Atlantic States Marine Fisheries Commission

Atlantic Striped Bass Management Board

February 4, 2014
10:15 a.m. – 12:15 p.m.
Alexandria, Virginia

Draft Agenda

The times listed are approximate; the order in which these items will be taken is subject to change; other items may be added as necessary.

1.	Welcome/Call to Order (*T. O'Connell)*	10:15 a.m.
2.	Board Consent	10:15 a.m.
	• Approval of Agenda • Approval of Proceedings from October 2013	
3.	Public Comment	10:20 a.m.
4.	Technical Committee Report *(C. Godwin)*	10:30 a.m.
	• North Carolina Albemarle Sound/ Roanoke River 2013 Stock Assessment	
5.	Consider Draft Addendum IV for Public Comment (*M. Waine)* **Action**	11:00 a.m.
6.	Consider 2013 FMP Review and State Compliance (*M. Waine)* **Action**	12:00 p.m.
7.	Other Business/Adjourn	12:15 p.m.

The meeting will be held at the Crown Plaza, 901 North Fairfax Street, Alexandria, VA 22314; 703-683-6000

Atlantic States Marine Fisheries Commission

MEETING OVERVIEW

Atlantic Striped Bass Management Board Meeting
Tuesday, February 4, 2014
10:15a.m. – 12:15p.m.
Alexandria, Virginia

Chair: Tom O'Connell (MD) Assumed Chairmanship: 02/12	Technical Committee Chair: Charlton Godwin (NC)	Law Enforcement Committee Rep: Kurt Blanchard (RI)
Vice Chair: Doug Grout	Advisory Panel Chair: Kelly Place (VA)	Previous Board Meeting: October 28, 2013
Voting Members: ME, NH, MA, RI, CT, NY, NJ, PA, DE, MD, DC, PRFC, VA, NC, NMFS, USFWS (16 votes)		

2. Board Consent

- Approval of Agenda
- Approval of Proceedings from October 2013 Meeting

3. Public Comment – At the beginning of the meeting, public comment will be taken on items not on the agenda. Individuals that wish to speak at this time must sign-in at the beginning of the meeting. For agenda items that have already gone out for public hearing and/or have had a public comment period that has closed, the Board Chair may determine that additional public comment will not provide additional information. In this circumstance, the Chair will not allow additional public comment on an issue. For agenda items that the public has not had a chance to provide input, the Board Chair may allow limited opportunity for comment. The Board Chair has the discretion to limit the number of speakers and/or the length of each comment.

4. Technical Committee Report (10:30 – 11:00 a.m.)

Background

- North Carolina completed a 2013 stock assessment for the Albemarle Sound/ Roanoke River stocks (**Supplemental Materials**).
- Note this is a stock specific assessment conducted within North Carolina and is separate from the Coast-wide stock assessment recently approved for management use in October 2013.

Presentations

- NC Stock Assessment Overview by C. Godwin

Board Actions for Consideration

- Accept North Carolina stock assessment for management use

5. Consider Draft Addendum IV for Public Comment (11:00 – 12:00 p.m.)

Background

- The 2013 Striped Bass Stock Assessment recommended changes to the fishing mortality reference points to be more internally consistent with the spawning stock biomass reference points.
- The Board initiated development of a draft addendum to consider changes to the biological reference points in October 2013 (**Supplemental Materials**).

Presentations

- Overview of Draft Addendum IV for Public Comment by M. Waine

Board Actions for Consideration

- Approve Draft Addendum IV for Public Comment.

6. Consider 2013 FMP Review and State Compliance (12:00– 12:15 p.m.) Action

Background

- State Compliance Reports are due on June 15 (**Briefing CD)**
- The Plan Review Team reviewed each state report and drafted the 2013 FMP Review (**Briefing CD**)

Presentations

- Overview of the 2013 Fishery Management Plan Review by M. Waine

Board actions for consideration at this meeting

- Accept the 2013 Fishery Management Plan Review

7. Other Business/Adjourn

DRAFT PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

ATLANTIC STRIPED BASS MANAGEMENT BOARD

The King & Prince Beach and Golf Resort
St. Simons Island, Georgia
October 29, 2013

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Adjournment 42

INDEX OF MOTIONS

1. **Approval of Agenda** by consent (Page 1).

2. **Move to accept the benchmark stock assessment and peer review report for management use** (Page 26). Motion by Pat Augustine; second by Paul Diodati. Motion carried (Page 27).

3. **Move to develop an addendum to adopt the new biological reference points as determined by the 2013 benchmark assessment** (Page 31). Motion by Pat Augustine; second by Loren Lustig.

4. **(SUBSTITUTE MOTION): Motion to substitute to develop an addendum to adopt the new biological reference points for the coastal fishery as determined by the 2013 benchmark assessment, as well as biological reference points for the Chesapeake Bay and Albemarle/Roanoke stocks, and to implement a 28-inch minimum size and one fish daily limit for coastal recreational fisheries with an equivalent reduction for coastal commercial quotas for implementation in 2014** (Page 32). Motion by Paul Diodati; second by Ritchie White.

5. **Move to divide the question to address the biological reference points and the management measures in separate motions** (Page 34). Motion by Pat Augustine; second by Roy Miller. Motion carried (Page 35).

6. **Divided Question #1**: **Move to substitute to develop an addendum to adopt the new biological reference points for the coastal fishery as determined by the 2013 benchmark assessment, as well as biological reference points for the Chesapeake Bay and Albemarle/Roanoke stocks**. Motion carried (Page 35).

7. **Divided Question #2**: **Move to implement a 28-inch minimum size and one fish daily limit for coastal recreational fisheries with an equivalent reduction for coastal commercial quotas for implementation in 2014**. Motion was defeated (Page 40).

8. **(MAIN MOTION): Motion to develop an addendum to adopt the new biological reference points for the coastal fishery as determined by the 2013 benchmark assessment, as well as biological reference points (fishing mortality) for the Chesapeake Bay and Albemarle/Roanoke stock** (Page 40). Motion by Pat Augustine; second by Dennis Abbott. Motion carried (Page 40).

9. **Move to initiate an addendum to develop a range of management measures that reduces fishing mortality to at least the fishing mortality target with implementation in January 2015** (Page 40). Motion by Pat Augustine; second by Dennis Abbott. Motion carried (Page 42).

10. **Motion to adjourn** by consent (Page 42).

ATTENDANCE

Board Members

Patrick Keliher, ME (AA)
Rep. Walter Kumiega, ME (LA)
Steve Train, ME (GA)
G. Ritchie White, NH (GA)
Doug Grout, NH (AA)
Dennis Abbott, NH, proxy for Sen. Watters (LA)
Jocelyn Cary, MA, proxy for Rep. Peake (LA)
Paul Diodati, MA (AA)
Dan McKiernan, MA, Administrative proxy
Bill Adler, MA (GA)
Robert Ballou, RI (AA)
David Borden, RI, proxy for B. McElroy (GA)
Rick Bellavance, RI, proxy for Sen. Sosnowski (LA)
Rep. Craig Miner, CT (LA)
David Simpson, CT (AA)
Lance Stewart, CT (GA)
James Gilmore, NY (AA)
Sen. Phil Boyle, NY (LA)
Pat Augustine, NY (GA)
Russ Allen, NJ, proxy for D. Chanda (AA)
Tom Fote, NJ (GA)
Adam Nowalsky, NJ, proxy for Asm. Albano (LA)
Leroy Young, PA, proxy for J. Arway (AA)
Loren Lustig, PA (GA)
Mitchell Feigenbaum, PA, proxy for Rep. Vereb (LA)
Bernie Pankowski, DE, proxy for Sen. Venables (LA)
Roy Miller, DE (GA)
David Saveikis, DE (AA)
John Clark, DE, Administrative proxy
Tom O'Connell, MD (AA)
Russell Dize, MD, proxy for Sen. Colburn (LA)
Bill Goldsborough, MD (GA)
Jack Travelstead, VA (AA)
Rob O'Reilly, VA, proxy for J. Travelstead (AA)
Cathy Davenport, VA (GA)
Kyle Schick, VA, proxy for Sen. Stuart (LA)
Bill Cole, NC (GA)
Mike Johnson, NC, proxy for Sen. Jenkins (LA)
Louis Daniel, NC (AA)
Michelle Duval, NC, Administrative proxy
Martin Gary, PRFC
Steve Meyers, NMFS
Mike Millard, USFWS

(AA = Administrative Appointee; GA = Governor Appointee; LA = Legislative Appointee)

Ex-Officio Members

Alexei Sharov, Technical Committee Chair
Kelly Place, Advisory Panel Chair

Staff

Robert Beal
Toni Kerns
Kirby Rootes-Murdy
Mike Waine
Pat Campfield

Guests

Nancy Addison, GA, Gov. Appt
Pete Himchak, NJ DFW
Lloyd Ingerson, MD DNR
Mike Luisi, MD DNR
Lynn Fegley, MD DNR
Ken Hastings, Mason Springs Conservancy
Charles Lynch, NOAA
Tom Hoopes, MA DMF
David Pierce, MD DMF
Nicola Meserve, MA DMF
Arnold Leo, E. Hampton Baymens Assn.
Kyle Overturf, CT DEEP
Phil Langley, PRFC
Ed O'Brien, Chesapeake Beach, VA
Raymond Kane, CHOIR
Patrick Paquette, MA Striped Bass Assn.
Vince Ringgold, MSSA
Lauren Latchford, Duke Univ.
Kelly Denit, NMFS
Joseph Gordon, PEW Trusts
Ross Self, SC DNR
Bill Sheldon, Woolrich, ME

The Atlantic Striped Bass Management Board of the Atlantic States Marine Fisheries Commission convened in the Lanier Ballroom of The King and Prince Beach & Golf Resort, St. Simons Island, Georgia, October 29, 2013, and was called to order at 8:30 o'clock a.m. by Chairman Thomas O'Connell.

CALL TO ORDER

CHAIRMAN THOMAS O'CONNELL: Welcome, everybody. My name is Tom O'Connell. I'm the Maryland representative that chairs the Striped Bass Management Board Meeting. We have a meeting that is probably going to last until lunchtime, so we're going to get started and work through the agenda items as expeditiously as we can.

APPROVAL OF AGENDA

CHAIRMAN O'CONNELL: Everybody should have an agenda. Looking at the agenda, we have got a couple of major topics today being the stock assessment review, discuss whether or not there needs to be a management response to those, and the compliance reports. Does anybody have any comments or additions to the agenda? Seeing none; the agenda will stand approved.

APPROVAL OF PROCEEDINGS

CHAIRMAN O'CONNELL: You should have received the proceedings for the August 2013 Striped Bass Board Meeting. Are there any comments to those proceedings? Seeing none; those will stand approved as well.

PUBLIC COMMENT

CHAIRMAN O'CONNELL: We're at the public comment period. Nobody has signed up from the public, but I will ask does anybody in the public want to make a comment for items that are not on the agenda at this time?

STRIPED BASS STOCK ASSESSMENT REPORT

CHAIRMAN O'CONNELL: All right, moving right into Agenda Item Number 4 is the Striped Bass Stock Assessment Report. This is going to be I think a tag team with Gary Nelson and Alexei. I will hand it over to Gary at this time.

DR. GARY A. NELSON: Good morning, everyone. I'm going to just take you through some of the things that we did this time to the benchmark stock assessment. We made some changes to the model and to the data sets that we have used in the past, so I will just review those and review some of the results.

For the benchmark assessment, we had done some work where, as you will see in the document, we tried to increase some of the model complexity to account for some differences we thought were occurring due to selectivity differences between like Chesapeake Bay and the coast. We had to go back and try to split the historical data into regions.

When we did that, there was actually some mistakes that been made that we corrected from 2004 to 2012. Actually MRIP had re-estimated all the recreational estimates, so we had to change and update all the information with those new changes. The time series that is actually available now is different from the one that has been available in the past. For this assessment, for the recreational data, the way we calculated dead releases, we actually went with the new release mortality estimate of 0.09, which is from the Diodati and Richards' '96 paper. We had originally used 0.08, and that was the preliminary estimate of the Diodati and Richards' paper that we just never changed, so we did some significant updates this time.

Commercial landings data all came from the states. All the data that we used in the benchmark were preliminary, and there were some changes. I will show you some of the differences in the landings between the benchmark and then what we used in the final update. Of course, we calculate the commercial discards the same way although we had to re-estimate all the commercial discards back to 2004 because of the changes in the MRIP estimates.

We also updated the release mortality for hook and line to 0.09 instead of using 0.08. Then we

did some of the same things that we normally do is the states apportion their catches and age classes using scales. Again, the benchmark used preliminary data for 2012; and the update, which I believe everyone has, is using the final 2012 data. I will show you some of the changes that occurred.

This graph just shows the percent changes in the harvest. In the upper left-hand corner is the percent change between the final and the preliminary data. The yellow is the estimate for releases, and then the red is for harvest. You can see there were not a lot of great changes between the preliminary and the final except for Maryland, which jumped up about 15 percent. You can see that big red bar.

The commercial harvest only changed a little bit. New York was the only one that changed their final estimates. Then the commercial discards; because of the changes in MRIP and an error that was made, the commercial discards increased between half to about 2 or 2.5 percent. This just shows a summary of the landings in metric tons that were landed by the commercial fishery; and then also the recreational fishery, which is in the red.

You can see that the commercial landings have been pretty much stable since 1998 or so. The red line being the recreational harvest peaked about 2006; has been variable but declining since. This slide just shows the coast-wide removals broken down by mortality sources. The blue here is our estimates of the recreational dead releases. The red is the recreational harvest.

Black is the commercial discards and the yellow is the commercial harvest. You can see that most of the removals are made up of the recreational dead and recreational harvest fishes, and that is about 55 percent of the removals are by the recreational fishery. As I mentioned before, for this assessment we actually split and modeled regional data because we were trying to improve the selectivity estimates.

There is a big difference in selectivity between the Chesapeake Bay and the coast. We essentially modeled the data as fleets, having the Chesapeake Bay as a fleet and then the coast as a fleet. Because we couldn't split out the commercial discards into regions of the 2003 and prior data, we had to model that as a separate fleet.

You can see this slide just shows the recreational discards in dark blue; the coast in gray; and the Chesapeake Bay numbers in red. As you can see, the coast is harvesting a lot more than the Chesapeake Bay. As you can see, the total trend here has been declining since about 2006. I am just going to show you some of the trends that have occurred in the harvest data from the MRIP estimates. This slide shows three states, Massachusetts, Maine and New Hampshire. Maine is in the red, Massachusetts in yellow and New Hampshire is in blue.

You can see for Maine harvest has declined since about 2007 or so, and it has been pretty low since. Massachusetts has been bouncing around. It went down a bit in 2011 and has bounced back up in 2012. New Hampshire jumped up in 2011 and is back down, but it has been pretty variable and had low catches during the 2007 to 2009 period.

This slide is showing the harvest for New York, which is in red; Rhode Island in yellow; and Connecticut in blue. New York has been increasing but kind of variable the last few years and did decline in 2012. Rhode Island has been bouncing around until about 2007, and so it went down a bit and has been at a lower level. Connecticut peaked around 2006 and has declined, but it has been variable the last few years.

The state of New Jersey is in the red; Maryland in blue; and Delaware in yellow. New Jersey did decline after 2006, increased a little but dropped down in 2012. Maryland peaked in about 2008 and has declined a little bit and dropped in 2012. Delaware had declined after 2008, I think, and has increased a little bit in 2012.

Then for Virginia and North Carolina, Virginia had declined significantly since about 2006; so

has North Carolina, but starting back in 2005 they increased a little bit in the last few years, and then in 2012 there was no recreational harvest in North Carolina, according to MRIP. I am going to show you just the release numbers. These tend to be the small fish because of the size regulations.

Again, Maine is in red, Massachusetts is in blue, New Hampshire is in yellow. You can see around 2005 and 2006, in all three states the number of released fish have dropped significantly and are still pretty low in 2012. For Connecticut in the blue, they have also dropped significantly. Rhode Island, they started about 2006 and they also show the same trend.

New York had dropped a bit – actually dropped a lot from 2011 to 2012. New Jersey, again, the same trend, about 2006 was the peak and the releases have dropped down to the lowest point – well, not the lowest point but lower in 2012. Maryland, also, although they saw an uptick in 2012, which I think is the 2011 year class.

Then Delaware peaked about 2008 or so and has been low and then went up a little bit in the last few years. Then Virginia again peaked in like 2007 or so and it has been low since then. North Carolina, basically the same trend as their harvest; there were essentially no releases in 2012 estimated by the MRIP Program.

This slide just shows you the age composition of the total removals. All I did here was just highlight some of the strong year classes from the Chesapeake Bay. If you look at this last graph in 2012, essentially we haven't had any really strong year classes indicated in the catch, comparing it to the young-of-the-year index from Maryland. In 2012 the peak age in the catch was about age five.

As I mentioned before, we split the data out this time into regions; Chesapeake Bay and then the coast. This just shows the age composition over time, going from 1982 up to 2012. You can see how the progression of the age structure has occurred over time where the larger fish comprised the total catches in the Chesapeake Bay in the last decade or so; or the composition has been increasing.

The coast has been a bit variable. We have always caught large fish; but if you can look down here at the bottom, you can see these ages filling in as time has occurred, so the age structure on the coast has been expanding, essentially, over time. This just shows the age structure for the commercial discards.

Commercial discards are made up of a lot of discards from the Chesapeake Bay, so this looks very similar to the Chesapeake Bay. Smaller fish are being discarded, but over time some of the larger and older fish are being discarded, also. Okay, just to update on some of the indices this time around; historically we have dropped – we used to have several fisheries-dependent indices.

Massachusetts, we used to develop a commercial CPUE index, but since 2008 or so we have dropped it because we determined that it is really not reflective of abundance. It was more of availability of the fish. This time around we dropped the Connecticut Recreational CPUE because the new person who does it hasn't been able to duplicate the index that was done in the past, and we believe that there was some double-counting since some of the MRFSS stuff was used to develop the index, so we got rid of that.

This time around we also included the Virginia Pound Net Index, which we had originally dropped back in 2007, I think. VIMS had submitted a paper to get us to reinstitute that, so the committee had decided to include that in the assessment this time. Overall, there were essentially 14 indices included.

We have an index we developed from the MRIP data; the Connecticut Trawl Survey. We have the NMFS Trawl Survey, but that we only used up to 2008 because they changed their vessel, and they no longer sample the inshore strata where they used to catch striped bass; so that ends in 2008.

We have the New Jersey Trawl Survey; the New York Ocean Haul Survey, which ended in 2006,

if I remember correctly. We still include that but there are no data after 2006. We have a Delaware Electro-fishing Survey, which is done in the Delaware River; the New York Young-of-the-Year Survey; New York Western Long Island Sound Age One Survey; New Jersey Young of the Year; Virginia Young of the Year; Maryland Young of the Year and Age One Survey.

We have a spawning stock index from the Maryland Gill Net Survey, and then we also include now the Virginia Pound Net Survey. This just shows some of the trends. On the left here are the fisheries-dependent indices. This should be over here. This is the MRIP Index showing how this index peaked about 2000 and has been declining and bouncing; but after about 2006 it has been going down. The Virginia Pound Net has been variable.

This is the New York Ocean Haul Survey; again, it only goes out to 2006. The Connecticut Trawl Survey has been showing a decline. The New Jersey Trawl had shown a decline also in the last few years, and then a bump-up in 2012. The Delaware Electro-fishing Survey has been kind of variable, but down since the beginning of the time series. The Maryland Gill Net Index, which is a measure of spawning stock biomass, has been variable but slightly down over time.

This last index is the NMFS Trawl Survey, which ended in 2008. Then the young of the years – I know these are messy, but things to out is this the Maryland Young-of-Year Index showing the very low 2012 value with the high at 2011. Also seen in Virginia right there; that's the 2011 and 2012; and then New York's young of the year. New Jersey has been down a bit in 2012; New York peaked in 2011 and it has been down a bit – so some general patterns.

Okay, for the modeling we used the same type of models, the forward-projecting statistical catch at age. We essentially estimate recruitment in age one in each year, the fully recruited fishing mortality. We have selectivity patterns that we estimate in four regulatory periods because regulations have changed.

We estimate all the coefficients for the indices that are used to tune the model; and also selectivity for each of the surveys that had age composition. Again, we split the data into fleets. The Chesapeake Bay, the coast commercial discard; this improved the estimates of selectivity and it provided a partial F that you could just add together to get the total.

This time around we actually used an age-specific natural mortality. Instead of just assuming a constant 0.15, we developed a relationship between age and natural mortality that we got from literature and also tagging data estimates of natural mortality. At age one we had an estimate of 1.13; and then from age seven and on it is still 0.15.

We're presenting now in these slides I'll show you just fully recruited fishing mortality instead of the old average F at ages eight to eleven since we have split the data up into fleets. This slide just shows the estimates of fully recruited F for the different regions. Down on the bottom here is the F for the commercial discards.

This is the F for the Chesapeake Bay. This is the F for the coast. You can't really sum these up because the fully recruited F is different between the Bay and the coast because of the selectivity pattern, but you can sum the fishing mortality at age across the areas to get the total. This is what the total is and the total fully recruited F; so this is the pattern.

The estimate in 2012 – and these are all for the updated data, the final MRIP estimates – is 0.2; so you can see that F has been declining since about 2006. This is basically the total I showed you but in a different manner. The dotted lines are the 95 percent confidence intervals; and again our current F in 2012 was 0.2.

This just shows the estimates. The upper graph is the estimates of age one plus; so the abundance in numbers for all the ages with the abundance projected one year ahead based on using the 2012 estimates. Using the 2012 young-of-the-year indices estimates, you can see that because of the low recruitment we had, it has declined up through 2010, and then has

increased because of the 2011 year class and then it is expected to drop because of the low 2012 Young-of-the-Year Index.

Here is the age eight-plus, essentially the large fish, showing a decline since 2006 or so. It is hard to see, but there is a projection here that goes to about – 2013 it shows that the age-plus numbers will decline a little bit. This is the estimates of the female spawning stock biomass with the 95 percent confidence intervals, showing that SSB has been declining since about 2004 or so, and currently we're at about 57,000 metric tons.

This just shows a graph of the total biomass in the population peaking around 2000 and has been slowly declining. It did go up a little bit in 2012 because of the 2011 year class, which were age one in 2012. This just shows the overall recruitment estimates. Remember this is a combined stock model so this doesn't always reflect exactly what is going on in the Chesapeake Bay only, but you can see that the 2011 year class has shown to be fairly large compared to some of the historical estimates.

Retrospective; a retrospective analysis is just a way of looking at if you take away one year's worth of data, how would the new estimates compare to the ones made with the current year data. This just shows that for the fully recruited F, we tend to overestimate F in the current year, and on average it is about 12 percent. We overestimate F in the current year by 12 percent.

The female spawning stock biomass we tend to underestimate in the current year by 14 percent. This just shows if you peel the data back, you get how the estimates compare to the current estimates. It is about average, about 14 percent for the SSB and again 12 percent for the fully recruited F. I am going to hand this over to Alexei, and he is going to talk about the reference points.

MR. ALEXEI SHAROV: I will give Gary a break and I will talk a little bit about the reference points for striped bass. First we'll talk about the current reference points that we're using to date. Our biological reference points utilize the female spawning biomass and fishing mortality as principal metrics to judge the status of the stock and the fishery.

Each of these metrics, the spawning stock biomass and the fishing mortality, has a target and a threshold that we use to control the fishery. The general concept, just to remind you, we have the first vertical line, the threshold – so we have a minimum spawning stock biomass that we would like to maintain, that we don't want the spawning stock biomass to drop below that line and be in this area.

Once we cross that line, we call it overfished; the status of the stock is overfished. I have to remind the audience that the use of the terminology; when we say "overfished", that doesn't mean necessarily that we're in immediate danger. All that means is that our spawning stock biomass is below our selected threshold.

Depending on the level of uncertainty and depending on the level of risk that we're willing to take, that threshold line could be located in different places; and, therefore, for different species we may select the position of that threshold line according our ability and will to stay precautionary or less precautionary as our knowledge allows to do so.

In addition to the threshold, we have a target spawning stock biomass, which according to certain calculations we believe would be near optimum level, whichever optimum we define as either the biomass that provides the maximum yield. In this case it would be a spawning stock biomass that is equivalent to the maximum sustainable yield.

For the fishing mortality, we have a target fishing mortality. That is where, again, according to theoretical calculations we assume that we will get the maximum of the stock, the threshold line, the limit that we really don't want to cross; and once we cross it, we define this as overfishing. Generally, the ideal place is to be in this area with the smiley face.

Current reference points were defined in Amendment 6 as the threshold for the spawning

stock biomass was selected to be equal to the spawning stock biomass in 1995; so this is not a theoretically based value. This is the value picked empirically. The logic behind it was pretty solid. It was decided by all of us about 15 years ago that the spawning stock biomass of the stock in 1995 is an appropriate threshold because we believed that by 1995 we announced that the population has been fully restored.

We had already seen the population to reproduce successfully; the strongest probably in the modern history of striped bass recruitment of the 1993 year class. Therefore, this was a logical and reasonable selection of the SSB threshold. For the target – well, obviously, you would like to have a target somewhat larger than your threshold; so the target has been selected to be 25 percent larger than the threshold, so it is equivalent to 125 percent of the SSB threshold.

Accordingly, the last time we updated the reference points was at the peer review five years ago at the stock assessment workshop in Woods Hole. At that time the threshold spawning stock biomass was estimated to be equal to 36,000 metric tons and the target at approximately 46,000 metric tons.

Just to recap how the population performed regarding the current threshold, this vertical line represents the spawning stock biomass threshold. As you can see historically, the spawning stock biomass has been increasing. These are mostly earlier data points. The red dots here represent the 2005 through 2010 estimates of SSB and recruitment.

These are the values from the last assessment update prior to this year's review that used the existing reference points. With respect to the fishing mortality, we have also a threshold and target fishing mortality. The threshold fishing mortality was estimated as the Fmsy or fishing mortality that corresponds to the maximum sustainable yield.

The last time the technical committee derived this value, we've used four different stock-recruitment models to come up with an estimate of Fmsy. These were competing models which were producing different results. Therefore, the estimates of Fmsy vary quite a lot, depending on the choice of the recruitment model.

There was no consensus on one single model, so the solution was to use the average. Nonetheless, that has been accepted by peer reviewers in 2007; so our average Fmsy estimate was at 0.34, and that is what we have used until recently to judge the status of overfishing or not overfishing.

The target fishing mortality was also selected to be slightly lower than the threshold; so it was selected to be equal to 25 percent annual exploitation rate. With respect to the performance of the fishing mortality relative to the current reference point, based on the most recent update, is that slide shows you the trend in the fishing mortality versus the threshold, which is – I'm sorry, the target, which is dotted line, and the threshold, which is the red line.

The last update with the current reference points that you have seen about a year ago or so indicated that we were not overfishing and not overfished. Following this summer's peer review of the new benchmark assessment that Gary had presented to you this morning, there were some changes proposed.
No changes to the definition of the spawning stock biomass reference points were done; but the actual numbers have been changed, and I will tell you in a second why. We did propose to revise the fishing mortality rate reference points in such a way that we proposed to define the F target fishing mortality that we would like to stay at – and this would be the fishing mortality that in the long term would produce the spawning stock biomass equal to the SSB target.

Correspondingly, the F threshold would be the fishing mortality that would bring us to our selected SSB threshold. Why did we do this; why we felt that there was a need to make those changes. There were several reasons for that. Well, first of all, as I told you already, the estimates of the Fmsy that we used in the past were very sensitive to the stock-recruitment models that are being used.

Since we're not certain which one is the most suitable to striped bass, we don't know which one to pick. Depending on which one you pick, you would come up with quite substantial differences in terms of the fishing mortality level. The additional calculations that would investigate the current Fmsy of 0.34 indicated that this would be equivalent to approximately 20 percent of the spawning potential ratio, which to many of us seemed to be too low for the Fmsy.

The spawning potential ratio generally should be higher at the Fmsy. Then, again, because the simulations indicated that if we try to calculate the SSBmsy using stock-recruitment data, that SSBmsy would larger than our 1995 threshold. There was clearly a disconnect between the Fmsy as calculated based on a theoretical curve and the selected SSB level.

Therefore, the committee decided that we should change that and use long-term projections by drawing from empirical recruitment out of the model since 1990 and use average selectivity which would represent the effect of the fishery on the different age classes and will calculate fishing mortality which will exactly produce an SSB target and an SSB threshold – of course, exactly meaning generally in the long term.

What are the advantages? Well, the advantages would be that the 1995 SSB or spawning stock biomass would be robust and not dependent on model assumptions about stock-recruitment relationships. It also avoids managing to optimum yield for recreational species, meaning that traditionally we are managing to where it is Fmsy, which optimizes the total yield or biomass that is being taken from the population.

In the case of recreational species, it is probably not what necessarily we want to do. In the end this aligns the spawning stock biomass reference points with the fishing mortality target and threshold. If we maintain the fishing mortality at the target, we should on average maintain the SSB at the target and the same to the threshold.

Once we have done that, there are certain inputs that come into the calculation of these reference points. Those are the sex ratio, male to female, and we did not change that compared to the previous assessment. We kept the same maturity information. We revised the natural mortality, so the natural mortality has been increased for the younger ages, which generally works this way.

When you increase the natural mortality, you increase an estimated size of the population, which in turn leads to the reduction in the estimated fishing mortality, and you will see that in a second. We used the new statistical catch-at-age model. In the heart of the model was the Beverton-Holt Stock-Recruitment Model; and we also updated mean weights at age, which are not critical for the assessment but had to be updated.

These are the inputs that come into the calculation of reference points just to show you how things are changing as a result of that. This blue line continuing into the red line would be our understanding of the natural mortality at age; that is, we used it as a constant value of 0.15 for all age groups.

With the updated information, the natural mortality is believed to be much higher at the younger ages, and it declines rapidly and about by age seven it becomes equivalent to 0.15. The selectivity on the age classes has not changed much and therefore did not affect much of the reference point's calculation.

What does change and did change was the calculated spawning stock biomass, and that is a primary effect of increasing the natural mortality rate. Therefore, if more fish are dying at the same level of the harvest, there has to be more fish present in the water; therefore, the model calculates the SSB much higher than the previously used model.

This certainly shows very clearly in the estimated number of recruits. This is what the number of recruits that the previous model would calculate; and that is what the new values of recruitment would be using the new natural

mortality rates. Finally, we're coming to what in the end we have calculated. Let's start with the SSB threshold. Our SSB threshold was estimated at 57.9 thousand metric tons.

DR. NELSON: Those are wrong.

MR. SHAROV: Why?

DR. NELSON: Those are from the benchmark and not the update.

MR. SHAROV: I've updated them.

DR. NELSON: No.

MR. SHAROV: All right, Gary is telling me that my table includes the numbers we have used at the peer review in late July, and they were updated since with the 2012 data. The SSB limit, I have it here as 57.9 thousand metric tons. The updated one is 57.6 thousand metric tons. That is compared to 36,000 metric tons, which it used to be. The SSB target here we have at 72,380. The updated one is 72,023 metric tons.

MR. JOHN CLARK: Alexei, by limit do you mean threshold?

MR. SHAROV: Yes, threshold and limits are being used interchangeably. I should have used threshold. The fishing mortality target I have at 0.75 here; rounded out it is 0.18; and the F limit I have at 0.21 here; and it is 0.219. Well, truly, we're not measuring with the precision to three digits, obviously. The current fishing mortality is 0.2 and an SSB of 58.2. On the right, these are plus or minus standard errors; so these are essentially the 95 confidence limit intervals for those parameters.

Where we are in terms of the new reference points; well, the red vertical line is our new proposed SSB threshold; the green line is our target for the spawning stock biomass. The green dotted line is our new proposed target fishing mortality; and the red horizontal line is our threshold. This was supposed to represent the 2012 data point. It has to be moved a little bit; it has to be right on the border of the red vertical line here; just moved a little bit to the left, so we are at the border with it but barely touching it.

The reference points probably was the element of the stock assessment that has received the greatest attention at the peer review, but in the end the peer review members agreed with us that this empirical approach is probably the most logical; and if we were to go with the theoretical stock-recruitment curves, that there was too much sensitivity of the results depending on the choice of the model, and at that point this has to be an area of investigation.

For practical use the proposed approach in the end has been decided to be the best to go with. There are a couple of elements that might affect the actual numbers, as Gary mentioned. One is that we do have some retrospective bias, which we have to keep in mind when we use the reference points and compare with the current estimate on where we are.

There is also a potential bias and a desired correction if we will use in the future. We will be able to use in the future aging based on the otoliths versus aging based on the scales. This also tends to change somewhat the results of the status of the stock. Finally, if you do decide to adopt these reference points – at this point I understand this is what we propose and what has been endorsed by the peer review but it requires your action – I'll just remind you that these are coast-wide reference points.

Based on these, we have an F-based reference point specifically for the Chesapeake Bay as well as the Albemarle Sound and Roanoke, which are slightly lower and that the fishing mortality thresholds are slightly lower; so if you adopt those, those should be appropriately adjusted. This concludes my presentation on reference points.

CHAIRMAN O'CONNELL: Thanks, Gary and Alexei, for those excellent presentations. Would there be any objection to letting Patrick Campfield review the peer review results before we open it up for comment and discussion?

DR. NELSON: We've still got more.

CHAIRMAN O'CONNELL: You've got more? All right, we're still going on.

DR. NELSON: I'm just going to show you some of the results that Alexei was talking about. This is the current fully recruited F trajectory from the model compared to the threshold and target. In 2012 here you can see that we're below the threshold and above the target; so we're not overfishing. This is the female SSB trajectory. The horizontal line is the threshold, and you can see that our current estimate is pretty close to the threshold. Although the point estimate is not quite over, so theoretically based on the point estimate we're not overfished.

MR. CLARK: Excuse me, Gary, is that SSB where it would have been under the old model? I mean, is this a higher – your prediction of where SSB actually is, is higher than it was under the previous assessment for right now?
DR. NELSON: Yes. This is the new 1995 SSB level and this is the estimate for the current level. Does that make sense?

MR. CLARK: Yes, but we're much closer now to the threshold than we were using the update from the previous assessment?

DR. NELSON: Yes. This is a table just showing the probability of the 2012 SSB value being less than or equal to the current SSB reference point, the new reference point. If we were right on top of the – if our current SSB level is right on top of the SSB reference, the probability would be 0.5; and if the SSB went below that, then this number would increase above 0.5.

Based on the current model, we're almost right on top of the SSB reference point. However, it is kind of in vogue now to try and correct for the retrospective patterns we see; and if we do that, again we were underestimating SSB in the current year. If I correct for that 14 percent and adjust it, the probability of below the SSB reference point is only about 0.12.

The same thing with the fishing reference point – well, the issue with the reference point, we don't always have error, so I had to assume some different error around it. If we assume the reference point has no error, our current fishing mortality estimate being greater than or equal to that reference is 0.24; and with error it is 0.31.

