## MEMORANDUM

DATE: July 31, 2012
TO: Council
FROM: Jim Armstrong
SUBJECT: Bluefish Management Measures for 2013 and 2014

The following materials are enclosed for Council consideration of the above subject:

1) Summary of Monitoring Committee Recommendations
2) Report of the July Meeting of the Council's Science and Statistical Committee
3) Staff Recommendation Memo
4) Bluefish Stock Assessment Update
5) Bluefish Fishery Performance Reports
6) Bluefish Advisory Panel Information Document

## Bluefish Monitoring Committee Recommendations for 2013, 2014

Attendees: Paul Caruso (MA-DMF), Jason McNamee (RI-DFW), Beth Egbert (NCDMF), Mark Terceiro (NEFSC), Mike Celestino (NJ-F\&W), Greg Wojcik (CT-DEEP), Allison Watts (VMRC), Des Kahn (DNREC), Rich Wong (DNREC), Steve Doctor (MD-DNR), John Maniscalco (NY-DEC), Joseph Munyandero (FL-FWC), Kirk Gotchell (CT-DEP), Mike Waine (ASMFC), Tony Wood (NEFSC), Jessica Coakley (Council Staff), Kiley Dancy (Council Staff), Lee Anderson (Council vice-chair), Toni Kerns (ASMFC), Adam Nowalsky (RFA), Jeff Kaelin (Lunds Fisheries)

Discussion: The Committee received an overview of the presentation provided to the SSC the prior day and was provided with the SSC recommendations for ABC in 2013 and 2014. The Committee discussed the various sources of management uncertainty in considering an adjustment from ACL to the fisheryspecific ACTs.

The sources of uncertainty considered by the Bluefish Monitoring Committee include:
"Forecast" of recreational landings and discards - Typically forecasts of recreational landings and discards are averages of the most recent three years. Measures based on those averages assume that recreational fishery catch will be consistent with that average. The Committee analyzed the history of catches (landings + discards) compared to running three year averages and found that since 2000, the average catch in a given year was about $5 \%$ less than the average of the previous three years. Additionally, discards as a proportion of total catch have averaged about $20 \%$ and no trend is evident. Based on these observations, the Committee agreed that use of these running averages provided an adequate basis for management measures in the upcoming 2013 and 2014 fishing years and that there is no need for an additional "buffer" to account for this source of management uncertainty.

History of management effectiveness - The Committee discussed the history of fishery landings relative to harvest limits. It was noted that since 2000 the combined commercial and recreational landings exceeded the allowable landings (formerly referred to as the TAL) only once. This occurred in 2007 and was specific to the recreational fishery which landed $113.7 \%$ of the RHL (overage of 2.6 M lb ). In all other years the combined landings were less than the TAL. The commercial fishery has never exceeded the coastwide quota. Based on this observation, the Committee agreed that combined landings in the upcoming 2013 and 2014 fishing years were likely to be under the harvest limits and therefore under the ACL. The Committee agreed that there is no need for an additional "buffer" to account for this source of management uncertainty.

## Calculation of Management Measures for 2013 and 2014.

The Committee reviewed the calculation of the 2013 and 2014 commercial quotas and recreational harvest limits and agreed with the methods used by staff for those measures. This included calculation of the maximum recreational-to-commercial transfer amount that the Council could recommend. To be clear, the Committee is not recommending the maximum transfer, but is in agreement that the calculation of the maximum transfer is correct.

## Monitoring Committee Recommendations

The tables below identify the Bluefish Monitoring Committee's recommended management measures for 2013 (top) and 2014 (bottom).

| 2013 Management Measure | Lbs | mt | Basis |
| :--- | ---: | ---: | :--- |
| OFL | $38,627,193$ | 17,521 | per SSC |
| ABC | $27,471,802$ | 12,461 | Constant F (0.132) |
| ACL | $27,471,802$ | 12,461 | = ABC |
| Mgmt Uncertainty | 0 | 0 | per MC |
| Comm Discards | 0 | 0 | from assessment |
| Rec Discards | $3,611,172$ | 1,638 | $2009-2011$ MRFSS avg. |
| Comm ACT | $4,670,206$ | 2,118 | (ACL - Mgmt Uncert) * 17\% |
| Rec ACT | $22,801,596$ | 10,343 | (ACL - Mgmt Uncert) * 83\% |
| Comm TAL | $4,670,206$ | 2,118 | Comm ACT - Disc |
| Rec TAL | $19,190,424$ | 8,705 | Rec ACT - Disc |
| TAL (combined) | $23,860,631$ | 10,823 | Comm + Rec TAL |
| Expected Recreational Landings | $14,068,836$ | 6382 | $2009-2011$ average |
| Maximum Transfer | $4,686,470$ | 2,126 | Calculated |
| pre-RSA Comm Quota | $9,356,676$ | 4,244 | Comm TAL + transfer |
| pre-RSA RHL | $14,503,955$ | 6,579 | Rec TAL - transfer |
| Comm RSA Deduction (3\%) | 280,700 | 127 | $3 \%$ of Comm Quota |
| Rec RSA Deduction (3\%) | 435,119 | 197 | $3 \%$ of RHL |
| Adjusted Comm Quota | $9,075,976$ | 4,117 | Comm Quota - RSA |
| Adjusted RHL | $14,068,836$ | 6,382 | RHL - RSA |


| 2014 Management Measure | Lbs | mt |  |
| :--- | ---: | ---: | :--- |
| OFL | $38,627,193$ | 17,521 | per SSC |
| ABC | $27,057,333$ | 12,273 | Constant $\mathrm{F}(0.132)$ |
| ACL | $27,057,333$ | 12,273 | $=$ ABC |
| Mgmt Uncertainty | 0 | 0 | per MC |
| Comm Discards | 0 | 0 | from assessment |
| Rec Discards | $3,611,172$ | 1,638 | $2009-2011$ MRFSS avg. |
| Comm ACT | $4,599,747$ | 2,086 | (ACL - Mgmt Uncert) * 17\% |
| Rec ACT | $22,457,587$ | 10,187 | (ACL - Mgmt Uncert) * 83\% |
| Comm TAL | $4,599,747$ | 2,086 | Comm ACT - Disc |
| Rec TAL | $18,846,415$ | 8,549 | Rec ACT - Disc |
| TAL (combined) | $23,446,162$ | 10,635 | Comm + Rec TAL |
| Expected Recreational Landings | $14,068,836$ | 6382 | $2009-2011$ average |
| Maximum Transfer | $4,342,460$ | 1,970 | Calculated |
| pre-RSA Comm Quota | $8,942,207$ | 4,056 | Comm TAL + transfer |
| pre-RSA RHL | $14,503,955$ | 6,579 | Rec TAL - transfer |
| Comm RSA Deduction (3\%) | 268,266 | 122 | $3 \%$ of Comm Quota |
| Rec RSA Deduction (3\%) | 435,119 | 197 | $3 \%$ of RHL |
| Adjusted Comm Quota | $8,673,941$ | 3,934 | Comm Quota - RSA |
| Adjusted RHL | $14,068,836$ | 6,382 | RHL - RSA |

## Additional Recreational Measures

The Bluefish MC recommends status quo recreational possession limit up to 15 fish.
RSA: Up to 3\%.

## MID-ATLANTIC FISHERY MANAGEMENT COUNCIL

Richard B. Robins, Jr.<br>Chairman<br>Lee G. Anderson<br>Vice-Chairman

Christopher M. Moore, Ph.D. Executive Director

800 North State Street, Suite 201
Dover, Delaware 19901 Tel 302-674-2331
Toll Free 877-446-2362 Fax 302-674-5399
www.mafmc.org
MEMORANDUM

DATE: 30 July 2012

TO: Richard B-Robins, Jr., Chairman, Mid-Atlantic Fishery Management Council
FROM: Sohn Boreman, Ph.D., Chairman, MAFMC Scientific and Statistical Committee
Subject: Report of July 2012 Meeting of the MAFMC Scientific and Statistical Committee

The Scientific and Statistical Committee (SSC) of the Mid-Atlantic Fishery Management Council (MAFMC) met on 25-25 July 2012 to review stock assessment information and develop acceptable biological catch (ABC) recommendations for four species under the management purview of the MAFMC: black sea bass, summer flounder, scup, and bluefish (Attachment 1). The SSC also discussed the 2012 RSA project selection process.

