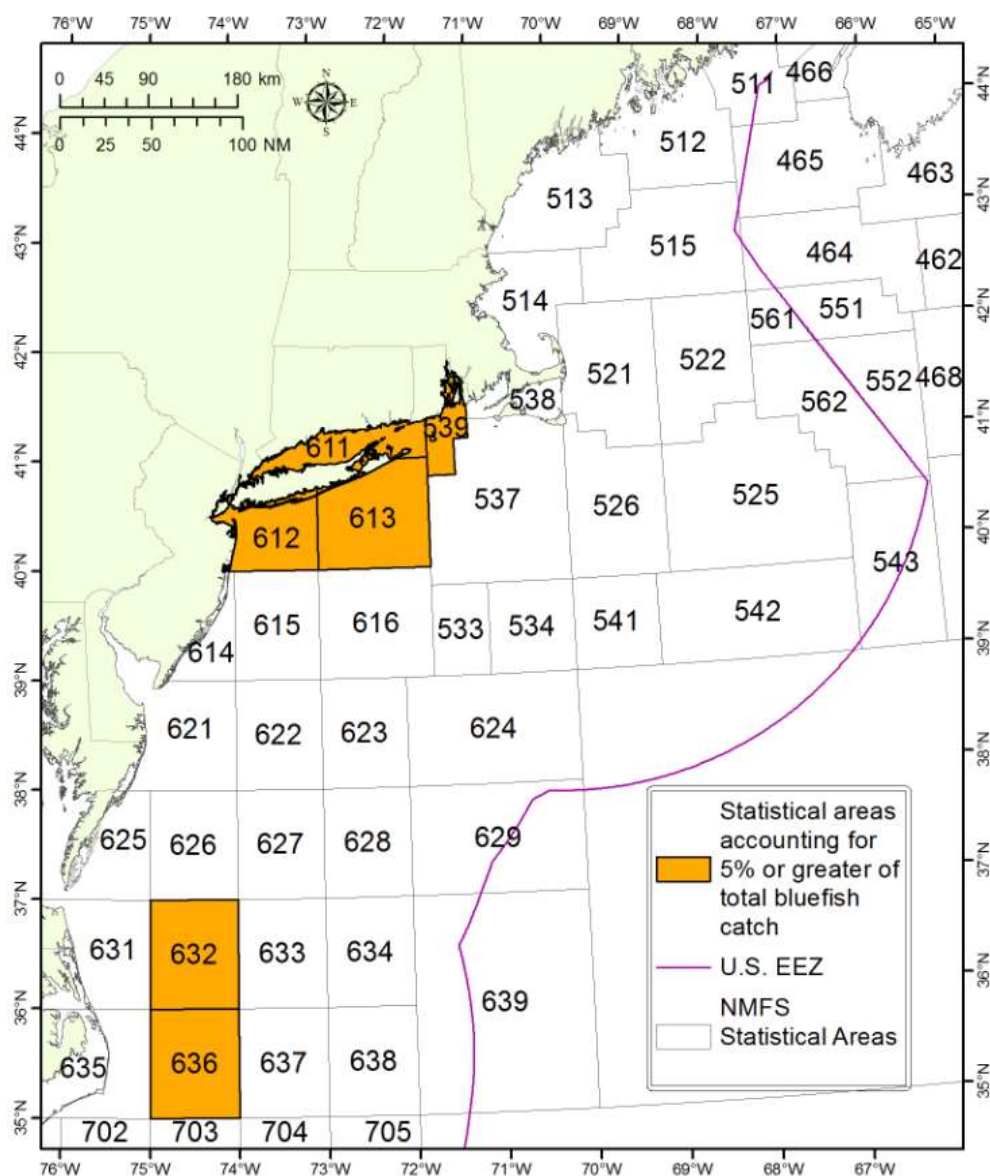


Figure 7. NMFS Statistical Areas, highlighting those that each accounted for 5% or more of the commercial bluefish catch in 2014.

The top commercial landings ports for bluefish in 2014 are shown in Table 7. Eleven 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 over 1.43 M lb 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 7. Top ports of bluefish landings (in pounds), based on NMFS 2014 dealer data.

Port ^a	Pounds	% of total commercial bluefish landings	# vessels
Wanchese, NC	1,425,362	31%	46
Point Judith, RI	415,511	9%	123
Montauk, NY	297,149	6%	93
Hampton Bays, NY	261,184	6%	27
Belford, NJ	233,456	5%	16
Hatteras, NC	232,986	5%	16
BarNEGAT Light / Long Beach, NJ	144,214	3%	29
Providence, MA	140,550	3%	9
Amagansett, NY	114,343	2%	3
Point Pleasant, NJ	112,235	2%	32
Engelhard, NC	107,557	2%	12

^a Since this table includes only the “top ports” (ports where landings of bluefish were > 100,000 lb), it does not include all of the landings for the year.