But if we correct for the retrospective pattern of overestimating 12 percent, it drops down to 0.04 and 0.13. I am just going to show you some sensitivity runs. These are some of the results comparing the fully recruited fishing mortality and the SSB reference point between what we submitted for the benchmark, which is in red, and the update with the 2012 final data.

You can see just some slight differences between the two. The estimates in the patterns and the trends are pretty much the same. This upper graph is comparing our current updated assessment to the 2011 assessment, which is the last one. You can see that our trends in F are fairly close. The magnitude changed a little bit and our F is a little bit lower in the 2012 model.

The lower graph is the SSB estimate. You can see again because of the natural mortality changes that our SSB levels are a lot higher; and our trends, particularly in the last few years, have become steeper compared to the 2011 assessment. We also did some sensitivity runs – because we want to switch to otoliths, but we still don't have information from a lot of the states to do that, so we did some exercises where we looked at what would happen if we had a proper conversion matrix.

This just shows some of the results if you corrected the scale ages up to 13-plus – a 13-plus model compared to correcting the scales and you had an age 15-plus model, you get some differences where the scale bias-corrected models produce a higher F in some cases than the current model. The SSB becomes a lot higher; and the recruitment estimates in the lower graph become more variable.

The next one just shows comparing the current model with the age-specific natural mortality values to a base model with just a constant natural mortality, and you can see our base model produces lower F's and assuming 0.15 for

all ages. Then the SSB is a bit higher with the model that assumes a constant natural mortality. We're going to get into projections now. Essentially what we did was – and these are in the document – we looked at some simulations where we projected the abundance of the population forward in time to 2017. We essentially calculated a number of different things; the probability of the SSB over time going below the SSB reference point, the new reference point.

For the projections we used current selectivity pattern in 2012; and then for 2013 to 2017 we averaged the selectivity pattern from 2008 to 2012. We didn't assume any type of recruitment function. We just sampled the estimates of recruitment from 1990 to 2012. We did this thousands of times. We looked at different F's.

We also looked at changing – we also did projections where we changed the amount harvested over time to different levels. This is a projection showing what would happen to SSB if you fished at 0.2 over the time period, which is the current F. On the left is the SSB projection; the red is the median value for the thousand repetitions; and then this is the probability of going below the SSB reference point.

Again, anything below about 0.5, that means we're going way below. You can see if we just continue to fish over time, the SSB is going to drop down below the reference point, but it will start to slowly creep up after 2015; and that is primarily due to the 2011 year class coming in. You can see the probabilities here start to decline.

These are projections using constant F from 2014, the upper, and constant F from 2015 to 2017. There are slight differences here. Because we're not changing anything in 2014, the probabilities are lower. Again it still peaks in 2015; but it goes down a bit faster. If we start fishing at 0.18 in 2015, you're still going to get this peak in 2015 where you're below the reference point; but then it slowly goes back up.

This one just shows what happens if we fish at the current reference point of 0.219. You will see the SSB is declining, and it stays a bit below the reference point. There is a high probability of being below it; and then it is going to slowly creep down. The upper one was starting in 2014; and then starting in 2015, if we fished at 0.219, again it is going to peak in about 2015.

The probability of being below is going to peak in 2015 and then slowly the probability starts to decline. This just shows what would happen if we actually fished at the old reference point of 0.34. The SSB just tanks. This is starting in 2014. The probability goes up and it is 1 until 2017. We didn't go any farther than that.

If we started fishing at 0.34 in 2015, again the SSB just tanks; and again the probability of being below the reference point stays at 1. These are just showing some difference levels of F at 0.15. If you start in 2014, we get some quicker recovery. Starting in 2014 you can see the probability doesn't go as high; and the probability actually steeply drops after 2015.

It is pretty similar in 2015; there will be a peak when we will be below it, but then it quickly drops and the reference point starts to go above the – the fishing mortality starts – no, the SSB starts to go above the reference point quickly after 2015. These are just some other levels that if we dropped F down to 0.1; you get a quicker recovery. There is a lag if you start at 2015, but it drops pretty quickly after that.

Then we looked at some constant harvest scenarios. On the left are the median projections of SSB for three different levels of reduction. The purple here is status quo of the harvest that occurred in 2012. The blue here is a 20 percent reduction, and then the red is a 40 percent reduction. You can see the more you reduce, the quicker the SSB goes back up after 2015.

On the right is just the probability of being overfished. Again, it is similar to some of the other graphs which showed where is going to peak in 2015; and depending on the level of reduction, you will still get a drop. The probability of being below the threshold will

start to decline. This just shows for the same constant harvest scenario what the F patterns in the fully recruited fishing mortality would be.

The left just shows the pattern in F and the right is the probability of going over the F reference point. You can see, again, the same thing. This is starting in 2015; if you reduce the harvest – if there was a 40 percent reduction; you get a big drop in F. The dotted line here, by the way, is the F target. If you only dropped 20 percent, it only drops down a little bit.

But if you look at the probability here, we never really go below 0.5 of F being above the reference point; but if we reduce the harvest of these different levels, after 2015 things drop down pretty quickly. This is just looking at whether we implement the 20 percent reduction starting in 2014 or 2015. The blue is the 2015 and the red is 2014.

SSB is still going to decline; but then depending on where you start, you will get a different pattern in recovery. If you start in 2014, the SSB levels will be a bit higher and increasing a little bit faster than if you start in 2015. On the right are the F estimates starting in 2014 or '15; and you can see depending on where you start, if you started later, the dropping F, of course, would go down later.

People always say, well, how do you know the results from the statistical catch-at-age model are accurate? This slide just shows a comparison between the total mortality estimates that you can get out of the model compared to the total mortality estimates that we get out of the tagging data. The blue here is the average for the coast-wide tagging programs.

The red are the total mortality estimates from the producer areas; the Chesapeake Bay, the Delaware Bay and the Hudson River. You can see we're pretty much in the ballpark; the same trends over time and about the same levels of total mortality. Compared to the tagging data, it suggests that the statistical catch-at-age model is fairly accurate. That's all I have.

CHAIRMAN O'CONNELL: Thanks again, Gary and Alexei, for a great presentation and a lot of information. Pat.

MR. PATRICK AUGUSTINE: Excellent presentation! I have a question. In that chart about five or six back, when you talked about if we went to constant mortality for a period of time, to 2014, and then we'd see the SSB slow down a little bit; I guess the question that comes to mind is – first off, a lot of our folks on Long Island are concerned about another crash; do something immediately to reduce the pressure on the large fish.

I am wondering if you can recall what the actual status of the female population SSB was when we had the crash, when we had the moratorium. I tried to vaguely remember what it was, and I thought it was like 20 or 30 million pounds. It was a strange number; but I wonder if you can recall that. Somehow I think we need to make the public aware. There is a lot of emotion here; but the reality of it is that the board will take action to correct where we're going now, but nothing to compare against other than saying it is going to crash and we're going to go back to where we were.

If we can come up with the number about where the SSB was back then, '95, '94, '95, '96 compared to where we will be if we stay if we stay at – assume we stay where we are until 2015, that SSB might be 58, whatever that number is, and it is not going to get down in that danger zone where we're ultimately going to crash. I think it is important to get that information out to the public and on the record. If you could supply that, I would appreciate it.

CHAIRMAN O'CONNELL: Perhaps they can look at that information. I'll take one more question from Jim; and then I really think it would be beneficial for time management to get into the peer review.

MR. JAMES J. GILMORE, JR.: On those projections – and you may have said this, but what was the assumption on recruitment? Was that going to be level throughout the – you know, in every one of those projections, though,

there was essentially going to be – was there any suggestion that if there was an increase in recruitment, those projections would be better?

DR. NELSON: We used the recruitment values from 1990 to 2012 and just randomly drew those from that distribution; so it is about an average recruitment over time.

MR. SHAROV: But the SSB is not going to be.

DR. NELSON: Yes, the SSB wouldn't really be impacted by those until after like 2017 because of the 2011 – that's why the SSB slowly increases regardless of what we did because the 2011 year class is working its way through into the SSB level.

CHAIRMAN O'CONNELL: I imagine we may be asking to pull up those slides again as we consider a management response later in the agenda. Let's go forward and let Patrick Campfield give a presentation on the peer-reviewed stock assessment.

PRESENTATION ON THE PEER-REVIEWED STOCK ASSESSMENT

MR. PATRICK A. CAMPFIELD: Mr. Chairman, I will briefly summarize the findings from the independent peer review of the striped bass stock assessment. The striped bass assessment was reviewed through the Northeast Science Center's Stock Assessment Review Committee or SARC Process.

The review panel consisted of the Chair and three scientists from the Center for Independent Experts; with the review having an emphasis on only evaluating the science and the assessment and not to consider management implications of those results. The SARC Process results in a number of reports or products, three individual reviewer reports from the CIE folks, a review panel consensus report and an overall shorter summary report.

Most of those are available are on the Center's site. We're still awaiting the final consensus report. Again, the Peer Review Workshop took place in late July of this year. The Chair was Dr. Cynthia Jones from Old Dominion University. The three independent experts were Robin Cook, John Simmonds and Henrik Sparholt; all from Scotland and Denmark. The overall outcome of the peer review is that the stock assessment was accepted, the stock is not overfished and overfishing is not occurring in 2012.

Again, the panel finds that the stock assessment is acceptable for management use. Next I will go through each individual assessment term of reference and provide the review panel's findings based on each term.

The first term was to investigate all fisheries-independent and dependent data sets; discuss strength and weaknesses of each data source; and evaluate evidence for changes in natural mortality in recent years. The panel concluded the assessment completed this term successfully and had a specific recommendation to reexamine the age-aggregated recreational index using different models and/or by truncating the age range of that index.

The second term was to estimate the commercial and recreational landings and discards, characterize the uncertainty in the data and spatial distribution of the fisheries. Again, the panel concluded that the assessment addressed this term fully. They had two specific recommendations; one, to organize the fishery-dependent data in the model to represent actual fishing fleets; i.e., commercial and recreational components as opposed to the current fishing fleets separated more geographically, Chesapeake, coastal, and then the commercial dead discards.

The panel also recommended the next time around attempting to split the assessment into female and male components to account for the sexual dimorphism. The third term was to use the statistical catch-at-age model to estimate fishing mortality, recruitment, abundance and biomass; also provide retrospective analyses; and to provide estimates of exploitation by stock component where possible for the total stock complex.

The review panel concluded that this term was completed and the current assessment is acceptable for estimating the status of the stock. A few specific recommendations from the panel were to re-evaluate model sensitivity to the Maryland Spawning Stock Survey Index and the Recreational Aggregate Index, because they are primary drivers and have great influence on the results.

Again, the assessment model was based on three fleets that do not correspond to the real fisheries. It may be possible to reformulate the assessment into two or more fleets, each with landings and discard components, allowing the commercial and recreational fisheries to be considered separately.

Again, the panel recommended splitting the assessment into female and male components, given the implications on mortality and the derivation of reference points. Finally, as I think Gary alluded to, explore the potential bias caused by the use of scales to age individuals where we're currently not using otoliths.

The fourth term was to use the tag-return model and associated modeling components to estimate F and abundance from coast-wide and producer area tag programs, along with uncertainty of those estimates. The review panel agreed that the assessment completed this term fully and had recommendations to include tag-estimated mortality in the assessment; either to estimate a new discard survival rate or to confirm that the discard rate that we're currently using is accurate.

There is also a recommendation to explore data on re-releases of tagged fish that may be more typical of fishery releases than those released by the tagging program. The fifth term was to update or redefine the biological reference points and to define stock status. Again, the panel agreed that the stock assessment successfully defined and evaluated stock status.

Relative to the reference points, the assessment produced internally consistent F and SSB thresholds and targets based on non-parametric assumption that future recruitment will be similar to past recruitment. Overall the approach does not estimate Fmsy or Bmsy explicitly, but provides management reference points that promote high and stable long-term yield.

The sixth term of reference was to provide annual projections of catch and biomass and to use a sensitivity analysis covering a range of assumptions about the most important sources of uncertainty in the assessment, including potential changes in natural mortality. The panel agreed that the assessment conducted the projections correctly and addressed this term.

The projections need to be run with the same recruitment model that is used for calculation of the reference points. Again, the recommendation that the current three-fleet approach makes it difficult to estimate mortality separately from the two main fisheries and suggests reformulating the model into recreational and commercial fleets.

The last term of reference, term seven, was to review and evaluate the research recommendations from the previous benchmark stock assessment and review; identify new research recommendations; and recommend the timing of future assessments. The assessment addressed this term, and they had recommendations for future work on developing an aggregate index from the state surveys. The panel thought that was a high priority.

They also suggested examining issues related to sexually differentiated migrations and consider differences in exploitation of males and females regarding migratory behavior and its influence on the reference points. It suggested evaluating a two-area spatial assessment model to account for the differences between the Chesapeake Bay and coastal fisheries.

The overall findings of the SARC Review the stock assessment was accepted; the stock is not overfished and overfishing is not occurring in the last year of the assessment; aggregating commercial and recreational catch makes the results less clear. Striped bass has a history of ad hoc reference points; and they agreed with

and commended the current assessment's development of consistent F and SSB thresholds and targets consistent with the SSB of 1995.

All of the available data were gathered and used correctly in the assessment models. Assessment was robust to different model formulations, and the modeling approach is stable. The review panel also agreed with the assessment team that the natural mortality is higher at younger ages. We used differential mortality by age in the assessment and they agreed with that approach.

Finally, the estimates of both recreational and commercial dead discards are sensitive to assumed values of post-release mortality. A few more recommendations down the line were to improve the coordination of the fishery-independent surveys to better match the temporal and spatial use of habitats by striped bass; and to attempt to standardize the state or coastal surveys to better address the temporal and spatial availability of the stock and toward providing a more meaningful combined stock index.

I mentioned this earlier, but also to explore the development of a model with separate male and female components. Also, given the non-uniform spatial distribution of the stock by age, try to obtain a better model selection for the recreational index or to simply truncate the age ratio of the index.

The panel also recommended examining whether modeling is consistent between the analyses done for projections and those done to define the biological reference points. They noted that the management targets based on female spawning stock biomass may need to be reconsidered if exploitation of males is significant. That is a quick report based on the SARC Review. Thank you.

DISCUSSION OF BENCHMARK STOCK ASSESSMENT AND PEER REVIEW REPORT

CHAIRMAN O'CONNELL: Thanks, Patrick. I guess where we are now with the agenda is we need to ask any questions and have some discussion so that we can get to a point where the board feels informed enough to take action as to whether or not to accept the reference points or not accept them.

If the board wants to accept them, we need to initiate an addendum process. Before we get into any motions on that, I would like to then ask Mike to give a slide just to help the board focus on the different options and scenarios that I think would facilitate our discussion. Before we get to that, I will open it up for some questions on the assessment and peer review. Rob.

MR. ROB O'REILLY: I know there will be a lot of questions; so if it would be acceptable, I'll have just a few questions now and then wait my turn if necessary until everyone has a chance to speak. One thing I noticed on the recreational data was a lot of declines depending on the states that were shown.

I wasn't sure how much was put into effort information, the trip information, because you see some of those stark declines. Certainly, I know in Virginia, right around 2007, economic factors certainly had something to do with less effort. I don't know whether the committee looked at that. That is one question.

Another question relates to the 12 percent and 14 percent for F and SSB respectively on the bias. I guess times have changed, but I know about five or six years ago at the Northeast Fisheries Science Center they had a workshop on retrospective bias. I wasn't there but I did see the PowerPoint presentation.

I think one of the conclusions was you really can't do much to adjust it, so I guess maybe that has changed a little bit, Gary, with what you've done. At the same time I wasn't sure whether those percentages were multi-year; so is that multi-terminal year where you came up with the 12 and 14 percent. That's two questions.

The third question has to do with the times changing again. It wasn't so long ago, maybe a half a dozen years ago, where the thought of including recreational data or commercial data

as both catch and an index was a little bit off limits. Since the aggregate recreational index is a pretty big component in the SCA for the output, I was wondering whether the peer review panel, when that was mentioned by Pat about relooking at the aggregate index, whether there was any concern there or whether or that type of concern has gone away as far as modernization of using information in both the index part and the catch. Thanks.

CHAIRMAN O'CONNELL: Can you guys try to tag team the three questions there?

DR. NELSON: Okay, in terms of the declining catch, I'm not sure if it is effort because we didn't really look at that. It could be, but I think Massachusetts it hasn't been. I can speak with our state. The 12 percent and 14 percent is an average for those five years. Whether to adjust or not, it seemed to be in vogue now. I've sat on a SARC-like committee for NMFS; and they're doing that now even though there is some danger of that, but I think with striped bass the pattern has always been overestimating F and underestimating SSB. I think we were confident in doing that. What was your third question?

MR. O'REILLY: It was on the aggregate index.

DR. NELSON: The MRIP index is based on a subset of data. It is using the raw intercept data, and we only use the offshore and the boat mode data; and, yes, there is some consentuous relationship. We have explored that because I did notice this time where the assessment is fairly sensitive to it. We had a conference call and it was decided to leave it in.

The impact on the assessment has essentially just changed the magnitude of the abundance. The trends are the same. If we did that, the SSB would I think drop a little bit, but the conclusion would be we're still not overfished and overfishing isn't occurring. We need to explore that in the future because we could do a number of things as suggested by the SARC Review, which we had actually already thought of, but we hadn't had time to do that. The panel didn't have any objection to leaving it that way.

MR. THOMAS FOTE: I guess I'm following up on one of Rob's questions. I'll just give you New Jersey's figures. In about 2004 we had 220,000 boats registered in New Jersey. Before Sandy in 2012, we had 160,000 boats registered. That is a dramatic drop in boats. I'm waiting for the figures this year, which will probably show us another 30,000 boats not in the water because of conditions.

Also, if we look our registry this year, the party and charterboat registry is down a third. We show less effort. What also happened during that period of time – and 2007 is the period of time when gas prices went through the roof, and it changed the behavior of striped bass fishermen in a big way.

People would travel from Leroy's area and Loren's area and come to the New Jersey Shore and they stopped making those trips when it cost them fifty dollars for a tank of gas to go back and forth. We've changed that kind of attitude. We also have changed where people used to run around all day and catch and release striped bass because they had a lot of fun doing that, but they burned a lot of gas on the boat. Now they catch their two fish and go home.

When I want to look at all that; did anybody ever discuss that and the social and economic study that we need to do to look at it? Striped bass is a prime subject on it; because when we opened the fishery in the nineties, most of the recreational sector was participating and was doing catch and release; and they were basically not taking a lot of fish because they were all worried about the stock rebuilding.

That has changed basically because we have affected other species like summer flounder, black sea bass, tautog and other species. We now may direct on striped bass more to take home a fish to eat; and so that has changed how we basically should look at striped bass. That is a whole big range of things that we not put into this equation or have we?

Is anybody asking that question at the SAW or the technical committee or are they planning to ask those types of questions, because I think it is

an important part of what we're doing with striped bass and explain some of the drop in numbers because it is fisherman dependent when you look at it. It always stymies me that we don't do that; we don't consider that in the socio-economic. It sits on the back burner. We refine the models but we never do the socio-economics to back it up.

CHAIRMAN O'CONNELL: I think what I hear from Rob and then Tom is in regards to the assessment how sensitive is it to – if fishing mortality was influenced through socio-economics and that was the why effort dropped? I guess the question that is being asked is whether that was considered or not; and if not, what are your thoughts in regards to how it may influence the assessment results?

DR. NELSON: I'm trying to find some slides, but in the 2011 assessment that we did – I didn't do it this time, but I should have showed for the MRIP data the catch-per-unit effort using trips. I have the old slides here if you want to see what those were alike. It did show for the states or like the release information the same trends in the declines that I showed up there when the numbers are adjusted for the number of trips.

The declines in the releases are real. I'm sorry, I was looking at total. This is the total catch per trips; and the trends did show declines. Do you want to see those from the old – okay, up here on this slide, this is the total catch per trip; so it is the release and the harvest information together divided by the total number of trips.

Up in that right-hand corner are the states of Maine, New Hampshire and Massachusetts. You can see the total catch per trip particularly in Maine has – and this goes to 2010 only, and you can see all these three states. Starting about 2006, the total catch per trip have dropped; a similar pattern to just the release numbers.

Down here is Maryland and Virginia showing basically the same thing through 2010; so actually the drops you see in the harvest and the release numbers are not, in some respect, due to people not fishing as much. It is related to how the population is changing. But if you look at like New Jersey and Delaware, you can see that in Delaware there was a pretty steep drop starting in about 2008 and in New Jersey slowly but variable.

Then you look at Rhode Island and Connecticut showing that their total catch per trip has actually increased. I think I remember at the 2011 assessment update I tried to explain that this – you saw those declining trends on the outskirts of the distribution in Maryland, Virginia and then Maine, New Hampshire and Massachusetts. In the center of the distribution, which is also influenced by the Hudson River, you're getting a different pattern here. Then New York has a completely different pattern showing a decline since the early nineties. That was it.

MR. CLARK: Thank you very much, Gary and Alexei and the stock assessment committee for the impressive work here. I was just wondering when the complete assessment will be available. We have staff that has wanted to review actually everything that went into this so we can get a better idea of how you arrived at all this. We were told that due to the government shutdown, that the assessment should be available soon, but it is not available yet. Do you know when it will be available?

MR. CAMPFIELD: In talking with the Science Center I think just this past week, we got the same answer that due to the government shutdown it is not yet available. It will become available in November, but it was supposed to be ready I think mid-September.

MR. CLARK: Well, just to follow up on that, as I said it is just one of those things where I think it is important for states to be able to evaluate the entire assessment before we vote. Thank you.

MR. DOUGLAS E. GROUT: Thank you, Gary and Alexei, for an outstanding report. I had a couple questions, and I will try not to inundate you with them all at once. The first one, I think, Alexei, you referred to the fact that we have an updated reference point; but in the Chesapeake Bay and in North Carolina, because of

differential size limits, the target reference point will actually be lower. Has that been calculated yet or if we accept the stock assessment with the new reference point, then the technical committee would go and calculate what that would be; correct?

MR. SHAROV: At your direction. We understand that you would have to direct us to do this, and we will gladly do this for you.

MR. GROUT: Hopefully, we can do it because I think that is part of management and clearly something that we would have to take into consideration in any management actions that we're going to be taking or that we might be considering. Finally, I heard the term that considering retrospective patterns are now in vogue. Should I take that as something that the technical committee would feel comfortable with us using as part of our management – considering the retrospective pattern as part of our management action here? Are you comfortable with that now?

MR. SHAROV: I cannot speak for the technical committee because we did not have the specific discussion of that nature. I would guess that based on what Gary said earlier, there certainly seemed to be an evolution in the world of stock assessments. Obviously, at the science center, the federal councils, et cetera, it is becoming pretty regular now the exercise of making an adjustment for the species where we do see consistent bias like in the case of striped bass. I wouldn't want to speak for the committee because they were not charged specifically to discuss that. I would speculate that probably they would agree to do that.

MR. PAUL DIODATI: Thanks, Gary and Alexei and Pat. That was great. Based on what you just pointed out with the CPUE estimates, Gary, I guess it is safe to assume that it is not fisheries' performance changes that are showing stock depletion. Well, the CPUE is dropping and it is not just the overall catches because of something going on in the cost of gas or people's desire not to fish as much.

DR. NELSON: Yes, I would interpret it that way.

MR. DIODATI: And I guess relative to the government shutdown and maybe some of our state scientists that haven't seen all of the information, for whatever reason that may be, the peer review was completed. Your team has done its work. It was presented for the peer review, which I think you actually indicated the type of membership that had, so it sounds to me like regardless of who looks at it tomorrow, this is a pretty well-done assessment at this point and considered to be ready to be used.

DR. NELSON: I would say, yes, I agree.

MR. DIODATI: Okay; and one of our commissioners asked to try to put current conditions in context with historical conditions and he talked about the '95 levels, and I think one of the reference points you're using now is 125 percent of the 1995 SSB; and that reference point is about 72,380 tons.

That means that in 1995 the SSB value was probably at around 58,000 tons, which means that current SSB based on your 2012 projection of about 61 or 62,000 tons is just slightly above where we were in 1995 when we called this a restoration, which was pretty debatable at the time, because I was involved in that; so it was pretty much a jump ball whether or not the resource was officially restored in 1995, but we did declare it for a number of qualifying factors that went into that, that it was restored.

That is where we are at; and I think the period of moratorium and true stock depletion, we're probably at half that that was back in the late 1970's and early eighties; and that was probably at around 25,000 tons. So we're not anywhere near that very low period, but we are at that period where we would be questioning whether or not this resource is restored. Do you disagree with any of that?

MR. SHAROV: Well, maybe it would be helpful for us to look at the graph of the spawning stock biomass through time. I think in the late eighties – like, for example, in 1990

when the fishery was reopened after five years of moratorium, as I recall it the SSB was estimated, using our current assessment results, at probably around 20,000 metric tons, which is one-third of where we are now.

The 1993 record year class has been produced by the spawning stock which was roughly 42,000 metric tons. The 1995 SSB has been estimated to be at 58,000 metric tons. We are definitely not in the area of the consistent – well, the spawning stock being as low as where the recruitment really fails. I think we're still in the area of the sustainable reproduction. If we do define this reference point as our threshold, then, therefore, we will have to act according to the management plan. Once we are below the threshold, we will have to make some corrective actions.

CHAIRMAN O'CONNELL: We can come back to that and just keep moving along. I think it is a really good distinction.

MR. DIODATI: I think we're roughly in agreement, then, based on what I just heard. I guess I want to clarify, based on the assessment and especially the retrospective analysis of where we have been, have we gone below targets or thresholds given our new reference points? I know that you talked about a projection that clearly we will do that; but have we already done that retrospectively?

DR. NELSON: Well, if we use the new F reference point, it would indicate that back between 2004 and 2006 that, yes, we were overfishing at that time. If we also use the same SSB reference point, we weren't overfished; but historically, yes. You can see back in 2006, around there, using the new reference point, we were overfishing for a short time. In 2011 it looks like we were, too, briefly. Now if we go to the SSB, we might have been close in '97; but we haven't been since 1995, anyway.

MR. DIODATI: The result of the peer review is that we should be using the new reference points; and it is also the recommendation of the technical committee that we should be using the new reference points. I guess under the current management plan we are not, so there is a technical correction that needs to be made.

I guess it is difficult for us to pass judgment on what the next step is. It would be, in my opinion, time to take a correction when you consider that we have already gone in areas where we don't want to be with this fishery. Your projections are telling us that we're going to do that again very soon.

It seems that the corrective action is upon us; but I'm not sure what comes first, the cart or the horse here given that the current plan is still dealing with the old reference points. It is pretty clear to me – and I understand that we've all heard from a lot of our clients out there or members of the fishing public that they're concerned about conditions in the fishery.

As we talk more about that, I think we really want to be thinking about where is the true fisheries' production coming from, the recreational or the commercial fishery; and I think in this case it is truly the recreational fishery. Those members of that community that I'm hearing from are supporting cuts in this fishery. I think this information is doing that; so I want us to be very crystal clear in our thinking as we move forward. But, thanks, that has cleared up some of my thoughts at least on the technical presentation.

CHAIRMAN O'CONNELL: Thanks, Paul; and where we are at this point is we're discussing whether or not to accept the benchmark stock assessment. Then if we do that, we'll move into the next agenda item, which is to discuss the management response. I've gotten about more people on the list, so let's get through that and see we can get to a point of taking action on the stock assessment.

MR. G. RITCHIE WHITE: Like Pat and Paul, I'm hearing from a lot of constituents; and I'm hearing terms like "collapse", "catastrophe", "you're going to manage this like Atlantic cod". My question comes from a comment that says "you've bet the farm" or "you're betting the farm on the 2011 year class". My question is if the 2011 year class had been below average;

where would we be? The second part would be going forward for the next three or four years, if we have below average recruitment, where will we be?

DR. NELSON: If the 2011 year class was below average, we would not see that increase in SSB in the projections. It would probably still go down. If it continues to be below average after 2011, then we will see an uptick in the SSB but then it will go down again as those low levels work itself through, but it will be many years before that happens. Does that answer your question?

MR. DAVID V.D. BORDEN: Mr. Chairman, I guess my question is for Gary. It is very troubling to me that the commercial discards have increased to the extent that they have. The way I look at the figure – I think it is Table 4 – they have essentially gone to the highest levels in the entire time series.

You may have said this and I may have missed it, but I don't understand why. Effort as it is being managed by the New England Council, Mid-Atlantic Council and this Commission has fallen like a stone in most of the commercial fishery; so why are the bycatch discards going up the way they are? That's one question.

DR. NELSON: Well, for the most part they're mostly state fisheries that are catching these fish.

MR. BORDEN: It is state-waters fisheries and is it based on observer data?

DR. NELSON: No; we actually estimate it based on tagging data and also the MRIP data. We essentially take the MRIP data, we have a ratio of the tags that are recovered in the recreational fishery and the commercial fishery, and we just do kind of an expansion from there. There is a lot of error in those estimates.

MR. BORDEN: Okay, and then where are the discards taking place; are they primarily taking place in the producer areas or is it along the coast or both?

DR. NELSON: I think it is mostly from the producer areas. I can't remember specifically. When we estimate the discards, we actually estimate it for the Chesapeake Bay, the coast, Delaware Bay; those three areas.

MR. BORDEN: I just reiterate my prior statement that I think it is problematic that they've gone up to the extent they have gone up. I think it is something the board should look at at some point. My next question for you is the projections you did. You put in implementation 2014; did that assume January 1, 2014; or when in 2014?

DR. NELSON: Yes, it would be January 2014. It is just a value that happens.

MR. BORDEN: Okay, if I understand this correctly, there is no proposed management action to implement any of those changes.

DR. NELSON: No.

MR. BORDEN: My assumption is we would have to rerun those projections because you couldn't put them in place before the fisheries start in the Mid-Atlantic; is that correct?

DR. NELSON: You are correct. You're right but we also have the 2015 projections, too, so you could go with those.

MR. BORDEN: Okay, and then I'd follow up on Ritchie White's – and this is my last one, Mr. Chairman – follow up on Ritchie White's question. I was going to ask a similar question; but this issue of the strength of the recent year class, how accurate are the point estimates of year class strength? I mean, over time when we estimate a year class strength for the first time, each year you get a new data point that validates that over time. How accurate are those estimates; were the initial estimates proven over time?

DR. NELSON: Well, there will be some retrospective issues in that first year, but we've never seen a year class disappear in the data as you're moving forward in time because the

Chesapeake Bay Young-of-the Year Index is a very good indication of what is coming out.

MR. CLARK: I didn't bring up the idea of giving more time to examine this just to delay. We saw some things in the assessment summary that raised I think some interesting questions. One of them, Gary, you showed the chart showing the instantaneous total mortality for both the tag recapture studies and the statistical catch-at-age models that were very similar.

Yet in a previous draft of the assessment report we saw there was also a comparison of the F from the fishing mortality from the tagging studies and from the statistical catch at age; and the F from the tagging studies was much lower than the statistical catch-at-age model. Would that suggest that there could be a difference in the natural mortality calculated from each of these models? Would this tie into the mortality we're seeing in the Chesapeake Bay?

I mean is this not a situation where it is not fishing pressure that is causing some of this. The other thing I was wondering is if spawning stock biomass is somewhat of a proxy for egg production; was any of the striped bass egg work done in the Chesapeake by Maryland looked at as part of the assessment? Thank you.

DR. NELSON: For the comparison of the tagging models and the statistical catch at age, it has always been a contention among the members of both committees, the tagging and the statistical catch age, which model is actually correct.

In my opinion and my impression is a lot of people on the tagging committee believe we can estimate differences in magnitude in the tagging models; but whether the magnitude is correct – the relative difference in magnitudes, but whether the magnitudes are actually correct is another question.

The natural mortality that comes out of the tagging models actually appears to be much higher than we would expect particularly out of the Chesapeake Bay. Because some of those estimates are so large, if they were correct, you wouldn't see any fish coming out of the Chesapeake Bay. Because the models are estimating those high M's, you get a low F. A lot of us don't really believe those are the true levels of F. That's why in that slide I showed the total mortality because they both estimate the total mortality correctly; but it is when we split it up into M and F that it becomes a problem.

MR. CLARK: But could natural mortality be higher than the SCA Model is showing?

DR. NELSON: I would believe that in the Chesapeake Bay. In some of the resident stuff, it could be higher. On the coast, some of the models estimate a very low F prior to '97 when we assume that is when myco started. I don't really believe those, but then it estimates a higher M after that.

It is somewhere in between but on average the coastal programs, if I remember correctly, come out to average around 0.15, anyway, which is what we're assuming for seven-pluses in the statistical catch-at-age model. We have gone back and forth with this, and the best scenarios that we came up with is the statistical catch at age and changing the M's during those earlier years; your earlier ages.

MR. CLARK: Do you have anything about the eggs?

DR. NELSON: We have looked at eggs. There are not really great studies that have been done. There are a few scant studies done on fecundity. Actually I did some work for the technical committee looking at what would happen if we used fecundity/age relationship that someone had developed from the seventies or something like that. It didn't really change the results much. Because fecundity changes over time with the age structure, at least the total fecundity, we didn't think we would use that because we don't have enough information on what has happened over time.

MR. CLARK: Is that the presence/absence data from the Chesapeake about the striped bass eggs?

DR. NELSON: Ann Richards had done some work when she was at the Chesapeake Biological Labs. I have those data, but they weren't sampled over the entire size ranges and stuff like that. There just hasn't been a lot done, and that is one of the recommendations that the SARC Panel Review also is to look into fecundity and do some more studies.

MR. SHAROV: I guess the questions leads towards the – we have a survey that is being done in the Maryland portion of the Chesapeake Bay by Jim Uphoff, which looks at just the presence/absence of the striped bass eggs – well, not only striped bass but in particular striped bass well.

According to Jim's analysis, it indicates that the SSB is – well, the eggs' biomass is stable. This was not reviewed by the technical committee. Maybe it is worth considering for inclusion in the assessment model in the future as an index or something, but at the moment it is not. I would have to admit that there is always a large variability or measurement in there in terms of the eggs' concentration or even the presence/absence. It is being done only in the Maryland portion of the Bay, but it is certainly an additional independent source of information which should not be discounted.

MR. DAVID SIMPSON: It is really a comprehensive report and summary and I learned a lot, and I have to now go back and study more to understand all the changes that happened and understand them. Mostly my questions relate to recruitment and trying to think ahead to projecting what is to come; and I wondered about – I don't know the history on the choice of the 1990 to I guess 2012 recruitment indices; why that time period.

Early in that timeframe you have fairly low recruitment; then a fairly sustained period of high recruitment; then it dropped in recent years; the last couple of years are high. If you went back further, you would have more low numbers. What is the history on that is my first question?

MR. SHAROV: Well, the technical committee discussed what range of years you use that would be representative of the sort of typical variability of recruitment given general climate conditions that drive the recruitment success. When we discussed which time period to use, we didn't want to limit it to only the period when we had a series of strong year classes like 1993 and on.

Well, look at the history of the past two decades. We had a period of very frequent strong year classes in '93 through 2003, roughly. The most recent years were less successful. We had mostly moderate to below average recruitment. It is a judgment call essentially. There was no specific formal statistical analysis as to which ones to include.