A total of 15 SSC members were in attendance on July $25^{\text {th }}$ and 14 SSC members on July 26th, which represented a quorum for each day as defined by the SSC standard operating procedures (Attachment 2). Also in attendance were representatives of the MAFMC, MAFMC staff, state biologists, and the public.

For each of the four species, MAFMC staff described the assessment history, the most recent survey and landings information, and comments from the Advisory Panel and Monitoring Committee. Scientists from the NEFSC were then asked to comment, followed by the SSC species lead on biology, the SSC species lead on socioeconomics, and members of the MAFMC/ASMFC Monitoring Committee. The public was then invited to comment. The SSC species lead for biology led the SSC discussion on selection of an ABC for the 2013 fishing year and beyond. Once the discussion was completed, the SSC provided the following consensus statements in response to the terms of reference provided by the MAFMC. All supporting materials are posted on the SSC's website.

## Bluefish (Excerpt taken from SSC Report)

1) The materials considered in reaching its recommendations:

- MAFMC Staff Report: Bluefish AP information document, dated June 2012. 14pp.
- Coastal Pelagic Working Group. 2012. Bluefish 2012 stock assessment update. Northeast Fisheries Science Center. 36pp.
- MAFMC staff memorandum from Jim Armstrong to Chris Moore, "Bluefish ABC and Management Measures for 2013," dated July 18, 2012. 9pp.
- MAFMC Staff. 2012. 2012 Bluefish fishery performance report. 3pp.
- Coastal Pelagic Working Group. 2012. 2012 bluefish stock assessment update. Northeast fisheries Science Center. Slide presentation. 25 slides.

2) The level (1-4) that the SSC deems most appropriate for the information content of the most recent stock assessment, based on criteria listed in the version of the proposed Omnibus Amendment submitted to the Secretary of Commerce:

The SSC designated the assessment as Level 3, because the structure of the assessment was unchanged from previous specification. There were no new estimates of uncertainties associated with maximum fishing mortality rate (OFL).
3) If possible, the level of catch (in weight) associated with the overfishing limit (OFL) based on the maximum fishing mortality rate threshold or, if appropriate, an OFL proxy:

The OFL is $17,521 \mathrm{mt}$ based on an $\mathrm{F}_{\mathrm{msy}}$ of 0.19 .
4) The level of catch (in weight) associated with the acceptable biological catch (ABC) for the stock:

The SSC recommends an ABC of $\mathbf{1 2 , 4 6 1} \mathbf{~ m t ~ ( 2 7 . 5 ~ m i l l i o n ~ l b ) ~ b a s e d ~ o n ~ t h e ~ c o n t r o l ~ r u l e ~ f o r ~ L e v e l ~}$ 3 assessments. The SSC used an assumed CV of the OFL with a lognormal distribution of $100 \%$, noting that the ratio of B/BMSY, based on mid-year estimates from 2012, is 0.8676 , and
that bluefish exhibit a typical life history. The SSC applied the Council's policy of $\mathrm{P}^{*}=0.341$. The projection is $71.1 \%$ of the catch at OFL.
5) Specify the number of fishing years for which the OFL and/or ABC specification applies and, if possible, identify interim metrics which can be examined to determine if multi-year specifications need adjustment prior to their expiration:

The SSC recommends a two-year specification of the ABC based on a constant fishing mortality rate, subject to review of an updated assessment in 2013. The SSC concerns are based on an estimated biomass currently below $\mathrm{B}_{\text {msy }}$, and that recruitment for the past three years has been the lowest in the time series. The fishing mortality rate ( $\mathrm{F}=0.132$ ), applied in 2013 and 2014, results in ABCs of $\mathbf{1 2 , 4 6 1} \mathbf{~ m t}$ ( 27.5 million pounds) and $\mathbf{1 2 , 2 7 3} \mathbf{~ m t}$ ( 27.1 million pounds), respectively.
6) If possible, the probability of overfishing associated with the OFL and ABC catch level recommendations (if not possible, provide a qualitative evaluation):

Based on the method applied, the probability of overfishing associated with the ABC is $34.1 \%$ in 2013, conditional on the assumed lognormal distribution of OFL with an associated CV $=100 \%$.
7) The most significant sources of scientific uncertainty associated with determination of OFL and $A B C$ :

- There is a significant level of missing data involved in the age-length keys (ALKs), which are critical for development of the catch-at-age matrix;
- Concern exists about the application of aggregate trawl calibration coefficients (ALBATROSS IV vs BIGELOW), and their influence on the selectivity pattern and results of the assessment. Also, some near shore areas previously sampled by the ALBATROSS IV are unavailable for sampling by the BIGELOW;
- Commercial discards are assumed to be insignificant, which may not be the case;
- Much of population biomass ( $\sim 40 \%$ ) is in the aggregated 6+ age group for which there is relatively little information;
- Questions have been raised about the uncertainty in the historical MRFSS estimates in general, and are particularly relevant here given the highly episodic nature of bluefish catches in the recreational fisheries coast wide; and
- The basis for the unusual bimodal selectivity curve used in the ASAP model is not well understood.

8) Ecosystem considerations accounted for in the stock assessment, and any additional ecosystem considerations that the SSC took into account in selecting the ABC, including the basis for those additional considerations:

No additional information pertinent to ecosystem considerations was explicitly included in selecting the ABC .
9) List high priority research or monitoring recommendations that would reduce the scientific uncertainty in the ABC recommendation:

- Evaluate amount and length frequency of discards from the commercial and recreational fisheries;
- Collect data on size and age composition of the fisheries by gear type and statistical area;
- Initiate fishery-dependent and fishery-independent sampling of offshore populations of bluefish during the winter months (consider migration, seasonal fisheries, and unique selectivity patterns resulting in the bimodal partial recruitment pattern; consider if the migratory pattern results in several recruitment events); and
- Develop bluefish index surveys (proof of concept), including abundance/biomass trend estimates for the offshore populations in winter.

10) A certification that the recommendations provided by the SSC represent the best scientific information available:

To the best of the SSC's knowledge, these recommendations are based on the best available scientific information.

# MEMORANDUM 

DATE: July 18, 2012

TO: Chris Moore, Executive Director

FROM: Jim Armstrong

## SUBJECT: Bluefish ABC and Management Measures for 2013

## Executive Summary

The latest bluefish assessment update (Attachment A) indicates that the bluefish stock is not overfished and that overfishing is not occurring. The estimate of stock biomass ( $292.972 \mathrm{M} \mathrm{lb} ; 132,890 \mathrm{mt}$ ) for 2011 is $90.37 \%$ of $\mathrm{B}_{\text {MSY }}\left(324,192 \mathrm{M} \mathrm{lb} ; 147,051 \mathrm{mt}\right.$ ) and $\mathrm{F}_{2011}$ ( 0.114 ) is estimated at $60 \%$ of $\mathrm{F}_{\text {MSY }}$ (0.19). Although the assessment characterizes the stock as below $\mathrm{B}_{\text {MSY }}$, the stock was officially declared rebuilt in 2009. The staff recommendation is for acceptable biological catch (ABC) $=27,472 \mathrm{M} \mathrm{lb}$ $(12,461 \mathrm{mt})$ which is consistent with the $\mathrm{P}^{*}$ method for a tier 3 assessment for a species with a typical life history, $\mathrm{B} / \mathrm{B}_{\mathrm{MSY}}$ ratio of 0.8676 , and $\mathrm{OFL}=17,521 \mathrm{mt}$. It is also recommended that $\mathrm{ACL}=\mathrm{ABC}$ and that commercial and recreational Annual Catch Targets (ACTs) are set that sum to ACL and ABC (no reduction for management uncertainty). After adjusting the ACTs for discards ( $3.610 \mathrm{M} \mathrm{lb;} 1,638$ mt ), the commercial and recreational total allowable landings (TALs) sum to $23.861 \mathrm{M} \mathrm{lb}(10,823 \mathrm{mt}$ ). The maximum allowable transfer of landings to the commercial fishery would result in a recreational harvest limit ( RHL ) of $14.503 \mathrm{M} \mathrm{lb}(6,579 \mathrm{mt})$ and a commercial quota of $9.356 \mathrm{M} \mathrm{lb}(4,244 \mathrm{mt})$ before adjusting for RSA. Staff recommends that up to $3 \%$ of the TALs ( $0.716 \mathrm{M} \mathrm{lb;} 325 \mathrm{mt}$ ) be made available to the Research Set-Aside (RSA) Program. Staff does not recommend any changes to the current recreational bag limit of 15 fish.

