

Bluefish AP Information Document - July 2014

The information in this document provides a brief overview of the management system, biology, stock conditions, and fishery performance for the Atlantic Bluefish fishery with an emphasis on the most recent complete fishing year (2013). Please review this information in preparation for the upcoming Advisory Panel meeting and in the context of your experience with the fishery.

Management System

The Bluefish Fishery Management Plan was implemented in 1990 and established the Mid-Atlantic Fishery Management Council's 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 (effective 1/1/2012) incorporated the development of annual catch limits (ACLs) and accountability measures (AMs) into the specification process, and Amendment 4 (effective 1/21/2014) modified recreational accountability measures to accommodate uncertainty in recreational management and catch estimation.

Specifying bluefish management measures is a joint process conducted by the Council and the Atlantic States Marine Fisheries Commission's Bluefish Management Board. 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 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 National Marine Fisheries Service. Table 1 below illustrates how the management measures for 2014 were calculated.

Table 1. Bluefish management measures for 2014.

2014 Management Measure	Lbs	Basis
Overfishing Limit (OFL)	36,389,501	Determined by SSC
Acceptable Biological Catch (ABC)	24,431,628	Determined by SSC
Annual Catch Limit (ACL)	24,431,628	Defined in FMP as equal to ABC
Management Uncertainty	0	Determined by Monitoring Committee
Commercial Discards	0	Value used in assessment
Recreational Discards	3,351,026	2010-2012 average from MRIP
Annual Catch Target (ACT)	24,431,628	ACL - Mgmt Uncertainty
Commercial ACT	4,153,377	17% of ACT
Recreational ACT	20,278,251	83% of ACT
Commercial Total Allowable Landings (Comm TAL)	4,153,377	Comm ACT – Comm Discards
Recreational Total Allowable Landings (Rec TAL)	16,927,225	Rec ACT – Rec Discards
TAL (combined)	21,080,602	Comm TAL + Rec TAL
Expected Recreational Landings	13,179,234	2010-2012 average from MRIP
Maximum Transfer	3,340,386	Calculated so that the Adjusted RHL will equal expected Rec Landings
Initial (pre-Research Set Aside) Comm Quota	7,493,762	Comm TAL + transfer
Initial (pre-Research Set Aside) Rec Harvest Limit	13,586,839	Rec TAL - transfer
Commercial Research Set Aside Deduction (3%)	224,813	3% of Comm Quota
Recreational Research Set Aside Deduction (3%)	407,605	3% of RHL
Adjusted Commercial Quota	7,268,949	Comm Quota - RSA
Adjusted RHL	13,179,234	RHL - RSA

Bluefish Biology

Bluefish, *Pomatomus saltatrix*, 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 lbs (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

Bluefish stock status and biological reference points are based on the maximum sustainable yield (MSY) concept and are determined from a stock assessment model called ASAP that was accepted by scientific peer-review in 2005. 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 bluefish stock assessment is updated annually and is in the process of being updated for the 2013 fishing year, so assessment results as of this writing are from the 2012 fishing year. For 2012, the estimate of fishing mortality ($F_{2012} = 0.10$) was below the overfishing level ($F_{MSY} = 0.19$), so overfishing was not occurring. 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.

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, and model estimates of year class size increased as the model was updated over time. It is unknown whether that pattern will continue until the updated assessment is available.