Collectively the group decided that 1990 through 2012 should be representative of the recruitment variability. Assuming that the climatic conditions would be similar in the next decade, then therefore we thought that it would be appropriate to draw from this range of recruitment that we had out of the model.

DR. NELSON: It is also in the updated document, but one stock reviewer had asked us, well, what if we start at 1995 since that is the SSB. You basically get the same answer.

MR. SIMPSON: Okay, I would have thought – I mean, as Alexei said, if you don't include '90 through '94, those are all low recruitment years, that I would think would – you know, if you don't include them, then you're going to project a higher expectation of recruitment off into the future.

If you do include them, then there are more occasional low recruitments in your projections. And then I wondered about the impact of the variable M on the assessment and ability to project recruitment; does it change that at all? That is a pretty profound change; but it is impressive that, as I interpret it, the old assessment that used constant M and the new one, the projections of biomass, those patterns don't seem to change all that much. I just wondered if you could discuss a little more

about what you expected from that variable M and what you saw.

DR. NELSON: The variable M doesn't really impact the SSB much because it is a scalar. Most of the SSB is like age seven and older; and that is when M was constant at 0.15.

MR. SIMPSON: And I think you said that is pretty much played out by the time you get into SSB; but, I don't know, just intuitively think if you change M at age one from 0.15 to 1.1, you'd get a bigger reaction, but I understand what you're saying. And then just as an aside to think about; I wonder how those much larger estimates of numbers at age early in the time series would affect the sort of parallel effort at ecosystem management and assessment and whether there are many, many more mouths to feed now in that model, and what your thought is on that.

I guess we don't really need to address that but I think the group will be interested later on, maybe through MSC or something like that just occurs to me. But to stay on the points here, you did some projections assuming status quo F and so forth; and in practical application terms I'm wondering if it is possible to project what you would expect F to do if we kept at 28 and two fish. That assumes a lot of interpretation of human behavior or projecting behavior; but is that possible to do, what would happen if we just hold measures constant?

DR. NELSON: Well, two at 28 is the general size limit for the coast, but each state has a different modification of that. If it is the same now, we used either the constant F – a constant of 0.2 would be the same – or the constant harvest of using the 2012 harvest over time, it would give you kind of the same thing.

MR. SIMPSON: Okay, so you would expect if we kept the same rules, that even though we're going through this little depression in stock size, that it won't change F. I would think the same rules, lower stock, might increase F; but your thought is that the F will change with the stock size and the regulations won't impact that?

MR. SHAROV: Well, that was the purpose of changing the reference points on fishing mortality where we said we need to find that level of fishing mortality; that if we will maintain it constant, then long term is you will keep us at the target SSB and consequently the fishing mortality – the threshold fishing mortality would keep us on the verge of the threshold SSB.

Our current F estimate in 2012 is 0.2, which is slightly below the threshold; so theoretically if we were able to keep F at 0.2 long term, then long term our SSB would be hovering around the threshold; sometimes above, sometimes below. We are still in the range of the spawning stock biomass where we believe that there is sufficient SSB for the successful reproduction, and primarily the strength of the year class will be defined by the environmental conditions but not by the SSB size in itself.

We have provided one condition; the sufficient number of spawners; therefore, the success of the year classes, we're unable to predict what the weather patterns would be, but we're hoping that the general pattern will be the same. So if we will keep at the F of o.2, then our SSB will be varying in the future; but in the long term it would be equal of SSB or close to SSB of 1995. That was the whole idea; it falls slightly lower of fishing mortality and keep it constant at the target level, then theoretically we should be able to bring the SSB on average to the level of 1995.

MR. SIMPSON: Okay, I'm trying to remember between questions Paul asked – and can you flip to the fishing mortality estimates, so the stock is going up and then slowly declining. Is the F one available? I'm trying to figure out how we maintain such great consistency in striped bass regulations and we wangle summer flounder all over the place every year trying to maintain that constant F. We have a peak in fishing mortality.

When the abundance peaked, it actually increased and then it dropped a little bit as the stock declined a little bit. I guess I wondered if there was any ability to project not just F into the future but sort of projecting that human

behavior a little bit in response to stock size and what F will do if we don't change our measures.

MR. SHAROV: Well, that is what is called management strategy evaluation or MSE analysis, which is a very comprehensive modeling exercise like economists or sociologists to join that – you know, to be able to predict what humans will decide. The technical community currently is certainly not at that level yet.

CHAIRMAN O'CONNELL: What I'm going to do is I've got four people on the list and then I think the board – I think we have had a good discussion. This has gone through a comprehensive peer review process. I think we would be a point in time that the board decides whether or not to act on, because we need to have sufficient time to discuss a management response if we accept the stock assessment. Pat.

MR. AUGUSTINE: The discussions have been extremely enlightening. I just would like to reiterate one more time or hear you reiterate one more time the fast numbers that Mr. Diodati went though in terms of where we really were so the listeners on the webinar and so can hear where we really were.

The number of 22,000 tons was an approximation of where we were really in the SSB when we were at that lowest level we possibly could have been. If we continue with the constant mortality that we talked about for 2014 and didn't do anything between now and development of a management action plan, from the approximately 58 or 59,000 metric tons we're at now, where would you assume we would be throughout 2014 as we approach 2015; maybe 56,000 metric tons.

I'm trying to get some relative comparison here so folks realize that we really are going to address the issues. But the difference between the bad time, the 22,000 metric tons, and the reasonably good times right now, we have a very good cushion. Can you give us a comparison of those two numbers and just get it on the record so we can put that away?

DR. NELSON: I'm going to show you the projection again.

MR. AUGUSTINE: Read off the numbers; someone should read off the numbers so the public – they can't see it; they can only hear it.

DR. NELSON: The projections suggest that SSB will decline – under status quo, which is the purpose here, it will decline in 2014 just below the reference point, so like 54,000 metric tons or something like that.

MR. AUGUSTINE: 54,000, okay, so we're comparing 54,000 to 20,000. Okay, and then as we go into 2015, if I see that correctly, there still will be slightly a little dip blip there?

DR. NELSON: Right.

MR. AUGUSTINE: Maybe another thousand at best, and then we're going to see a very sharp increase, and it looks like 2016 we're well on our way to getting back up to the 60,000 metric tons and on up beyond that by 2017.

DR. NELSON: Under status quo there will be a slight increase through 2017 of the SSB; and the rest, the red and blue here is if a 20 percent reduction is taken in total harvest.

MR. AUGUSTINE: I appreciate that clarification on the record, and you hit it right. I have one follow-on question. One of our folks from New York passed me a note saying we shouldn't mix the coastal and producer fisheries for total dead discards because we are looking only to reduce coastal SSB.

Mr. Clark raised the question about what the impact was of the mortality rate on the Chesapeake Bay to the overall number; and I think your response, Gary, was, well, the number is so large in the Chesapeake and variable that we had to combine them.

I think that's what you said. Now, what does that do to the coastal – if you looked at the coastal SSB by itself in terms of total discards as opposed to the producer area; is that a significant number? Should we be concerned

about it or should we just say it is what it is? Can you help me on that?

DR. NELSON: The commercial discards or the recreational discards?

MR. AUGUSTINE: I would probably say commercial at this time, yes.

DR. NELSON: I want to say that the SSB is the estimate of the female spawning stock that will actually go into the producer areas to spawn so it is –

MR. AUGUSTINE: I would like that clarification; can you expound upon that a little bit?

DR. NELSON: I don't quite understand what the rest of your question was.

MR. AUGUSTINE: He just asked what the effect would be on total discards when you add the producer area to the coastal SSB; and your answer is that's how you figured it out. It includes all of them.

DR. NELSON: It includes everything; yes, it's the total population,.

MR. AUGUSTINE: That's perfect; good, thank you very much. That's all I have; and when you're ready, Mr. Chairman, I would like to make that motion.

MR. RICK BELLAVANCE: My question I guess is kind of spatially in depth. Up and down the coast over the last five or six years we've heard quite a few reports of large numbers of large striped bass being harvested illegally in the EEZ. The Office of Law Enforcement under NOAA and also the United States Coast Guard I believe made illegal fishing in the EEZ a priority for their 2012 and 2013 years.

As far as I understand it, we don't really have any fisheries-dependent data within that part of the range of the fish, and our fisheries-independent data that might capture some of those fish stopped in 2008 when you stopped using the trawl surveys from NOAA.

I guess my question is anecdotally we have heard lots of stories of large numbers of big stripers out in the EEZ as commercial fishermen and a lot of charterboat fishermen see them and they're after them regularly. My question to you is how do those make it into the stock assessment, and is there a possibility that they don't? I'm trying to figure out how they get accounted for.

DR. NELSON: If they're reported like the issue that happened in Maryland a couple of years ago, then they're included in the assessment. Otherwise, poaching is not included in the estimates for the model or in the model. We just don't have a good way of estimating poaching numbers.

MR. BELLAVANCE: So, taking out the illegal harvest, just a general idea that there is a large number of large females out in the EEZ, how would that pile of fish make it through the assessment? I'm just trying to get an idea of where that would fit it.

DR. NELSON: I would say unless someone is so stupid that they report to an interceptor on the coast that they were fishing in the EEZ, they don't make it in any of the estimates. That is one of the issues. We have some other issues, too, like MRFSS doesn't cover some of the major rivers like Hudson upriver, near the mouth or something like that. There is some other information that we don't have for catches that occur in major rivers that aren't included, too. Harvest is likely more than what we have estimated.

DR. KATIE DREW: But when they come back to the rivers to spawn, they should show up in our spawning stock indices, which are different. I think your concern is that there is part of the population that we're not measuring somehow and that we're not accounting for that biomass; like, for example, with what happens with red drum where they move off the shore and we never see them again. But with striped bass, they come back to the spawning grounds to spawn; so they will be picked up in our spawning stock surveys.

MR. BELLAVANCE: Perfect; thanks.

MR. GILMORE: From what I've heard today and also the readings I've done – and I think Paul Diodati's questions before summarized it pretty well – I'm pretty well convinced we're at some point where we need to do some management action, but I wanted to follow up on Ritchie White's comments because I think the – I've gotten several hundred e-mails and most of them are the doom-and-gloom e-mails about shutting fisheries down and collapse and all those other things. I clearly don't think we're at that particular point.

I think we've done a good job from the mid-eighties of putting together a management plan and built-in triggers, and we're hitting those triggers, and we need to take action so that we don't get back to the doom-and-gloom days. One other point – and I think people need to keep this in mind – is the other issue we've had in the Hudson is we've had three pretty poor years of juvenile abundance index. That's one of the other triggers we had added in here.

However, we have a bunch of density-independent issues that happened in the name of Irene, Lee and Sandy the last two years, also, so we have other things going on that are also driving some of these numbers down. We just need to keep that in mind; but again I believe we are at the point where we need to initiate some action. Thank you.

MR. DIODATI: I guess I'll just go back to it once more. The 22,000 tons was a point where we had collapse of the stock and the fishery; so at 54,000 versus 22,000, that is not an attribute we want to – it is not a redeeming quality for us when you consider that our limit is over 60,000 tons and we're at 54,000 in that projection. That is the number we have to deal with.

We don't want to even think about the 22,000. Jim just mentioned that we've hit some triggers. The current plan has five management triggers that balance both the SSB and the fishing mortality rates; five. When you consider these new reference points that have been very clearly presented, we've have hit three of those triggers. If you go through it, we've hit three. In fact, some of them are so desperate that the F threshold has been exceeded in six of the past nine years that I just saw in the chart.

Our SSB has fallen below target for at least the past seven years. When you consider the new reference points; that is what is going on. What is not clear to me and it wasn't clear in your presentation is that these new reference points are just for the migratory stock, because the Bay fisheries have a separate but parallel management system with its quota-driven harvest program.

We haven't talked much about that, but do these reference points – it is my impression that they don't apply to the Bay fisheries and we don't know what those F rates are yet. I haven't heard what those F rates are, so are we going to see similar information for the Bay fisheries; or is this plan starting to separate in terms of how we're going to move forward? I guess that is my real question.

DR. NELSON: The reference point we showed applied to the whole population, the combined stock population. As Alexei mentioned earlier, if you guys accept the reference points, then we have to go back and recalculate the ones for the Bay. We don't have any for you today.

MR. KELLY PLACE: For Alexei and Gary, can you provide the PowerPoint that Rob O'Reilly alluded to a while ago, from about five years ago, the conference on retrospective bias, provide that to the board; because all those retrospective biases have confounded a lot of things that have been done here ever since the VPA was in use.

I think it would be illustrative for people to understand that. My question for either of the three of you is what are the common causal factors in your opinion that are causing these retrospective biases as far back as the VPA and now with SCA. Are the causal factors the same; can you identify some of those.

Would it be the case that since the otolith versus scaled-based aging is a known discrepancy and

it is also a commonality ever since the VPA and before the discrepancy between scale and otolith-based aging; could that be one of the significant factors that results in these retrospective biases?

Will we ever see one as severe as when we saw a 0.62 in the VPA when the target was 0.3 or 0.31? If you could answer those and possibly provide the board with some more things like the PowerPoint Mr. O'Reilly alluded to, I think it would help a lot to understand not only the nature but the significance of what those biases mean.

DR. NELSON: I guess the staff could go to the NMFS Website and try and get those. I'm not familiar with the PowerPoint presentation. I have the document. I wish we knew what was causing the retrospective; because if that were the case, then we could try and correct, but we don't really know what is causing it.

It could be some catch we're missing – like I mentioned before, poaching. MRIP doesn't go up rivers where we know striped bass harvest is occurring, the Delaware River, like the Merrimac River in Massachusetts. We know there is harvest there but MRIP doesn't go up that far to estimate. It could be that; it is just hard to say.

MR. PLACE: So it is more like inputs to the models and not the models themselves, then, but the common causal factors or just simply the inputs regardless of what model you're using. Could it be the age-and-growth thing? Recognizing that can cut both ways, depending on what you're calculating, but why are we still using that input when we know it is erroneous on some levels? I'm sure there is a reason; I just don't understand why.

DR. NELSON: We're still using the catch because that's all we have.

MR. PLACE: Scales versus otoliths?

DR. NELSON: We're working on that. Not so much the retrospective but in terms of some of the estimates, it will change some of the estimates. I did do some sensitivity runs looking at that in the document, and you can see there can be differences in the magnitudes of some of these estimates whether we correct for the bias in the scales.

But it is not great and that's what was surprising. It really surprised me that it wasn't that great. We get increased variability in recruitment estimates, so it reflects really what was seen in the young-of-the-year index. If you don't correct for the bias, the recruitment kind of gets dampened a little bit. There are some changes, but I was surprised when I did this exercise it wasn't as great as I had imagined it could be.

CHAIRMAN O'CONNELL: I said after Kelly we would move on to board consideration of – I guess what we're looking for is consider acceptable of the benchmark stock assessment and peer review. Pat Augustine.

MR. AUGUSTINE: Mr. Chairman, it has been a very interesting and informative debate we have had; and, Gary, Alexei and Patrick, you have done an outstanding job. I on behalf of myself and the rest of you, I hope, we can say we appreciate it**. I move that the board accept the striped bass stock assessment report and peer review report for management use as presented today.**

CHAIRMAN O'CONNELL: We've got Paul Diodati as a second. We've got move to accept the benchmark stock assessment and peer review report for management use. Pat Augustine and seconded by Paul Diodati. Is there discussion on the motion? Rob.

MR. O'REILLY: This incorporates the reference points within that?

CHAIRMAN O'CONNELL: That's correct.

MR. O'REILLY: I would like to comment on a little bit of the discussion about the reference points. Before Amendment 6, there was sort of a lobbying to even have the target F be 0.25. It ended up at 0.3 and now it's at 0.18. I think probably for the public's sake they need to

understand that the goal posts have changed a little bit and that has to be a clear message.

It is not that management hasn't been moving ahead all along. The idea that three of the triggers have been pulled is accurate with the new reference points, but it is really not reflective of the last several years. I think that probably is something that needs to be part of the public information document, if approved.

CHAIRMAN O'CONNELL: Thanks, Rob, I agree. Are there any other comments on the motion? All right, all those in favor please raise your right hand – do you guys need a minute to caucus? You've got 30 seconds to caucus.

(Whereupon, a caucus was held.)

CHAIRMAN O'CONNELL: All those in favor please raise your right hand; all those opposed, same sign; any abstentions; null notes**. The motion carries unanimously.**

DISCUSSION OF MANAGEMENT RESPONSE TO STOCK ASSESSMENT RESULTS

CHAIRMAN O'CONNELL: We're going to move into Agenda Item 5, which is to discuss a management response to the action we just have taken. Mike Waine is going to provide a brief presentation just to try to provide some focus as to the next steps.

MR. MICHAEL WAINE: I won't take up too much time, but I just wanted to go through the fact that with accepting the benchmark stock assessment for management use comes new fishing mortality reference points; and to change the reference points the board needs to consider an addendum through the adaptive management process to do that.

As was mentioned by several board members, we have reference points for the coast-wide stock and then reference points for the producer areas. Right now the reference points for the coastal stock are ready to go. The board would need to consider whether stock-specific reference points are still something that they want to manage with; and if so, the technical committee would need to be tasked to evaluate what those reference points would be.

To give some sense for potential actions moving forward, one potential pathway would be essentially when does the board want to act on the assessment results. Do you want to take action in 2014 or do you want to take action in 2015? The constant harvest projections were provided to help the board assess what the differences would be in the implementation dates.

What I wanted to provide for context is that acting quickly in 2014, we have the reference points for the coastal stock, but it would take the technical committee a little bit of time to develop the producer areas and so consider potentially splitting this out into two documents if that was a pathway the board wanted to go down more quickly.

I just wanted to provide that perspective before we launch into the discussion of how to handle this, keeping in mind there will be some limitations in working with the technical committee getting what those Chesapeake Bay and Roanoke River/Albemarle Sound reference points would be and potentially doing a management document on those producer areas separate from the coastal stock if you wanted to take different timelines for this.

For the actual document process – this is the action timelines – moving forward, just as a reminder, it takes us essentially two meetings to approve an addendum. If initiated at this meeting, you would approve the document for public comment at the February 2014 meeting. We would have hearings in the spring and then bring back a final document for May of 2014.

If you were going to split the document just like I had talked about as a potential pathway, you could then initiate a separate addendum through that process and have it be finalized later in 2014. That is just a little perspective for moving forward. Thank you.

CHAIRMAN O'CONNEL: Thanks, Mike. I think it provides a good focus of we how we want to act, whether or not we want to initiate something today for 2014 and take some time to do it during 2014 for 2015 or a combination approach. Paul.

MR. DIODATI: I think now that we've accepted these reference points we've got to do an addendum to move to officialize that. Clearly, we are in the situation now that once we adopt these new reference points we have pulled three of the five triggers over the past several years. Looking at that, you would surmise that we should have taken an action a few years ago, at least in 2012 or '13, and we haven't.

I think it is important that we expedite the process to begin actions to reduce fishing in 2014. I think that what I just heard from Mike is a good way to expedite that. I think not only do we not have the information for the producer areas to have a parallel action, but I believe the producer areas as well as the Roanoke/Albemarle Sound Fisheries are probably getting set to begin relative sooner than everyone else.

I think it would be more appropriate to split off actions on those fisheries to begin in 2015. I would support that and I would support separating the addendums, so we have one addendum starting right now to be implemented in 2014 that accepts the biological reference points and initiates actions in the coastal fisheries to be implemented in 2014.

Those actions should be very simple and straightforward. In order to save time, I would recommend a reduction in our recreational fisheries from the 28 and two to 28 and one fish and whatever the equivalent reduction to commercial quotas is necessary to equal that. That is what I would support. Then if states want to do other things – some states have seasons, others have different bag limits – they could accomplish that through conservation equivalency on their own. They can come in and propose something different that meets that biological target.

CHAIRMAN O'CONNELL: Does Alexei or Gary know what percent reduction reducing the coastal recreational creel limit from two to one would yield?

DR. NELSON: Well, we could do that, but I know from Massachusetts I have already done this and it reduces total mortality by only 38 percent; because you've got to remember if you're not harvesting, the fish are being released and there is mortality associated with catch and release, so it is not always a 50 percent reduction.

MR. AUGUSTINE: Point of information, Mr. Chairman. Didn't we have a motion tabled about a reduction of 0.40 from last year that we carried over two years in a – well, yes, I think two years in a row now. There was then an addendum put on the record and we tabled it because we didn't have the stock assessment completed.

I'm not sure what else we were going to address in that particular addendum, and I'm wondering if we could key off of that. In other words, untable it and then take Mr. Diodati's advice and put it on that. It also sounds like we're talking about two addendums or two separate ones rather than lumping them together when we might run into difficulty and some folks are happy with one part of it and not happy with the other part, and then the whole thing collapses. So, your choice, Mr. Chairman.

CHAIRMAN O'CONNELL: Staff is advising me that we dealt with that motion at the last meeting; so we've got a clean slate to start from. Rob.

MR. O'REILLY: I just want to comment on two things; one, the expectation from reducing the bag limit. In Virginia, it has been about five or six years, but in the 35 percent from going from two to one fish without accounting for the discard mortality, so that, of course, would lower that a little bit.

The other thing I wanted to do was to say that one or two addenda is not the big issue. The big issue is the simplicity that Paul talked about. I

think part of the problem in the meeting in Boston was that everything leading up to that was very complicated. Those working on the proposals really never knew what the 40 percent or less reduction in F, how that would exactly be configured or dealt with; so the more straightforward, the better. I agree that maybe seasons are an option as well. It is going to be up to the state plans. I think we do need something that is really straightforward.

MR. FOTE: It seems I've been here over the years doing the same thing. We have been looking at some figures for a period of time and then decided we're going to do a drastic cut. Two years later they're finding out that we didn't need the drastic cuts and had to change the regulations in New Jersey again.

This is a real change in how we manage striped bass recreationally along the whole coast. This is not a minor change. It affects a lot of people's livelihoods; it affects a lot of people the way they do business. It is going to have a huge impact on the recreational fishing industry up and down the coast. I think this is too big to just do an addendum.

I think this is really an amendment process because we have changed what we basically passed. When we opened the fishery, it was two fish at 18 inches and two fish at 28 inches along the coast. That is a major change that has been in place. You know, major regulations have been in place for 20 years and we shouldn't jump to conclusions to change that regulation.

It is one of the few data bases that we have on a stock assessment. I mean, we can't tell what happens with summer flounder with regulations since we've changed the regulations every year. We can't do the same thing with sea bass and a whole bunch of other species. This is the one species where we can have.

In my estimation, we've been here where the sky is falling and a whole bunch of people yammering. I mean, it was Maine sitting at the table for years yammering and they had a good year on striped bass. Whether fish come inshore or not depends on water temperature and with the bait inshore a lot of times, and that is what it affects especially when we keep the EEZ closed. We see the effects of that happening.

I mean, New Jersey at this time of year usually has a temperature – it used to be in the high forties, fifty-one. We were still 60 degrees two weeks ago. I mean, we're still sitting in the summer and we have done that for the last three years. Last year it was a total loss because the water was warm and then we had Sandy, so that closed all the beaches and most of the fishing down in New Jersey.

I'm really concerned to do this in such a fast-track method when it has such an impact on the people involved that basically harvest these fish and the industry is there. We're not doing any social and economic impact of what will happen going from two fish to one fish. As I said, I look at these figures and I don't see the sky falling.

I see that we're coming to where we have decided where a threshold will be and then we're getting close to that line, but we're not under that line. It is not overfished and overfishing is not taking place. People have been pushing for closing this or doing something. The people that basically send the e-mails are the people that want to do that. The people that are out fishing a lot times, which is a majority of the fishermen I go around and talk to, they're not ready to jump through this type of hoop. I really think we have some real concerns here.

DR. MICHELLE DUVAL: Mr. Chairman, I just wanted to echo a point that Rob O'Reilly made earlier with regard to tripping of management triggers. I think just being really clear in the public information document that based on the previous reference points we had not hit any of those triggers, but these new reference points have resulted in us tripping three of those triggers.

The other thing I wanted to do is just update the board again on the stock assessment update that we're doing in the Albemarle/Roanoke. Whenever this body conducts a new assessment for the coast-wide stock, that automatically

triggers an update for the Albemarle/Roanoke stock. Obviously, the technical committee is going to need to go back and calculate what those new reference points are going to be for the Chesapeake Bay.

It is currently an F target of 0.27, I believe, and that is also the same target that is applied to the Albemarle/Roanoke. Just as an example, when we redid our stock assessment just three years ago, that produced a target F reference point that we used of 0.25, which is lower than the 0.27. Obviously, we would be adopting for the Albemarle/Roanoke whatever target biological reference points that the technical committee comes up with for the Chesapeake, but I did just want to let everyone know that we're in the process of updating that assessment, and we may end up with more conservative reference points than what the technical committee ends up with.

MR. PATRICK C. KELIHER: Mr. Chairman, I want to just follow up a little bit on Paul Diodati. I think his comments regarding 2012 and potentially a missed opportunity to take action based on the information we've seen today is very appropriate. We continue to see dramatic declines in catch within the northeast. I think it is time to take action at this time.

The trends are very disturbing with this fishery. Mr. Fote's comment about Maine having a good year this year, I'm not sure if you have fished there but I did and it was still below average compared to what it has been in years past. I think if Paul was willing to take what he condensed in his last comment and put it into a motion, I would be happy to second it.

MR. ROY MILLER: I guess Pat's comment may have answered my question; but the items that are on the board before us, it was my impression that we were creating a timeline for accepting the terms of reference; and yet at Paul's suggestion we have sort of leaped one step beyond that to considering taking management actions to reduce the recreational creel limit based upon three of the five triggers having been pulled. I'm not sure where we are at this point in time. Are we debating when to start an addendum to accept the terms of reference or have we already gone beyond that and are now discussing specific management measures; so if someone can help me with that. Plus, I have another question, if I may, while I have the microphone; and that is in regard to recruitment indices.

Mr. Chairman, could you refresh my memory or perhaps someone else; the management trigger for recruitment indices, that was a three-year running average; so in order for that trigger to be pulled, there would have to be a sub-par recruitment in 2014. If that were to occur, that would be a fourth trigger being pulled. Am I right in my recollection of that? Thank you.

CHAIRMAN O'CONNELL: The JAI trigger that was approved in Addendum II, I think, was that if there were three consecutive years that fell below the 75th percentile, then it warranted management review. While we did have that in 2012 at least for Maryland and I think some other states it fell below that threshold, this year it is above the threshold, so it kind of resets the clock so we're not in the position, at least for Maryland and Virginia, to be looking at a potential third year of below the threshold in 2014; so it doesn't appear that we will be hitting that trigger at least in the next few years.

In regards to your first question, I think that is the discussion right now. We accepted the benchmark stock assessment, so we need an addendum to adopt that for management use. I think the other point in regards to the management response is trying to decide if we want to do something for '14 or '15. If the board wants to take management action in '14, we probably need to have an addendum that accepts the reference points for the coast and the management response.

If the board decides to not take management action until '15, those actions could be separated. The idea that was put on the table from Paul Diodati is that perhaps we initiate an addendum to adopt the coastal reference points with some management response to the coastal stock; task the technical committee to develop the reference points for the producer areas; and then bring that back to the board and then

consider those reference points and the management response to those; so it will be done through two separate addendums. Does that help clarify, Roy, where we are at; so we're kind of like to decide what is the next step.

MR. GROUT: Mr. Chairman, I agree, based on our management plan, the time has come that we're going to need to take some action here. My personal perspective on this is that what we're trying to do is make some adjustments so that we're attaining the target fishing mortality rate that we have set.

I don't think, from my personal standpoint, that there is going to be a difference between 2014 and 2015 implementation of it; because in both cases we will be heading back towards our target SSB, which is where we want to go. Both of them will start moving things up. The reason I think we should wait to implement an action that will be in place at the beginning of 2015 is twofold; one, I want to get some clarity of what our real target is.

I've heard this comment that now because we have a consistent retrospective pattern, that considering retrospective patterns are now in vogue. I would like to get clear information from the technical committee and the PDT as to whether we should consider this in any management action we're taking. In the past we weren't supposed to consider retrospective patterns. I just want to make sure that we are all clear on what our target is right now. It could be not considering the retrospective pattern and I just want to make sure this board is all together on what our target is.

The second is that I believe because we're managing the striped bass stock as a whole, I think that both management actions for the Chesapeake Bay and the coastal areas should be moving together in the same management action. Whatever changes we're going to be making for the coast, we should have some comparable management action for the Chesapeake Bay states and North Carolina, the other producer areas.

That's where the initial fishing mortality on this stock is taking place because they have lower size limits. I think it would be prudent for this board to take action at the same time on this. I will be prepared to make a motion or a substitute motion depending which way we go to try and have us initiate an action that would be going at the same timeframe.

CHAIRMAN O'CONNELL: I've got two more speakers and then perhaps we can get a motion on the table to focus the discussion. Bob.

MR. ROBERT BALLOU: Thanks to all for a very informed and thoughtful discussion today. I've learned a lot. My sense as to where I think we should go is very similar to that just expressed from Mr. Grout. I like the idea of rolling together the reference points with regard to the coastal stock and the producer areas together with a management review, if you will.

I don't see the need for a rush-to-management response, but I do certainly see the need for a management review in accordance with the information generated from the stock assessment. Perhaps most importantly I would want to see any action taken to be effective for the 2015 fishing year.

I just think from a practical standpoint it would be very difficult, if not impossible, for a state like Rhode Island to implement new management measures for the 2014 season given the timeframes that we're looking at here. I would support a motion that sounds very similar to the one that Mr. Grout was suggesting. Thank you.

MR. AUGUSTINE: Mr. Chairman, I would like to make that motion. **I move that we go forward with a draft addendum to implement the new reference points effective January 1, 2014.** I would like to hold the second motion. Either Mr. Grout or Mr. Diodati, if they have a preference to make the second motion – let me get a second on that first, please.

CHAIRMAN O'CONNELL: All right, let's get it on the screen and make sure we get it right first.

MR. AUGUSTINE: I would like to have it separated. I would like to have the reference points separated based on the benchmark; and then the second one stand alone because there will be some options put in it what specifically we'll do in terms of management, and I would like to see that effective January 1 of 2015. It may require a substitute motion by someone else.

CHAIRMAN O'CONNELL: **All right, Pat, are you okay with the wording that staff put up there; "Move to develop an addendum to adopt the new biological reference points as determined by the 2013 benchmark assessment"?**

MR. AUGUSTINE: Yes, Mr. Chairman, that is excellent.

CHAIRMAN O'CONNELL: All right, do we have a second to the motion? I've got Loren. All right, discussion on the motion. Doug.

MR. GROUT: Clarification, Pat; are you including new reference points for the Chesapeake Bay in this motion, which we don't have?

MR. AUGUSTINE: I'm hesitant because there is underway some other reassessment by Albemarle. Now, is that a stand-alone? Let's get some clarification on that before I say yes or no. If it includes the Chesapeake and the other and it is appropriate to include them based on what our technical committee has told us, then I would say yes. I would like to get a response to find out if it is better to do it that way. I do not want to rush an assessment that is going on if that is going to create a problem for several of our –

MR. GROUT: Yes, just for clarification, I meant for Chesapeake Bay and North Carolina. That's my question.

MR. AUGUSTINE: Mr. Chairman, can I get clarification from the states that are affected on the Albemarle and the other? If not, we'll just include it and then let them discuss whether they want to substitute that. Let's make it inclusive. Thank you, Mr. Grout, make it inclusive with the Chesapeake and –

CHAIRMAN O'CONNELL: So can we add wording to that to make it clarify that this addendum would include reference points from the coast as well as the producer areas.

MR. AUGUSTINE: And producer areas unless there is absolute problems with that.

DR. DUVAL: I certainly don't have a problem with including the biological reference points for the producer areas. All I was saying is that we do our own assessment for the Albemarle/Roanoke stock. One thing I just wanted to clarify, based on a comment that Doug made, the Albemarle/Roanoke is not a producer area in the sense that the Chesapeake Bay is.

Our JAI is not included in the coast-wide stock assessment at all. We have a very small percentage of out-migration. We've just had some recent work done on that and has been accepted for publication. It has been peer reviewed now showing sort of a size dependency on out-migration. I did just want to clarify that for the record.

MR. AUGUSTINE: To that point, Mr. Chairman, that's fine – then with the Chesapeake, we're all set.

MR. O'REILLY: I share the idea that this can go forward. I think the technical committee understands this; we have a tag-based fishing mortality rate that is for the Chesapeake Bay. We have had a single value. I'm not really positive that it is – it has been called a target; so when you talk about biological reference points, it is a little bit different in that since 1995 there has just been what is called a target fishing mortality rate. There hasn't been the same situation with a limit or threshold and a target, but I think the technical committee probably can do something there.

MR. DIODATI: It seems to me that we've been rushing this decision since 2011; but given that, **I would like to make a substitute motion,**

which I don't think I'm going to have much support from the board, but I will make it, anyway. It is add to this motion the language that was on the screen a few minutes ago.

CHAIRMAN O'CONNELL: Can we try to work to get that on the screen?

MR. DIODATI: It would start with "and to"; so it is all the existing language plus the supplemental language that was on the screen.

CHAIRMAN O'CONNELL: I think the staff understands. Let's give them a second to put it on the screen for review and then we'll see if there is a second for that. While we're waiting for that, in regards to moving forward an addendum for the reference points, that action, if approved, would task the technical committee to develop the stock-specific reference points for the producer areas. That would be brought back to the board in February under consideration as an addendum and then going out for public review. Paul, are you good with that language on there?

MR. DIODATI: It doesn't include the language that was in Mr. Augustine's motion.

CHAIRMAN O'CONNELL: Okay, staff, what we need is Pat's main motion substituted to include the management response for the coastal area.

MR. DIODATI: And then add where it starts "and to implement".

CHAIRMAN O'CONNELL: I think all we need to do is take "and to implement" and add that to the original motion. While we're waiting, Alexei, do you want to make a clarification in regards to the biological reference points for the producer areas?

MR. SHAROV: Yes, I just want to reiterate what Mr. O'Reilly had mentioned earlier that with respect to the Chesapeake Bay Biological Reference Point, there is only one single reference point for the fishing mortality that has been historically developed. Unfortunately, we don't have an ability to produce an estimate of the spawning stock biomass like with the statistical catch-at-age model we do with coastwide.

We were unable to methodologically do this just for the Bay area. For that reason we have only F-based reference point, which was called the target reference point. I just want to get a clarification from the board that there is no expectation of the production of the SSB reference points, because that would be a challenge to the technical committee to do so; so that you know it now and not ask us how come that you didn't do this thing three months from now.

CHAIRMAN O'CONNELL: So, basically, it would be the same as it is in Amendment 6 right now. Dennis.

MR. DENNIS ABBOTT: I'm getting confused. I see this motion being changed and still being seconded by Mr. Augustine and Mr. Lustig. I'm not sure where we're going, but we should have a substitute motion that was offered by Mr. Diodati and have a second to that.