## Introduction

The specification of bluefish management measures is a joint process conducted annually by the MidAtlantic Fishery Management Council (Council) and the Atlantic States Marine Fisheries Commission's Bluefish Management Board (Board) with information and recommendations coming from their associated committees. The Commission's Bluefish Stock Assessment Sub-Committee (SASC) updates the bluefish assessment and conducts short term projections. The Council's Scientific and Statistical Committee (SSC) reviews assessment results and determines the acceptable biological catch (ABC) for the upcoming year. ABC is a reduction from the overfishing limit (OFL) based on the SSC's consideration of scientific uncertainty and serves as an upper limit on the catch target that management measures attempt to achieve. The Council's Bluefish Monitoring Committee (MC) develops and recommends specific coastwide (Maine - E. Coast Florida) management measures and allocations that will achieve target catch and make 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.

In this memorandum, information is presented to assist the SSC and MC in their roles in the specification process. Assessment update results are presented briefly, and a more detailed summary prepared by the SASC is distributed under separate cover (i.e., Attachment A).

## Catch and Landings

Given the importance of the recreational component of the bluefish fishery, the history of bluefish catches begins with the implementation of data collection via MRFSS in 1981 (Figure 1). From the early 1980s to the early 1990s, recreational landings declined by factor of about 70\% (avg. 1981-1983 = 89.140 M lb [40,433 mt]; avg. 1991-1993 = 25.824 M lb [11,727 mt]). Recreational landings continued to decline at a somewhat slower rate until bottoming out at $8.254 \mathrm{M} \mathrm{lb}(3,744 \mathrm{mt})$ in 1999. A rebuilding plan was implemented in 2000. Since then, recreational landings have grown to $14.069 \mathrm{M} \mathrm{lb}(6,382 \mathrm{mt}$; avg. 2009-2011). Additionally, 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 through the landings history. Commercial discards are treated as insignificant and are not estimated in the current assessment.


Figure 1. Total bluefish catch (mt) from 1981-2011.

## Regulatory Review (Current Management Measures)

For the current 2012 fishing year, bluefish ABC ( $32.044 \mathrm{M} \mathrm{lb} ; 14,535 \mathrm{mt}$ ) was based on $\mathrm{P}^{*}=0.384$ which was calculated using $\mathrm{OFL}_{2012}=18,752 \mathrm{mt}, \mathrm{B}_{2011} / \mathrm{B}_{\mathrm{MSY}}=0.9645, \mathrm{CV}$ for $\mathrm{OFL}=100 \%$, and life history = "typical".

Specific sources of uncertainty in the assessment that have been noted by the SSC include:

- Missing data in the age-length keys (ALKs)
- Calibration of Albatross vs. Bigelow trawl catches
- Previously sampled near shore areas unavailable to the BIGELOW.
- Commercial discards assumed insignificant
- Significant population biomass ( $\sim 40 \%$ ) aggregated in the 6+ age group
- Uncertainty in the MRFSS estimates, in general

According to the FMP, ACL is set equivalent to ABC and, given the historic underharvest of landings allowances by the fishery the Monitoring Committee concluded that no deduction to accommodate management uncertainty was needed, so $\mathrm{ABC}=\mathrm{ACL}=\mathrm{ACT}$. Specifically, the recreational ACT (83\%) is 26.597 M lb and the commercial ACT (17\%) is 5.448 M lb . Estimated discards for the 2012 fishery are the average observed discards for the past three years and were 4.350 M lb for the recreational fishery and zero for the commercial fishery for which discards are not estimated in the assessment and considered inconsequential. Based on the historic proportion of recreational and commercial landings for the period 1981-1989, $83 \%$ of the TAL is initially allocated as a recreational TAL and $17 \%$ is allocated as a commercial TAL. The resulting recreational TAL for 2012 is 22.247 M lb and the commercial TAL is 5.448 M lb . The FMP stipulates that if $17 \%$ of the TAL is less than 10.5 M lb $(4,763 \mathrm{mt})$, then a transfer of landings could be made to increase the commercial quota to a limit of 10.5 Mlb as long as the combined commercial and recreational landings would not exceed the TAL.

In the final rule that established the 2012 management measures an estimate of recreational harvest for 2012 (11,893 M lb; 5,394 mt) was reported. Accordingly, a transfer of $5.052 \mathrm{M} \mathrm{lb}(2,291 \mathrm{mt})$ to the commercial fishery was made resulting in an adjusted commercial quota of $10.500 \mathrm{M} \mathrm{lb}(4,763 \mathrm{mt})$ and an adjusted RHL of $17.776 \mathrm{M} \mathrm{lb}(8,059 \mathrm{mt})$. A final adjustment allowed for three research projects to utilize $491,672 \mathrm{lb}(223 \mathrm{mt})$ of bluefish RSA quota. The final commercial quota was $10.317 \mathrm{M} \mathrm{lb}(4,680$ mt ) and the final RHL was $17.457 \mathrm{M} \mathrm{lb}(7,919 \mathrm{mt})$.

## Biological Reference Points

Bluefish biological reference points were established in the most recent benchmark assessment ( $41^{\text {st }}$ SARC; NEFSC 2005). The reference points are based on output from the ASAP model, a forward projecting statistical catch-at-age model that is used to estimate current and historic population size and fishing mortality (Legault and Restrepo 1998).

Overfishing is defined as occurring above $\mathrm{F}_{\text {MSY }}$ is 0.19 , which was determined internally to the ASAP model. Overfishing is prevented by setting management measures based on ABC which is calculated using the Council's risk policy for a Tier 3 assessment ( $\mathrm{P}^{*}$ method).

The estimate of $\mathrm{B}_{\mathrm{MSY}}$ is $147,051 \mathrm{mt}(324.192 \mathrm{M} \mathrm{lb})$, and the level at which the stock is determined to be overfished ( $1 / 2 \mathrm{~B}_{\mathrm{MSY}}$ ) is $73,525.5 \mathrm{mt}(162.096 \mathrm{M} \mathrm{lb})$. $\mathrm{B}_{\text {MSY }}$ was estimated in the 2005 assessment using

SSB and recruit estimates from ASAP, fit externally to a Beverton-Holt stock-recruit model and subsequently using Thompson-Bell Yield and SSB/R.

## Stock Status and Projections

The current update uses MRIP instead of MRFSS data as recreational inputs for 2004 forward. The effect is that of minor shifts in annual catches, but no significant change in recreational estimates.

The ASAP estimate of fishing mortality for 2011 is 0.114 , well below the F threshold ( $\mathrm{F}_{\text {MSY }}=0.19$ ). This outcome supports the statement that for 2011 overfishing was not occurring. Relative to fishing mortality targets, model estimates of annual F have been below threshold levels since 1997 (see Figure 2 ), consistent with catches that support growth in population biomass.