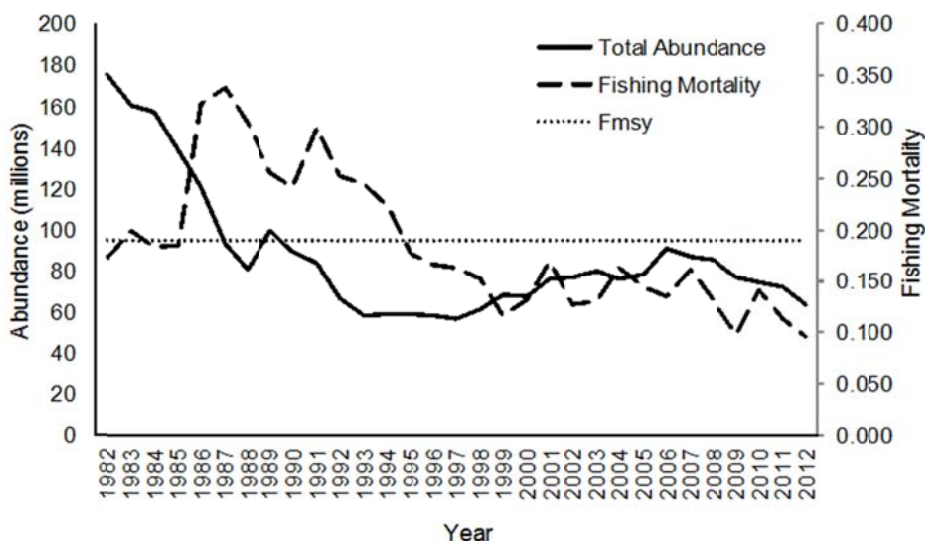


Figure 1. Total bluefish abundance and fishing mortality as estimated in ASAP model in 2012. F_{MSY} is indicated by the solid horizontal line. (Source: 2012 Assessment Update)

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). The estimate of total biomass for 2012 is below B_{MSY} but above the $\frac{1}{2} B_{MSY}$ threshold. This supports the statement that for 2012 the stock was not overfished. 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. A benchmark assessment, that is a complete re-examination of the appropriate population model and its configuration, will be done in 2015 and may result in a different interpretation of population trends.

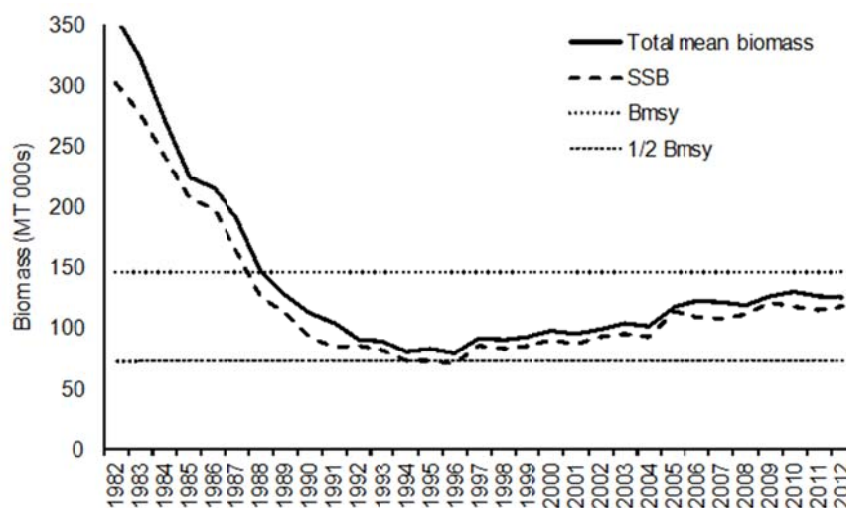


Figure 2. Time series of bluefish total mean biomass (000s mt) and spawning stock biomass (000s mt) relative to B_{MSY} target and threshold. (Source: 2012 Assessment Update)

Fishery Performance Relative to Management Measures

The performance of the fishery, that is, the recreational and commercial catches 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 M lb, and although the commercial fishery underperformed by 1.1 M lb, the combined catches were above the specified TAL. In 2013, the combined fisheries underharvested the combined bluefish TAL even though the recreational fishery exceeded the RHL. The recreational fishery landed 15.281 M lb compared to the 14.069 M lb RHL (a 1.2 M lb overage), and the commercial fishery landed 4.114 M lb compared to a quota of 9.076 M lb (a 5 M lb underage). Commercial fishery landings in 2014 are on the same track as in 2013 (Figure 3). Only preliminary Wave 1 (Jan-Feb) recreational landings for 2014 are available at this time.

Table 2. Summary of bluefish management measures, 2000 - 2014.