CHAIRMAN O'CONNELL: Yes, we're cleaning that up right now. We're in the process of cleaning it up and we will try to clarify where we are at here in a second. Dave.

MR. SIMPSON: While we're working on that, I'm trying to get a sense of how big the reduction this might represent. We heard from Gary that for Massachusetts this would be about 38 percent reduction in the recreational fishery harvest. I guess you're more familiar – would that be on the high end, do you think, of other states; you know, really good fishing off of Massachusetts, so that would be the high end probably?

DR. NELSON: Probably the high end, yes. It would more likely be lower – if we do the bag limit analysis for each state, it would probably be lower.

CHAIRMAN O'CONNELL: All right, Paul, what do you think of the language there; good? **Move to substitute to develop an addendum**

to adopt the new biological reference points for the coastal fishery as determined by the 2013 benchmark assessment, as well as biological reference points for the Chesapeake Bay and Albemarle/Roanoke stocks, and to implement a 28-inch minimum size and one fish daily limit for coastal recreational fisheries with an equivalent reduction for coastal commercial quotas for implementation in 2014. Made by Mr. Diodati; second by Ritchie White. Discussion on the motion? Tom.

MR. FOTE: I'm just trying to figure out what equivalency means. We're talking about this being a 35 percent reduction or a 38 percent reduction in the recreational catch. Does that mean that it is also corresponding to a 38 percent reduction in the commercial catch? If we're doing equivalency, that is what I would assume that means. I just want to get that clarified. We might as well put that up that it will be the same percentage reduction that we do in the recreational. Otherwise, people will not look at this as being equal and equivalent.

CHAIRMAN O'CONNELL: All right, Pat, do you want to speak for or against the motion. I'm going to practice our parliamentary training procedures here.

MR. AUGUSTINE: I'm against it, sir. If you would like to have me talk now, I will. Okay, the problem I have with this is do we know biologically – or not biologically, but do we know through our statistical folks there that 28 inches is going to do the job? Now, the reason I wanted it separated is because I was going to ask as a part of the options that the technical committee come forward with what percentage of reduction would that mean.

Should we go to a 28 inch: what would be the effect on our stocks? What if 28 isn't the right number? What if we should go to 27 or 26? If this is a moving management plan and a live management plan, we may want to go back and do that for two years or three years; to get two or three years of good production.

I see Alexei nodding his head yes; so to lock in now in one motion, where you have a complex motion that some folks are in favor of the top part, let's get that out of the way and then go to the second part. I would move to divide the question, Mr. Chairman. I can do that by Roberts' Rules, can't I, Mr. Abbott? Thank you, sir, and maybe you'll second it for me.

I would move to divide the question right where we were before, "biological reference points to the Chesapeake Bay and Albemarle-Roanoke stocks", period. That would be Motion 1. The second motion would then be to start with the next line, "implement a 28-inch minimum size and one fish daily limit" –

CHAIRMAN O'CONNELL: Pat, I may need a little help here from staff, but I think we need to determine whether or not the substitute motion will replace the main motion before we divide it.

MR. AUGUSTINE: Darn; I thought I could get away with it.

EXECUTIVE DIRECTOR ROBERT E. BEAL: Unfortunately, you can divide a substitute motion. (Laughter)

MR. AUGUSTINE: Thank you, Mr. Beal.

EXECUTIVE DIRECTOR BEAL: The first vote is whether the board does or does not want to divide the question, and then you will have subsequent votes on the reference points be included in an addendum, and then your next vote will be on the management being included in an addendum.

CHAIRMAN O'CONNELL: All right, Pat, do you want to make the motion or do you want to let the discussion continue on the substitute?

MR. AUGUSTINE**: I want to make that motion to divide. I want to divide it as I said – divide the question, "move to substitute to develop an addendum to adopt" I'm trying to read it there – "for the coastal as well as – yes, so divide it at the point where we say "Roanoke stock", period; and then stop there; drop off the word "and to " or "or to**

implement" – no, take out "and to"; and then it starts off "implement a 28-inch" – that would be the second motion. Then we could deal with them separately. I will probably want to substitute that, too, but that is another story.

CHAIRMAN O'CONNELL: Do we have a second to the motion? Roy seconded the motion. I guess where we're at is a motion to divide the substitute motion. The motion will be to divide the question to address the biological reference points and the management measures in separate motions. Motion made by Pat Augustine; seconded by Roy Miller.

Discussion on that motion? All right, let's vote on the motion. All those in favor please raise your right hand; all those opposed please raise your right hand; any abstentions; null votes, 1 null vote**. The motion passes.** Staff is working to divide those two so we can take those on one at a time; so just bear with us for a second. Dennis.

MR. ABBOTT: Mr. Chairman, we've been going along here and we were going quite well. I was viewing where we were headed is with this whole management issue that we viewed striped bass management and we have been heading down a highway and we had suddenly gone to the right-hand lane and we veered into the breakdown lane; and we're making a decision of whether we want to go in the gutter or not.

I think that taking some action essentially and hopefully will put us back on the right track; but what seems to have happened in the last 15 minutes is we got back on the road and we're now on a Ferrari going a hundred miles an hour. I think it all went a little faster than what we would have liked. The first motion that was made is divided now; so we're going to deal with the two divided motions. I think that it would have been easier to vote on the first motion that was offered and to have a decision on that, because it is way too early, in my opinion, to decide, in deference to Paul Diodati and others, at this point we need a one-fish limit and a 28-inch size limit at this point in time. Especially in the year 2014; to me it is nearly an impossibility to achieve that. I think the formation of an addendum is the right way to go, so my vote would be to vote down the second part of the divided question, adopt the first question, and then from there decide in which direction we want to go and leave it at that today and move ahead. At least those are my thoughts.

MS. TONI KERNS: The board will need to vote on both of the divided questions; and then whatever passes from those two votes will become the main motion.

CHAIRMAN O'CONNELL: So moved to substitute to develop an addendum to adopt the new biological reference points for the coastal fishery as determined by the 2013 benchmark assessment, as well as biological reference points for the Chesapeake Bay and Albemarle/Roanoke stocks. Is there discussion on that motion? Russ, do you want to speak for or against it?

MR. RUSS ALLEN: For it. I'd just like to echo Dennis' comments. I thought they were very well put. I'm definitely for this part of the motion. Thank you.

CHAIRMAN O'CONNELL: All right, anybody else want to comment on the motion? I'll give you guys 30 seconds to caucus.

(Whereupon, a caucus was held.)

CHAIRMAN O'CONNELL: **All right, all those in favor please raise your right hand; all those opposed like sign; any abstentions; any null votes. The motion carries 15 in support; zero opposition; zero abstentions; zero null votes.** Now we're going to look at the second part of the divided question. **This is to implement a 28-inch minimum size and one fish daily limit for coastal recreational fisheries with an equivalent reduction for coastal commercial quotas for implementation in 2014.** Paul.

MR. DIODATI: I just want to clarify that in this motion the equivalent reduction was meant to reflect the percentage decrease that is achieved

by going from two fish to one in our coastal fisheries. We're heard that there are estimates from 35 to 38 percent; but what I envision is that the technical committee would take a broad range of what their estimates are along the coast and take an average, and it is going to be somewhere between it sounds like 30 and 40 percent.

That was the intent and I think that is captured well enough on the record. As for a 28-inch fish as a minimum size and a creel limit, that is a well-founded principle that we've been living by in this fishery for about 18 years. We know that works. That is not a new discovery or something that we haven't been dealing with.

It doesn't mean that a state cannot do something different. You always have the opportunity to come in with a conservation equivalency. I know that for some of us this might seem like a Ferrari-like action to take an action in 2014, but I'm a little bit disappointed that ASMFC, through this board, has not been able to move and it won't move – it is going to be about five years I expect before this board takes any action to make a correction in management for the most important fisheries' resource that we have before us.

That is an embarrassment and I really would encourage the board to think about that. It is not the messages that we all received in our e-mails. It is the information that is in front of me. The information that I see in our fisheries when I'm out there on the water, it is clear what is going on. There is no mystery.

We have more information about this resource and this fishery than any other fishery. If you've been sitting at this table a while and haven't recognized these signals, maybe you shouldn't be sitting here. I don't know; I'm kind of wondering if you can't see these signals, what can you see? I'm in support of this.

CHAIRMAN O'CONNELL: Thanks, Paul, and thanks for the clarification. Dave, do you want to speak for or against?

MR. SIMPSON: It is not so much for or against but thinking ahead to addenda and how we handle it, I would see this as it sets the bound for a range of alternatives. There is status quo and there is one fish. I would like to see something intermediate between the two. I don't know how to characterize that right now because I don't know what one fish does in terms of percent reduction in F.

I'm in favor of this provided we have the latitude for some intermediate level that might look like something like two fish over 28 but only one over 40; that sort of blend. As my colleague said, you can't have 1-1/2 fish, Dave, but something in between like that just needs to be included in the addendum.

CHAIRMAN O'CONNELL: Russ, do you want to speak for or against?

MR. ALLEN: Against. The reason I'm against this is I'd really like to hear the technical committee's input and options that they could set forth to move forward with this fishery. Just all of a sudden saying we're going to drop to a one-fish daily limit is drastic; and I don't see that as the solve all problems.

I think the board needs to hear a bunch of options that the technical committee puts together, and I think that's the process. In deference to Paul, I'm not looking at five years down the road. I'm only looking at 14 months to have an implementation date by January 1, 2015. I think I can wait that long.
Considering how long it takes New Jersey to get the process done, anyway, we're not going to have anything done until probably mid-summer, anyway, so then it's only a six-month wait from then. I'm definitely against this, and I hope to see this shot down. Thank you.

CHAIRMAN O'CONNELL: All right, I've got four more speakers. I have a reputation of ending meetings on time and it is in jeopardy today, so let's try to make the point specific so we can get to a vote here soon. Ritchie, for or against.

MR. WHITE: For. Paul really said it all; we've been dealing with this for a number of years. It is always kick the can down the road. We had the information and let's wait until the benchmark stock assessment. Okay, we have the benchmark stock assessment and it's telling us we need to take action and that we have been overfishing under the new terms of reference.

When you talk about a lot of other options, my guess is that if this fails, which it looks like, that the options are very limited because other than going to one fish your other options are going to be a season or increasing sizes. It seems clear to me that this is where we will end up even though it looks like it is going to take us longer. It looks like New Hampshire will not be voting as I would like it to vote, and I just want to make sure the constituents know where to send the e-mails. Thank you. (Laughter)

MR. GROUT: I have a motion to amend.

MR. ABBOTT: No, you can't; this is a substitute motion.

EXECUTIVE DIRECTOR BEAL: We're dividing the substitute motion.

MR. ABBOTT: We've already had a main motion and a second. We've got to do either this or that.

MR. GROUT: My motion to amend is to add at the end "and to include in the management action an equivalent reduction in the Chesapeake Bay quota that will be implemented in 2015".

CHAIRMAN O'CONNELL: I'm just trying to get clarification if we can allow the amendment to a divided question. We have a divided question to the main motion; can we amend it at this point in time?

EXECUTIVE DIRECTOR BEAL: Technically I don't think you can. I think it's cleaner to decide up or down on the second half of your divided question; and then if there are changes that need to be made after that, it is probably better to do it once you have kind of cleaned the table up a little bit. It is getting pretty messy right now.

CHAIRMAN O'CONNELL: All right, I'm going to rule it out of order right now.

MR. GROUT: That's fine; could I speak to this motion? Now that we're getting rid of the amendment, as I stated I certainly appreciate the board or Mr. Diodati and my fellow commissioners here a decision to make – wanting to make things happen quickly here, and I appreciate that.

I also appreciate the intent here by Mr. Diodati to make things simple; but I do very strongly believe that we need to move forward in the same action and do this in a holistic manner. Because at this point it is not included in there, I will encourage my other commissioner to vote against it with me; but at some point in the future, if this does pass, I would like to include some action in the Chesapeake Bay in the same addendum.

CHAIRMAN O'CONNELL: Paul, do you want to respond to this?

MR. DIODATI: Since that's still my motion I think, even though it has been split, I would be willing to accept Mr. Grout's amendment as a friendly one and not require it for – I can't do that?

CHAIRMAN O'CONNELL: I think we should try to deal with this divided question and get back to the main motion; and if people want to amend, we can do that. It is getting a little messy. Tom Fote, do you want to speak for or against?

MR. FOTE: Against.

CHAIRMAN O'CONNELL: All right, hold on. Michelle, for or against?

DR. DUVAL: I'm in the Dave Simpson camp; I'm in the neutral and I just wanted to echo his comments. I think I would just like to see a greater range of alternatives. Understanding what Ritchie has said that there is probably not a

whole lot of other places to go, but I think it would be important for the public to at least see what some of those other options are. Obviously, a reduction in season length is not going to be popular; but I think just for the public to see what those other options are. Thank you.

CHAIRMAN O'CONNELL: Mitch, are you for or against?

MR. MITCHELL FEIGENBAUM: I'm also in a little of both camps. My comments would echo David's and Michelle's that I do think there should be – that the PDT should have the ability to put any appropriate recommendations into the addendum as it sees fit. I have a particular question or concern.

Of course, I'm a little bit newer on this species so someone might clear up what I'm missing, but as I understand the stock assessment it is the spawning stock biomass coming too close to the threshold that's driving our concerns. If the technical folks tell us that the commercial harvest is not targeting the bigger fish, the spawning stock biomass, in the same proportion as the recreational fishery, would it really be appropriate, necessary or fair to insist on an equivalent reduction if in fact that portion of the fishery is not imposing as much impact? Perhaps I'm missing something, but it is a concern that – it just seems like it would be unfair to say the commercial reduction has to be the equivalent just as a matter of public relations. Is that going to serve a scientific purpose would be my question?

MR. FOTE: To answer Mitch, the commercial fishery on the coast is the same size. It has to be 28 inches or larger so you're targeting the same type of fish. In some states it is a hook-and-line fishery and it is a big-fish fishery. What I'm looking at – and I understand Paul is trying to prove his points and trying to move things, but to say some of the things I find a little annoying or I think presumes a lot of us.

This is a stock that is not being overfished and overfishing is not taking place. I look at the federal plans and when we look at scup and we look at black sea bass and we look at – and we have stocks that are not being overfished and overfishing is not taking place; and yet we're going to do reductions as we go along through this process on them. As we looked at scup and what happened at the Mid-Atlantic Council Meeting, this is a stock that is producing.

We made an estimate of what we wanted to have the spawning stock biomass. This is a stock that is not collapsing; the stock is not going to be any different. Some of us have been around this table 30 years ago because we cared about striped bass. It was one of the driving forces that got us involved.

We're not going to do anything that is going to hurt the stock. What we are looking at is what is the necessary knee-jerk reactions that we have taken over the years just to come back two years later and redo it. I can remember being forced to put a slot fish limit in New Jersey because basically the board forced us to do it.

I do it by legislation and two years later telling my legislature, making them have a special meeting, to change that because then the commission says, well, it wasn't necessary for you to do a slot limit and we want you back at two at 28 inches. Now, those are the knee-jerk reactions that have consequences in the way people respect us and people look at us.

Again, that is what I'm looking at; because I know two or three years down the road when we do another retrospective analysis these figures are going to be different than what they are now, and that is where I'm concerned. That is why I'm saying I don't want this Ferrari. I want to take it slow and easy if we're going to do a major change in a species that we've been fishing the same for 20 years without overfishing and without being overfished.

CHAIRMAN O'CONNELL: I have three people on the list, Dennis, Rob and Rob. Please, if something has already been stated, it doesn't need to be stated again and just try to keep your comment on a new concern or comment. Rob.

MR. O'REILLY: I just wanted to talk about 2015, and to me that's the way to go about this. The complaint in 2011 from the PDT was that the board had not given the PDT really a very good direction. No one again seemed to understand what the reductions in F – how they could be configured, how that could be done.

There was some talk of maybe looking at changes in maximum spawning potential. I think all of that imploded the whole event. I think that was certainly part of it. Now this divided motion part here is simplistic, but we still haven't heard what the impact is. I heard Dave Simpson ask a couple of times what does the technical committee think is the reduction that is required.

It seems like we need to know that information; what is required, what will help out here; and, secondly, what are the mechanisms that can be accomplished. How is the technical committee going to recommend that we go about this? I don't see that right now.

MR. ABBOTT: Tom, I hope that you conclude this meeting at 12:15 as I'm beginning a meeting at 12:15 with lunch included for the LGAs.

CHAIRMAN O'CONNELL: Help me out here, then.

MR. ABBOTT: I will. But, seriously, in my choice of using the Ferrari was obviously pointed at Mr. Diodati, a good Italian car (laughter). And, again, I agreed with most things that Paul Diodati said because I agree with him; and if you asked me as an individual what I wanted, I would probably go along with this.

But I think that we're in a political arena here in that we're trying to make sausage, and that is what politics is all about and it is about what is achievable at this time. I don't feel that achieving a result by 2014 is possible.

What I think we need to do is either vote this up or down and then offer a reasonable new motion which to me would be something along the lines of implementing an addendum to achieve what it is that the technical committee has shown us where we should go.

I can't come up with the exact words, but we really need to set the groundwork to have an addendum and give ourselves the opportunity to work through that and have it implemented by the year 2015. I thank you for your indulgence.

CHAIRMAN O'CONNELL: We got one last speaker and then we're going to call the question.

MR. MILLER: Mr. Chair, I need a clarification before I can vote on this particular motion; and that is specifically with regard if I could request of the maker of the motion did he intend, as Amendment 6 does, to lump Delaware River and Delaware Bay into coastal fisheries; or, my memory goes back to prior to Amendment 6 when Delaware River and Delaware Bay were part of the producer area; so which is it for the purposes of this motion? Thank you.

MR. DIODATI: I wouldn't use this motion to change the way we've been managing the fishery since we've implemented the current amendment. However your fishery and your geographic area are defined in the current amendment, it would remain under that definition. I would pose to change that. That's a different game.

CHAIRMAN O'CONNELL: I see your hand in the audience. We're still trying to get back to a main motion; so I'm not going to call upon you right now and probably not going to be call on the public, recognizing that if the board moves forward, this is just initiating an addendum. It is going to come back in February, which there will be other opportunities for the public to comment.

I apologize for that, but it is based upon the time constraints that are upon us today. I would encourage you to follow up with board members after the meeting if you have a concern that has not been raised. We're going to call the question here; 30 seconds to caucus.

(Whereupon, a caucus was held.)

CHAIRMAN O'CONNELL: All right, let's take the vote here. Depending on how this vote turns out, we're going to go back and vote on the main motion of the divided question**. All those in favor please raise your right hand; all those opposed please raise your right hand; abstentions; null votes. The motion fails two to twelve, zero, zero.**

Now we're going to go to the main motion, which was the first part of this divided question. The main motion is to develop an addendum to adopt the new biological reference points for the coastal fishery as determined by the 2013 benchmark assessment, as well as biological reference points for the Chesapeake Bay and Albemarle/Roanoke stocks. Is there discussion on the motion? Michelle.

DR. DUVAL: Just a clarification; it is not two separate stocks for the Albemarle and Roanoke. It is one stock so it should read Albemarle/Roanoke.

CHAIRMAN O'CONNELL: We can make that clarification without any objection. Bob.

MR. BALLOU: Mr. Chairman, I'm certainly supportive of this motion. I would also be supportive of either an additional motion or a substitute motion that would add to this language, language along the following the following lines, "combined with a range of management options to address fishing mortality reductions for implementation in 2015".

I don't know about parliamentary procedures in terms of whether we want to deal with this first and that issue second or whether a substitute motion would be in order at this time, but those are my sentiments. Thank you.

CHAIRMAN O'CONNELL: Well, it is the board's preference but I think it would be more efficient if we could deal with this motion and then discuss if there is additional action the board wants to consider. Okay, Bob? All right, Doug.

MR. GROUT: Just another potential clarification for the motion based on what Alexei's comments were about this, that maybe when it says "as well as F biological reference points" – " fishing mortality biological reference points", just to make it clear that we're not talking about SSB for Chesapeake Bay and Albemarle/Roanoke.

CHAIRMAN O'CONNELL: We can put that in parentheses, perhaps. Loren.

MR. LOREN W. LUSTIG: Although it is somewhat confusing with the tremendous amount of dialogue we've had, I believe this is indeed Pat Augustine's motion, which I seconded, and perhaps for the record you would like to include that information.

CHAIRMAN O'CONNELL: It doesn't matter at this point, I guess, but it is on the record. **The main motion is to develop an addendum to adopt the new biological reference points for the coastal fishery as determined by the 2013 benchmark assessment, as well as biological reference points (fishing mortality) for the Chesapeake Bay and Albemarle/Roanoke stock.** All right, 30 seconds to caucus.

I don't see anybody talking so let's call the question. All those in favor please raise your right hand; all those opposed please raise your right hand; any abstentions; null votes. **The motion carries fifteen, zero, zero, zero**. Go ahead, Pat.

MR. AUGUSTINE: Mr. Chairman, unless Mr. Grout would like to make the motion he talked about**, I move that the board initiate an addendum, directing the technical committee to develop a range of management measures to reduce fishing mortality to meet the recommended target reduction.**

I'm not sure if "target reduction" are the right words; but if you want to help me wordsmith that one, I would appreciate it. The essence is we want them to come forward with a range of options, whether it includes one at 28 or whether it is 24 or 26, but leave it up to the technical committee to give us a broad range. I could

qualify it by saying five options because we don't want more than 15 or 20, and we can talk about that later; but the essence is to develop that range. That's my motion, Mr. Chairman.

CHAIRMAN O'CONNELL: So the concept, as they're writing it, is to task the staff and the technical committee to begin developing options that will bring the fishery back to the fishing mortality target?

MR. AUGUSTINE: Yes, to be implemented in 2015, if you want to add that, so we now have closed the loop; January 1st of 2015.

CHAIRMAN O'CONNELL: And the date would be to be implemented in –

MR. AUGUSTINE: To be implemented by January 1, 2015, because that will close the loop as far as the public is concerned that we are taking specific action.

CHAIRMAN O'CONNELL: And, Pat, just one other question for clarity; it was your intention that the reduction would be to reduce the fishery to the target level to be achieved in 2015 or over a period of years?

MR. AUGUSTINE: The real concern is whether or not it's conceivable to spread it out over a group of years. My concern there is if we do – and I'd like to hear from the other members before I give the yes or no – we do not want to kick the can down the road. We want to make sure that we're going to be able to bring this back to that level we want it. I would say, no, in 2015 and then let the public come back and say it is not doable or the commissioners around the table say it's not doable.

CHAIRMAN O'CONNELL: **All right, we got a motion: move to initiate an addendum to develop a range of management measures that reduces fishing mortality to meet the fishing mortality target implemented in January 2015.** Made by Pat Augustine; second by Dennis Abbott. Ritchie.

MR. WHITE: I would ask the maker of the motion if he would "at least" – "reduce fishing mortality to at least the target," so there might be something in there that might be a little more conservative.

MR. AUGUSTINE: Please add that. Thank you.

MR. O'REILLY: I guess I would ask the technical representatives if that addresses some of the concerns of the past about reducing fishing mortality rates in areas with different size limit regimes and different affects that is it more that the measures to achieve the fishing mortality target; so it might be harvest rate, annual harvest rate; it might be the exploitation rate. Is that something that the technical committee is comfortable with?

CHAIRMAN O'CONNELL: They're shaking their head yes. Are there other comments on the motion?

MR. AUGUSTINE: Mr. Chairman, is that implicit in our request; is that implicit to the technical committee what Rob O'Reilly said?

CHAIRMAN O'CONNELL: I think so, yes. John.

MR. CLARK: My only comment was if you're talking about the target now, you're saying that we have to go at least to the target; so we have to go below the threshold down to the target and even below the target mortality; that is what we're shooting for in this addendum?

CHAIRMAN O'CONNELL: This motion is to get to at least the target. Bill Adler.

MR. WILLIAM A. ADLER: Mr. Chairman, is the intent here for two separate addendums to be delivered to us in February, which was the first one that passed; and the second is this one. Is that the intent here, so we're going to be looking at two different addendums to approve to go out to public hearing after the February meeting; is that what I'm understanding here?

CHAIRMAN O'CONNELL: Yes, I see it being two separate addendums. Whether or not we can get this addendum ready to go out to public

comment after the February meeting is a thing that is going to be pretty ambitious, but it would at least bring something back to the board to fine tune and maybe if not February, in May. Bob.

MR. BALLOU: Mr. Adler actually asked the question I was going to ask. I would prefer to have the two actions rolled together. I think it serves the public better to have just one addendum to focus on addressing both issues, but I understand your point and I think it is well taken. I think we can deal with that issue at the February meeting.

I would just lastly note that I think the addition of the words "at least" make me less supportive of this motion. I don't think they're necessary and I think it pushes us farther than where we need to go. Generally, I like the motion with the caveat that the addition of those words "at least" I think are unnecessary. Thank you.

MR. BORDEN: Mr. Chairman, I assume it is the intent here – this is just for the record – I assume that the intent is to implement this in all areas on January 1, 2015; is that correct?

CHAIRMAN O'CONNELL: That is yet to be determined, but I think that is the kind of focus that this will include coastal areas and producer areas, and the board will review the options that the technical committee provides. Paul.

MR. DIODATI: We talked about the existing management triggers in our current amendment, the five, and in several of them there is very similar language. I want to make sure that this language doesn't contradict with that in the amendment unless we really want it to change. The original language, for instance, says the board must adjust the Striped Bass Management Program to reduce the fishing mortality rate to a level that is at or below the target within one year if the fishing mortality threshold is exceeded in any year. You want to I think be consistent with that amendment language. We have done that for six of the nine years if we accept the biological reference points.

CHAIRMAN O'CONNELL: Yes, I think we're consistent. Doug.

MR. GROUT: Mr. Chairman, I do support this motion. I think it is holistic and a prudent way to go. I think it will make things cleaner. I do also continue to support Mr. Diodati's concept that we make the options – that we limit the number of options that each sector has so that we don't get wrapped up like we did before with having so many options that it was so confusing that we didn't do anything. I want to make sure we have some very – I would like to encourage the board to direct the PDT to develop something with a very relatively small number of options for each sector, the recreational and commercial base and the Chesapeake Bay and Albemarle/Roanoke Sound management measures.

CHAIRMAN O'CONNELL: All right, let's call the question**. The motion is move to initiate an addendum to develop a range of management measures that reduces fishing mortality to at least the fishing mortality target with implementation in January 2015.** Motion by Mr. Augustine; second by Mr. Abbott.

All those in favor please raise your hand; all those opposed; any abstentions; null votes. **The motion carries fourteen to one to zero to zero.**

FMP REVIEW AND STATE COMPLIANCE

CHAIRMAN O'CONNELL: Given the time constraints before us today, we're going to skip the FMP review. Is there any objection with doing that? If you have any questions, follow up with myself or staff.

ADJOURNMENT

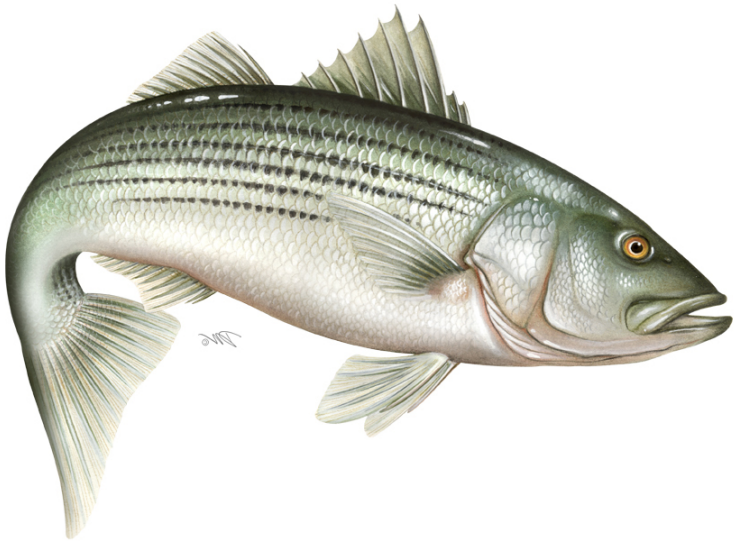
Is there any other business that the board wants to bring up? All right, before we adjourn I think we all owe gratitude to the folks that were involved with the stock assessment and the peer review, particularly Gary Nelson who has chaired the last two benchmark stock assessments. With that, staff has a little gift for Gary. (Applause) Meeting adjourned.

(Whereupon, the meeting was adjourned at 12:20 o'clock p.m., October 29, 2013.)

2013 REVIEW OF THE
ATLANTIC STATES MARINE FISHERIES COMMISSION
FISHERY MANAGEMENT PLAN FOR

ATLANTIC STRIPED BASS
(Morone saxatilis)

2012 FISHING YEAR



Atlantic Striped Bass Plan Review Team
Charlton Godwin, North Carolina Division of Marine Fisheries
Wilson Laney, US Fish and Wildlife Service
Gary Shepherd, National Marine Fisheries Service
Mike Waine, Atlantic States Marine Fisheries Commission, Chair

Executive Summary

Atlantic striped bass from Maine through North Carolina are managed under Amendment 6 to the Interstate Fishery Management Plan, and Addendum I, II and III to Amendment 6.

Stock status was estimated in 2011. The stock was not overfished and overfishing was not occurring in 2010, although total striped bass population abundance declined 37 percent from 2004. A benchmark stock assessment was completed and peer reviewed by the 57th Stock Assessment Review Committee in July 2013, and will be considered for management use at the Management Board meeting in October 2013.

The review of the juvenile abundance indices did not trigger any recommendations for management action. Recruitment failure is defined as a value that is below 75% of all values in a fixed time series appropriate to each juvenile abundance index.

Total striped bass harvest in 2012 is estimated at 2.385 million fish or 25.8 million pounds, which is a 24.2% decrease by weight and a 24.6% decrease by number from 2011. Recreational anglers harvested 1.54 million fish (19.27 million pounds) in 2012, while commercial fishermen harvested 839,329 fish (6.51 million pounds). Dead discards from the recreational fishery are estimated at 467,270 fish.

All states have implemented management programs consistent with Amendment 6. Two states (MA and DE) exceeded their coastal commercial quotas in 2012, requiring reduced 2013 quotas. The Chesapeake Bay quota in 2012 was 8.9 million pounds and was not exceeded.

All states have implemented monitoring programs consistent with Amendment 6. Requirements vary by state, and may include monitoring commercial and/or recreational catch, effort, and catch composition, and performing juvenile abundance surveys, spawning stock surveys, and tagging programs.

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I. Status of the Fishery Management Plan

Date of FMP Approval:	Original FMP – 1981
Amendments:	Amendment 1 – 1984 Amendment 2 – 1984 Amendment 3 – 1985 Amendment 4 – 1989; Addendum I – 1991, Addendum II – 1992, Addendum III – 1993, Addendum IV – 1994 Amendment 5 – 1995; Addendum I – 1997, Addendum II – 1997, Addendum III – 1998, Addendum IV – 1999, Addendum V – 2000 Amendment 6 – 2003; Addendum I – 2007, Addendum II – 2010, Addendum III – 2012
Management Unit:	Migratory stocks of Atlantic striped bass from Maine through North Carolina
States With Declared Interest:	Maine - North Carolina, including Pennsylvania
Additional Jurisdictions:	District of Columbia, Potomac River Fisheries Commission, National Marine Fisheries Service, United States Fish and Wildlife Service
Active Boards/Committees:	Atlantic Striped Bass Management Board, Advisory Panel, Technical Committee, Stock Assessment Subcommittee, Tagging Subcommittee, Plan Review Team, and Plan Development Team

The Atlantic States Marine Fisheries Commission (Commission) developed a fisheries management plan (FMP) for Atlantic striped bass in 1981 in response to declining juvenile recruitment and landings. The FMP recommended increased restrictions on commercial and recreational fisheries, such as minimum size limits and harvest closures on spawning grounds. Two amendments were passed in 1984 recommending additional management measures to reduce fishing mortality. To strengthen the management response, the Atlantic Striped Bass Conservation Act (P.L. 98-613) was passed in late 1984, which mandated the implementation of striped bass regulations passed by the Commission.

The first enforceable plan, Amendment 3, was approved in 1985, and required size regulations to protect the 1982 year class, which was the first modest size cohort since the previous decade. The objective was to increase size limits to allow at least 95% of the females in the cohort to spawn at least once. Smaller size limits were permitted in producer areas than along the coast. Several states, beginning with Maryland in 1985, opted for a more conservative approach and imposed a total moratorium on striped bass landings for several years. The amendment contained a trigger mechanism to reopen the fisheries when the 3-year moving average of the Maryland juvenile abundance index (JAI) exceeded an arithmetic mean of 8.0. That level was attained with the recruitment of the 1989 year class.

Consequently, Amendment 4 was adopted to allow state fisheries to reopen in 1990 under a target fishing mortality (F) of 0.25, which was half the estimated F needed to achieve maximum

sustainable yield (MSY). The amendment allowed an increase in the target F once spawning stock biomass (SSB) was restored to levels estimated during the late 1960s and early 1970s. The dual size limit concept was maintained, and a recreational trip limit and commercial season implemented to reduce the harvest to 20% of that in the historic period of 1972-1979. The amendment and its four addenda aimed to rebuild the resource, rather than maximize yield.

In 1995, coastal striped bass were declared restored by the Commission, and Amendment 5 was adopted to increase the target F to 0.33, midway between the existing F target (0.25) and $F_{MSY,}$ which was revised to 0.40. Regulations were developed to allow 70% of the historic harvest and achieve the target F , although states were allowed to submit proposals for alternative regulations that were conservationally equivalent. From 1997-2000, a series of five addenda were implemented to respond to the latest stock status information.

In 2003, Amendment 6 was adopted to address five limitations within the management program: 1) potential inability to prevent the Amendment 5 exploitation target from being exceeded; 2) perceived decrease in availability or abundance of large striped bass in the coastal migratory population; 3) a lack of management direction with respect to target and threshold biomass levels; 4) inequitable effects of regulations on the recreational and commercial fisheries, and coastal and producer area sectors; 5) and excessively frequent changes to the management program. Amendment 6 was fully implemented by January 1, 2004, and completely replaced all previous Commission plans for Atlantic striped bass.

The goal of Amendment 6 is to perpetuate, through cooperative interstate management, migratory stocks of striped bass; to allow commercial and recreational fisheries consistent with the long-term maintenance of a broad age structure, a self-sustaining spawning stock; and also to provide for the restoration and maintenance of their essential habitat. In support of this goal, the following objectives are included:

- Manage striped bass fisheries under a control rule designed to maintain stock size at or above the target female spawning stock biomass level and a level of fishing mortality at or below the target exploitation rate.
- Manage fishing mortality to maintain an age structure that provides adequate spawning potential to sustain long-term abundance of striped bass populations.
- Provide a management plan that strives, to the extent practical, to maintain coastwide consistency of implemented measures, while allowing the States defined flexibility to implement alternative strategies that accomplish the objectives of the FMP.
- Foster quality and economically viable recreational, for-hire, and commercial fisheries.
- Maximize cost effectiveness of current information gathering and prioritize state obligations in order to minimize costs of monitoring and management.
- Adopt a long-term management regime that minimizes or eliminates the need to make annual changes or modifications to management measures.
- Establish a fishing mortality target that will result in a net increase in the abundance (pounds) of age 15 and older striped bass in the population, relative to the 2000 estimate.