Within the past 20 years, estimated population abundance peaked in 2006 at 94 million fish, but has declined since to 66 million fish in 2011 (Table 9 in Attachment A). The declines are due to model estimates of weak year classes beginning in 2009 with the 2011 year class being the lowest in the time series. Retrospective analysis of age zero estimates does not show a pronounced trend (Figure 7 in attachment A). Recreational catches of age zero fish have been lower in recent years (about 3\% of the rec catch in 2009-2011) than the long term average (around $18 \%$ in 1982-2008). Whether the lower catches reflect changes in the fishery or reflect population level trends is important in responding to the assessment update, but the distinction remains unclear. These low year classes comprise the age-1, 2 and 3 bluefish in 2012 which comprise about $75 \%$ of the landings.

The time series of estimated stock biomass has increased by about 171\% since 1996 (See Figure 3 below and Table 10 in attachment A). The estimate of total biomass for 2011 is $132,890 \mathrm{mt}(292.972 \mathrm{M} \mathrm{lb})$ which is $90.37 \%$ of $B_{\text {MSY }}$ and $180.74 \%$ of the $1 / 2 \mathrm{~B}_{\text {MSY }}$ threshold. As such, the stock is not overfished.


Figure 2. Total bluefish abundance and fishing mortality as estimated in ASAP model. F MSY is indicated by the solid horizontal line.


Figure 3. Time series of bluefish total mean biomass (000s mt) and spawning stock biomass (000s mt) relative to Bmsy target and threshold (Source: 2011 Assessment Update).


Figure 4. Age zero bluefish as a proportion of the recreational catch. Source: Assessment update data.

## ABC Recommendation

(Note: A concise presentation of the calculation of OFL, ABC, TAL and other management measures is provided in Table1. A diagram of the specification process is provided in Figure 5.)

The bluefish OFL for 2012 is the total catch at $\mathrm{F}_{\mathrm{MSY}}$ ( 0.19 ) which is estimated to be $38.627 \mathrm{M} \mathrm{lb}(17,521$ mt ). For 2012 the SSC calculated ABC based on the Council's P* policy. For 2013, it is assumed that the SSC will continue to apply $\mathrm{P}^{*}$ for calculating ABC and so the recommended ABC is consistent with that approach. The staff recommendation, therefore, is $\mathrm{ABC}=$ of $27.472 \mathrm{M} \mathrm{lb}(12,461 \mathrm{mt})$ based on $\mathrm{P}^{*}$ for a stock with typical life history, where the $\mathrm{B}_{2012} / \mathrm{B}_{\mathrm{MSY}}$ (mid-year) is 0.8676 , OFL $=17,521 \mathrm{mt}$, CV for OFL $=100 \%$ (Tier 3 assessment). This corresponds to $\mathrm{P}^{*}=0.341$ and is $71.1 \%$ of the catch at OFL.

## Other Management Measures

## Annual Catch Limit

Under the Omnibus Amendment, an annual catch limit (ACL) is set equal to ABC. Accordingly, the recommended ACL for bluefish for 2012 is $27.472 \mathrm{M} \mathrm{lb}(12,461 \mathrm{mt})$.

Table 1. Recommended bluefish management measures for 2013.

| Management Measure | LBS | MT | Basis |
| :--- | ---: | ---: | :--- |
| OFL | $38,627,193$ | 17,521 | per SSC |
| ABC | $27,471,802$ | 12,461 | P* |
| ACL | $27,471,802$ | 12,461 | = ABC |
| Mgmt Uncertainty | 0 | 0 | per MC |
| Comm Discards | 0 | 0 | from assessment |
| Rec Discards | $3,611,172$ | 1,638 | 2009-2011 MRFSS avg. |
| Comm ACT | $4,670,206$ | 2,118 | (ACL - Mgmt Uncert) * 17\% |
| Rec ACT | $22,801,596$ | 10,343 | (ACL - Mgmt Uncert) * 83\% |
| Comm TAL | $4,670,206$ | 2,118 | Comm ACT - Disc |
| Rec TAL | $19,190,424$ | 8,705 | Rec ACT - Disc |
| TAL (combined) | $23,860,631$ | 10,823 | Comm + Rec TAL |
| Expected Recreational Landings | $14,068,836$ | 6382 | 2009-2011 average |
| Maximum Transfer | $4,686,470$ | 2,126 | Calculated |
| pre-RSA Comm Quota | $9,356,676$ | 4,244 | Comm TAL + transfer |
| pre-RSA RHL | $14,503,955$ | 6,579 | Rec TAL - transfer |
| Comm RSA Deduction (3\%) | 280,700 | 127 | 3\% of Comm Quota |
| Rec RSA Deduction (3\%) | 435,119 | 197 | 3\% of RHL |
| Adjusted Comm Quota | $9,075,976$ | 4,117 | Comm Quota - RSA |
| Adjusted RHL | $14,068,836$ | 6,382 | RHL - RSA |

## ACT and TAL

The FMP initially prescribes $17 \%$ of the ACL to the commercial ACT and $83 \%$ to the recreational ACT (Table 1) which is based on the historic proportion of commercial and recreational landings for the period 1981-1989. Prior to this initial split, however, a reduction from ACL can be made in order to accommodate management uncertainty. The bluefish fishery has exceeded the combined (commercial + recreational) TAL once, in 2007 (Table 2) and has been below the TAL by an average of 5.2 M lb in the last five years (2007-2011; Table 2). Based on the historic performance of the bluefish fishery relative to specified management measures, no reduction from ACL is recommended such that the sum of the ACTs is equal to the ACL. A further reduction of the commercial and recreational ACTs to their respective TALs is calculated as ACT - discards for each fishery. No adjustment is made in calculating the commercial TAL since commercial discards are not currently estimated in the assessment and are assumed to be negligible. Average recreational discards for 2009-2011 ( $3.610 \mathrm{M} \mathrm{lb} ; 1,638 \mathrm{mt}$ ) result in a recreational TAL that is $19.190 \mathrm{M} \mathrm{lb}(8,705 \mathrm{mt})$. The combined TAL is $23.861 \mathrm{M} \mathrm{lb}(10.823 \mathrm{mt}$; Table 1).

## Quota Transfer and Initial RHL and Commercial Quota

The FMP further stipulates that if $17 \%$ of the combined TAL ( 4.056 M lb ) is less than 10.5 M lb then the commercial quota could be increased to as much as 10.5 M lb as long as the recreational fishery is projected to land less than $83 \%$ of the TAL ( 19.804 M lb ) for the upcoming year. Average recreational landings for 2009-2011 are $14.069 \mathrm{M} \mathrm{lb}(6,382 \mathrm{mt}$; Table 1) and this value is the basis for expected recreational landings in 2013. Because RSA will also be deducted (below), a constraint on the transfer would prevent the RSA-adjusted RHL from falling below expected recreational landings. Accordingly, a transfer of as much as $4.686 \mathrm{M} \mathrm{lb}(2,126 \mathrm{mt})$ to the commercial fishery could be made resulting in an initial commercial quota of $9.356 \mathrm{M} \mathrm{lb}(4,244 \mathrm{mt})$ and an initial RHL of $14.504 \mathrm{M} \mathrm{lb}(6,579 \mathrm{mt}$; Table 1). Note that this would comprise a roughly 3 M lb reduction from the 2012 RHL. The allocation of landings among the recreational and commercial fisheries is a Council-level decision and this memo only provides the maximum value for a potential transfer.

## RSA deduction and Adjusted RHL and Commercial Quota

An adjustment allowing for research projects to utilize up to $3 \%$ of bluefish TAL is recommended as provided by the FMP. Full utilization of this allowance would result in a reduction of the commercial quota to $9.076 \mathrm{M} \mathrm{lb}(4,117 \mathrm{mt})$ and a reduction of the RHL to $14.069 \mathrm{M} \mathrm{lb}(6,382 \mathrm{mt})$ consistent with the expected recreational landings for 2013. The final RSA amount will likely be less than the full $3 \%$ and further adjustment to the estimated recreational landings (to include 2012 rec landings data) will occur during rulemaking.