Management Measures	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
TAL (M lb)*	35.328	37.841	26.866	37.293	31.85	30.853	24.797	27.762	28.156	29.356	29.264	27.293	28.267	23.861	21.081
Comm. Quota (M lb)†	9.583	9.583	10.5	10.5	10.5	10.5	8.081	8.689	7.705	9.828	10.213	9.375	10.317	9.076	7.269
Comm. Landings (M lb)	8.041	8.688	6.863	7.401	7.994	7.045	6.955	7.499	5.968	6.99	7.069	5.082	4.93	4.114	
Rec. Harvest Limit†	25.745	28.258	16.365	26.793	21.35	20.353	16.718	19.073	20.451	19.528	18.631	17.813	17.457	14.069	13.179
Rec. Landings (M lb)	10.606	13.23	11.371	13.136	15.203	16.162	16.894	21.163	18.9	13.583	18.042	11.499	10.684	15.281	
Rec. Possession Limit	10	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Total Landings	18.647	21.918	18.234	20.537	23.197	23.207	23.849	28.662	24.868	20.573	25.111	16.581	15.614	19.395	N/A
Overage/Underage (M lb)	-16.681	-15.923	-8.632	-16.756	-8.653	-7.646	-0.948	0.9	-3.288	-8.826	-4.153	-10.712	-12.653	-4.466	N/A
Target F	N/A	N/A	N/A	N/A	N/A	0.15	0.15	0.15	0.15	0.15	0.15	0.15	N/A	0.132	0.132
ASAP F estimate	0.13	0.15	0.13	0.14	0.15	0.15	0.14	0.16	0.12	0.10	0.14	0.11	0.10	-	-

*Includes RSA

† RSA deducted

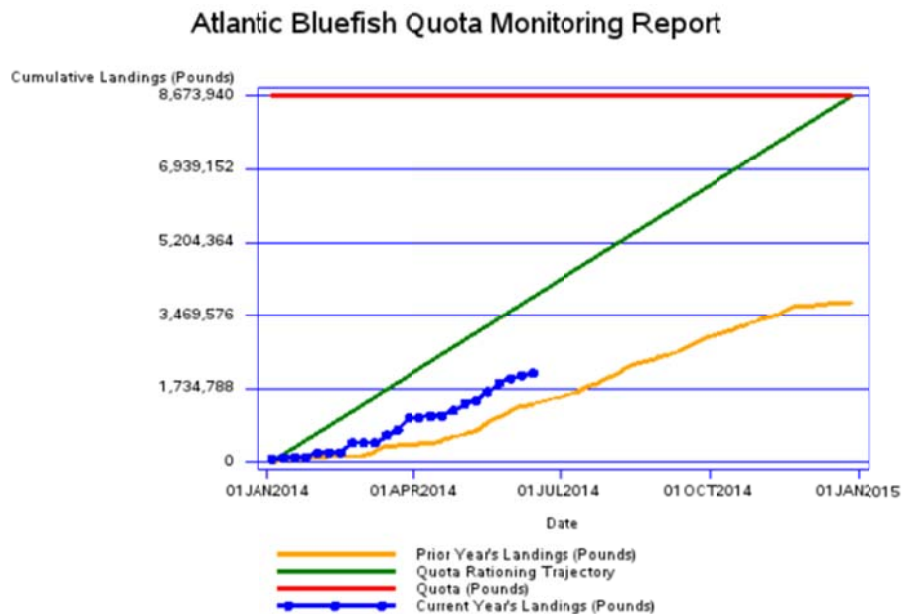


Figure 3. Comparison of 2013(yellow line) and 2014 (blue line) commercial landings from the NMFS quota monitoring website: http://www.nero.noaa.gov/ro/fso/reports/reports_frame.htm

Landings History

Given the predominance of the recreational component of the bluefish fishery, the history of bluefish catches begins with the implementation of data collection via the Marine Recreational Fisheries Statistic Survey (MRFSS) in 1981 (Figure 4). From the early 1980s to the early 1990s, recreational landings declined by factor of about 70% (avg. 1981-1983 = 89.140 M lb; avg. 1991-1993 = 25.824 M lb). Recreational landings continued to decline at a somewhat slower rate until reaching their lowest level at 8.254 M lb in 1999, but since have grown to a peak of 21 M lb in 2007. There has been an overall decline of about 10 M lb in recreational landings since 2007 to roughly 11-12 M lb in 2011 and 2012. According to MRIP, recreational landings increased to a little over 15 M lb in 2013 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.