Amendment 6 modified the F targets and thresholds, and introduced a new set of biological reference points (BRPs) based on females spawning stock biomass (SSB), as well as a list of management triggers based on the BRPs. (The targets and thresholds were updated in 2008; see Sections II and IV for more information.) The coastal commercial quotas for striped bass were restored to 100% of the states' average landings during the 1972-1979 historical period, except for Delaware's coastal commercial quota, which remained at the level allocated in 2002. In the recreational fisheries, all states were required to implement a two fish bag limit with a minimum size limit of 28 inches, except for the Chesapeake Bay fisheries, Albemarle/Roanoke fisheries, and states with approved alternative regulations. The Chesapeake Bay and Albemarle/Roanoke regulatory programs are predicated on a more conservative F target than the coastal migratory stock, which allows these jurisdictions to implement separate seasons, harvest caps, and size and bag limits as long as they remain under that F target. No minimum size limit can be less than 18 inches. The same minimum size standards regulate the commercial fisheries as the recreational fisheries, except for a minimum 20 inch size limit in the Delaware Bay spring gillnet fishery.

States are permitted the flexibility to deviate from these standards by submitting proposals for review by the Striped Bass Technical Committee, Advisory Panel, and Plan Review Team and contingent upon the approval of the Management Board. A state may request a change only if it can demonstrate that the action is "conservationally equivalent" to the management standards or will not contribute to the overfishing of the resource. This practice has resulted in a variety of regulations among states (see Tables 1 and 2).

In 2007, Addendum I was implemented to establish a bycatch monitoring and research program to increase the accuracy of data on striped bass discards and also recommend development of a web-based angler education program. In 2010, Addendum II modified the definition of recruitment failure as a value that is below 75% of all values in a fixed time series appropriate to each juvenile abundance index. In 2012, Addendum III was approved by the Board. This addendum requires all states and jurisdictions with a commercial fishery to implement a commercial harvest tagging program. The addendum was initiated in response to significant poaching events in the Chesapeake Bay and aims to limit illegal harvest of striped bass.

The Exclusive Economic Zone (EEZ) has been closed to the harvest and possession of striped bass since 1990, with the exception of a defined route to and from Block Island in Rhode Island. A recommendation was made in Amendment 6, and submitted to the Secretary of Commerce, to re-open federal waters to commercial and recreational fisheries. Starting in July 2003 and continuing for several years, National Marine Fisheries Service (NMFS) took steps in the rulemaking process to consider the proposal. In September 2006, NMFS concluded that it would be imprudent to open the EEZ to striped bass fishing and chose not to proceed further in its rulemaking. Specifically, NMFS concluded that: 1) it could not be certain, especially after taking into account the overwhelming public perception that large trophy sized fish congregate in the EEZ, that opening the EEZ would not increase effort and lead to an increase in mortality that would exceed the threshold, and 2) both the Commission's and NMFS' ability to immediately respond to an overfishing and/or overfished situation is a potential issue, particularly given the timeframe within which Amendment 6 was created, and given the lag time in which a given year's data is available to management (71 FR 54261-54262).

Additionally, in October 2007, President George W. Bush issued an executive order prohibiting the sale of striped bass (and red drum) caught within the EEZ. The Order also requires the Secretary of Commerce to encourage management for conservation of the resources, including State designation as gamefish where the State determines appropriate under applicable law, and to periodically review the status of the populations within US jurisdictional waters. The most recent report to Congress on the status of the striped bass population was submitted in 2012 (NOAA 2012).

II. Status of the Stocks

The 2013 benchmark stock assessment was completed and peer reviewed by the 57th Stock Assessment Review Committee in July 2013. The 2013 assessment will be considered for management use by the Board at its October 2013 meeting. As a result the most recent status of the stock is based on results from the 2011 stock assessment update.

In 2011 a stock assessment was conducted by the Striped Bass Technical Committee, Stock Assessment Subcommittee, and Tagging Subcommittee which included data through 2010 (ASMFC 2011). Two models were included to assess stock status: an age-based statistical catch-at-age (SCA) model, and a tag-based catch equation (CE) model. Based on the results of both models and comparison to the biological reference points, below, Atlantic striped bass are not overfished and are not experiencing overfishing.

	Female Spawning Stock Biomass	***Fully-Recruited Fishing Mortality***
Threshold	SSB_{1995} = 30,000 metric tons	F_{msy} = 0.34
Target	$SSB_{threshold}$ x 1.25 = 37,500 metric tons	0.30 (0.27 in Chesapeake Bay and Albemarle/Roanoke)

The SCA model estimated that the resource remains at a high level with female spawning stock biomass (SSB) at 50,548 metric tons (mt), or 168% of the threshold and 134% of the target (Figure 1). The 2010 estimate of SSB was a decrease from the 2008 estimate of 55,500 mt and SSB estimates continue to be less than the time series maximum of 63,588 mt in 2004. Recruitment estimated in the SCA model as age-1 abundance averaged 13.5 million fish from 1994-2004 (Figure 2). The 2003 cohort (age 1 in 2004) remains the second largest year-class since 1982 at 20.8 million fish. The 2009 and 2010 estimates (7.1 million and 9.1 million, respectively) were near the average recruitment observed during 2005-2010 (8.1 million fish), but well below the 1994-2004 average. The SCA model estimated the 2010 fishing mortality rate (F) on age 8–11 fish to be F=0.23, which is well below the fishing mortality threshold and target (Figure 3).

Overall, the conclusion is that stock abundance has declined since the assessment time series high of 2004. The decrease in abundance is reflected in a decline in coastwide catch in 2009 and 2010, particularly in recreational discards comprised of smaller fish. The decline is more prevalent in areas largely dependent on contributions from the Chesapeake stocks (such as Maine) than areas such as New York that are dominated by the Hudson stock (Waldman et al 1990). Despite the decline in abundance, the spawning stock in 2010 remained relatively high

due to the growth and maturation of the 2003 year class and the accumulation of spawning stock biomass from year classes prior to 1996.

Because Amendment 6 implemented distinct management programs for the Chesapeake Bay and Albemarle/Roanoke area with a fishing mortality target of 0.27, separate estimates of fishing mortality for the areas are required. The 2011 stock assessment includes the estimates for the Chesapeake Bay. Based on application of Maryland and Virginia tagging data to the CE model, Chesapeake Bay F estimates for fish 18 – 28 inches ranged from 0.01 to 0.15 throughout the time series (1987-2010), and was estimated at 0.16 for 2010.

In March 2010, the North Carolina Division of Marine Fisheries used the Age Structured Assessment Program (NOAA Fisheries Toolbox http://nft.nefsc.noaa.gov/) to determine stock status (data through 2008). Currently, the stock is not experiencing overfishing. Fishing mortality on ages 4-6 striped bass has declined steadily since 2004 and was estimated at 0.10 in 2008. The JAI continues to fluctuate around the average observed since the stock was declared recovered in 1997. The age structure of the stock continues to expand, with an overall increase in abundance of age 9+ fish in the population. The current maximum age observed on the spawning grounds is 17 (captured during the 2008 sampling season). Estimated abundance of age 4-6 striped bass in the stock increased steadily and peaked in 2000 at about 550,000 fish. Age 4-6 abundance declined slightly and varied without trend at about 470,000 fish through 2006, and has since fallen to an estimated 336,000 fish in 2008. The low abundance of age 4-6 fish in 2008 is due to poor recruitment from the 2003 and 2004 year classes.

III. Status of the Fishery

Total striped bass commercial and recreational harvest in 2012 (excluding Albemarle Sound/Roanoke River Management Area) is estimated at 25.8 million pounds or 2.385 million fish (Figures 4 and 5; Tables 3 - 6). This is a 24.2% decrease by weight and a 24.6% decrease by number from 2011. The commercial and recreational fisheries harvested 25 and 75 percent, respectively.

The commercial fishery (coastal and Chesapeake Bay combined) landed 6.51 million pounds in 2012, slightly lower than landings in 2011 (6.78 million pounds). The Chesapeake Bay jurisdictions dominated the 2012 commercial landings; by pounds, Maryland landed 30%, Virginia landed 23%, and PRFC landed 11%. Additional landings came from Massachusetts (19%), New York (10%), Rhode Island (4%), Delaware (3%), and North Carolina (<1%).

The total coastal commercial harvest in 2012 was 2.596 million pounds, which was a 10% decrease from the 2011 coastal landings of 2.874 million pounds. The total Chesapeake Bay commercial harvest in 2012 was 3.924 million pounds, which represents an fractional decrease from the 2011 landings of 3.925 million pounds.

In 2012, the recreational fishery (coastal and Chesapeake Bay combined) landed an estimated 1.54 million fish (19.27 million pounds). This was a 31% decrease from 2011 landings by number (2.23 million fish) and a 29% decrease by weight from 2011 (27.23 million pounds). The coastal recreational harvest was 16.87 million pounds. The recreational Bay-wide harvest was 2.40 million pounds and represents an 18% decrease in Chesapeake harvest from 2011.

Recreational releases decreased for the sixth consecutive year to 5.192 million fish; releases peaked in 2006 at 23.343 million fish (Figure 6; Table 7). The 2012 recreational catch estimate of 6.737 million fish is the lowest on record since 1994, and represents a 74% decline from the peak in 2006. Anglers are keeping more of the fish they catch in recent years or catching fewer sub-legal fish. The proportion of catch that is released was 77% in 2012. Using a 9% release mortality rate, recreational dead discards are estimated to be 467,270 fish in 2012. Total recreational removals (harvest and dead discards combined) in 2012 was 2.01 million fish, a decrease from the previous year. New York landed the largest percent of the coastwide recreational harvest in number of fish (27.5%), followed by Massachusetts (24.5%), Maryland (17%), New Jersey (10%), and Virginia (8.7%). The remaining states each landed less than 5% of the 2012 recreational landings by number of fish.

IV. Status of Assessment Advice

The 2011 Atlantic striped bass stock assessment is an update to the 2007 benchmark stock assessment (NEFSC 2008a, NEFSC 2008b). The benchmark assessment was favorably peer reviewed at the 46th Stock Assessment Workshop (SAW). The Stock Assessment Review Committee (SARC) identified several topics deserving special attention or improvement in future assessments, including: examining sensitivity of assessment results to discard estimates and improving those estimates; age determination for striped bass older than about age 10; extracting more information out of the young-of-year indices; employing better methods of averaging multiple survey indices; using regional surveys to get direct information about differences in recruitment levels for the sub-stocks of the fishery; and better standardization of state surveys (NEFSC 2008a). The SARC found that the SCA model "best estimated parameters that could be judged against the current biological benchmarks."

The SARC also advised the assessment team to re-estimate the F threshold (Fmsy) based on data and stock estimates from the SCA model, and link the female SSB target and threshold to the SCA model's 1995 SSB estimate. The assessment team undertook this work and in August 2008 the Board approved updated Amendment 6 BRPs (see Section II).

A benchmark assessment was completed in July 2013 at the 57th SAW. The Board will be considering acceptance of the 2013 stock assessment for management use at its October 2013 meeting.

V. Status of Research and Monitoring

The management plan requires certain jurisdictions to implement fishery-dependent monitoring programs for striped bass. All jurisdictions with commercial fisheries or substantial recreational fisheries are required to define the catch composition of these fisheries. Jurisdictions with substantial commercial fisheries and those agencies monitoring recreational fisheries are required to gather representative catch and effort data for these fisheries.

The management plan also requires certain states to monitor the striped bass population independent of the fishery. Juvenile abundance indices are required from Maine (Kennebec River), New York (Hudson River), New Jersey (Delaware River), Maryland (Chesapeake Bay

tributaries), Virginia (Chesapeake Bay tributaries), and North Carolina (Albemarle Sound). Spawning stock sampling is mandatory for New York (Hudson River), Pennsylvania (Delaware River), Delaware (Delaware River), Maryland (Upper Chesapeake Bay and Potomac River), Virginia (Rappahannock River and James River), and North Carolina (Roanoke River and Albemarle Sound). Amendment 6 requires NOAA Fisheries, USFWS, Massachusetts, New York, New Jersey, Maryland, Virginia, and North Carolina to continue their tagging programs, which provide data used to determine survivorship and migration patterns.

VI. Status of Management Measures and Issues

Status of Amendment 6

Amendment 6 and Addendum I to Amendment 6 set the regulatory measures in 2009. Management requirements include size limits, bag limits, coastal commercial quotas, and regulatory measures in the Chesapeake Bay and Albemarle Sound/Roanoke River set to not exceed target fishing mortality rates.

In May 2009, the Management Board initiated the development of an addendum to consider options to roll over unused coastal commercial quota up to fifty percent, and approved sending the draft addendum out for public comment in August 2009. In November 2009, the Board voted for status quo management in regards to unused quota rollover.

In February 2010, the Management Board initiated the development of an addendum to consider options to increase the coastal commercial quota. The Board approved the draft addendum for public comment in May 2010, with the addition of an option to consider adopting a Technical Committee recommendation to revise the JAI management trigger. Adopting the Technical Committee recommendation would modify the definition of recruitment failure, such that each index would have a fixed numerical value indicating failure, rather than one that changes from year to year. The Board approved the revised JAI management triggers. The new definition of recruitment failure is a value that is below 75% of all values in a fixed time series appropriate to each juvenile abundance index.

In 2012, Addendum III was approved by the Board. This addendum requires all states and jurisdictions with a commercial fishery to implement a commercial harvest tagging program. The addendum was initiated in response to significant poaching events in the Chesapeake Bay and aims to limit illegal harvest of striped bass.

Coastal Commercial Quota

In 2012, four states had coastal commercial quotas lower than their Amendment 6 allocation due to quota overages in 2011 and/or conservation equivalencies related to minimum size limits: Massachusetts (overage), Rhode Island (size limit), New York (overage and size limit), and Maryland (size limit) (Table 8). In 2012, two states exceeded their coastal commercial quotas and should have their 2013 quotas reduced accordingly. Massachusetts exceeded its adjusted coastal commercial quota by 161,882 pounds, resulting in an adjusted 2013 quota of 997,868 pounds. Delaware exceeded its coastal commercial quota by 877 pounds, for an adjusted 2013 quota of 192,570 pounds.

Chesapeake Bay Quota
Amendment 6 includes a separate management program for the Chesapeake Bay due to the size availability of striped bass in this area. Based on a target fishing mortality rate of F=0.27, Maryland, Virginia, and the Potomac River Fisheries Commission (PRFC) annually establish a bay-wide quota for resident fish using the Harvest Control Model (Table 9). In 2012, the bay-wide quota was 8,825,510 pounds. Shares are allocated to Maryland, the PRFC, and Virginia based on historical harvest, and each jurisdiction then allocates portions of the quota to its recreational and commercial fisheries. In 2012, the bay-wide harvest was 6,327,071 pounds and within the quota.

Chesapeake Bay Spring Trophy Fishery
Recreational fishermen in the Chesapeake Bay are permitted to take adult migrant fish during a limited seasonal fishery, commonly referred to as the Spring Trophy Fishery. From 1993 to 2007 the fishery operated under a quota. Beginning in 2008, the Board approved non-quota management until stock assessment indicates that corrective action is necessary to reduce F on the coastal stock. After several years of varying size limits in Maryland and the Potomac River to account for quota overages, a 28 inch size limit has been in place since 2008; Virginia's trophy fish size limit has been higher at 32 inches. The trophy season in Virginia is also shorter.

In 2012, the estimate of migrant fish harvested during the trophy season is 16,874 fish (16,769 fish in Maryland and 105 fish in Virginia [state compliance reports 2013]) and represents a 52% decrease from 2011. In weight of fish, the estimate is 275,301 pounds total (273,733 pounds in Maryland and 1,568 pounds in Virginia). Harvest of migrant striped bass in the spring fishery in 2012 was below the 2007-2011 average (43,700 fish). In Maryland, the break down between private angler and charter boat harvest is 9,315 fish and 7,454 fish, respectively.

Wave-1 Recreational Harvest Estimates
Evidence suggests that North Carolina, Virginia, and possibly other states have had sizeable wave-1 (January/February) recreational striped bass fisheries beginning in 1996 (NEFSC 2008b). The Marine Recreational Fisheries Statistics Survey (MRFSS) has sampled for striped bass in North Carolina during wave-1 since 2004. Other states are not currently covered during wave-1.

Juvenile Abundance Indices
Amendment 6 requires the following states to conduct striped bass young-of-year juvenile abundance index (JAI) surveys on an annual basis: Maine for the Kennebec River; New York for the Hudson River; New Jersey for the Delaware River; Maryland for the Maryland Chesapeake Bay tributaries; Virginia for the Virginia Chesapeake Bay tributaries; and North Carolina for the Albemarle Sound/Roanoke River stock. Refer to Figure 5 for the results of the juvenile abundance surveys.

The Striped Bass Technical Committee (TC) annually reviews trends in all required JAIs. Under Amendment 6, recruitment failure was defined as a value that was lower than 75 percent of all the other values in the dataset for three consecutive years. This methodology created a constantly moving value with each additional year of data. Under the new definition of recruitment failure, per Addendum II to Amendment 6, recruitment failure is defined as a value that is below 75% (the first quartile, or Q1) of all values in a fixed time series appropriate to each JAI. If any

survey's JAI falls below their respective Q1 for three consecutive years, then appropriate action should be recommended by the TC to the Management Board. The Management Board is the final arbiter in all management decisions.

For the 2013 review of the JAIs, the trigger analysis evaluated the 2010, 2011, and 2012 JAI values (Figure 5). Three consecutive years of recruitment failure did not occur in any of the surveyed areas, thus no action is triggered. The New York - Hudson River index has experienced two years of recruitment failure in a row, in 2011 and 2012, while the New Jersey - Delaware River, Maryland – Chesapeake Bay, and Virginia – Chesapeake Bay indices all fell below the recruitment failure definition in 2012. The Maine value for 2012 was slightly above average while the North Carolina - Albemarle/Roanoke value was below average (Figure 5). A more thorough description below outlines state specific effects on JAI surveys from hurricanes and tropical storms in 2011 and 2012.

New Jersey: Despite a decent index in 2011, it is likely that production would have been higher. The index and overall catch dropped considerably after Hurricane Irene made landfall in NJ on August 28 and Tropical Storm Lee in PA on September 8, causing major flooding of streams and rivers. The high water levels and debris led to a period of three weeks where sampling was not possible. As a result, sampling was not completed in Region 2 for August when striped bass catches are typically high. Environmental conditions in the spring of 2012 were not conducive to good spawning. Unusually high temperatures and dry conditions likely contributed to the low index.

New York: During August 14 through September 9, 2011 three large storms deposited more than 20 inches of rain over the Hudson Valley. Two of the storms were Tropical Storms Irene and Lee. They left unprecedented flooding and damage throughout this entire region. The salinity of the Hudson River estuary south of Manhattan was near zero soon after TS Irene. The area briefly returned to brackish conditions, when a similar phenomenon occurred after TS Lee a week later. The storms produced a 70 yr flood event at Troy (RM 152), and an estimated 1.75 million tons of sediment was deposited and remained trapped in the Hudson.

NYSDEC suspended Hudson River sampling from Aug 28th until Sept 11th 2011 due to high flood waters and debris caused by the storms. When sampling resumed, beach seine survey catches were noticeably altered. Observed numbers of fish were decreased, and estuarine fish, including striped bass, were literally swept out of lower portions of the Hudson.

To evaluate potential size of the 2011 striped bass year class, we ranked catch per unit effort data from the first three weeks of the surveys for their entire 28 year history. The results indicated an average, or slightly less than average, year class was shaping up prior to the 2011 storms. Catch data obtained from the five remaining sample weeks of 2011 were decreased, due to the sheer volume of water, debris, and fish washing out of the Hudson. It is not known if the fish washed out to sea survived.

The 2012 index for NY was very low, similar to what occurred in what appears to be a coast-wide event. Sediment deposited in the previous year's storms remained in the Hudson estuary and covered the substrate in many shallow water areas. There was also a complete lack of submerged aquatic vegetation, perhaps a consequence of the sediment or storms of the previous

year. We do not know if either of these environmental changes due to 2011 storms affected sampling efficiency or survival of young in 2012.

Albemarle/Roanoke Striped Bass FMP

The Interstate FMP for Atlantic Striped Bass requires North Carolina to inform the Commission of changes to striped bass management in the Albemarle Sound/Roanoke River (A/R) System. North Carolina must adhere to the compliance criteria in Amendment 6. After a Technical Committee review, the PRT previously determined that North Carolina's FMP complies with the mandatory components of Amendment 6.

The A/R System is managed jointly for striped bass by the North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries, which manages the Albemarle Sound Management Area (ASMA), and the North Carolina Wildlife Resources Commission, Division of Inland Fisheries, which manages the Roanoke River Management Area (RRMA). The 2004 FMP, which updated the 1994 FMP, set a target fishing mortality rate equal to 0.22 and threshold spawning stock biomass equal to 400,000 pounds for the A/R System. The annual total allowable catch (TAC) of 550,000 pounds is allocated evenly between the recreational and commercial fisheries, with 25% for the RRMA recreational fishery, 25% for the ASMA recreational fishery, and 50% for the ASMA commercial fishery.

Total 2012 harvest in the A/R System was estimated at 275,667 pounds, an increase from the 248,635 pounds harvested in 2011, but still 274,333 pounds below the 2012 TAC. Each sector harvested within its quota allocation. The commercial harvest in the ASMA was estimated at 115,940 pounds. Recreational harvest in the ASMA was estimated at 71,456 pounds and in the RRMA at 88,271 pounds.

To assess the A/R stock specific reference points, a peer-reviewed statistical catch at age stock assessment model was completed in 2010, at which time a Plan Development Team and Advisory Committee were convened to update the NC Estuarine Striped Bass FMP. Amendment 1 to the North Carolina Estuarine Striped Bass FMP was approved by the North Carolina Division of Marine Fisheries and the North Carolina Wildlife Resources Commission in the summer of 2013.

A peer-reviewed statistical catch at age stock assessment model was completed in 2010 (see Section II for more results), at which time a Plan Development Team and Advisory Committee were convened to review the 2004 NC Estuarine Striped Bass FMP. An updated draft Amendment I NC Estuarine Striped Bass FMP was developed and approved to go out for public comment by the NC Marine Fisheries Commission in September 2011.

Law Enforcement Reporting

The following section describes law enforcement cases that were included in the 2013 compliance reports and does not necessarily cover all striped bass law enforcement violations in 2012.

- Pennsylvania conservation officers cited recreational anglers for violations that would have represented a maximum detected illegal harvest of 111 striped bass in 2012. Additionally, officers found 43 illegally taken fish that had been discarded by anglers; therefore, the maximum detected illegal harvest was 154 striped bass in 2012.

- The Virginia Marine Police confiscated 621 pounds in 2012, compared to 1,281 pounds in 2011 and 1,476 pounds in 2010. Using a traditional average weight (4.7 pounds), the 2012 confiscations amounted to 132 striped bass.
- In 2012 North Carolina Marine Patrol confiscated 59 pounds of striped bass

VII. Annual State Compliance

Based on the annual state compliance reports, the Plan Review Team determines that each state/jurisdiction implemented a management program for 2012 that was approved by the Striped Bass Management Board and was consistent with the requirements of Amendment 6. Refer to Tables 1 and 2 for state-by-state regulations.

The following regulatory changes were documented in the compliance reports for 2013:

- In Maine, it is unlawful to use treble hooks when using bait as a method of harvest (effective January 1, 2013).
- Massachusetts' commercial season will not open until July 14, 2013.
- In Rhode Island, there will be slight changes to the management of the general category within the striped bass commercial fisheries in 2013. The start date of the first sub-period for this category will remain June 6th (RIMF Reg. Part 12.3 2013b). The start date of the second sub-period for this category will be September 8th (RIMF Reg. Part 12.3 2013b). The possession limit during both sub-periods for the general category will be five fish per vessel per calendar day. Allocation of the general category quota between the sub-periods will be 70/30. During both sub-periods, the fishery will be closed each calendar week from 12:00 AM Friday until 11:59 PM Saturday and commercial possession and sale of striped bass on these days will be prohibited.
- Effective June 8, 2012, the NJDEP Division of Fish and Wildlife is indefinitely suspended the Party/Charter Boat facet of the Striped Bass Bonus Program. This did not impact the individual angler facet of the SBBP nor did it affect the recreational fisheries regulations for striped bass. Recreational anglers without a SBBP permit, including those fishing on for-hire vessels, can still harvest two striped bass per day at 28 inches or larger. Party/Charter Boat anglers can still harvest a 'bonus' bass if they obtain a SBBP permit from the Division's website prior to their fishing trip and have the permit in possession while fishing on the for-hire vessel.
- Maryland's 2013 Chesapeake Bay quota was reduced by 14% from 2012 in response to decreased estimates of overall stock abundance. In addition, the 2013 Chesapeake Bay commercial quota was reduce 2.5% to account for management uncertainty in harvest reporting. The effective 2013 commercial quota is 1,646,742 pounds.
- The Virginia commercial and recreational striped bass quotas were established as 1,230,110 pounds each for 2013 (compared to 1,430,361 pounds in 2012). In addition, the commercial season opening date was changed from February 1 to January 16. The commercial season closing date remains as December 31. Commercial striped bass quota shares may not be transferred in any quantity less than 500 pounds (compared to 200 pounds in 2012). Transfers of commercial striped bass quota will be prohibited from October 1 through November 30, and December 16 through January 31. Temporary

transfers of commercial striped bass quota will be permitted between December 1 and December 16.

Following the first full year of implementation of an alternative management program approved by the Management Board, the PRT is responsible for evaluating the effects of the program. The Management Board approved a conservation equivalency proposal from New Jersey in May 2010 that would permit anglers to take 1 fish at 24 inches or greater and 1 fish at 32 inches or greater (rather than 2 fish at 28 inches or greater). The state has not implemented this proposal to date. The Management Board requested that the Technical Committee re-evaluate the conservation equivalency of the alternative measure three years post-implementation.

Amendment 6 includes compliance requirements for monitoring programs (summarized in *Section V*). Compliance with these requirements is summarized in Table 10. The PRT found that all states carried out the required monitoring programs in the 2012 fishing year.

No monitoring program changes were documented in the compliance reports or provided via personal communication.

VIII. Recommendations

Management Recommendations

If the management Board approves the recommended reference points from the 2013 benchmark stock assessment through the addendum process, the Management Board needs to consider any changes in stock status and the management triggers of Amendment 6. Amendment 6 contains a number of management triggers that invoke Board action to ensure the viability of the striped bass resource, and the sustainability of its fishery. These triggers are intended to prevent an overfished and/or overfishing condition, and recruitment failure.

Research Recommendations

Fishery-Dependent Priorities
High

- Continue collection of paired scale and otolith samples, particularly from larger striped bass, to facilitate development of otolith-based age-length keys and scale-otolith conversion matrices.

Moderate

- Develop studies to provide information on gear specific discard morality rates and to determine the magnitude of bycatch mortality.[1]
- Improve estimates of striped bass harvest removals in coastal areas during wave 1 and in inland waters of all jurisdictions year round.
- Evaluate the percentage of fishermen using circle hooks.[2]

Fishery-Independent Priorities
Moderate

- Develop a refined and cost-efficient, fisheries-independent coastal population index for striped bass stocks.

Modeling / Quantitative Priorities

High

- Develop a method to integrate catch-at-age and tagging models to produce a single estimate of F and stock status.[3]
- Develop a spatially and temporally explicit catch-at-age model incorporating tag based movement information.[4]
- Review model averaging approach to estimate annual fishing mortality with tag based models. Review validity and sensitivity to year groupings.[5]
- Develop methods for combining tag results from programs releasing fish from different areas on different dates.
- Examine potential biases associated with the number of tagged individuals, such as gear specific mortality (associated with trawls, pound nets, gill nets, and electrofishing), tag induced mortality, and tag loss.[6]
- Develop field or modeling studies to aid in estimation of natural mortality or other factors affecting the tag return rate.

Moderate

- Develop maturity ogives applicable to coastal migratory stocks.
- Examine methods to estimate annual variation in natural mortality.[7]
- Develop reliable estimates of poaching loss from striped bass fisheries.
- Improve methods for determining population sex ratio for use in estimates of SSB and biological reference points.
- Evaluate truncated matrices and covariate based tagging models.

Low

- Examine issues with time saturated tagging models for the 18 inch length group.
- Develop tag based reference points.

Life History, Biological, and Habitat Priorities

High

- Continue in-depth analysis of migrations, stock compositions, etc. using mark-recapture data.[8]
- Continue evaluation of striped bass dietary needs and relation to health condition.[9]
- Continue analysis to determine linkages between the mycobacteriosis outbreak in Chesapeake Bay and sex ratio of Chesapeake spawning stock, Chesapeake juvenile production, and recruitment success into coastal fisheries.

Moderate

- Examine causes of different tag based survival estimates among programs estimating similar segments of the population.
- Continue to conduct research to determine limiting factors affecting recruitment and possible density implications.

- Conduct study to calculate the emigration rates from producer areas now that population levels are high and conduct multi-year study to determine inter-annual variation in emigration rates.

Low

- Determine inherent viability of eggs and larvae.
- Conduct additional research to determine the pathogenicity of the IPN virus isolated from striped bass to other warm water marine species, such as flounder, menhaden, shad, and largemouth bass.

Management, Law Enforcement, and Socioeconomic Priorities
Moderate

- Examine the potential public health trade-offs between the continued reliance on the use of high minimum size limits (28 inches) on coastal recreational anglers and its long-term effects on enhanced PCB contamination among recreational stakeholders.[10, 12]
- Evaluate striped bass angler preferences for size of harvested fish and trade-offs with bag limits.

<u>Habitat Recommendations</u>

- Passage facilities should be designed specifically for passing striped bass for optimum efficiency at passing this species.
- Conduct studies to determine whether passing migrating adults upstream earlier in the year in some rivers would increase striped bass production and larval survival, and opening downstream bypass facilities sooner would reduce mortality of early emigrants (both adult and early-hatched juveniles).
- All state and federal agencies responsible for reviewing impact statements and permit applications for projects or facilities proposed for striped bass spawning and nursery areas shall ensure that those projects will have no or only minimal impact on local stocks, especially natal rivers of stocks considered depressed or undergoing restoration.[10]
- Federal and state fishery management agencies should take steps to limit the introduction of compounds which are known to be accumulated in striped bass tissues and which pose a threat to human health or striped bass health.
- Every effort should be made to eliminate existing contaminants from striped bass habitats where a documented adverse impact occurs.
- Water quality criteria for striped bass spawning and nursery areas should be established, or existing criteria should be upgraded to levels that are sufficient to ensure successful striped bass reproduction.
- Each state should implement protection for the striped bass habitat within its jurisdiction to ensure the sustainability of that portion of the migratory stock. Such a program should include: inventory of historical habitats, identification of habitats presently used, specification of areas targeted for restoration, and imposition or encouragement of measures to retain or increase the quantity and quality of striped bass essential habitats.
- States in which striped bass spawning occurs should make every effort to declare striped bass spawning and nursery areas to be in need of special protection; such declaration should be accompanied by requirements of non-degradation of habitat quality, including minimization

of non-point source runoff, prevention of significant increases in contaminant loadings, and prevention of the introduction of any new categories of contaminants into the area. For those agencies without water quality regulatory authority, protocols and schedules for providing input on water quality regulations to the responsible agency should be identified or created, to ensure that water quality needs of striped bass stocks are met.[11]

- ASMFC should designate important habitats for striped bass spawning and nursery areas as HAPC.
- Each state should survey existing literature and data to determine the historical extent of striped bass occurrence and use within its jurisdiction. An assessment should be conducted of those areas not presently used for which restoration is feasible.

Footnotes

- [1] Literature search and some modeling work completed.
- [2] Work ongoing in New York through the Hudson River Angler Diary, Striped Bass Cooperative Angler Program, and ACCSP e-logbook.
- [3] Model developed, but the tagging data overwhelms the model. Issues remain with proper weighting.
- [4] Model developed with Chesapeake Bay and the rest of the coast as two fleets. However, no tagging data has been used in the model.
- [5] Work ongoing by Striped Bass Tagging Subcommittee to evaluate the best years to use for the IRCR and the periods to use for the MARK models.
- [6] Gear specific survival being examined in Hudson River.
- [7] Ongoing work by the Striped Bass Tagging Subcommittee
- [8] Ongoing through Cooperative Winter Tagging Cruise and striped bass charter boat tagging trips. See Cooperative Winter Tagging Cruise 20 Year Report.
- [9] Plans for a stomach content collection program in the Chesapeake Bay by the Chesapeake Bay Ecological Foundation.
- [10] Ongoing in New York.
- [11] Significant habitat designations completed in the Hudson River and New York Marine Districts.
- [12] Samples collected from two size groups ($\geq$ 28 inches and 20-26 inches) in Pennsylvania and processed by the Department of Environmental Protection to compare contamination of the two size groups.

IX. References

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National Oceanic and Atmospheric Administration (NOAA). 2010. 2009 Biennial Report to Congress on the Progress and Findings of Studies on Striped Bass Populations. Washington (DC): US Department of Congress, NOAA National Marine Fisheries Service. 30 p.