## Gear Regulations and Minimum Fish Size

A 15 fish recreational possession limit was first implemented in 2001. Prior to that a 10 fish possession limit was in place since 1990, when the FMP was first implemented. There does not appear to be a compelling reason to deviate from the existing possession limits (15 fish) for the 2013 fishing season.

Table 2. Summary of bluefish management measures, 2000-2012.

| Management Measures | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 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 |
| Comm. Quota (M lb) $\dagger$ | 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 |
| Comm. Landings (M lb) | 8.040 | 8.697 | 6.869 | 7.403 | 8.041 | 6.694 | 6.706 | 7.182 | 5.699 | 6.947 | 7.069 | 5.413 | - |
| Rec. Target $\dagger$ | 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 |
| Rec. Landings (M <br> lb) | 10.606 | 13.230 | 11.371 | 13.136 | 17.222 | 19.852 | 16.445 | 21.690 | 19.672 | 14.513 | 16.194 | 11.499 | - |
| Rec. Possession Limit | 10 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Total Landings | 18.646 | 21.918 | 18.234 | 20.537 | 23.197 | 23.207 | 23.849 | 28.662 | 24.868 | 20.573 | 25.111 | 16.581 | - |
| Overage/Underage <br> (M lb) | -16.682 | -15.923 | -8.632 | -16.756 | -8.653 | -7.646 | -0.948 | 0.900 | -3.288 | -8.783 | -4.153 | -10.712 | - |
| 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 |
| ASAP F estimate | 0.13 | 0.15 | 0.13 | 0.14 | 0.15 | 0.15 | 0.14 | 0.16 | 0.12 | 0.1 | 0.14 | 0.11 | - |

* includes RSA
$\dagger$ adjusted downward for RSA


## Atlantic Bluefish Flowchart



Figure 5. Specification process for Atlantic Bluefish as described in the Omnibus ACL/AM Amendment.

# 2012 Bluefish stock assessment update 

Coastal Pelagic Working Group
July 9th, 2012

Bluefish Atlantic coast commercial landings (mt)


## Proportion of Bluefish commercial landings - FL, NC, NJ, NY



## Bluefish commercial landings length frequencies



Bluefish Recreational Landings and Discards (number of fish)


2011 Recreational Bluefish landings and Discards by state


## Bluefish recreational landings length frequencies




Recreational bluefish 2010



## Bluefish discard length frequency - 2011 MRIP



## Bluefish total catch at age 2010-2011




## Bluefish indices of abundance



Updated Weight at age (kg)


Year

## Bluefish - selectivity in ASAP model



## ASAP model:

-Updated Catch at Age (e.g. improved age-length key including information from VA, NC, and MA., updated catch information, corrections in length data)
-Updated Weight at Age (e.g. annual values using semiannual survey length-weight equations)
-Model remains constant (e.g. same indices, fixed selectivity, parameter weighting ,etc.)

Observed vs. Model Predicted Bluefish catch


## Catch residuals



## Bluefish estimate of abundance and $F$ from ASAP



## Bluefish biomass estimates from ASAP



## Age 0 recruitment estimates for Bluefish



## SSB retrospective pattern



Fishing Mortality retrospective pattern


## Stock Abundance retrospective pattern



## Recruitment estimate retrospective pattern



## Probability distribution of 2011 bluefish F and SSB from ASAP




1000 iterations

## Bluefish Projection estimates

|  |  | Quota (000s mt) | F | Jan 1 <br> Abundance (000s) | Mean Biomass (000s mt) | $\begin{gathered} \text { SSB } \\ \text { (000s mt) } \end{gathered}$ | $\begin{gathered} \text { Yield } \\ \text { (000s mt) } \end{gathered}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| F status quo | 2012 | 14.54 |  | 71299.60 | 127.58 | 121.21 | 14.54 |
|  | 2013 |  | 0.114 | 73900.40 | 120.18 | 112.27 | 10.84 |
|  | 2014 |  | 0.114 | 76850.60 | 117.75 | 108.07 | 10.85 |


|  |  | Quota (000s mt) | F | Jan 1 <br> Abundance (000s) | Mean Biomass (000s mt) | $\begin{gathered} \text { SSB } \\ \text { (000s mt) } \end{gathered}$ | $\begin{gathered} \text { Yield } \\ \text { (000s mt) } \end{gathered}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| F0.1 | 2012 | 14.54 |  | 71299.60 | 127.58 | 121.21 | 14.54 |
|  | 2013 |  | 0.16 | 73900.40 | 118.13 | 110.26 | 14.93 |
|  | 2014 |  | 0.16 | 75124.00 | 111.78 | 102.38 | 14.42 |


|  |  | Quota (000s mt) | F | Jan 1 <br> Abundance <br> (000s) | Mean Biomass (000s mt) | $\begin{gathered} \text { SSB } \\ \text { (000s mt) } \end{gathered}$ | $\begin{gathered} \text { Yield } \\ \text { (000s mt) } \end{gathered}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Ftarget | 2012 | 14.54 |  | 71299.60 | 127.58 | 121.21 | 14.54 |
|  | 2013 |  | 0.17 | 73900.40 | 117.69 | 109.82 | 15.80 |
|  | 2014 |  | 0.17 | 74757.20 | 110.53 | 101.19 | 15.14 |



## Summary

-Simple update of 2010 model with 2011 data
-Not overfished
-Overfishing not occurring
-Model estimates show little variation or significant retro patterns
-Fixed selectivity parameters
-Still room for improved age information
-Limited length samples from the recreational discards and no estimates of commercial discards contribute to the uncertainty

## 2012 Bluefish Fishery Performance Report

The Bluefish Advisory Panel (AP) met from 9 AM - 11:30 AM June 27, 2012 in Baltimore, MD to develop a Fishery Performance Report (FPR) for consideration during the upcoming bluefish specification cycle. At the end of its meeting, the AP reviewed and approved the summary below as the FPR.

MAFMC Bluefish Advisers in attendance were: Fred Akers (NJ recreational), Arthur Brownell (NC recreational), Greg Hurley (VA recreational), and Arnold Leo (NY commercial). Also in attendance were Dan Swanson (NH recreational) of the ASMFC Bluefish AP, James Fletcher, Marc Hoffman, and Frank Folb.

## Recreational Fishery Issues

Concerns about the accuracy of MRFSS and MRIP data were voiced. There is concern that bluefish recreational effort and hence catches are significantly and systematically overestimated by a biased high estimate of overall effort. There is also great concern about the impact on recreational fisheries of inaccurate recreational catch estimates given that the FMP now includes AMs requirements (may be penalized due to overly high catch estimates). One remedy that was suggested would be to require greater individual reporting by recreational fishermen, but this is not endorsed by the entire AP. It was perceived that the final structure of the MRIP sampling program using the national registry is about the best that can be expected for management once it is finally implemented.

## Market / Economic Issues

Recent increases in price of fuel reduce the amount of time and the distance fishermen can search for bluefish and have been a major constraining factor in the commercial and recreational fisheries. Poor economic conditions overall have been such that fewer people can afford to go fishing, and thus, overall participation is reduced. Fuel costs were perceived as strongly affecting bluefish recreational effort and catch in 2011. Within the recreational sector, the economic recession has resulted in reduced fishing effort across all fishing modes (headboat, charter, private, and shore). Bluefish are not highly sought after compared to fluke, striped bass, etc., and many people are focusing their limited resources on more highly valued species.

In general, the perception is that although there seem to be plenty of bluefish effort is declining due to poor economic conditions.

## Environmental Issues

There was a general consensus that bluefish availability is highly variable from year to year and that this has always been the case.

If fish are moving offshore or staying offshore longer due to changes in nearshore water temperature, this would affect the availability of bluefish to recreational fishermen, but no trend is perceived. In North Carolina, bluefish are currently on the beach and there has been no change in inshore/offshore distribution of bluefish.

Changes in oceanographic conditions (wind and current patterns, water temperature) definitely affect bluefish distribution (primarily affecting availability) and there is concern that this is not currently factored in stock assessments.