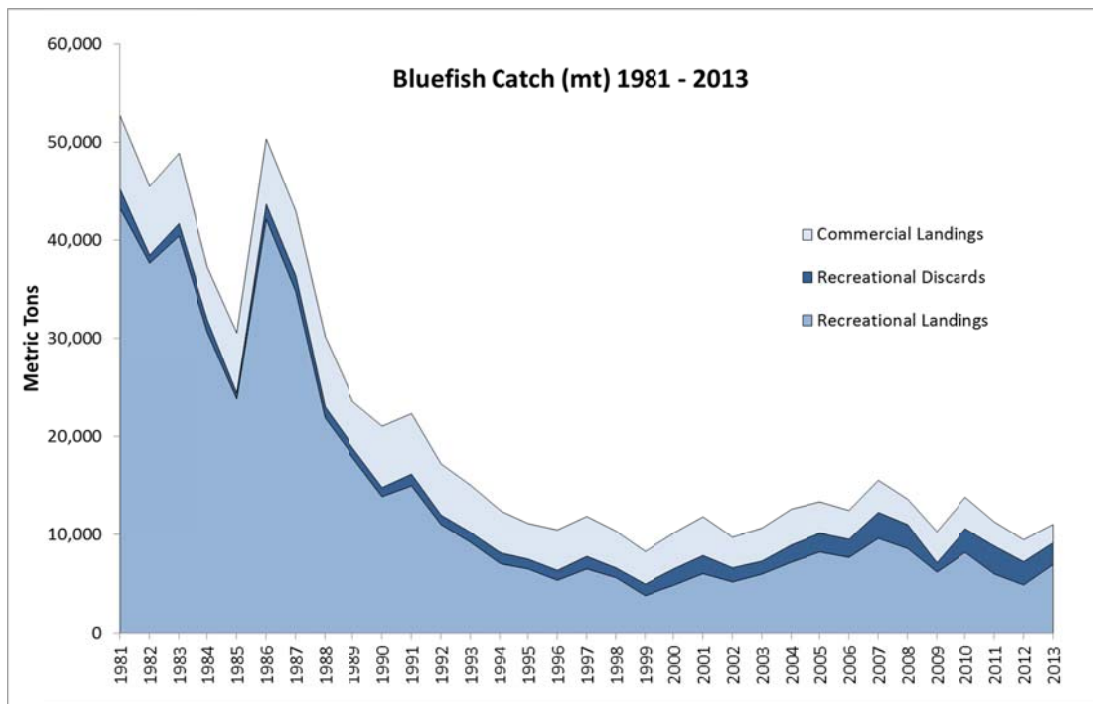


Figure 4. Time series of bluefish recreational and commercial landings and discards (Source: 2013 Assessment Update and current MRIP data).

Recreational Fishery

Trends in recreational trips associated with targeting or harvesting bluefish from 1991 to 2013 are provided in Table 3. The lowest annual estimate of bluefish trips was 1.727 million trips in 1999, but last year (2013) was also very low with 1.733 million trips. The highest annual estimate of bluefish trips in this timeframe was 5.9 million trips in 1991. Relative to total angler effort in 2013, bluefish were the primary target of recreational trips only about 4.7% of the time.

Table 31. Number of bluefish recreational fishing trips, recreational harvest limit, and recreational landings from 1991 to 2013.

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	2,898,679	7,250,407	2.5
2005	3,233,133	7,949,179	2.5
2006	2,781,357	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

^aEstimated 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 2013 are provided in Table 4. The greatest overall catches (includes discards) were in North Carolina with 3 million fish and New York and Florida with about 2 million fish each. The greatest harvest (retained catch) of bluefish by weight occurred in Connecticut and New York with 3.7 and 4.2 million pounds, respectively. According to MRIP only 85 bluefish were caught in New Hampshire. 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 2013 recreational harvest and total catch for bluefish.

State	Harvest			Catch
	Pounds of Fish	Number of Fish	Average wt of fish (lbs)	Number of Fish
ME	62,654	19,542	3.2	41,726
NH	0	0	-	85
MA	2,141,185	371,734	5.8	829,473
RI	1,382,072	312,040	4.4	934,810
CT	4,192,558	875,068	4.8	1,599,615
NY	3,684,907	983,041	3.7	1,990,952
NJ	1,833,248	740,335	2.5	1,617,134
DE	26,230	24,391	1.1	94,726
MD	65,389	55,544	1.2	316,501
VA	274,713	188,367	1.5	408,435
NC	988,664	1,183,627	0.8	3,055,543
SC	109,218	298,451	0.4	607,472
GA	3,645	3,408	1.1	10,783
FL (East Coast)	516,404	409,076	1.3	1,901,087
Total	15,280,887	5,464,624	2.8	13,408,342

Figure 5 reflects MRFSS/MRIP-based estimates of catch and landings by mode (1991 through 2012) and indicates that the primary catch modes for bluefish are private boats and shore-based fishing. Less than 10 % of the catch came from for hire boats over the same time period. A remarkable increase (more than double the 2012 landings in weight) from shore-based fishing is shown in 2013.