X. Figures

Figure 1. Striped bass spawning stock biomass (SSB) estimates and biological reference points
Source: ASMFC 2011

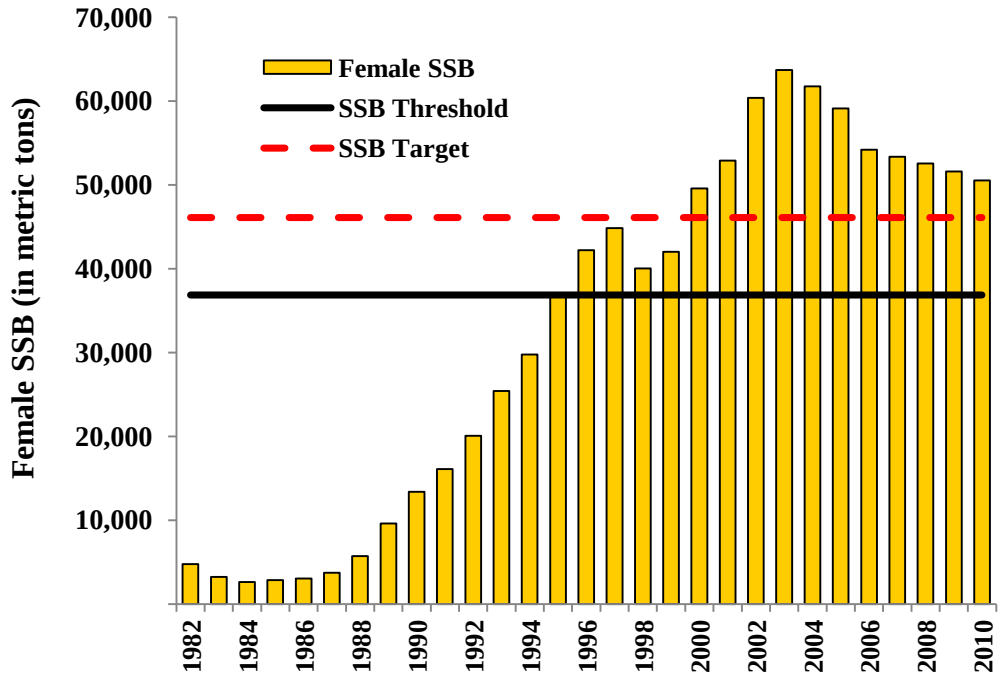


Figure 2. Striped bass abundance and recruitment estimates. Source: ASMFC 2011

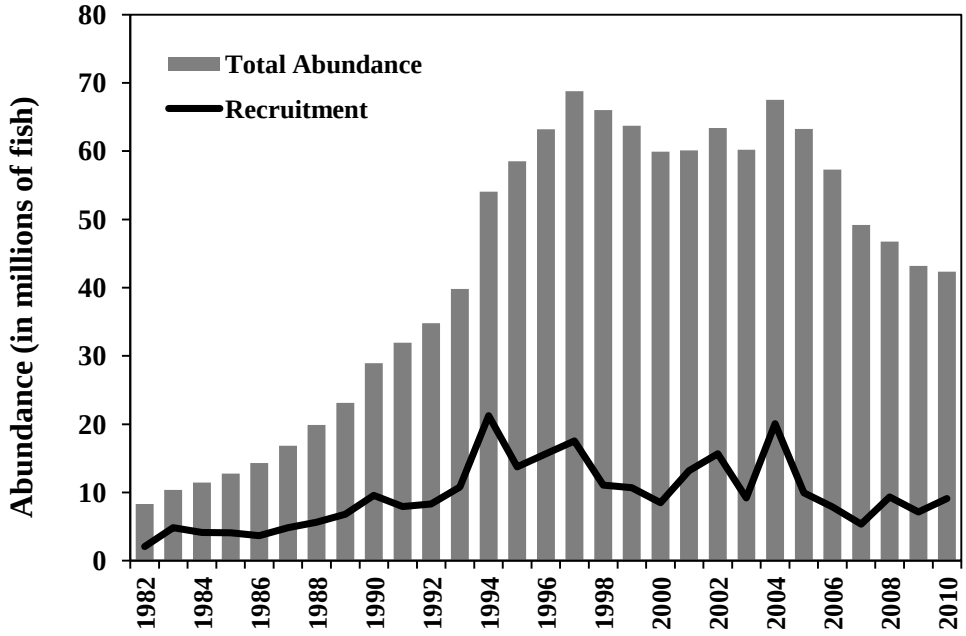


Figure 3. Striped bass fishing mortality (F) estimates from the statistical-catch-at-age (SCA) model and biological reference points. Source: ASMFC 2011

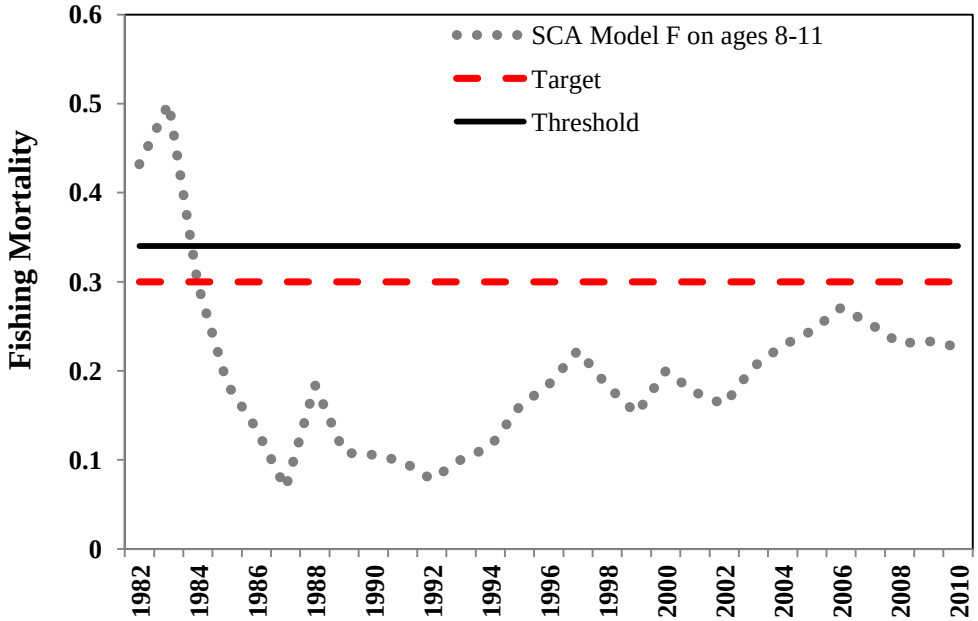


Figure 4. Commercial landings, in numbers, of migratory striped bass, by state, 1990 – 2012. Note: All harvests are based on the calendar year. MD and VA harvests include Chesapeake Bay harvest. NC is Atlantic Ocean only. Source: ASMFC 2013 Compliance Reports.

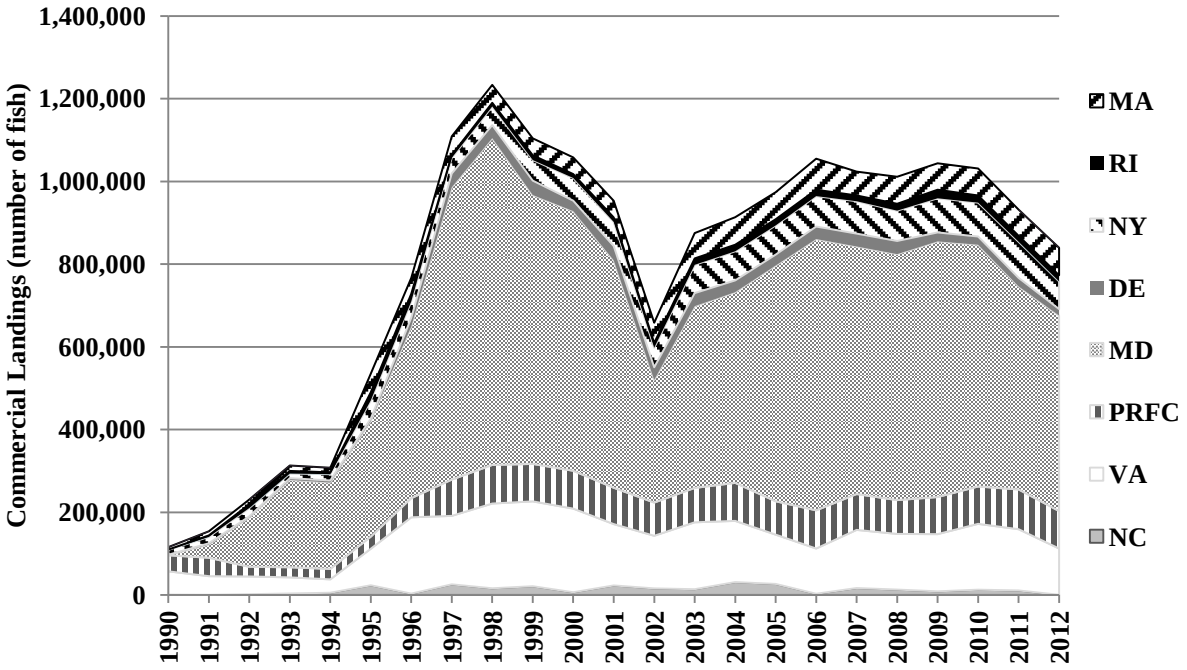


Figure 5. Commercial landings, in pounds, of migratory striped bass, by state, 1990 – 2012.
Note: All harvests are based on the calendar year. MD and VA harvests include Chesapeake Bay harvest. NC is Atlantic Ocean only. Source: ASMFC 2012 Compliance Reports.

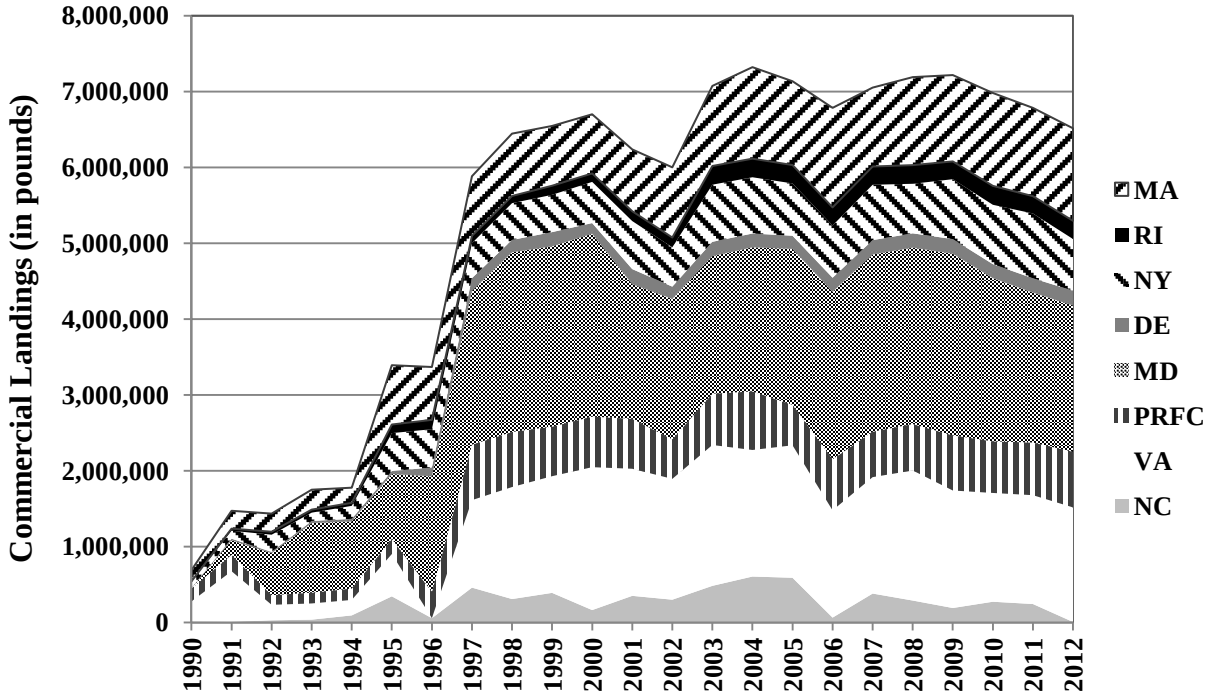


Figure 6. Recreational catch and the proportion of fish released, 1982-2012
Source: personal communication with NMFS Fisheries Statistics Division, Silver Spring, MD

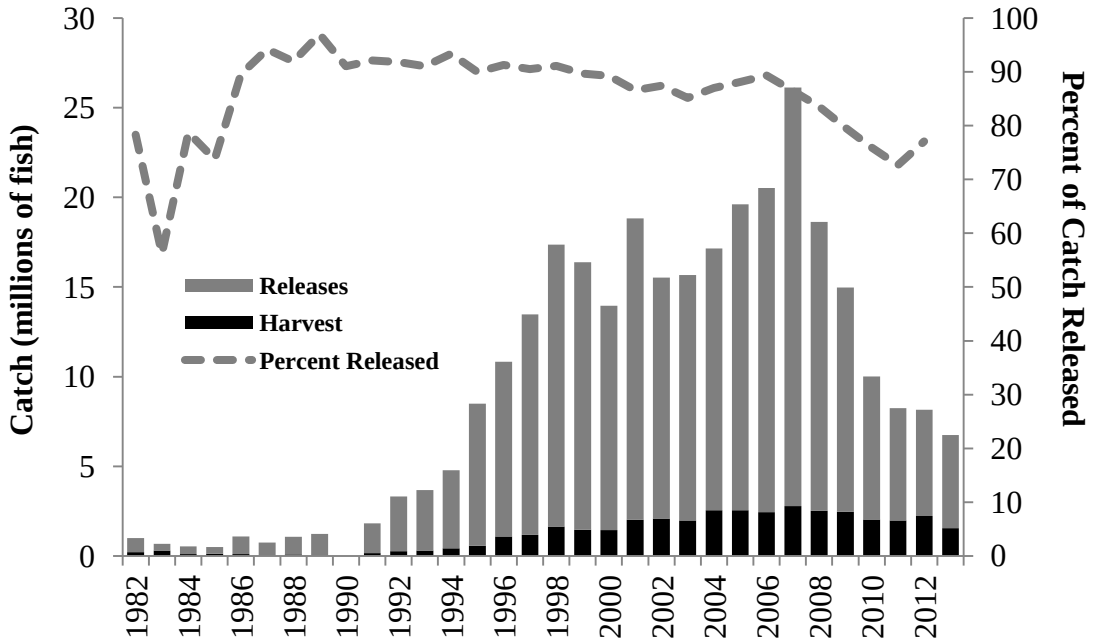


Figure 5. Juvenile abundance indices from Maine, New York, Jew Jersey, Maryland, Virginia, and North Carolina. Source: 2013 State Compliance Reports. Q1 = first quartile, which is the value that is below 75% of all values in a specified time series.

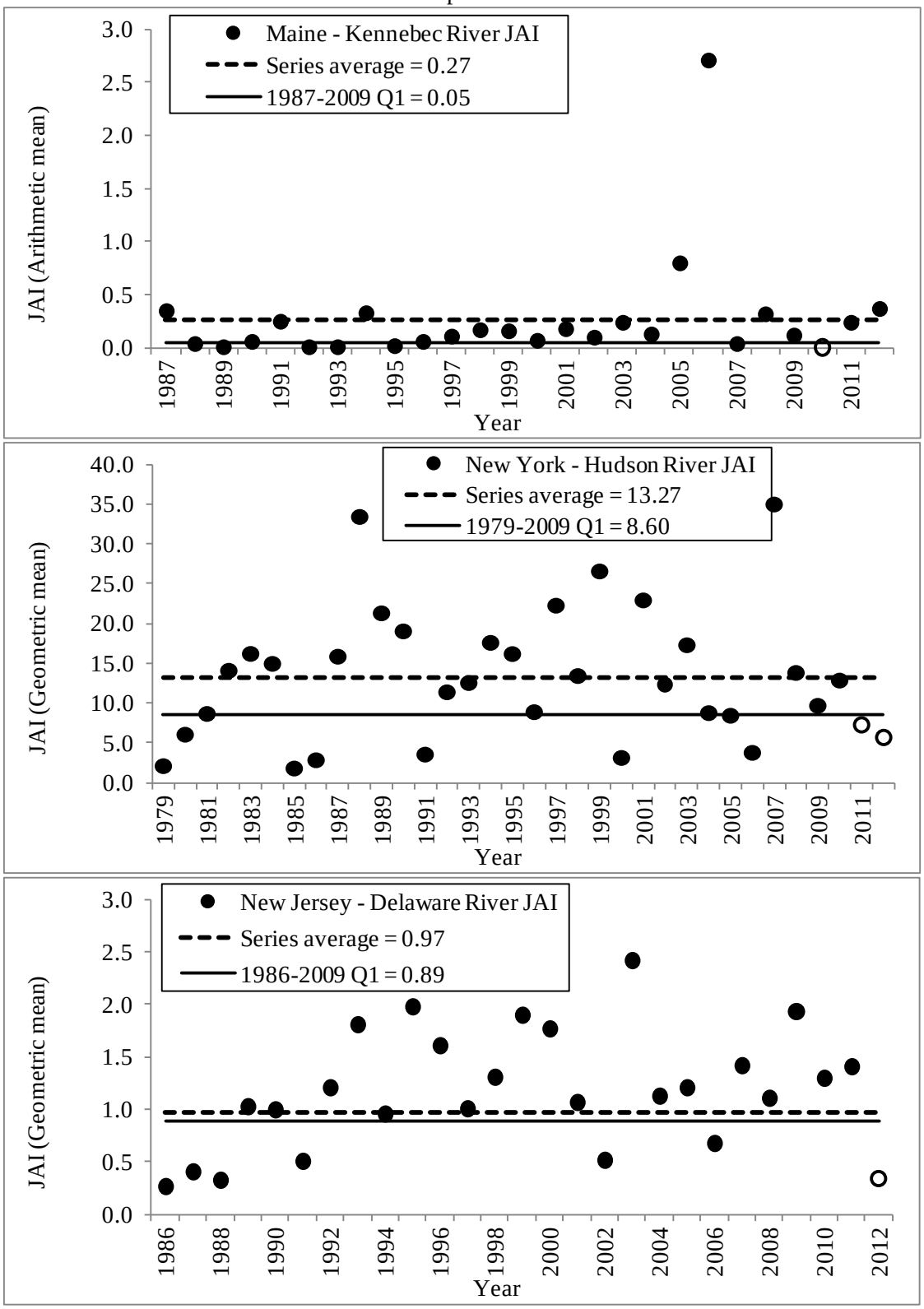
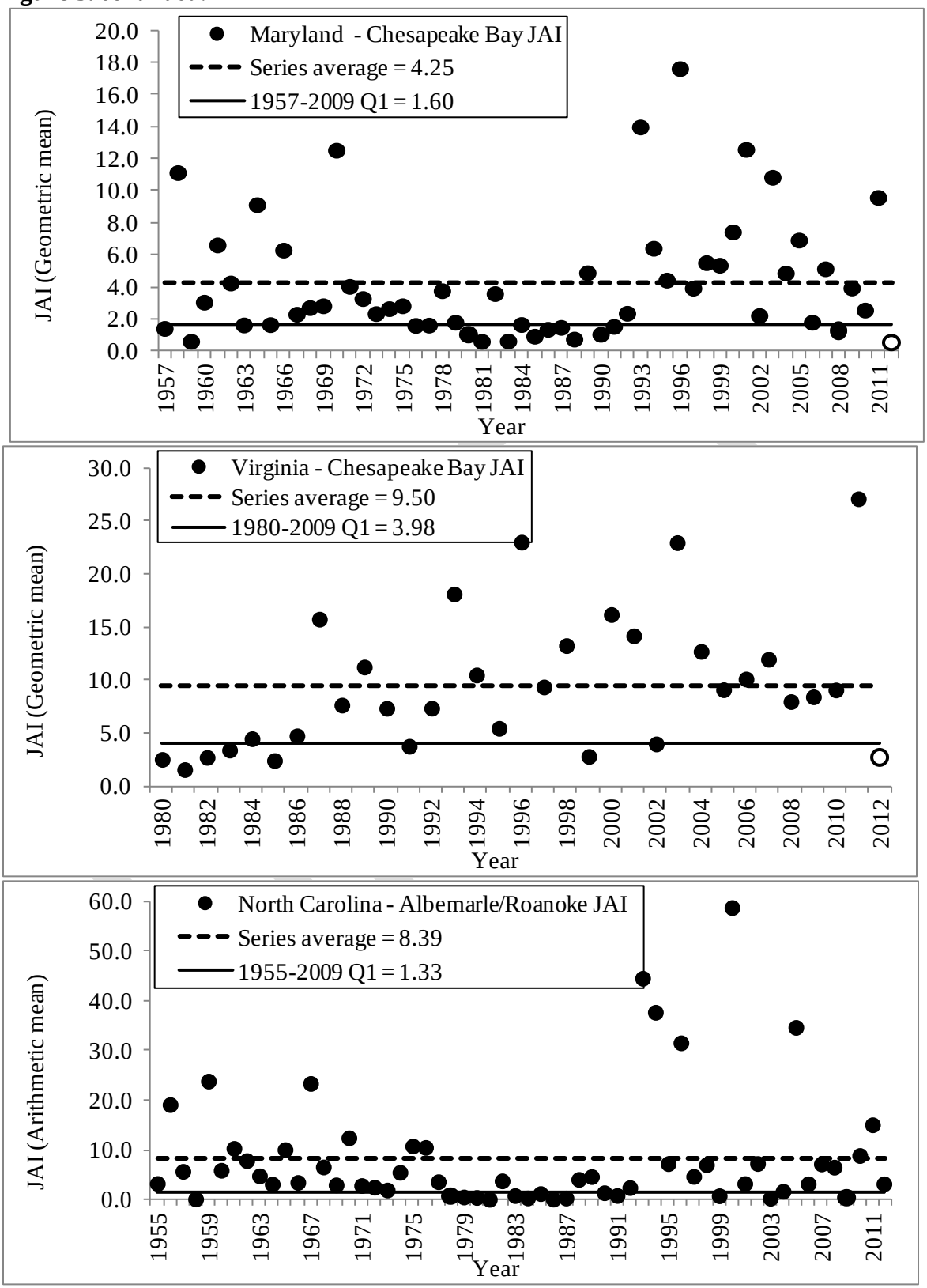


Figure 5. *continued.*



XI. Tables

Table 1. Summary of Atlantic Striped Bass Commercial Regulations in 2012

STATE	SIZE LIMITS	SEASONAL QUOTA	OPEN SEASON
ME	Commercial fishing prohibited		
NH	Commercial fishing prohibited		
MA	34" min.	1,159,750 lb. (minus any overage from previous year) Hook & line only	7.12 until quota reached; 5 fish/day on Sun; 30 fish/day Tues-Thurs
RI	Floating fish trap: 26" min. General category (mostly rod & reel): 34" min.	Total: 239,963 lb. (minus any overage from previous year) Split 39:61 between trap and general category. Gill netting prohibited.	Trap: 1.1 until quota reached; if 80% quota harvested before 8.26, a 500 lb/trap/day limit is imposed; from 8.27–12.31, 10,000 lb. quota set-aside available. General Category: 6.1-8.31 or 75% quota; 9.13-12.31 or 100% quota; 5 fish/day Sun-Thu.
CT	Commercial fishing prohibited		
NY	24–36" Ocean only (Hudson River closed to commercial harvest)	828,293 lb. (minus any overage from previous year). Pound nets, gill nets (6-8"stretched mesh), hook & line.	7.1 – 12.15 Gill nets <6 or >8", 7 fish/trip; trawls 21 fish/trip. Gill nets prohibited in Great South, South Oyster, and Hempstead Bays.
NJ	Commercial fishing prohibited		
PA	Commercial fishing prohibited		
DE	28" minimum except 20" spring gillnet in DE Bay/River & Nanticoke River (5.5" max mesh & 0.28mm max twine)	193,447 lb. (minus any overage from previous year)	Gillnet: 2.15-5.31 (3.1-31 for Nanticoke) & 11.15-12.31; drift nets only 2.15-28 & 5.1-31; no fixed nets in DE River Hook and Line: 4.1–12.31 Except 4.1-5.31 closed spawning areas
MD	Bay and Rivers: 18–36" Ocean: 24"	Bay and River: 1,963,873 lbs (part of Baywide quota) Gear specific quotas and landing limits Ocean: 126,396 lb. (minus any overage from previous year)	Bay Pound Net: 6.1-11.30, Mon-Sat Bay Haul Seine: 6.7-11.30, Mon-Fri Bay Hook & Line: 6.7-11.30, Mon-Thu Bay Drift Gill Net: 1.1-2.28, 12.1-12.31, Mon-Fri Ocean Drift Gill Net & Trawl: 1.1-4.30, 11.1-12.31, Mon-Fri

(Table 1 continued – Summary of commercial regulations in 2012)

STATE	SIZE LIMITS	SEASONAL QUOTA	OPEN SEASON
PRFC	18” min all year 36” max 2.15–3.25	739,097 lbs (part of Baywide quota)	Hook & line: 2.15-3.25, 6.1-12.31 Pound Net & Other: 2.15-3.25, 6.1-12.15 Gill Net: 1.1-3.25
DC	Commercial fishing prohibited		
VA	Bay and Rivers: 18” min, 28” max & complimentary gill net mesh size limit 3.26–6.15 Ocean: 28” minimum	Bay and Rivers: 1,430,361 lbs in 2012 (part of Baywide quota) Ocean: 184,853 lb. (minus any overage from previous year)	Bay and Rivers: 2.1-12.31 Ocean: 2.1-12.31
NC	Albemarle Sound: 18” Ocean: 28”	Albemarle Sound: 275,000 lb Ocean: 480,480 lb. (minus any overage from previous year) split 160,160 lbs each to beach seine, gill net & trawl	Albemarle Sound: 1.1-4.30, 10.1-12.31; daily trip limit ranging from 5 to 15 fish; striped bass cannot exceed 50% by weight of total finfish harvest; season and daily trip limits set by proclamation. Ocean: gear requirements; open days and trip limits for beach seine, gill net, and trawl set via proclamation

Table 2. Summary of Atlantic Striped Bass Recreational Regulations in 2012

STATE	SIZE LIMITS	BAG LIMIT	OTHER	OPEN SEASON
ME	20 – 26" OR ≥40"	1 fish	Hook & line only	All year, except spawning areas are closed 12.1 – 4.30 and catch and release only 5.1 – 6.30
NH	1 fish 28–40" & 1 fish >28"	2 fish	No netting; no gaffing; must be landed with head and tail intact; no culling	All year
MA	28" min	2 fish	Hook & line only	All year
RI	28" min	2 fish		All year
CT	28" min, except Connecticut River Bonus Program: 22-28"	2 fish, except CR Bonus: 1 fish	CR Bonus Quota: 4,025 fish	All year, except CR Bonus 5.4-6.30 (limited to I-95 bridge to MA border)
NY	Ocean Private: 1 fish 28-40" & 1 fish > 40" Ocean Charter: 28" min Hudson River: 18" min DE River: 28" min	Ocean: 2 fish Hudson R.: 1 fish DE River: 2 fish	Angling or spearing only	Ocean: 4.15 – 12.15 Hudson River: 3.16 – 11.30 Delaware River: All year
NJ	28" min	2 fish, plus 1 additional through Bonus Program	Bonus program quota: 321,750 lb. No netting. Non-offset circle hooks required 4.1-5.31 in DE River if using natural bait.	All year except 1.1-2.28 in intra-coastal waters plus 4.1-5.31 in lower DE River
PA	Non-tidal DE River: 28" min; Delaware Estuary: 28" min. except 20-26" from 4.1-5.31	2 fish		Year round
DE	28" min. except 20-26" from 7.1-8.31 in Del. River, Bay & tributaries	2 fish	Hook & line, spear (for divers) only. Circle hooks required in spawning season.	All year except 4.1-5.31 in spawning grounds (catch & release allowed)

(Table 2 continued – Summary of recreational regulations in 2012)

STATE	SIZE LIMITS	BAG LIMIT	OTHER	OPEN SEASON
MD	Susquehanna Flats (SF): 18-26” Chesapeake Bay Trophy: 28” min Chesapeake Bay Regular: 18” min with 1 fish > 28” Ocean: 28” min	SF: 1 fish Chesapeake Bay Trophy: 1 fish Chesapeake Bay Regular: 2 fish Ocean: 2 fish	SF: non-off set circle hook if baited hooks & gap>0.5” Chesapeake Bay Quota: 2,657,102 lbs (part of Baywide quota; includes Susquehanna Flats harvest, excludes trophy harvest)	SF: 3.1-5.31; catch & release only 3.1-5.3 Chesapeake Bay Trophy: 4.18-5.15 (most tribs closed) Chesapeake Bay Regular: 5.16-12.15 (most tribs closed until 6.1) Ocean: All year
PRFC	Trophy: 28” Regular: 18” min with 1 fish > 28”	Trophy: 1 fish Regular: 2 fish	Quota: 604,716 lbs. (part of Baywide quota; excludes trophy harvest)	Trophy: 4.18 -5.15 Regular: 5.16-12.31
DC	18” min with 1 fish > 28”	2 fish	Hook & line only	5.16-12.31
VA	Bay/Coastal Trophy: 32” min (28” Potomac tribs) CB Spring: 18-28”; 1 fish >32” CB Fall: 18–28”; 1 fish >34” Potomac Tribs: 18-28”; 1 fish >28” Ocean: 28”	Bay/Coastal Trophy: 1 fish CB Spring: 2 fish CB Fall: 2 fish Potomac Tribs: 2 fish Ocean: 2 fish	Hook & line, rod & reel, hand line only Chesapeake Bay Quota: 1,430,361lbs in 2012 (part of Baywide quota; excludes trophy harvest)	Bay Trophy: 5.1-6.15 (open 4.18 Potomac tribs) Coastal Trophy: 5.1-5.15 CB Spring: 5.16-6.15 (no fish >32” in spawning areas) CB Fall: 10.4-12.31 Potomac Tribs: 5.16-12.31 Ocean: 1.1-3.31, 5.16-12.31
NC	Roanoke River: 2 fish 18-22” OR 1 fish 18-22” and 1 fish >27” Albemarle Sound: 18” min. Ocean: 28” min	Roanoke River: 2 fish Albemarle Sound: 3 fish Ocean: 2 fish	Roanoke River quota: 137,500 lb. Albemarle Sound quota: 137,500 lb.	Roanoke River: 3.1 – 4.30 (single barbless hook required 3.1-6.30 from Roanoke Rapids dam downstream to US 258 bridge) Albemarle Sound: Spring 1.1 – 4.30; Fall 10.1-12.31 Ocean: All year

Table 3. Commercial harvest (pounds) of migratory striped bass by state, 1990-2012.
Source: personal communication with NMFS. Note: All harvests based on the calendar year. MD and VA harvests include Chesapeake Bay. NC is Atlantic Ocean only.

Year	ME	NH	MA	RI	CT	NY	NJ	DE	MD	PRFC	VA	NC	Total
1990		37	148,000	4,000		81,870		6,509	2,887	169,060	267,735	9,797	689,895
1991			235,000	28,000		105,163		21,079	191,066	216,755	668,454	6,186	1,471,703
1992			239,200	39,000		226,611		17,795	552,451	127,398	204,338	27,702	1,434,495
1993			262,600	40,000		109,362		28,032	916,764	142,742	213,665	36,463	1,749,628
1994			199,600	39,810		171,279		33,897	884,970	149,891	204,124	92,605	1,776,176
1995			782,000	113,461		500,784		38,198	856,568	198,478	557,741	343,707	3,390,937
1996			696,815	122,562		504,350		117,560	1,523,293	346,834		55,771	3,367,185
1997			785,942	96,519		460,762		165,978	2,030,061	731,114	1,153,743	458,524	5,882,643
1998			822,000	94,663		484,900		163,169	2,368,393	726,179	1,476,502	308,068	6,443,874
1999		33	788,171	119,679		491,790		187,096	2,377,393	653,266	1,538,220	389,454	6,545,102
2000			779,736	111,812		542,659		140,634	2,411,554	666,001	1,883,856	162,736	6,698,988
2001			815,054	129,654		633,095		198,802	1,774,758	658,676	1,675,469	350,280	6,235,788
2002			924,870	129,172		518,573		160,560	1,852,634	521,048	1,592,910	299,508	5,999,275
2003			1,055,439	246,312		753,261		188,419	1,813,727	676,574	1,856,831	482,123	7,072,686
2004		203	1,206,305	245,204		741,668		181,974	1,899,539	772,333	1,668,307	604,824	7,320,357
2005			1,104,737	242,303		689,821		173,815	2,055,558	533,456	1,746,247	588,601	7,134,538
2006			1,312,168	238,797		688,446		185,987	2,207,350	673,508	1,413,914	63,458	6,783,628
2007			1,040,328	240,627		729,743		188,668	2,336,886	599,261	1,534,799	380,380	7,050,692
2008			1,160,122	245,988		653,100		188,719	2,326,023	611,789	1,714,564	288,410	7,188,715
2009			1,138,291	234,368		789,891		192,311	2,394,620	727,197	1,549,145	189,995	7,215,818
2010			1,224,356	249,520		782,402		185,410	2,150,577	680,496	1,434,219	272,632	6,979,612
2011			1,163,865	228,163		854,731		188,620	1,976,473	694,151	1,434,636	242,600	6,783,239
2012			1,219,665	239,913		681,399		194,324	1,928,982	733,789	1,509,940	6,226	6,514,238

Table 4. Commercial harvest (numbers) of migratory striped bass by state, 1990-2012.
Source: personal communication with NMFS. Note: All harvests based on the calendar year. MD and VA harvests include Chesapeake Bay. NC is Atlantic Ocean only.

Year	ME	NH	MA	RI	CT	NY	NJ	DE	MD	PRFC	VA	NC	Total	*Dead Discards*
1990			5,927	784		11,784		698	534	38,884	56,222	803	115,636	*510,011*
1991			9,901	3,596		15,426		3,091	31,880	44,521	44,970	413	153,798	*327,167*
1992			11,532	9,095		20,150		2,703	119,286	23,291	42,912	1,745	230,714	*186,601*
1993			13,099	6,294		11,181		4,273	211,089	24,451	39,059	3,414	312,860	*347,839*
1994			11,066	4,512		15,212		4,886	208,914	25,196	32,382	5,275	307,443	*359,518*
1995			44,965	19,722		43,704		5,565	280,051	29,308	88,274	23,325	534,914	*515,454*
1996			38,354	18,570		39,707		20,660	415,272	46,309	184,495	3,151	766,518	*394,824*
1997			44,841	7,061		37,852		33,223	706,847	87,643	165,583	25,562	1,108,612	*216,745*
1998			43,315	8,835		45,149		31,386	790,154	93,299	204,911	16,040	1,233,089	*326,032*
1999			40,838	11,559		49,795		34,841	650,022	90,575	205,143	21,040	1,103,812	*236,619*
2000			40,256	9,418		54,894		25,188	627,777	91,471	202,227	6,480	1,057,712	*666,997*
2001			40,248	10,917		58,296		34,373	549,896	87,809	148,346	22,936	952,820	*310,900*
2002			48,926	11,653		47,142		30,440	296,635	80,300	127,211	15,784	658,091	*168,201*
2003			61,262	15,497		68,354		31,531	439,482	83,091	161,777	13,823	874,817	*261,974*
2004			66,556	15,867		70,367		28,406	461,064	91,888	147,998	31,014	913,160	*465,642*
2005			65,332	14,949		70,560		26,336	569,964	80,615	119,244	26,573	973,572	*798,544*
2006			75,062	15,429		73,528		30,212	655,951	92,288	109,396	2,799	1,054,664	*194,524*
2007			57,634	13,934		78,287		31,090	598,495	86,695	140,602	16,621	1,023,358	*608,279*
2008			65,330	16,616		73,263		31,866	594,655	81,720	134,603	12,903	1,010,955	*308,715*
2009			63,875	20,725		82,574		21,590	618,076	89,693	138,303	8,675	1,043,512	*611,944*
2010			65,277	17,256		81,896		19,830	584,554	90,258	159,197	12,670	1,030,938	*254,841*
2011			63,309	14,344		87,349		20,517	490,969	96,126	148,063	10,814	931,490	*634,421*
2012			66,394	14,953		66,897		15,738	472,517	90,616	111,891	323	839,329	*818,579*

Table 5. Recreational harvest (pounds) of migratory striped bass by state, 1990-2012

Source: personal communication with NMFS. Note: All harvests based on the calendar year. Estimates are for March to December, except for North Carolina. Maryland and Virginia harvests include Chesapeake Bay. North Carolina is Atlantic Ocean only.