The availability of forage greatly affects where bluefish will be found. An example is the limiting role of menhaden in the Chesapeake. Menhaden availability is constrained by their harvest for the vitamin industry. Demand for fish oil drives the catch of forage which then affects bluefish catch.

Accurate estimates of predation on young bluefish by spiny dogfish and striped bass needs to be better estimated and considered in stock assessments

Another environmental factor affecting the drop in bluefish commercial landings in Wanchese, North Carolina is the closure of Oregon Inlet. This probably decreased commercial fishing access/effort off NC. Although vessels have been given permission to land in VA, the low value of bluefish often does not justify the added expense of steaming to VA.

## Management Issues \& Management Induced Effort Shifts

Unlike many fisheries, the bluefish fishery is not characterized by management constraining landings since the recreational and commercial fisheries are consistently below harvest limits.

Fish health advisories may have negatively affected bluefish landings and increased the discard rate. This probably also contributes negatively to effort since fishing becomes more of a catch and release activity which has limited appeal.

At first glance, the 15 fish bag limit appears to be in conflict with fish advisory for personal consumption since 15 fish would be in excess of the recommended annual consumption (e.g., one meal per month for bluefish less than 24 inches and six meals per year for bluefish over 24 inches. The differential consumption recommendation may also drive effort toward smaller (<24 in) fish and increased discard rates for larger fish. If the retention of smaller fish and discard of larger fish is the norm, then assumptions about the size composition of discards in the assessment may be wrong.

## General Fishing Trends

The AP was asked for their perception about the size structure of bluefish last year. Members of the AP commented that in 2011, there had been larger than normal numbers of approximately 12 inch bluefish in the Chesapeake Bay. Additionally, it was pointed out that the abundance of small fish in the surf in North Carolina was no different than usual. 9-17 inch and 14-23 inch fish in 2011 would correspond to the 2009 and 2010 year classes. This subject was brought up
because in the 2011 assessment update, the 2010 year class was estimated to be the smallest in entire time series, the 2009 year class being the second smallest.

## Other Issues

There was a comment that sunset clauses need to be included in FMPs to allow for adaptation of management to changing fishery conditions. Additionally, it was suggested that any uncaught quota should not be allowed to roll into next year as a conservation measure.

## Bluefish AP Information Document - June 2012

## Management System

The Bluefish Fishery Management Plan (FMP) was implemented in 1990 establishing the MidAtlantic Fishery Management Council's (Council) management authority over the fishery in federal waters. Amendment 1, implemented in 2000, addressed stock rebuilding and created the Bluefish Monitoring Committee (MC) 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. Specifying bluefish management measures is a joint process conducted by the Council and the Atlantic States Marine Fisheries Commission's Bluefish Management Board (Board). The Council's Scientific and Statistical Committee (SSC) reviews assessment results, and the Advisory Panel's fishery performance report, and determines the acceptable 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 2012 were calculated based on the Council's recommendations.

Table 1. Recommended bluefish management measures for 2012.

| Management Measure | Value (lbs) | Basis |
| :--- | :---: | :---: |
| OFL | $40,944,251$ | per SSC |
| ABC | $32,044,190$ | per SSC |
| ACL | $32,044,190$ | = ABC |
| Mgmt Uncertainty | 0 | per MC |
| Comm Discards | 0 | from assessment |
| Rec Discards | $3,777,618$ | 2008-2010 MRFSS avg. |
| Comm ACT | $5,447,512$ | (ACL - Mgmt Uncert) * 17\% |
| Rec ACT | $26,596,678$ | (ACL - Mgmt Uncert) * 83\% |
| Comm TAL | $5,447,512$ | Comm ACT - Disc |
| Rec TAL | $22,819,060$ | Rec ACT - Disc |
| TAL (combined) | $28,266,572$ | Comm + Rec TAL |
| Transfer | $5,052,488$ | By definition |
| pre-RSA Comm Quota | $10,500,000$ | Comm TAL + transfer |
| pre-RSA RHL | $17,766,572$ | Rec TAL - transfer |
| Comm RSA Deduction (3\%) | 315,000 | 3\% of Comm Quota |
| Rec RSA Deduction (3\%) | 532,997 | 3\% of RHL |
| Final Comm Quota | $10,185,000$ | Comm Quota - RSA |
| Final RHL | $17,233,575$ | RHL - RSA |

## Bluefish Biology

The bluefish, Pomatomus saltatrix, is distributed worldwide, but in the western North Atlantic ranges 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 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. More recent studies suggest that spawning is a single, continuous event, but that young are lost from the middle portion resulting in the appearance of a split season. As a result of the bimodal size structure of juveniles, young are referred to as the spring-spawned cohort or summer-spawned cohort. In the MAB, the spring cohort appears to be the primary source of fish that recruit into the adult population.

## Status of the Stock

Bluefish stock status and biological reference points are based on output from the ASAP model, a forward projecting statistical catch-at-age model that was accepted by SAW/SARC reviewers in 2005. Overfishing is defined as occurring when fishing mortality ( F ) is above $\mathrm{F}_{\mathrm{MSY}}(0.19)$. Target stock size, in weight, is defined as $\mathrm{B}_{\mathrm{MSY}}$, currently estimated to be 324 M lb , and the level at which the stock is determined to be overfished ( $1 / 2 \mathrm{~B}_{\mathrm{MSY}}$ ) is 162 M lb .

A stock assessment update is still pending for the 2011 fishing year. The ASAP estimate of fishing mortality for 2010 is 0.14 , well below the F threshold ( $\mathrm{F}_{\mathrm{MSY}}=0.19$ ). This supports the statement that for 2010 overfishing was not occurring. Relative to fishing mortality targets, model estimates of annual F have been below threshold levels since 1997 (Figure 1), consistent with catches that support growth in population biomass.

Within the past 20 years, bluefish abundance peaked at 100 million fish (in 2008), declined slightly in 2009 to 86 million fish and further to 72 million fish in 2010. The declines are due to apparent weak 2009 and 2010 year classes, the two lowest in the time series. Retrospective analysis indicates no trend in updates to terminal year age-0 abundance estimates. These two year classes comprise age-1 and 2 bluefish in 2011 and will be age-2 and 3 bluefish in 2012. Selectivity on age 1 and 2 bluefish is $100 \%$ and $94 \%$, respectively, and $48 \%$ on age 3 bluefish.

The time series of estimated stock biomass has increased by about $176 \%$ since 1996 (Figure 2). The final estimate of total biomass for 2010 is $140,297 \mathrm{mt}(309.302 \mathrm{M} \mathrm{lb})$ which is $95.4 \%$ of $\mathrm{B}_{\text {MSY }}$ and $190.8 \%$ of the $1 / 2 \mathrm{~B}_{\text {MSY }}$ threshold. Therefore, the stock is not overfished.


Figure 1. Total bluefish abundance and fishing mortality as estimated in ASAP model. F msy is indicated by the solid horizontal line. (Source: 2011 Assessment Update)


Figure 2. Time series of bluefish total mean biomass ( 000 s mt ) and spawning stock biomass ( 000 s mt ) relative to Bmsy target and threshold. (Source: 2011 Assessment Update)

## Fishery Performance

The performance of the fishery relative to specified management measures is provided in Table 2. Except for 2007, the bluefish fishery has never exceeded the Council-recommended harvest limits. In 2007, the recreational fishery exceeded the recreational harvest limit by about 2 million lbs. In 2011, both the commercial and recreational fisheries greatly under-harvested bluefish. The recreational fishery landed 11.499 M lb compared to the 17.813 M lb RHL , and the commercial fishery landed 5.082 M lb compared to a quota of 9.375 M lb . Additionally, the commercial fishery is on track to underperform in 2012 compared to 2011 (Figure 3).