Revenue

According to Dealer data, commercial vessels landed about 4.58 M lb of bluefish valued at approximately \$2.86 million in 2014. Average coastwide ex-vessel price of bluefish was \$0.62/lb in 2014, a 16% decrease from the previous year (2013 price = \$0.72/lb). The relative value of bluefish is very low among commercially landed species, approximately 0.17 % of the total value, respectively of all finfish and shellfish landed along the U.S. Atlantic coast in 2013. A time series of bluefish revenue and price is provided in Figure 8.

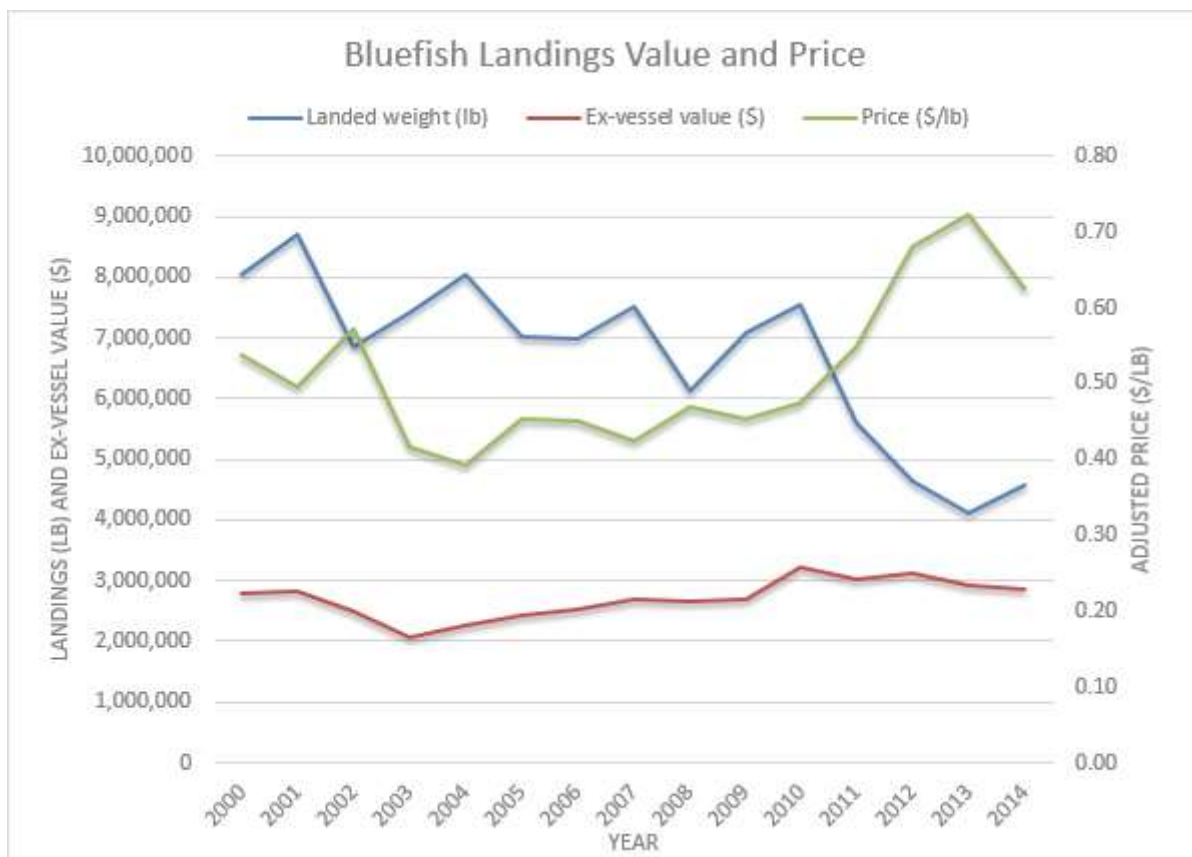


Figure 8. Landings, ex-vessel value, and price (adjusted to 2014 real dollars) for bluefish, 2000-2014.

Bycatch

The commercial fishery for bluefish is primarily prosecuted with gillnets and handlines. This fishery often harvests mixed species, including bonito, Atlantic croaker, weakfish, spiny dogfish, and other species. Among these species, weakfish are considered to be depleted; however, natural mortality rather than fishing mortality is implicated as constraining stock size. Atlantic croaker and spiny dogfish are not overfished, nor is overfishing occurring. Bonito are unregulated and stock status is unknown. 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. Ibarra. 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.
- 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. 2015. Personal communication. Atlantic bluefish assessment lead. NMFS/NEFSC/READ/PDB. Woods Hole, MA.