Year	ME	NH	MA	RI	CT	NY	NJ	DE	MD	VA	NC	Total
1990	60,483	11,363	319,092	73,349	193,011	505,440	588,974	18,115	12,967	443,751	0	2,226,545
1991	58,177	6,731	440,605	496,723	125,309	1,053,589	643,571	25,501	456,954	333,743	3,091	3,643,994
1992	107,693	44,612	972,116	203,109	196,278	921,201	746,343	25,677	613,174	187,852	8,602	4,026,657
1993	11,953	28,115	1,113,446	292,428	400,067	1,575,938	874,296	52,540	794,853	505,742	1,701	5,651,079
1994	66,451	66,017	1,686,049	109,817	355,829	1,974,759	438,080	63,832	1,096,409	870,140	50,503	6,777,886
1995	45,933	67,992	1,504,390	436,058	671,647	3,296,025	3,141,222	175,347	2,057,450	955,822	73,663	12,425,549
1996	44,802	102,271	1,291,706	950,973	915,418	4,809,381	1,736,508	281,481	1,560,389	1,340,414	89,989	13,123,332
1997	185,178	206,904	2,891,970	927,919	920,465	4,449,564	821,784	232,186	1,962,947	2,813,471	301,683	15,714,071
1998	178,584	114,342	2,973,456	671,841	989,923	2,318,291	1,333,329	236,926	1,908,344	1,581,560	150,626	12,457,222
1999	98,623	84,255	1,822,818	886,666	824,031	3,171,344	3,342,372	100,541	1,137,940	1,741,857	268,026	13,478,473
2000	269,325	71,370	2,618,216	1,160,304	515,962	4,050,569	4,286,040	346,905	2,100,854	2,005,721	72,946	17,498,212
2001	290,233	223,072	3,644,561	1,138,974	628,044	2,996,805	5,341,867	382,498	2,072,943	2,140,713	284,449	19,144,159
2002	383,270	152,342	4,304,883	1,192,295	600,482	2,813,596	4,133,678	299,561	1,423,515	2,648,115	267,406	18,219,143
2003	253,910	281,549	5,120,554	1,502,455	1,537,899	4,687,685	4,545,515	303,909	2,975,437	2,789,745	772,981	24,771,639
2004	226200	98995	6112746	1386138	1,617,561	3727105	5548167	330623	2347752	2956310	4,833,112	29,184,709
2005	381058	281114	5097821	1732581	2,173,638	5537432	5958454	286777	4612417	1996840	2,164,859	30,222,991
2006	323355	179181	4832355	999300	2,030,878	6028409	7067533	260134	3868944	3694529	1,759,796	31,044,414
2007	232328	68142	5136580	1584354	1,468,499	7913817	3718451	99800	3504041	2392258	876,707	26,994,977
2008	271768	73807	5763763	751507	1,868,335	10925408	4696090	333149	2728048	2657976	525,891	30,595,742
2009	329064	113705	4786895	1123434	835,970	5004604	4238319	275410	4278145	1791058	160,922	22,937,526
2010	104117	67409	4270401	1096369	1,259,008	6997089	5382743	251853	2630802	481147	453,844	22,994,782
2011	91705	370798	3504522	1257302	758,216	8969762	6197026	241149	2640309	1160914	2,042,981	27,234,684
2012	57,509	163,804	5,489,928	851,460	814,310	6,540,024	2,376,866	360,106	1,260,490	1,353,351	0	19,267,848

Table 6. Recreational harvest (numbers) of migratory striped bass by state, 1982- 2012

Source: personal communication with NMFS. Note: All harvests based on the calendar year. Estimates are for March to December except for North Carolina. Maryland and Virginia harvests include Chesapeake Bay. North Carolina is Atlantic Ocean only. The table includes wave 1 estimates of harvest (January-February) if MRIP estimated weight for wave 1.

Year	ME	NH	MA	RI	CT	NY	NJ	DE	MD	VA	NC	Total
1990	2,912	617	20,515	4,677	6,082	24,799	44,878	2,009	736	56,017	0	163,242
1991	3,265	274	20,799	17,193	4,907	54,502	38,300	2,741	77,873	42,224	391	262,469
1992	6,357	2,213	57,084	14,945	9,154	45,162	41,426	2,400	99,354	21,118	967	300,180
1993	612	1,540	58,511	17,826	19,253	78,560	64,935	4,055	104,682	78,481	264	428,719
1994	3,771	3,023	74,538	5,915	16,929	87,225	34,877	4,140	199,378	127,945	7,426	565,167
1995	2,189	3,902	73,806	29,997	38,261	155,821	254,055	15,361	355,237	149,103	11,450	1,089,182
1996	1,893	6,461	68,300	60,074	62,840	225,428	127,952	22,867	337,415	244,746	17,136	1,175,112
1997	35,259	13,546	199,373	62,162	64,639	236,902	67,800	19,706	334,068	518,483	96,189	1,648,127
1998	38,094	5,929	207,952	44,890	64,215	166,868	88,973	18,758	391,824	383,786	45,773	1,457,062
1999	21,102	4,641	126,755	56,320	55,805	195,261	237,010	8,772	263,191	411,873	65,658	1,446,388
2000	62,186	4,262	181,295	95,496	53,191	270,798	402,302	39,543	506,462	389,126	20,452	2,025,113
2001	59,947	15,291	288,032	80,125	54,165	189,714	560,208	41,195	382,557	355,020	58,873	2,085,127
2002	71,907	12,857	308,749	78,190	51,060	202,075	416,455	29,149	282,429	411,248	109,052	1,973,171
2003	57,765	24,878	407,100	115,471	95,983	313,761	391,842	29,522	525,191	455,812	127,727	2,545,052
2004	48,816	8,386	445,745	83,990	102,844	263,096	424,208	25,429	368,682	548,768	230,783	2,550,747
2005	83,617	24,940	340,743	110,490	141,290	376,894	411,532	20,438	533,929	293,161	104,904	2,441,938
2006	75,347	13,521	314,987	75,811	115,214	367,835	509,606	20,159	669,140	547,482	79,023	2,788,125
2007	53,694	6,348	315,409	101,400	118,549	474,062	289,656	8,465	765,169	353,372	37,376	2,523,500
2008	59,152	5,308	377,959	51,191	108,166	685,589	309,411	26,934	415,403	401,155	25,750	2,466,018
2009	62,153	8,587	344,401	71,427	60,876	356,311	283,024	19,539	501,845	326,867	5,650	2,040,680
2010	17,396	5,948	341,045	70,108	92,806	538,374	320,413	16,244	457,898	102,405	23,778	1,986,415
2011	18,105	32,704	255,507	88,635	63,288	674,844	393,194	18,023	445,171	146,603	94,182	2,230,256
2012	11,624	14,498	377,931	61,537	64,573	424,522	168,629	25,399	262,143	134,758	0	1,545,614

Table 7. Recreational releases (numbers) of migratory striped bass by state, 1982-2012, and annual dead discard estimates

Source: personal communication with NMFS. Note: All harvests based on the calendar year. MD and VA harvests include Chesapeake Bay. NC is Atlantic Ocean only.

Year	ME	NH	MA	RI	CT	NY	NJ	DE	MD	VA	NC	Total	*Dead Discards^*
1990	12,542	15,518	339,511	67,509	89,490	265,099	254,384	14,411	420,084	175,046	0	1,653,594	*148,823*
1991	67,490	6,559	448,735	30,975	301,476	756,663	166,198	38,334	1,036,011	208,350	256	3,061,047	*275,494*
1992	31,177	27,613	779,814	120,410	292,259	799,149	413,506	36,932	749,959	115,899	679	3,367,397	*303,066*
1993	373,064	14,979	833,566	100,993	271,318	694,107	308,253	89,543	1,556,848	100,374	1,524	4,344,569	*391,011*
1994	363,703	43,501	2,102,514	138,989	489,967	1,132,707	568,047	103,992	2,785,392	197,022	5,005	7,930,839	*713,776*
1995	505,758	285,486	3,280,882	356,324	507,124	1,209,585	694,889	115,363	2,401,277	370,949	16,225	9,743,862	*876,948*
1996	1,626,705	292,820	3,269,746	314,336	1,051,612	1,436,091	776,165	99,372	2,545,238	759,916	116,667	12,288,668	*1,105,980*
1997	1,417,976	279,298	5,417,751	606,746	722,708	1,018,892	736,734	130,073	4,019,987	1,232,323	135,853	15,718,341	*1,414,651*
1998	691,378	243,301	7,184,358	613,421	1,026,192	884,626	488,319	185,016	2,641,680	796,372	173,704	14,928,367	*1,343,553*
1999	649,816	145,730	4,576,208	360,121	704,025	1,228,628	1,152,682	105,696	2,387,615	940,755	263,445	12,514,721	*1,126,325*
2000	942,593	209,606	7,382,031	541,516	926,367	1,373,069	885,289	151,838	3,244,731	1,022,040	129,729	16,808,809	*1,512,793*
2001	870,522	164,336	5,410,899	377,474	1,107,707	824,278	965,650	162,677	2,890,054	620,947	49,953	13,444,497	*1,210,005*
2002	1,392,200	238,003	5,718,984	530,402	696,976	588,155	715,099	114,650	2,928,589	706,729	63,269	13,693,056	*1,232,375*
2003	846,708	260,167	4,361,710	448,707	843,037	1,083,808	925,885	169,012	4,652,800	970,554	48,945	14,611,333	*1,315,020*
2004	693,400	225,777	4,979,075	525,936	826,724	2,709,246	1,502,694	155,655	3,479,634	1,732,890	222,302	17,053,333	*1,534,800*
2005	2,985,203	572,633	3,988,679	633,871	1,761,628	1,412,191	1,218,893	251,049	3,855,552	1,295,768	103,432	18,078,899	*1,627,101*
2006	4,000,309	460,615	7,809,777	834,953	986,700	1,722,386	1,890,294	247,653	3,711,343	1,655,007	24,262	23,343,299	*2,100,897*
2007	1,115,068	257,372	5,331,470	677,851	984,638	1,677,717	1,789,294	248,689	3,064,928	949,158	13,838	16,110,023	*1,449,902*
2008	465,003	77,237	3,649,415	416,373	3,104,779	1,346,385	1,309,453	260,677	1,338,728	532,161	10,776	12,510,987	*1,125,989*
2009	263,512	57,443	2,282,601	398,686	1,161,278	1,073,467	800,510	145,586	1,423,332	358,991	5,407	7,970,813	*717,373*
2010	193,743	51,833	1,671,437	183,112	670,534	1,068,672	690,340	65,048	1,508,647	134,350	20,365	6,258,081	*563,227*
2011	142,505	98,693	973,192	214,302	612,367	1,506,080	884,013	110,085	1,127,511	153,582	110,150	5,932,480	*533,923*
2012	214,185	64,226	989,509	247,075	264,927	586,044	406,096	109,960	2,206,518	101,736	1,615	5,191,891	*467,270*

^ Dead discards are estimated by multiplying the number of released fish by a mortality rate of 9%.

Table 8. Coastal commercial quotas and harvests (in pounds).

	Amendment 6 Allocation	2012 Quota	2012 Harvest	Overage	2013 Quota
MA	1,159,750	1,057,783	1,219,665	161,882	997,868
RI*	243,625	239,963	239,913		239,963
NY^	1,061,060	801,855	681,399		828,293
NJ+	321,750	321,750	6,285		321,750
DE	193,447	193,447	194,324	877	192,570
MD^	131,560	126,396	77,551		126,396
VA	184,853	184,853	170,788		184,853
NC~	480,480	480,480	6,226		480,480

^ Beginning in 2003, NY and MD quotas reduced due to conservation equivalency; MA and RI quotas reduced in 2003 due to quota overages in previous year.
* Beginning in 2007, RI quota reduced due to conservation equivalency.
+ NJ quota applied to recreational bonus fish program
~ NC harvests and quotas are for the December 1 to November 30 fishing year

Table 9. Chesapeake Bay Quotas and Harvests (pounds), 2012

2012	Jurisdiction	Quota	Harvest
Commercial Fisheries	Maryland	1,963,873	1,851,431
	PRFC	739,097	733,789
	Virginia	1,430,361	1,339,152
	Subtotal	4,133,331	3,924,372
Recreational Fisheries	Maryland	2,657,102	1,060,611
	PRFC	604,716	*
	Virginia	1,430,361	1,342,088
	Subtotal	4,624,988	2,402,699
Chesapeake Bay Total		8,758,319	6,327,071

Notes: Recreational harvest in the Potomac River is included in Maryland and Virginia harvest estimates. Estimates of recreational harvest in Maryland do not include migratory fish harvested in the spring season. These fish are not counted against Maryland's portion of the Chesapeake Bay recreational quota. The 2012 migratory harvest is estimated at 16,769 fish and 273,733 pounds. The PRFC recreational quota includes the charter boat quota of 67,191 pounds.

Table 10. Status of compliance with monitoring and reporting requirements, 2012
(JAI = juvenile abundance index survey, SSB = spawning stock biomass survey, tag = participation in coastwide tagging program, Y = compliance standards met, N = compliance standards not met, na = not applicable)

Jurisdiction	Fishery-independent monitoring		Fishery-dependent monitoring		Annual reporting
	Requirement(s)	Status	Requirement(s)	Status	Status
ME	JAI	Y	x	na	Y
NH	x	na	x	na	Y
MA	tag	Y	composition, catch & effort (C&R)	Y	Y
RI	x	na	composition (C&R), catch & effort (R)	Y	Y
CT	x	na	composition, catch & effort (R)	Y	Y
NY	JAI, SSB, tag	Y	composition, catch & effort (C&R)	Y	Y
NJ	JAI, tag	Y	composition, catch & effort (R)	Y	Y
PA	SSB	Y	x	na	Y
DE	SSB, tag	Y	composition, catch & effort (C)	Y	Y
MD	JAI, SSB, tag	Y	composition, catch & effort (C&R)	Y	Y
PRFC	x	na	composition, catch & effort (C&R)	Y	Y
DC	x	na	x	na	Y
VA	JAI, SSB, tag	Y	composition, catch & effort (C&R)	Y	Y
NC	JAI, SSB, tag	Y	composition (C)	Y	Y

STATE OF MAINE

2012 STRIPED BASS
FISHERY AND MONITORING REPORT

ASMFC Graphic

DEPARTMENT OF MARINE RESOURCES
BUREAU OF MARINE SCIENCE
#172 STATE HOUSE STATION
AUGUSTA, MAINE 04333

May 2013

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I. Introduction

In accordance with Amendment #6 of the ASMFC Interstate Fisheries Management Plan (ISFMP) for Striped Bass, the Maine Department of Marine Resources (MDMR) submits the following report. The Striped Bass ISFMP requires each state to submit an annual report of its striped bass fisheries to maintain ISFMP compliance. The management unit for striped bass includes all coastal states from Maine through North Carolina, the Potomac River Fisheries Commission, Pennsylvania, and the District of Columbia. The ISFMP allows for variability in monitoring and data collection based on the significance of each jurisdiction's fishery and if the state produces striped bass in its waters.

Current management regulations in Maine prohibit commercial fishing and sales of striped bass caught in Maine waters. The possession limit of one fish restricts in-state sales of striped bass legally harvested from another states' waters. No commercial fishery monitoring program was required, or implemented in Maine, in 2012. One change to the regulations governing the recreational take of striped bass was made in 2012, and now only circle hooks are allowed when fishing with bait with one exemption. The specific regulation is:

42.01 Statewide Striped Bass Size Restrictions, Harvest Methods

1. Method of Taking.
   C. It is unlawful to use treble hooks when using bait.
   The following became effective January 1, 2013:
   It is unlawful to use any hook other than a circle hook when using bait. For purposes of this chapter the definition of circle hook means “a non-offset hook with a point that points 90º back toward the shaft of the hook”.

   Exception: Rubber or latex tube rigs will be exempt from the circle hook restriction as long as they conform to the following: the lure must consist of a minimum of 8” of latex or rubber tubing with a single hook protruding from the end portion of the tubing where bait may be attached. Use of treble hooks is not allowed with these rigs.

Maine continued to supplement the MRFSS survey to achieve recreational harvest estimates with a PSE (Proportional Standard Error) no greater than 20 percent. Maine has a small spawning population of striped bass in the Kennebec River (including the tidal sections of the Androscoggin and Sheepscot rivers). Maine closes the spawning area to fishing from December 1 through April 30. During May and June, fishing in spawning areas is restricted to catch and release with single hooked artificial lures.

States that produce striped bass are required to conduct spawning stock assessments and/or carry out surveys to establish annual juvenile abundance indices. In 1979, the MDMR began conducting a beach seine survey for juvenile shad, river herring, and striped bass in the Kennebec/Androscoggin estuary. The survey captures small numbers of young-of-the-year striped bass annually since 1987.

II. Request for de minimis, where applicable (NA)

III. Previous Calendar Year's Fishery and Management Program

A. Fishery Dependent Monitoring Programs

i. Commercial Fishery

(1) Characterization of the commercial fishery

Current management regulations in Maine prohibit commercial fishing and sale of striped bass caught in Maine waters. Changes to state law in 2011 prohibit the sale of any recreationally or commercially caught striped bass from waters outside the State of Maine. This change closes a loophole that existed in state law for several years, though it is unclear how many individuals sold striped bass caught recreationally caught in other states. No commercial fisheries monitoring program was required in Maine during 2012.

(2) Characterization of directed commercial harvest (NA)

ii. Recreational Fishery

(1) Characterization of recreational fishery (seasons, cap, gears, regulations, etc.)

Size Limit: Slot length 20-26" and 40" or greater
Daily Creel Limit: One fish, either between 20-26" or 40" or greater

- Possession Limit: One fish
- Disposition of Catch: No sale of Maine-caught striped bass
- Gear Restrictions: Hook and line only
- Gear Restrictions: Only circle hooks when using live bait
- Open Season: No closed season statewide
- Closed Season: December 1 through April 30 in spawning areas; catch and release fishing only in spawning areas May 1 through June 30.

Maine is near the northern end of the range of migratory striped bass. Because of its geographical location and relatively small striped bass population, Maine is not a key state in the recreational striped bass fishery. Striped bass fishing typically begins in late April and extends through October. The method of harvest is restricted to hook and line only. Spawning areas (Kennebec, Androscoggin, and Sheepscot Rivers) are closed from December 1 through April 30. During May and June, fishing in spawning areas is restricted to catch and release with single hooked artificial lures only.

(2) Characterization of directed harvest

Landings and method of estimation:
In accordance with provisions of the Striped Bass Plan, states not considered key in the recreational fishery may use existing MRFSS (now MRIP) recreational data as the estimate of recreational landings. According to the 2012 MRIP data for Maine, the striped bass recreational harvest was 11,541 fish with a PSE of 52.4. The total weight harvested was 57,509 pounds with a PSE of 47.8 and the total number of discards (numbers released alive) was 213,277 with a PSE of 31.2. Table 1 contains estimates from previous years, which have been updated using MRIP data from March 4, 2013.

Catch composition:

Staff scientists calculate the catch composition for the 2012 recreational striped bass fishery using data collected from 61 volunteer angler logbook keepers fishing for striped bass in southwestern Maine. Table 2 contains the length frequency distribution for 994 striped bass caught and measured in 2012. Of the total catch, 16 were $\geq$ 40" of which 15 were released; 193 striped bass were in the 20-26" slot, 78(40%) of which were kept (Table 3).

(i) Age frequency
Maine uses the age-length key developed by Massachusetts Division of Marine Fisheries to determine age.

(ii) Length frequency (legal and sub-legal catch)
See Table 3

(iii) Sex (if available)
Not available

(c) Estimation of effort (where available)

The 61 logbook keepers reported 990 fishing trips which, when multiplied by the number of logbook keepers and their fishing companions, resulted in 1,738 individual angler-trips.
The logbook keepers reported they and their fishing companions fished for more than 5,500 angler-hours over the course of the season. Anglers caught <1.0 striped bass per angler-hour on self/family/friends trips targeting striped bass as the primary or secondary target (738 trips).
Of the 990 reported fishing trips, 85% (842) targeted striped bass as the primary or secondary target.

iii. Other losses (poaching, hook & release mortality, by-catch, etc.)

Maine utilizes total catch and harvest estimates provided by the NMFS MRFSS survey. Maine fisheries staff calculates the annual hook and release mortality of striped bass by multiplying the number of released fish by the ASMFC hook and release mortality rate of 8.0%. The poaching rate (1.3%), established by the Striped Bass Technical Committee, is implemented to estimate poaching losses in the recreational fishery. Results are reported in Table 4.

iv. Total harvest & losses

Estimates of losses due to recreational harvest, hooking mortality, and poaching are located in Table 4.

B. Fishery Independent Monitoring Programs

i. Results

In accordance with the Striped Bass Plan, fishery independent monitoring and tagging programs are required to generate the information necessary for adaptive management. Maine is responsible for determining an annual juvenile index for striped bass. Recruitment of striped bass in the Kennebec River estuary continues to be minimal since first documented in 1987.

Description of work performed and results:

MDMR established a beach seine survey in the Kennebec and Androscoggin estuaries in 1979 to monitor the abundance of juvenile alosines at 14 permanent sampling sites located in tidal freshwater. Four sites are on the Upper Kennebec River, three on the Androscoggin River, four on Merrymeeting Bay, one on the Cathance River, one on the Abagadasset, and one on the Eastern River. The mean tidal range at head-of-tide in Augusta is four feet; at head-of-tide in Brunswick, six feet; and in Merrymeeting Bay, eight feet. Beginning in 1987, small numbers of juvenile striped bass were captured during the survey. To better monitor the abundance of striped bass, six additional experimental sites located in the lower, salinity-stratified part of the estuary have been sampled since 1994 (Figure 1).

Each site is sampled once on a biweekly schedule from mid-July to early-October, and is typically sampled six times during the season. All samples are taken with a beach seine within three hours of low slack water. The seine is made of 3.17-mm mesh nylon, measures 20-m long and 1.8-m deep, and has a 1.8-m by 1.8-m bag at its center. One end of the seine is held stationary at the land/water interface and the other end is towed by boat perpendicular to shore; after the net is fully extended, the waterside end is towed in an upriver arc and pulled ashore. An area of approximately 300 m^2 is sampled. All alosines and striped bass are counted, and the total lengths of a maximum of 50 of each species are recorded. The catch per unit effort (CPUE) index is calculated by dividing the number of individuals caught in each river segment (sites are combined) by the number of seine hauls made in each river segment.

During the 2012 field season, 30 juvenile striped bass were caught in 82 seine hauls at the 14 standard stations, resulting in a CPUE index of 0.37 fish/haul (Table 5). This was slightly above the average CPUE value for the standard stations. An additional 33 seine hauls at the six experimental stations in the lower Kennebec captured 7 juvenile striped bass for a CPUE index of 0.19 fish/haul (Table 5) This was well below the average CPUE value for the these stations. Based on DMR's experience and comments made by striped bass guides, adult striped bass were scarce again in the Kennebec River during 2012.

IV. Planned Management Programs for the Current Calendar Year

A. Summarize regulations that will be in effect

The regulations for the current year remain the same as last year and are described in Section III.

B. Summarize monitoring programs

Maine will continue to supplement the MRFSS survey to achieve recreational harvest estimates with PSE (Proportional Standard Error) no greater than 20%. Maine will continue the beach seine survey for juvenile striped bass in the Kennebec River.

C. Highlight any changes from the previous year

There are no plans for any changes from the previous year.

Table 1. Maine recreational striped bass landings from MRIP Recreational Survey.

Year	Number Harvested (A+B1)	A+B1 PSE	Weight (lbs) Harvested	Weight PSE	Discards	Discard PSE
1982	929	76.5	2,664	77.1	687	94.4
1983	7,212	44.9	13,031	46.4		
1984					1,887	100.0
1985	11,862	51.8	140,952	63.0	81,153	42.4
1986					4,379	82.9
1987					18,106	48.7
1988					4,528	65.2
1989	738	96.0	15,221	93.6	16,028	49.6
1990	2,912	80.0	60,483	80.8	12,542	63.8
1991	3,265	76.6	58,177	95.3	67,490	41.9
1992	6,357	48.2	107,693	58.8	31,177	25.9
1993	612	100.0	11,953	100.0	373,064	35.0
1994	3,771	41.4	66,451	41.9	363,703	27.5
1995	2,189	41.6	45,933	42.7	505,758	22.3
1996	1,893	42.0	44,801	42.6	1,626,705	19.2
1997	35,259	21.9	185,177	24.3	1,417,976	19.4
1998	38,094	17.0	178,583	20.3	691,378	17.7
1999	21,102	20.1	98,622	19.9	649,816	20.1
2000	62,186	14.3	269,325	14.7	942,593	15.2
2001	59,947	12.2	290,234	12.3	870,522	12.6
2002	71,907	11.4	383,270	13.1	1,392,200	10.2
2003	57,765	16.2	253,911	16.6	846,708	15.0
2004	48,816	31.1	226,200	32.6	693,400	19.7
2005	83,617	28.5	381,058	27.5	2,985,203	19.8
2006	75,347	21.8	323,355	22.7	4,000,309	21.1
2007	53,694	21.5	232,328	21.5	1,115,068	20.6
2008	59,152	20.5	271,768	20.5	465,003	27.4
2009	62,153	28.6	329,064	27.8	263,512	20.5
2010	17,396	28.1	104,117	30.3	193,743	18.0
2011	18,105	26.7	91,705	26.6	142,505	30.4
2012	11,541	52.4	57,509	47.8	213,277	31.2

Table 2. Length frequency distribution of measured striped bass reported by 61 Volunteer Logbook Anglers for the 2012 Maine recreational striped bass fishery.

Length ** (inches)	Number	Percent of total	Cumulative Number	Cumulative percent
8	0	0.00%	0	0.00%
9	0	0.00%	0	0.00%
10	1	0.10%	1	0.10%
11	0	0.00%	1	0.10%
12	5	0.50%	6	0.60%
13	8	0.80%	14	1.41%
14	23	2.31%	37	3.72%
15	20	2.01%	57	5.73%
16	43	4.33%	100	10.06%
17	35	3.52%	135	13.58%
18	38	3.82%	173	17.40%
19	13	1.31%	186	18.71%
20	19	1.91%	205	20.62%
21	7	0.70%	212	21.33%
22	14	1.41%	226	22.74%
23	15	1.51%	241	24.25%
24	46	4.63%	287	28.87%
25	42	4.23%	329	33.10%
26	50	5.03%	379	38.13%
27	52	5.23%	431	43.36%
28	58	5.84%	489	49.20%
29	64	6.44%	553	55.63%
30	87	8.75%	640	64.39%
31	85	8.55%	725	72.94%
32	82	8.25%	807	81.19%
33	45	4.53%	852	85.71%
34	46	4.63%	898	90.34%
35	23	2.31%	921	92.66%
36	24	2.41%	945	95.07%
37	16	1.61%	961	96.68%
38	12	1.21%	973	97.89%
39	5	0.50%	978	98.39%
40	3	0.30%	981	98.69%
41	2	0.20%	983	98.89%
42	3	0.30%	986	99.20%
43	3	0.30%	989	99.50%
44	1	0.10%	990	99.60%
45	2	0.20%	992	99.80%
46	2	0.20%	994	100.00%
47	0	0.00%	994	100.00%
48	0	0.00%	994	100.00%
49	0	0.00%	994	100.00%
50	0	0.00%	994	100.00%
Totals:	**994**	**100.00%**	**994**	**100.00%**

Table 3. Number of striped bass released versus number retained based on striped bass total lengths reported by 61 Volunteer Logbook Anglers during the 2012 Maine recreational striped bass fishery.

Length (in.)	Number released	Percent released	Number kept	Percent kept	Total number
20	15	11.54%	4	5.06%	19
21	4	3.08%	3	3.80%	7
22	12	9.23%	2	2.53%	14
23	8	6.15%	7	8.86%	15
24	29	22.31%	17	21.52%	46
25	17	13.08%	25	31.65%	42
26	30	23.08%	20	25.32%	50
40	3	2.31%	0	0.00%	3
41	2	1.54%	0	0.00%	2
42	2	1.54%	1	1.27%	3
43	3	2.31%	0	0.00%	3
44	1	0.77%	0	0.00%	1
45	2	1.54%	0	0.00%	2
46	2	1.54%	0	0.00%	2
47	0	0.00%	0	0.00%	0
48	0	0.00%	0	0.00%	0
49	0	0.00%	0	0.00%	0
50	0	0.00%	0	0.00%	0
Totals:	**130**	**100.00%**	**79**	**100.00%**	**209**

Table 4. Maine Striped Bass Harvest and Losses, 20112

Commercial Bycatch:	Number	Pounds	Mean weight (pounds/fish)
Bait Gill Nets:	0	0	
Recreational:	Number	Pounds	Mean weight (pounds/fish)
Total Recreational Catch	224,818		
Total Recreational Harvest	11,541	57,509	4.98
Catch and Release Mortality (.08)	923	4,601	4.98
Poaching (.013)	2,923	14,564	4.98
Total Losses	15,387	76,673	

Table 5. Striped bass young-of-year survey and CPUE index, Maine.

	Standard Stations			Experimental Stations			Overall
Year	Number of Hauls	Total Catch	CPUE Index	Number of Hauls	Total Catch	CPUE Index	CPUE Index
1987	74	26	0.35				
1988	68	3	0.04				
1989	68	1	0.01				
1990	68	4	0.06				
1991	63	16	0.25				
1992	80	1	0.01				
1993	71	1	0.01				
1994	69	23	0.33	36	245	6.81	2.55
1995	83	2	0.02	36	3	0.08	0.04
1996	69	4	0.06	30	8	0.27	0.12
1997	80	9	0.11	36	0	0.00	0.08
1998	82	14	0.17	33	0	0.00	0.12
1999	80	13	0.16	34	17	0.50	0.26
2000	84	6	0.07	36	10	0.28	0.13
2001	96	17	0.18	42	3	0.07	0.14
2002	110	11	0.10	42	117	2.79	0.94
2003	84	20	0.24	36	104	2.89	1.03
2004	75	10	0.13	36	36	1.00	0.41
2005	82	66	0.80	36	146	4.06	1.80
2006	83	225	2.71	36	960	26.67	9.96
2007	84	3	0.04	35	0	0.00	0.03
2008	69	22	0.32	34	24	0.71	0.45
2009	81	10	0.12	30	0	0.00	0.09
2010	84	0	0.00	30	0	0.00	0.00
2011	84	20	0.24	33	28	0.85	0.41
2012	82	30	0.37	36	7	0.19	0.31

Figure 1. Juvenile alosine and striped bass survey sites in the Kennebec and Androscoggin estuaries. Stations SB9 through SB14 are experimental stations; others are standard stations.

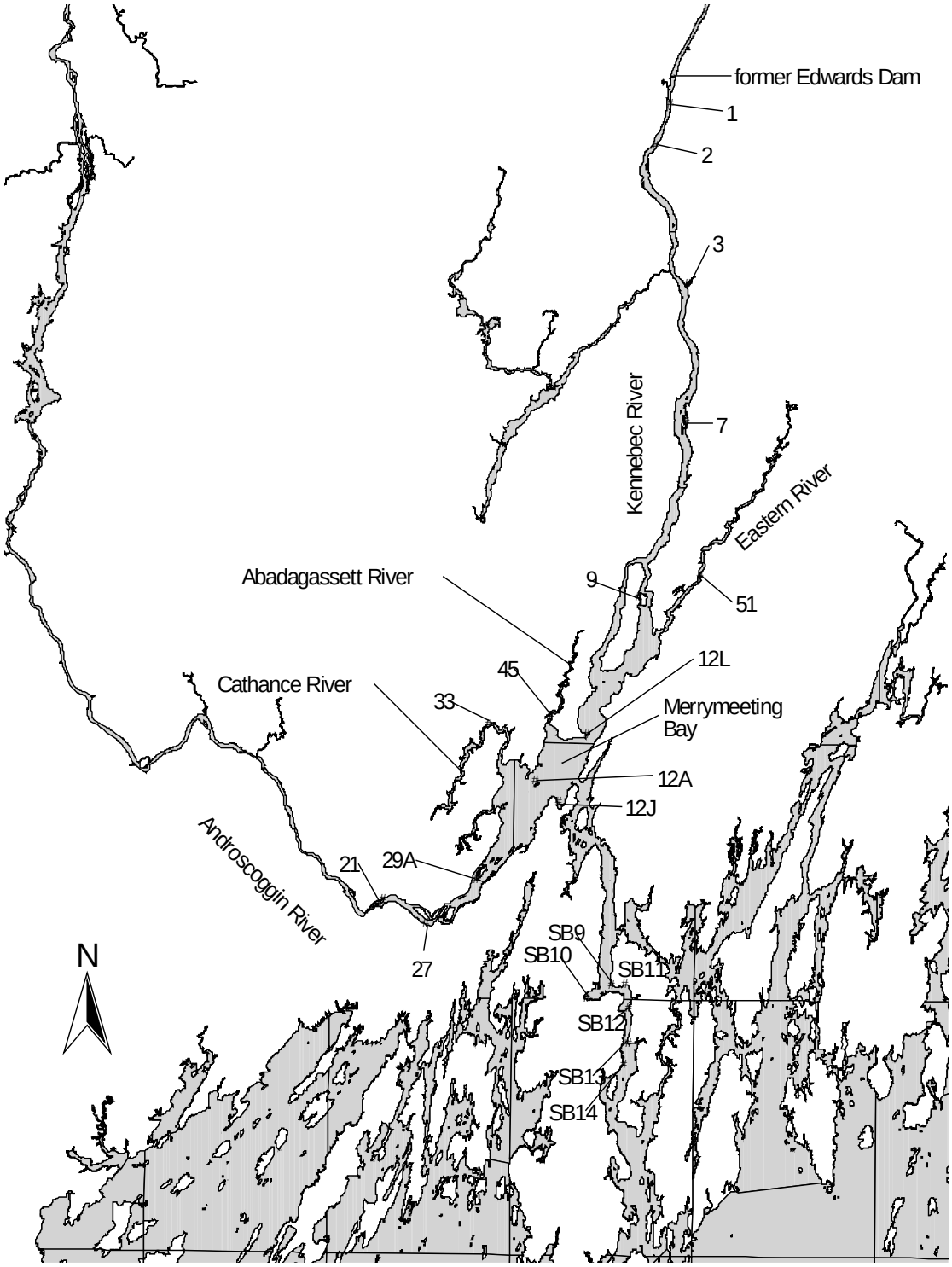
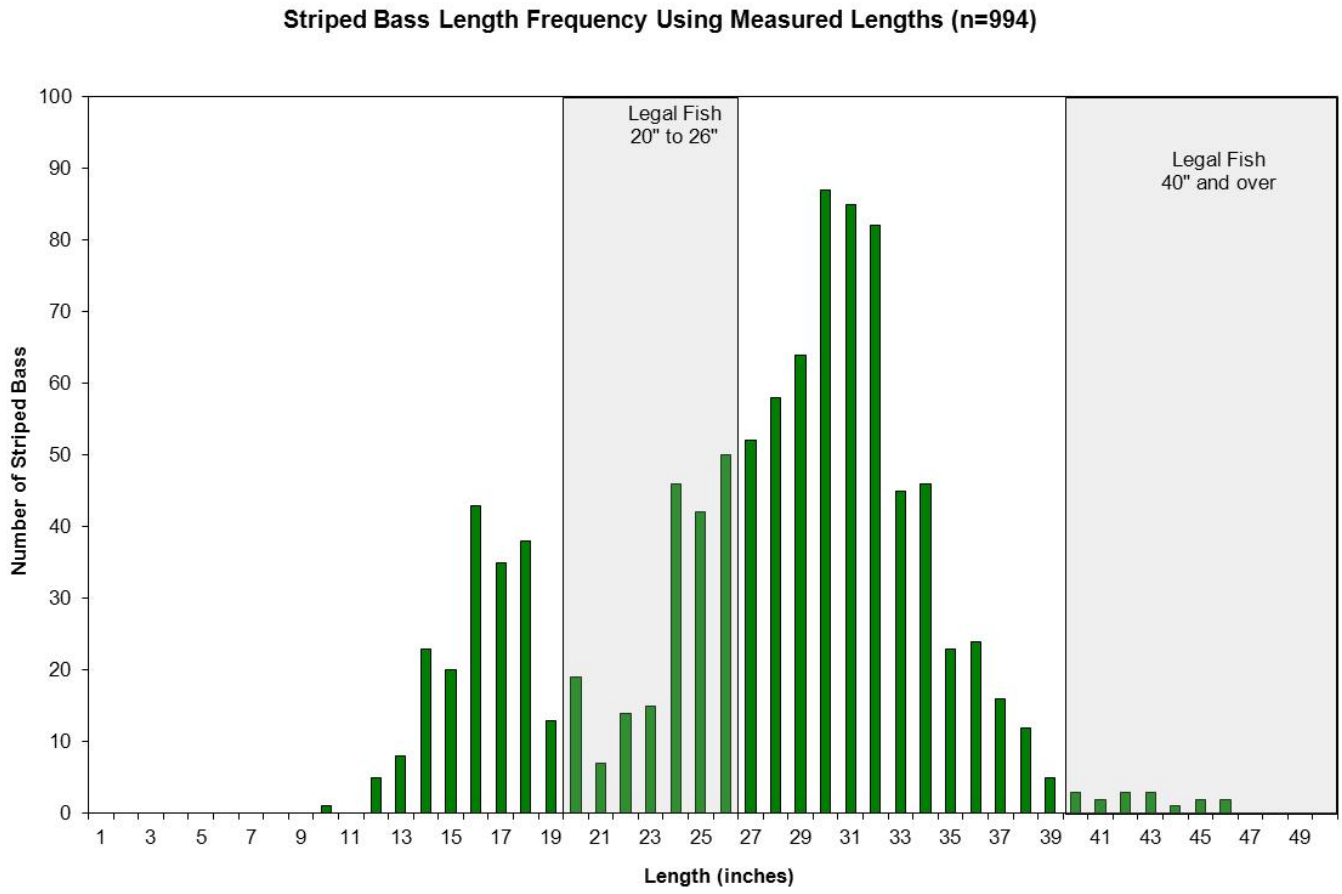


Figure 2. Striped bass length frequency for Maine 2012 based on data from 61 Volunteer Log Books.