Table 2. Summary of bluefish management measures, 2000-2011.

| Management Measures | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 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 |
| Comm. Quota (M lb) $\dagger$ | 9.583 | 9.583 | 10.500 | 10.500 | 10.500 | 10.500 | 8.081 | 8.689 | 7.705 | 9.828 | 10.213 | 9.375 |
| Comm. Landings (M lb) | 8.041 | 8.688 | 6.863 | 7.401 | 7.994 | 7.045 | 6.955 | 7.499 | 5.968 | 6.990 | 7.069 | 5.082 |
| Rec. Target $\dagger$ | 25.745 | 28.258 | 16.365 | 26.793 | 21.35 | 20.353 | 16.718 | 19.073 | 20.451 | 19.528 | 18.631 | 17.813 |
| Rec. Landings (M lb) | 10.606 | 13.23 | 11.371 | 13.136 | 15.203 | 16.162 | 16.894 | 21.163 | 18.900 | 13.583 | 18.042 | 11.499 |
| Rec. Possession Limit | 10 | 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 |
| Overage/Underage (M lb) | -16.681 | -15.923 | -8.632 | -16.756 | -8.653 | -7.646 | -0.948 | +0.900 | -3.288 | -8.826 | -4.153 | -10.712 |
| 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 |
| 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 | - |

* Includes RSA
$\dagger$ RSA deducted

Figure 3. Comparison of 2011(top) and 2012 (bottom) commercial landings from the NMFS quota monitoring website: http://www.nero.noaa.gov/ro/fso/reports/reports_frame.htm


## Landings History

Given the importance of the recreational component of the bluefish fishery, the history of bluefish catches begins with the implementation of data collection via 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. A rebuilding plan was implemented in 2000. Since then, population size has increased and recreational landings have grown to 16.841 M lb (avg. 2008-2010). Additionally, 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. 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: 2011 Assessment Update).

## Recreational Fishery

Trends in directed fishing for bluefish from 1991 to 2010 are provided in Table 3. The lowest annual estimate of directed trips was 1.3 million in 1999 and the highest annual estimate of directed trips was 5.8 million trips in 1991. In 2010, anglers targeted bluefish in 1.7 million trips. Relative to total angler effort in 2010, bluefish were the primary target of recreational trips only about $4 \%$ of the time (Table 4).

Table 31. Number of bluefish recreational fishing trips, recreational harvest limit, and recreational landings from 1991 to 2012.

| Year | Number of <br> Fishing Trips | Recreational <br> Harvest Limit <br> (‘000 lb) | Recreational <br> Landings <br> (‘000 lb) |
| :---: | :---: | :---: | :---: |
| $\mathbf{1 9 9 1}$ | $5,811,446$ | None | 32,997 |
| $\mathbf{1 9 9 2}$ | $4,261,811$ | None | 24,275 |
| $\mathbf{1 9 9 3}$ | $3,999,487$ | None | 20,292 |
| $\mathbf{1 9 9 4}$ | $3,414,337$ | None | 15,541 |
| $\mathbf{1 9 9 5}$ | $3,409,966$ | None | 14,307 |
| $\mathbf{1 9 9 6}$ | $2,523,984$ | None | 11,746 |
| $\mathbf{1 9 9 7}$ | $2,021,713$ | None | 14,302 |
| $\mathbf{1 9 9 8}$ | $1,838,525$ | None | 12,334 |
| $\mathbf{1 9 9 9}$ | $1,316,939$ | None | 8,253 |
| $\mathbf{2 0 0 0}$ | $1,526,554$ | 25,745 | 10,606 |
| $\mathbf{2 0 0 1}$ | $2,156,043$ | 28,258 | 13,230 |
| $\mathbf{2 0 0 2}$ | $1,893,640$ | 16,365 | 11,371 |
| $\mathbf{2 0 0 3}$ | $2,100,057$ | 26,691 | 13,136 |
| $\mathbf{2 0 0 4}$ | $2,178,373$ | 21,150 | 15,828 |
| $\mathbf{2 0 0 5}$ | $2,511,295$ | 20,157 | 18,132 |
| $\mathbf{2 0 0 6}$ | $2,050,409$ | 16,473 | 16,752 |
| $\mathbf{2 0 0 7}$ | $2,636,900$ | 18,823 | 21,181 |
| $\mathbf{2 0 0 8}$ | $2,210,230$ | 20,414 | 18,900 |
| $\mathbf{2 0 0 9}$ | $1,532,445$ | 19,528 | 13,583 |
| $\mathbf{2 0 1 0}$ | $1,745,312$ | 18,631 | 16,166 |
| $\mathbf{2 0 1 1}$ | NA | 17,813 | 11,499 |
| $\mathbf{2 0 1 2}$ | - | 17.234 | - |
|  |  |  |  |

${ }^{\text {a }}$ Estimated number of recreational fishing trips (expanded) where the primary species targeted was bluefish, Maine Florida's East Coast. Source: Scott Steinback, NMFS/NEFSC, ${ }^{\text {b }}$ Atlantic coast from Maine through Florida's east coast, NA = Data not available.

Table 4. Angler effort (number of trips) that targeted bluefish in 2010, Maine through Florida.

| Mode | Total Angler <br> Effort | Angler Effort Targeting <br> Bluefish $^{\mathbf{a}}$ | Percent Angler Effort <br> Targeting Bluefish |
| :--- | ---: | ---: | :---: |
| Party/Charter | $1,634,404$ | 58,457 | $\mathbf{3 . 5 8 \%}$ |
| Private/Rental | $23,091,530$ | 624,894 | $\mathbf{2 . 7 1 \%}$ |
| Shore | $19,231,201$ | $1,061,961$ | $\mathbf{5 . 5 2 \%}$ |
| Total | $43,957,135$ | $1,745,312$ | $\mathbf{3 . 9 7 \%}$ |

${ }^{\text {a }}$ Total effort targeting bluefish as primary species.
Source: Scott Steinback NMFS/NEFSC.

## Landings by State

Recreational catch and landings by state for 2011 are provided in Table 5. The greatest overall catches (includes discards) were in North Carolina and New Jersey, both with a little over 3 million fish. The greatest harvest (retained catch) of bluefish occurred in New York with 3.1 million pounds. The lowest catches occurred in New Hampshire and Maine. Average weights, based on dividing landings weight by number for each state, suggest that bluefish size tends to increase toward the north along the east coast.

Table 5. MRIP estimates of 2011 recreational harvest and total catch for bluefish.

| State | Harvest |  |  | Catch |
| :---: | ---: | ---: | ---: | ---: |
|  | Pounds of <br> Fish | Number of <br> Fish | Average wt of <br> fish (lbs) | Number of <br> Fish |
| ME | 3,407 | 481 | 7.1 | 8,084 |
| NH | 18,393 | 2,118 | 8.7 | 3,478 |
| MA | $1,175,610$ | 224,501 | 5.2 | 822,274 |
| RI | 520,783 | 124,143 | 4.2 | 451,992 |
| CT | $1,752,582$ | 306,858 | 5.7 | $1,303,595$ |
| NY | $3,112,771$ | 927,493 | 3.4 | $2,525,590$ |
| NJ | $2,622,125$ | $1,149,558$ | 2.3 | $3,060,364$ |
| DE | 57,417 | 45,786 | 1.3 | 173,305 |
| MD | 312,884 | 259,286 | 1.2 | 667,609 |
| VA | 53,728 | 85,092 | 0.6 | 282,368 |
| NC | 993,543 | $1,152,105$ | 0.9 | $3,075,872$ |
| SC | 159,975 | 225,058 | 0.7 | 776,082 |
| GA | 1,661 | 2,742 | 0.6 | 72,657 |
| FL (East Coast) | 714,366 | 556,172 | 1.3 | $1,468,378$ |
| Total | $11,499,245$ | $5,061,393$ | 2.3 | $14,691,648$ |

Table 6 reflects MRFSS/MRIP-based estimates of catch and landings by mode (1999 through 2010) and indicates that the primary catch modes for bluefish are private or rental boats (52.05\%) and shore-based fishing (41.23\%). Only $6.72 \%$ of the catch came from party/charter boats for the same time period. In terms of landings, private and rental boats are still the most important mode (56.45\%); however shore-based fishing drops to $23.28 \%$ and party/charter boats increase to $20.27 \%$. Retention of bluefish, therefore, varies by mode and possibly the expense associated with a given mode.