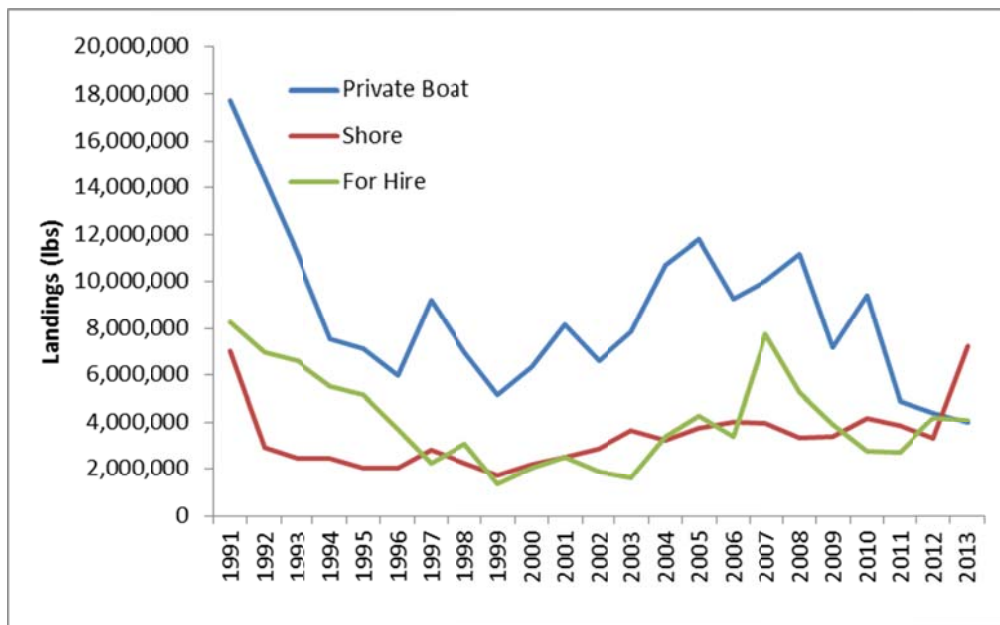


Figure 5. Bluefish landings (lbs) by recreational fishermen by mode, Atlantic Coast, 1991-2013.

Recreational Catches by Area

MRIP classifies catch into three fishing areas, inland, nearshore ocean (< 3 mi), and offshore ocean (> 3 mi). About 54% of the catch of bluefish on a coastwide basis came from inland waters, followed by nearshore ocean (39%) (Figure 4). Offshore ocean is only about 7% of the total catch. The very large increase in shore-based landings is reflected in the increase for inland waters for 2013.

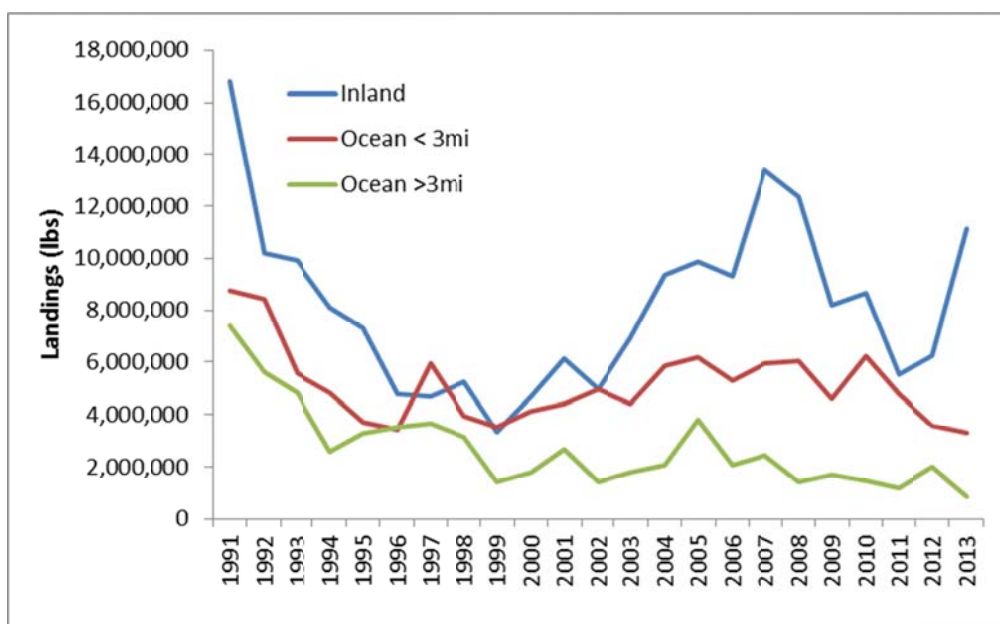


Figure 4. Bluefish recreational catch by area, Atlantic Coast, 1991-2013.