Table 6. The percentage (\%) of bluefish caught and landed by recreational fishermen for each mode, Maine through Florida, 1999-2010.

| Mode | Catch <br> (Number A+B1+B2) | Landings <br> (Weight A+B1) |
| :--- | ---: | ---: |
| Private/Rental | $52.05 \%$ | $56.45 \%$ |
| Shore | $41.23 \%$ | $23.28 \%$ |
| Party/Charter | $6.72 \%$ | $20.27 \%$ |
| Total | $100.0 \%$ | $100.0 \%$ |

## Federally Permitted Vessels

Federal permit data indicate that a total of 971 recreational (party/charter) bluefish permits were issued in 2010. Among these, 502 vessels had both commercial and party/charter bluefish permits. According to VTR data, 443 party/charter vessels reported catching bluefish from Maine through North Carolina with 437 of these vessels retaining bluefish.

## Recreational Catches by Area

MRIP classifies catch into three area distinctions, inland, nearshore ocean ( $<3 \mathrm{mi}$ ), and offshore ocean ( $>3 \mathrm{mi}$ ). 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.


Figure 4. Bluefish recreational catch by area (1990-2011).

## Commercial Fishery

## Vessel and Dealer Activity

Federal permit data indicate that 2,765 commercial bluefish permits were issued in 2011 (Table 7). A subset of federally-permitted vessels was active in 2010 with dealer reports identifying 588 vessels with commercial bluefish permits that actually landed bluefish.

Of the 658 federally permitted bluefish dealers, there were 172 dealers who actually bought bluefish in 2011 (Table 7).

Table 7. Permitted and active bluefish vessels and dealers by state for 2011.

| STATE | PERM <br> VESSELS | ACTIVE <br> VESSELS | PERM <br> DEALERS | ACTIVE <br> DEALERS |
| :--- | ---: | ---: | ---: | ---: |
| MA | 1064 | 147 | 178 | 48 |
| NY | 287 | 131 | 128 | 42 |
| NJ | 379 | 92 | 103 | 9 |
| RI | 187 | 84 | 63 | 28 |
| NC | 155 | 69 | 34 | 22 |
| VA | 124 | 21 | 35 | 12 |
| CT | 47 | 13 | 7 | $<3$ |
| MD | 36 | 12 | 21 | $<3$ |
| NH | 118 | 9 | 14 | $<3$ |
| ME | 16 | 3 | 31 | $<3$ |
| PA | 14 | 37 | 1 | 7 |
| DE | 2765 | 588 | 11 | 0 |
| OTHER |  | 1 | 21 | 6 |
| TOTAL |  |  | 658 | 172 |

Note: States with less than 3 dealers reporting are not reported for confidentiality issues. Source: NMFS Permit Database and Dealer Weighout Data.

## Effort/Landings by Gear

NMFS VTR data indicate that a total of 1,383 commercial trips targeted bluefish (bluefish $\geq 50$ \% of total catch) in 2011 (Table 8). Landings from directed trips ( 1.600 M lb ) are approximately 31.5 \% of coastwide commercial bluefish landings for 2011 ( 7.290 M lb ). Gillnets accounted for $93 \%$ of the directed catch while hook gear accounted for $5 \%$.

Table 8. Commercial gear types associated with bluefish harvest in 2011.

| Commercial Gear Type | Trips | Landings <br> (lbs) | Pct <br> Total |
| :--- | ---: | ---: | ---: |
| GILL NET | 818 | $1,494,252$ | $93 \%$ |
| HOOK AND LINE | 545 | 72,404 | $5 \%$ |
| OTHER | 20 | 33,319 | $2 \%$ |
| TOTAL | 1,383 | $1,599,975$ | $100 \%$ |

## 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 40 statistical areas in 2011 (Figure 5). Seven statistical areas, however, collectively accounted for 75.1 \% of VTR-reported landings in 2011, with individual areas contributing $7 \%$ to $14 \%$ of the total. These areas also represented $69.6 \%$ 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 are shown in Table 9. 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 over 2.170 M lb landed.

Table 9. Top ports of bluefish landings (in pounds), based on NMFS 2010 dealer data. Since this table includes only the "top ports" (ports where landings of bluefish were $\mathbf{> 1 0 0 , 0 0 0} \mathbf{l b}$ ), it does not include all of the landings for the year.

| Port $^{\text {a }}$ | Pounds | \# Vessels |
| :--- | ---: | ---: |
| WANCHESE, NC | $2,170,087$ | 36 |
| BARNEGAT LIGHT/LONG BEACH, NJ | 830,001 | 26 |
| ENGELHARD, NC | 374,970 | 16 |
| HATTERAS, NC | 364,811 | 17 |
| POINT PLEASANT, NJ | 269,779 | 39 |
| BELFORD, NJ | 254,567 | 17 |
| POINT JUDITH, RI | 250,852 | 102 |
| CHATHAM, MA | 188,850 | 48 |
| MONTAUK, NY | 181,513 | 92 |
| GREENPORT, NY | 173,843 | 4 |
| HAMPTON BAYS, NY | 146,934 | 32 |
| PROVINCETOWN, MA | 129,354 | 12 |

${ }^{a}$ Ports with less than 3 vessels not reported for confidentiality issues.
Source: Dealer Weighout Data, as of November 11, 2011.

## Revenue

In 2010, commercial vessels landed about 7.290 M lb of bluefish valued at approximately $\$ 3.14$ million. Average coastwide ex-vessel price of bluefish was $\$ 0.43 / l \mathrm{~b}$ in 2010, a $10 \%$ increase from the previous year ( 2009 price $=\$ 0.39 / \mathrm{lb}$ ). The relative value of bluefish is very low among commercially landed species, approximately $0.30 \%$ and $0.18 \%$ of the total weight and value, respectively of all finfish and shellfish landed along the U.S. Atlantic coast in 2010. For states where bluefish were commercially landed, the contribution of bluefish to the total value of all finfish and shellfish varied by state in 2010 (Table 10). Bluefish ranged from less than $0.01 \%$ of total commercial value in Maine to 4.47 \% in North Carolina. Relative to total landings value, bluefish were most important in New York and North Carolina, contributing the largest percentage of ex-vessel value of all commercial landings in those states. This contribution did not change considerably from the previous complete fishing year (i.e., 2009).


Figure 5. Landings, ex-vessel value, and price for bluefish, 2000-2011. Source: NMFS unpublished dealer data. Prices are unadjusted.

Table 10. Percent contribution of bluefish to the commercial landings and value of all species combined from Maine through East Coast of Florida, 2010.

| State | Pounds of Bluefish as a <br> Percentage of all Species | Value of Bluefish as a <br> Percentage <br> of all Species |
| :---: | :---: | :---: |
| ME | $<0.00 \%$ | $<0.00 \%$ |
| NH | $0.03 \%$ | $0.01 \%$ |
| MA | $0.09 \%$ | $0.08 \%$ |
| RI | $0.29 \%$ | $0.24 \%$ |
| CT | $0.15 \%$ | $0.07 \%$ |
| NY | $1.50 \%$ | $1.26 \%$ |
| NJ | $0.29 \%$ | $0.33 \%$ |
| DE | $0.31 \%$ | $0.13 \%$ |
| MD | $0.08 \%$ | $0.05 \%$ |
| VA | $0.08 \%$ | $0.11 \%$ |
| NC | $4.47 \%$ | $1.41 \%$ |
| SC | $0.00 \%$ | $0.00 \%$ |
| GA | $0.00 \%$ | $0.00 \%$ |
| FL (East Coast) | $1.09 \%$ | $0.24 \%$ |
| Total | $0.30 \%$ | $0.18 \%$ |

Source: Commercial Fisheries Database, as of November 9, 2011; and South Atlantic General Canvass Data as of June 13, 2011.

## 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.