Commercial Fishery

Vessel and Dealer Activity

Federal permit data indicate that 2,954 commercial bluefish permits were issued in 2013 (Table 5). A subset of federally-permitted vessels was active in 2013 with dealer reports identifying 602 vessels with commercial bluefish permits that actually landed bluefish.

Of the 394 federally-permitted bluefish dealers, there were 167 dealers who actually bought bluefish in 2013 (Table 5).

Table 5. Permitted and active bluefish vessels and dealers by state for 2013.

STATE	PERM VESSELS	ACTIVE VESSELS	PERM DEALERS	ACTIVE DEALERS
MA	1,040	154	113	44
NJ	460	83	58	9
NY	320	124	89	45
ME	258	-	12	-
RI	212	101	41	26
NC	153	71	26	19
VA	133	33	19	11
NH	131	7	8	-
CT	66	10	4	-
MD	60	12	10	3
FL	52	-	6	5
DE	49	-	-	-
PA	13	-	3	
OTHER	7	7	5	5
TOTAL	2,954	602	394	167

Source: NMFS Permit Database and Dealer Weighout Data.

Effort/Landings by Gear

NMFS VTR data indicate that a total of 1,444 commercial trips targeted bluefish (bluefish \geq 50 % of total catch) in 2013 (Table 6). Landings from directed trips (996 k lb) are approximately 24.2 % of coastwide commercial bluefish landings for 2013 (4.114 M lb). Gillnets accounted for 83.0 % of the directed catch while hook gear accounted for 12.0 %.

Table 6. Commercial gear types associated with bluefish harvest in 2013.

Commercial Gear Type	Trips	Landings (lbs)	Pct Total
GILL NET	716	826,502	83%
HOOK AND LINE	699	119,069	12%
OTHER	29	50,457	5%
TOTAL	1,444	996,028	100%

Effort/Landings by Area

The Northeast Region is divided into 46 statistical areas for Federal fisheries management. According to VTR data, bluefish were commercially harvest in 36 statistical areas in 2011 (Figure 5). Six statistical areas, however, collectively accounted for more than 75 % of VTR-reported landings in 2013, with individual areas contributing 6% to 18% of the total. These areas also represented 70% of the trips that landed bluefish suggesting that resource availability as expressed by catch per trip is fairly consistent through the range where harvest occurs.

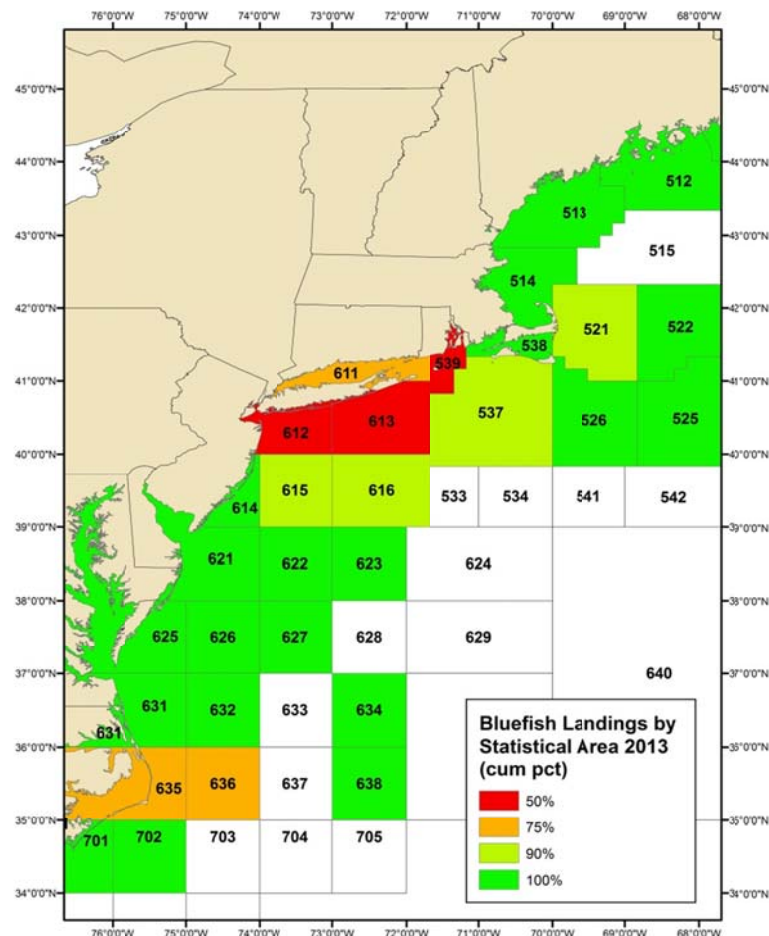


Figure 5. NMFS Statistical Areas. Shading reflects the cumulative percentage of landings with red and orange being the primary areas where the commercial landings are taken.

The top commercial landings ports for bluefish in 2013 are shown in Table 7. Ten 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 600,000 lb landed.

Table 7. Top ports of bluefish landings (in pounds), based on NMFS 2013 dealer data. 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.

Port ^a	Pounds	# Vessels
WANCHESE, NC	612,147	15
POINT JUDITH, RI	400,572	90
MONTAUK, NY	354,559	84
HAMPTON BAYS, NY	345,573	30
HATTERAS, NC	174,150	13
AMAGANSETT, NY	152,111	4
POINT PLEASANT, NJ	124,769	67
CHATHAM, MA	124,578	24
BELFORD, NJ	115,374	13
SHINNECOCK, NY	107,809	-

^aPorts with less than 3 vessels not reported for confidentiality issues.

Source: Dealer Weighout Data, as of June 26, 2014.

Revenue

In 2013, commercial vessels landed about 4.114 M lb of bluefish valued at approximately \$2.94 million. Average coastwide ex-vessel price of bluefish was \$0.67/lb in 2013, a 6 % increase from the previous year (2011 price = \$0.67/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 timeseries of bluefish revenue and price is provided in Figure 6.

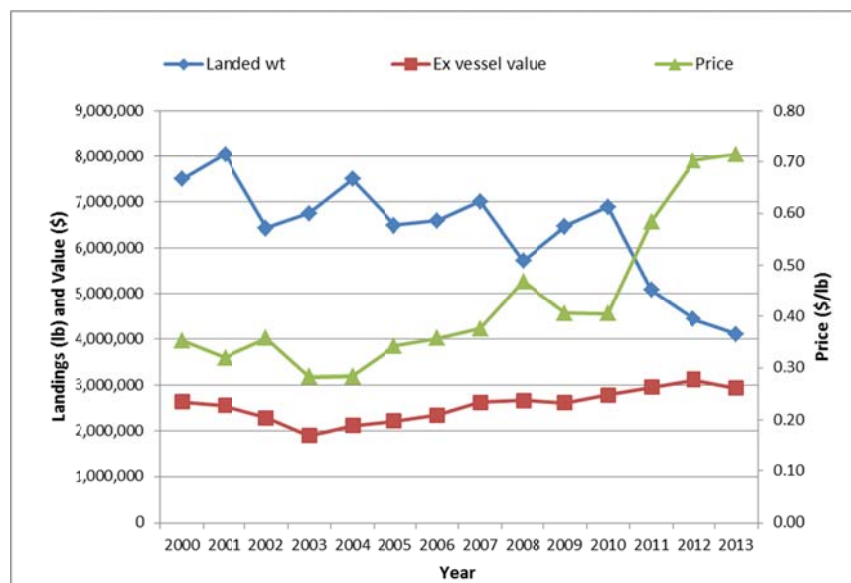


Figure 6. Landings, ex-vessel value, and price for bluefish, 2000-2013. Source: NMFS unpublished dealer data. Prices are unadjusted.

Bycatch

The commercial fishery for bluefish is primarily prosecuted with gillnets, otter trawls, 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.
- Essential Fish Habitat Source Document: Bluefish, *Pomatomus saltatrix*, Life History and Habitat Characteristics, 2nd Edition by Gary R. Shepherd and David B. Packer. NOAA Technical Memorandum NMFS-NE-198. 100 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.