NEW HAMPSHIRE - 2012

ASMFC Annual State Report for the Striped Bass Fishery

I. Introduction

During 2012, New Hampshire striped bass catch and harvest by recreational anglers decreased from 2011. Effort (angler trips) was stable between 2011 and 2012, but remains relatively low. The catch per trip for New Hampshire anglers as measured by a state conducted volunteer angler survey increased by 33% from 2011 to 2.8, but also remains low. There were no changes in management measures and monitoring of striped bass in New Hampshire during 2012.

II. Request for *de minimis*. N/A

III. Harvest and Losses for 2012

A. Commercial Fishery

1. Characterization of fishery
   a) The taking of striped bass by netting of any form is prohibited.
   b) The sale of striped bass is prohibited regardless of origin.

2. Characterization of directed harvest. N/A

3. Characterization of other losses. See Law Enforcement report.

B. Recreational Fishery

1. Characterization of fishery
   a) No seasonal restrictions
   b) Striped bass must be landed with head and tail intact 28 inch minimum size limit
   c) Two fish per day creel limit, only one fish may be greater than 40 inches
   d) No gaffing of striped bass allowed
   e) Culling of striped bass is prohibited

2. Characterization of directed harvest
   a) Landings and methods of estimation - see Table 1
   b) Catch composition –see Table 2 and Appendix A.
   c) Estimation of effort – Table 3

3. Characterization of losses - see Tables 1-3.

C. Other losses - none

IV. Required fishery-independent monitoring. - None required.

V. Planned management program for 2013.

There were no changes to New Hampshire's striped bass management program in 2012 and none currently proposed in 2013. Possession of a Recreational Saltwater Fishing License is required for anglers to take, possess, or transport finfish from the coastal and estuarine waters of New Hampshire.

Fis 603.08 Striped Bass.

(a) No person shall take, possess, or transport striped bass less than 28 inches in total length. Striped bass shall have head and tail intact while on or leaving the waters or shores of the state.

(b) No person shall possess more than the daily creel limit of two fish, and only one fish may be greater than 40 inches in total length.

(c) There shall be no closed season for the taking of striped bass.

(d) The sale of striped bass shall be prohibited regardless of origin.

(e) The taking of striped bass shall be prohibited by netting in any form except that striped bass may be landed by the use of a hand held dip net.

(f) The taking of striped bass by gaffing shall be prohibited.

(g) Striped bass legally taken in Maine, which do not meet the New Hampshire size and creel restrictions shall only be possessed on the waters of the Piscataqua and Salmon Falls rivers. All striped bass landed in New Hampshire shall meet New Hampshire's size and creel restrictions.

(h) No person shall cull any striped bass taken from or while on the waters under the jurisdiction of the state.

Table 1. Estimate of striped bass catch, harvest, and release losses in New Hampshire's recreational fishery, 2012.

	NUMBER	POUNDS	MEAN WT(lbs)/FISH
	MRIP	MRIP	
Total Catch[1]	77,641	-	-
Total Harvest[1]	14,410	163,804	11.37
Release Losses[2]	5,691	21,626	3.80[3]

1 - Source: NMFS-MRIP (Preliminary for 2012 at time of report)

2 - Striped bass released*0.09

3 - Mean weight of recreationally caught, striped bass in New Hampshire derived by applying length/weight formula log10(pounds) =-3.463+3.007*log10(TL inches), RMS=0.0028, (Massachusetts Striped Bass Fishery Monitoring Report - 2012) to length data from New Hampshire Striped Bass Volunteer Angler Survey 2012.

Table 2. Catch at age estimates from New Hampshire's recreational striped bass fishery, 2012.

Fishery:	Total #	Total wt	Catch at age											
			2	3	4	5	6	7	8	9	10	11	12	13+
MRIP Rec. Harvest	14,410	168,882	0	0	538	1,725	3,111	3,551	2,825	1,649	361	197	177	277
MRIP Rec. Discard Mortality	5,691		2,096	1,723	395	499	304	279	208	113	25	14	12	19
MRIP TOTAL	20,101	168,882	2,096	1,723	933	2,224	3,416	3,830	3,033	1,762	385	210	189	296

Table 3. Estimates of catch, harvest, release losses, and effort in New Hampshire's recreational fishery for striped bass, 1994-2012.

	Catch		Harvest						Release Losses					Effort	
Year	#		#		lbs.		Mean wt.		#		lbs.		Mean	(angler trips)	
	MRFSS	MRIP	MRFSS	MRIP	MRFSS	MRIP	MRFSS	MRIP	MRFSS	MRIP	MRFSS	MRIP	weight	MRFSS	MRIP
2012	NA	77,641*	NA	14,410*	NA	163,804*	NA	11.4*	NA	5,058*	NA	21,626	3.8	NA	295,611*
2011	105,776	131,397	23,976	32,704	269,921	370,798	11.3	11.3	6,544	7,895	46,528	56,137	7.1	294,566	296,570
2010	49,513	57,781	5,089	5,948	53,963	67,409	10.6	11.3	3,554	4,147	23,664	27,617	6.7	251,969	243,075
2009	76,348	66,030	10,761	8,587	146,005	113,705	13.6	13.2	5,247	4,595	30,614	26,791	5.9	414,337	400,587
2008	90,175	82,545	6,642	5,308	92,178	73,807	13.9	13.9	6,683	6,179	35,351	32,687	5.3	348,590	332,539
2007	296,055	263,720	7,070	6,348	73,283	68,142	10.4	10.7	23,119	20,590	84,616	75,359	3.7	537,684	501,517
2006	582,640	474,136	14,748	13,521	212,012	179,181	14.4	13.3	45,431	36,849	127,214	103,178	2.8	546,952	501,320
2005	538,797	597,573	26,026	24,940	291,663	281,114	11.2	11.3	41,022	45,811	151,780	169,499	3.7	520,433	504,774
2004	207,165	234,163	10,359	8,386	121,565	98,995	11.7	12	15,744	18,062	70,850	81,280	4.5	360,359	343,160
2003	285,045	NA	24,878	NA	281,548	NA	11.3	NA	20,813	NA	82,005	NA	3.9	415,763	NA
2002	250,860	NA	12,857	NA	152,343	NA	11.8	NA	19,040	NA	90,250	NA	4.7	318,430	NA
2001	179,628	NA	15,291	NA	223,072	NA	14.6	NA	13,147	NA	91,898	NA	7	360,098	NA
2000	213,868	NA	4,262	NA	71,370	NA	16.7	NA	16,768	NA	91,386	NA	5.5	367,899	NA
1999	150,371	NA	4,641	NA	84,256	NA	18.2	NA	11,658	NA	69,948	NA	6	285,303	NA
1998	249,229	NA	5,929	NA	114,341	NA	19.3	NA	19,464	NA	97,320	NA	5	276,670	NA
1997	292,844	NA	13,546	NA	206,904	NA	15.3	NA	22,344	NA	114,142	NA	5.1	337,836	NA
1996	299,281	NA	6,461	NA	102,271	NA	15.8	NA	23,426	NA	87,476	NA	4.1	265,065	NA
1995	289,388	NA	3,902	NA	67,992	NA	17.4	NA	22,839	NA		NA		299,763	NA
1994	46,524	NA	3,023	NA	66,017	NA	21.8	NA	3,480	NA		NA		314,034	NA

*MRIP estimates are preliminary at time of report.

APPENDIX A. Progress report of New Hampshire's Volunteer Angler Creel Survey for striped bass anglers, 2012.

PROGRESS REPORT

State: **New Hampshire** **Grant: F-61-R**

Title: **NEW HAMPSHIRE'S MARINE FISHERIES INVESTIGATIONS**

Project I: **ANADROMOUS FISH INVESTIGATIONS**

Job 5: **Volunteer Angler Creel Survey for Striped Bass Anglers**

Objective: To annually monitor the recreational fishery for striped bass in New Hampshire waters in order to identify trends and evaluate the effect of management measures.

Period Covered: January 1, 2012 - December 31, 2012

ABSTRACT

Thirty-two anglers participated in New Hampshire's Volunteer Angler Creel Survey for striped bass (*Morone saxatilis*) during 2012. The anglers reported on 580 fishing trips (approximately 1,852 angler hours) directed at striped bass in New Hampshire waters. Catch per unit effort indices in 2012 from this survey remained low compared to historical values.

The percentage of trips where flies were used as terminal tackle increased while fishing trips using lures saw a slight decline in use in 2012. The use of bait has remained the preferred method over the time series. The shifting terminal tackle preferences of New Hampshire anglers may be a contributing factor to the variability of sizes of striped bass catch reported interannually due to a possible gear selectivity of bait catching larger fish.

A reported 1,638 striped bass were caught in 2012, and volunteers provided length data on 1,495 (91%) of those fish. Lengths ranged from 9 to 46 inches, and 78% were from sub-legal size fish that would not have been obtained by conventional shore-based creel surveys. The mean length of striped bass caught decreased to 20.3 inches in 2012. A strong recruitment of certain year classes may also affect the size variability and mean size of fish caught in New Hampshire waters from one year to the next.

INTRODUCTION

Striped bass (*Morone saxatilis*) has traditionally been an important component of the marine recreational fishery in New Hampshire (NH). The

increased abundance of striped bass observed in the 1990s translated into increased effort in the recreational fishery for this species in New Hampshire.

The Marine Recreational Survey (MRS), conducted by the New Hampshire Fish and Game Department and the National Oceanic and Atmospheric Administration Fisheries Service (NOAA Fisheries) in New Hampshire, is a general purpose survey that provides basic catch and effort data about the fishery. More specific information about the striped bass fishery, such as the relative use of different terminal tackle types and size distribution of sub-legal and legal fish that are released, would aid in the management of this fishery.

To gain additional information specific to this important recreational fishery in New Hampshire, the New Hampshire Fish and Game Department (Department) developed and implemented a Striped Bass Volunteer Angler Survey Program (SBVAS) for striped bass in 1993. The program is used to obtain information about the fishery that will assist managers in efforts to effectively manage the striped bass resource along the New Hampshire and other Atlantic states' coasts.

PROCEDURES

Volunteer angler logbooks were distributed to anglers who expressed a willingness to participate in the program. Anglers were solicited at marinas, public access sites, sportsman's clubs, in publications released by the Department, on recreational fishing websites, and at public informational meetings concerning striped bass.

The local chapter of the Coastal Conservation Association (CCA-NH) assisted by providing a membership list to the Department so survey forms could be sent to all members. In addition, they donated a signed and framed striped bass print to the Department to be raffled to one survey participant. In 2012, a second prize was offered. Kittery Trading Post donated a rod and reel to the Department to be raffled to one additional participant.

The survey logbooks provided space for collecting the following information: angler’s name and address, trip date, number of hours fished, number of anglers in party, number of fish caught and kept, number of fish caught and released, number of legal size fish released, whether fishing occurred from boat or shore, the terminal tackle used, and length measurements (total length to the nearest inch) of any striped bass caught. Instructions completing the logbooks were included on the form. Participants were also given the opportunity to electronically submit logbook information in a spreadsheet format through e-mail.

Letters were sent out at the end of the fishing season in November to remind anglers to submit the logbooks. Those anglers that did supply a record of their fishing effort and catch were provided with a letter that summarized

their individual data, as well as, the combined data of all participants.

If anglers reported measurements as ranges that were in increments greater than four inches, they were omitted because such large increments can include the entire size range of several different age groups. To utilize the smaller range measurements (≤4 inches), the lengths of the fish reportedly caught in a given size range were sequentially apportioned to lengths within the range in one-inch increments with the central values having the greatest probability of being used. For example, a report of four fish between 12 and 14 inches would be assigned length values as follows: 12, 13, 13, and 14 inches. This method seems appropriate for the small range increments at the lower fish sizes because average annual growth of striped bass less than 25 inches is approximately 4 to 6 inches per year.

Summary statistics were calculated for all logbook and length data received. Comparisons of reported catch and harvest rates were made to MRS and stock assessment data using standard correlations to produce Pearson's product moment correlation coefficients. Mean lengths of striped bass harvested by three separate tackle types (bait, lure, fly) were analyzed using a one-way ANOVA, and pair-wise combinations were made using Tukey's (HSD) Studentized Range test.

RESULTS

In 2012, thirty-two anglers provided information on 580 trips, accounting for 1,852 angler hours directed at striped bass via the Striped Bass Volunteer Angler Survey Program (Table 5-1). Anglers reported catching a total of 1,638 striped bass this year, 336 (21%) of which were of legal size. Of all the fish caught, approximately five percent were harvested, 75% of the legal size fish were released alive, and 95% of the entire catch was released.

The majority of the trips taken (69%) were from a boat, and bait was the most commonly used terminal tackle (Table 5-1). The percentage of trips using bait has made up the majority of trips since the inception of this survey. Trips using lures have remained relatively constant since 2003, ranging from a low of 24% in 2004 and 2012 to a high of 33% in 2005. The use of flies as terminal tackle had steadily declined since 2000 (41% of trips) to the second lowest percentage on record in 2011 (10% of trips). In 2012, the percent of trips using flies as terminal tackle rose from 2011 to equate to the average of the time series (27% of trips) and surpassed the use of lures for the first time since 2006. A consistently reduced proportion of legal size fish caught using lures and flies, in relation to bait is clearly exhibited in Figure 5-1.

The catch per trip for survey participants increased in 2012 and at 2.8 striped bass per trip was the highest reported value since 2007, but is still well below the average of 3.8 striped bass per trip over the time series. This index of catch per unit effort (CPUE) remained relatively high from 1995 through 2007; in 2008 a 50% drop was observed in the SBVAS reported data

(Table 5-1). Similarly, the catch per hour fished increased by 73% from 2011 to the highest value seen since 2007 but remains below the average for the time series. In contrast, the 2012 harvest of 0.04 striped bass per hour decreased from 2011; however, the catch of legal size fish per hour fished remained consistent with 2011 at 0.18 legal size fish caught per hour fishing. Catch rates from this survey and the MRS survey have generally mirrored each other with the exception of the past three years. In 2012, the catch per trip index apparently increased according to the SBVAS data and decreased according to the MRS data. Comparisons of catch rates from the MRS to this survey are shown in Figures 5-2 and 5-3, indicating a moderate to strong significant correlation between the two independent surveys.

Length measurements were provided on 1,495 striped bass ranging from 9 to 46 inches total length (Table 5-2). Seventy-eight percent of all reported length measurements were of sub-legal size fish (< 28 inches), with the mean length of all fish measured being 20.3 inches. The influence of terminal tackle on proportional encounters with legal size fish and the mean length of fish caught are shown for each tackle type in Figures 5-4 and 5-5. The distributions of all lengths in a sample year, as well as, the mean length of fish reported among all anglers and tackle types are depicted in Figure 5-6.

DISCUSSION

Annual participation in the Department's Striped Bass Volunteer Angler Survey has fluctuated over the years from nine to fifty-eight anglers reporting with an average of thirty-seven individuals responding annually (Table 5-1). This year's participation by 32 volunteer anglers is below average. The number of reporting anglers increased in 2000 most likely due to CCA-NH's assistance in providing access to their membership list for solicitation of new participants, as well as, providing raffle opportunities of framed limited edition prints as an incentive. Despite efforts, the voluntary design of the SBVAS results in consistently low response rates each year, and retention of participants for more than two years has been difficult. In 2012, 346 individuals comprised primarily of CCA-NH members and past survey participants were directly contacted by the Department, a 4% increase in direct solicitation over 2011 when 334 individuals were contacted. In addition to directly contacting past participants and CCA-NH members, a press release was distributed by the Department to advertise the survey and was also published in a local fishing magazine. The Department also advertises the volunteer opportunity on its webpage.

In 2012, five anglers submitted electronic spreadsheets through e-mail, three of which were new participants, out of a total of six new participants. Considering that half of the new participants in 2012 prefer electronic reporting, the diversification into other electronic options such as web-based

submission of single trip information may allow for increased data collection in coming years.

A second incentive was added in both 2011 and 2012. Kittery Trading Post donated a rod and reel combination to be raffled off along with the print donated annually by CCA-NH. The response rate to the solicitation request to report striped bass catch decreased in 2012 to nine percent compared to 12% in both 2010 and 2011. There are likely many factors that go into whether an individual participates in the survey from year to year. Considering the level or decreased response rate with an added incentive, it does not appear that the added prize had much influence on the decision of whether to participate in the survey. Given that the response rate did not increase with added incentives in 2011 or 2012, a greater recruiting effort should be made in the future, especially to the internet audience.

Catch and effort information collected through the SBVAS was used to quantify CPUE, as both striped bass caught per angler trip and striped bass caught per hour fished (Table 5-1). In 2012, both forms of catch rates remain low in comparison to historical values although both showed an increase over 2011. When comparing SBVAS catch rates to those generated by the MRS for striped bass directed trips in New Hampshire, the MRS rates are consistently lower in magnitude (NOAA Fisheries: Office of Science and Technology, 2013), but exhibit a very similar trend from year to year with the exception of the last 3 years (Figure 5-2). A correlation analysis of the SBVAS CPUE and the MRS CPUE between 1993 and 2012 resulted in a correlation coefficient of $r = 0.88$, indicating a correlation between the two was significant (P-value < 0.001). The similarity of results between the two independently conducted surveys would suggest that the current angler sample size of the SBVAS is sufficient for providing variation in catch rates from year to year.

Like catch data, harvest information was used to calculate harvest rates in striped bass harvested per trip and harvest per hour fished (Table 5-1). Measures of harvest rates fell this past year and the harvest per hour fished is the lowest in four years while the harvest per trip has not seen a lower value since 1997. Even though fewer fish are being reported harvested, the index of legal catch per hour fished is equal to the second highest value in the time series suggesting the continued popularity of catch and release in this fishery.

Participants in this survey provided length information on 1,495 striped bass this year (Table 5-2). Length measurements provided by the SBVAS are important to the coastwide stock assessment for striped bass to characterize the catch from recreational anglers in New Hampshire. The Department has continued to promote the high importance of providing length measurements through communications related to this survey program, and as a result, this year anglers provided measurements of 91% of all fish encountered. Similarly, the efforts to reduce the amount of lengths reported in ranges greater than

four inches has also been beneficial to the quality of length information collected, only one participant's length measurements being omitted this year from the length-frequency. Fifty-six lengths were recorded in ranges of four inches or less, four percent of those reported. Seventy-eight percent of all reported measurements were sub-legal fish that would not have been obtained by conventional creel surveys. Interestingly, as the harvest rates of legal sized striped bass have remained unchanged over the 2011 and 2012 fishing seasons, the catch rates have increased and the average sized fish caught has decreased. This matches well with the anecdotal information gathered from speaking with striped bass anglers in 2012. Anglers this past year were reporting numerous smaller ("schoolie") sized stripers present in NH waters.

One possible explanation for the size variability reported from year to year may be a change in terminal tackle preference by anglers. Figure 5-1 illustrates that since 1993, using bait consistently resulted in a higher proportion of legal size fish caught than using either lures or flies with the exception of 1997. This may indicate fishing with flies or lures may be selective towards smaller fish. Figure 5-5 plots the length frequency of fish caught on the three terminal tackle types reported on in 2012, and indicates that the mean length of fish caught using solely bait as terminal tackle will be significantly different than that of fish caught using lure or fly ($P < 0.01$). The analysis of variance (ANOVA) and post hoc analysis indicate that by using bait an angler is more likely to catch a larger fish than an angler using either a lure or fly. In 2012, there was no significant difference in the mean length of fish caught using a lure versus a fly. Therefore, an increased tackle preference of lures or flies should result in a greater proportion of sub-legal fish caught, potentially resulting in a lowered mean length of fish caught annually. In 2012, the percentage of anglers using flies rose and the use of bait as terminal tackle fell, this corresponded with a drop in the mean length of fish encountered. Another way to look at the relationship would be that terminal tackle preference could be determined by the size of fish available, if there are "schoolie" striped bass an angler is more likely to use flies rather than bait. Therefore the shift in preference of terminal tackle could indicate a change in the size composition of the striped bass fishery.

Another potential explanation of the variability of size seen interannually may be related to variations in success of certain cohorts of striped bass. Annual SBVAS information, like the shifting distributions of reported lengths, may help to provide insight into recruitment success into the recreational fishery. The Atlantic States Marine Fisheries Commission's (ASMFC) 46th Northeast Regional Stock Assessment Workshop (46^{th} SAW) indicated that the 2003 cohort recruitment was the highest (22.3 million fish at age 1 in 2004) followed closely by the 1993 cohort (20.6 million fish at age 1 in 1994). Since striped bass generally do not migrate before age 3 (Collette,

Bruce B and Klein-MacPhee, Grace. 2002), it would be expected that these large cohorts would be available to New Hampshire anglers during 2006 and 1996, respectively. These year classes do coincide with two of the three highest calculated CPUEs (catch/hr fished) over the history of the SBVAS (Table 5-1). An analysis performed on the total abundance as given in the ASMFC 2011 Stock Assessment Update and the SBVAS CPUE (catch/trip), shown in Figure 5-3, indicated a moderate to strong significant correlation ($r = 0.78$, P-value < 0.01). However, the 46th SAW estimated the lowest striped bass recruitment since 1993 occurred from the 1999 and 2002 cohorts, which do not correspond with unusually low SBVAS CPUEs in 2002 and 2005. As such, we may not draw conclusions about poor recruitment from the survey.

An age-length key produced by the Massachusetts Division of Marine Fisheries in 2006, characterized most fish between approximately 13 and 17 inches as age 3, fish between 18 and 20 inches as ages 3 and 4, fish between 21 and 24 inches as primarily age 5, and fish between 25 and 27 as ages 5 and 6 (Nelson, G., Personal Communication). Using this age-length structure to translate reported length data from the survey into likely corresponding ages, also suggests that the 2003 cohort was exceptionally strong. Figure 5-6 shows the mean length of reported fish between 2006 and 2010 increased steadily at a rate that nearly mirrors the predicted lengths of the 2003 cohort in each of those years. However, without directly sampling the population of striped bass in New Hampshire waters for age it is difficult to be assured the pulse is in fact a result of the strong 2003 cohort.

While SBVAS data may indicate elevated catch rates follow high recruitment years, it does not show reduced catch rates from poor recruitment years. This may support angler logbook information as useful to state-specific analysis only. Using catch and harvest information from the SBVAS to make inferences about the health or status of striped bass stocks coastwide has proven difficult. Scatter plots of both SBVAS catch and harvest rates against total stock estimates from the most recent striped bass stock assessment show significant moderate to weak correlations, with coefficients of determination at 0.61 and 0.05 respectively (Figure 5-3). It is likely that annual catch and harvest rates determined from the SBVAS may only reflect the availability of striped bass within New Hampshire waters on a given year. Northward migrating striped bass populations may vary greatly from year to year dependent upon factors such as weather, water temperatures, and abundance of prey. Therefore, while the SBVAS is useful in demonstrating trends in angler effort and success within state waters, it should be noted that the fluctuations in striped bass abundance within the coastal waters of New Hampshire should not be used alone in drawing conclusions about the coastwide striped bass population size and structure.

In conclusion, survey participation has risen sharply since the program’s inception; this year’s participation of 32 anglers is below the

average level over the time series. A concerted effort should be made to recruit more anglers to the program. While the survey may benefit from an increase in sample size, comparisons to the MRS show a strong significant correlation in interannual trends. Catch rates over the last four years have been the lowest values since 1994, with the exception of the catch per hour fished index in 2004, and a substantial change since peak catch rates only six years ago. The reported length data indicated that more than 78% of fish caught were of sub-legal size in 2012, primarily fish between 12 and 16 inches, which produced a mean length of 20.3 inches for fish caught this year. The increased use of flies, as well as the decreased use of bait, as terminal tackle may have contributed to the decrease in average size of fish caught in 2012. Finally, an analysis between SBVAS data and stock assessment data over the entire time series suggest that data, such as catch and harvest rates, should not be solely used in making decisions on the status of striped bass stocks coastwide, but rather the availability of these fish in New Hampshire waters.

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Table 5-1. Summary of data reported by participants in New Hampshire Fish and Game Department's Striped Bass Volunteer Angler Survey, 1993-2012.

	1993	1994	1995*	1996	1997	1998	1999	2000	2001+	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Reporting Anglers	9	13	26	33	32	29	25	46	43	58	50	46	44	45	45	49	47	24	41	32
# of Trips	333	403	922	1,402	1,104	1,492	1,184	1,504	1,442	1,738	990	1,219	984	1,045	1,027	856	689	489	638	580
Angler Hours	1042	1340	3,770	5,700	4,634	6,884	5,322	6,346	7,126	7,015	3,814	5,253	3,745	3,919	4,036	3,240	2,335	1,814	2,571	1,852
Total Stripers Caught	571	1040	4,108	7,744	6,341	8,673	5,469	6,377	5,450	7,603	4,093	4,174	4,406	6,118	4,265	1,834	1,667	1,050	1,314	1,638
Total Stripers Harvested	28	31	86	178	139	499	400	276	518	434	141	320	218	161	173	129	142	155	158	83
Total Legal Size Fish Released	45	118	177	427	458	628	519	243	837	798	561	248	214	194	68	114	140	154	314	253
Fishing Type (percent)																				
Boat	95%	77%	80%	70%	69%	85%	87%	82%	89%	72%	73%	75%	84%	81%	87%	82%	84%	77%	75%	69%
Shore	5%	23%	20%	30%	31%	15%	13%	18%	11%	28%	27%	25%	16%	19%	13%	18%	16%	23%	25%	31%
Tackle Type (percent)																				
Bait	89%	72%	61%	52%	65%	69%	66%	54%	61%	54%	53%	51%	52%	46%	51%	62%	63%	59%	73%	54%
Lure	14%	21%	18%	15%	13%	17%	16%	19%	13%	14%	26%	24%	33%	31%	31%	32%	29%	31%	27%	24%
Fly	3%	15%	35%	34%	39%	32%	29%	41%	39%	36%	32%	33%	28%	34%	27%	20%	19%	15%	10%	27%
Catch/Trip	1.7	2.6	4.5	5.5	5.7	5.8	4.6	4.2	3.8	4.4	4.1	3.4	4.5	5.9	4.2	2.1	2.4	2.1	2.1	2.8
Harvest/Trip	0.08	0.08	0.09	0.13	0.13	0.33	0.34	0.18	0.36	0.25	0.14	0.26	0.22	0.15	0.17	0.15	0.21	0.32	0.25	0.14
Catch/Hr. Fished	0.55	0.78	1.09	1.36	1.37	1.26	1.03	1.00	0.76	1.08	1.07	0.80	1.18	1.56	1.06	0.57	0.71	0.58	0.51	0.88
Legal Catch/Hr. Fished	0.07	0.11	0.07	0.11	0.13	0.16	0.17	0.08	0.19	0.18	0.18	0.11	0.12	0.09	0.06	0.08	0.12	0.17	0.18	0.18
Harvest/Hr. Fished	0.03	0.02	0.02	0.03	0.03	0.07	0.08	0.04	0.07	0.06	0.04	0.06	0.06	0.04	0.04	0.04	0.06	0.09	0.06	0.04
% Caught & Released	95%	97%	98%	98%	98%	94%	93%	96%	91%	94%	97%	92%	95%	97%	96%	93%	92%	85%	88%	95%
% Legal Size Released	63%	79%	67%	71%	77%	56%	56%	47%	62%	65%	80%	43%	50%	55%	28%	47%	50%	50%	67%	75%

*1995 - Size limit changed from 36 to 32 inches.
+2001 - Size limit changed from 32 to 28 inches.

Table 5-2. Length frequency data for striped bass measured by anglers participating in New Hampshire's Striped Bass Volunteer Angler Survey, 2012.

Length (inches)	Number of Occurrences	Percent (%)
9	1	0.07%
10	4	0.27%
11	15	1.00%
12	117	7.83%
13	105	7.02%
14	150	10.03%
15	139	9.30%
16	135	9.03%
17	96	6.42%
18	77	5.15%
19	46	3.08%
20	43	2.88%
21	16	1.07%
22	32	2.14%
23	24	1.61%
24	38	2.54%
25	46	3.08%
26	48	3.21%
27	35	2.34%
28	48	3.21%
29	46	3.08%
30	50	3.34%
31	35	2.34%
32	39	2.61%
33	38	2.54%
34	25	1.67%
35	8	0.54%
36	12	0.80%
37	5	0.33%
38	9	0.60%
39	2	0.13%
40	1	0.07%
41	2	0.13%
42	0	0.00%
43	3	0.20%
44	2	0.13%
45	1	0.07%
46	2	0.13%
N	1,495	
Mean Length	20.3	

Legal Size Fish

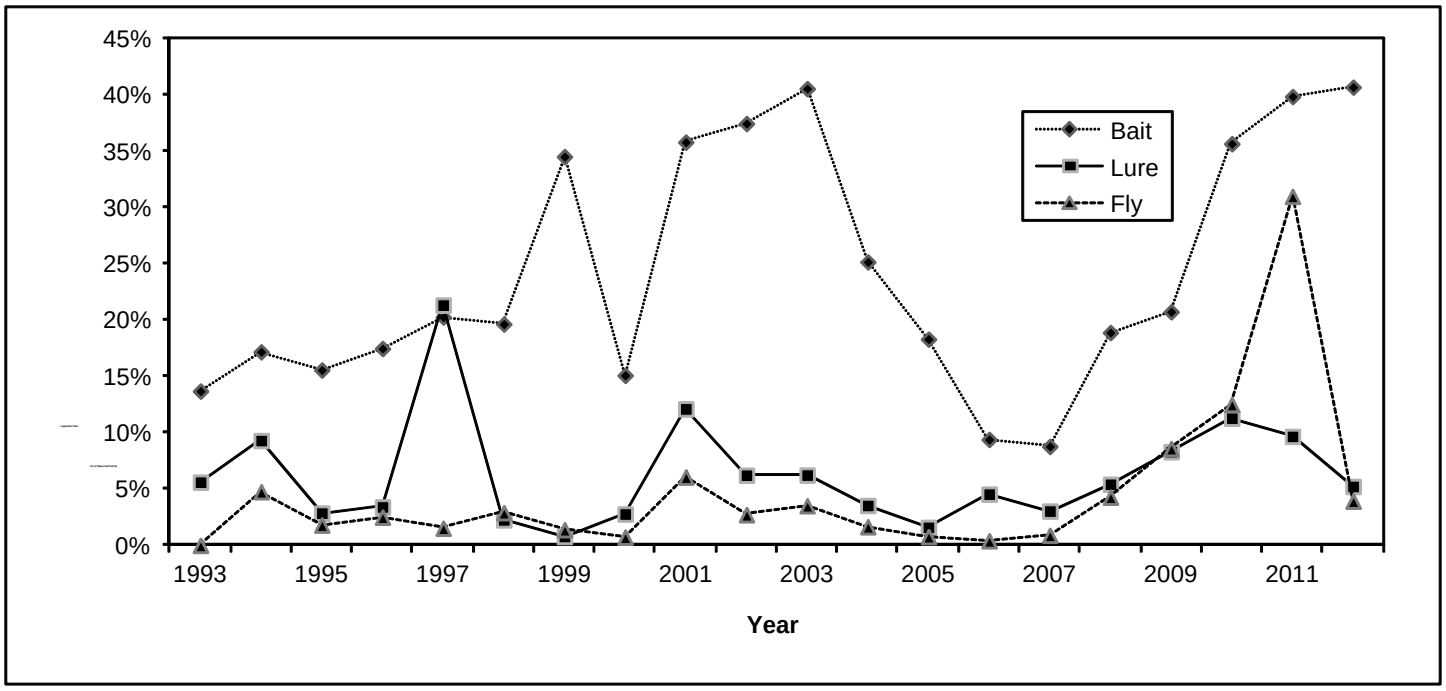

Figure 5-1. Legal size fish encountered as a percentage of total fish reported for each terminal tackle type from the Striped Bass Volunteer Angler Survey, 1993-2012.

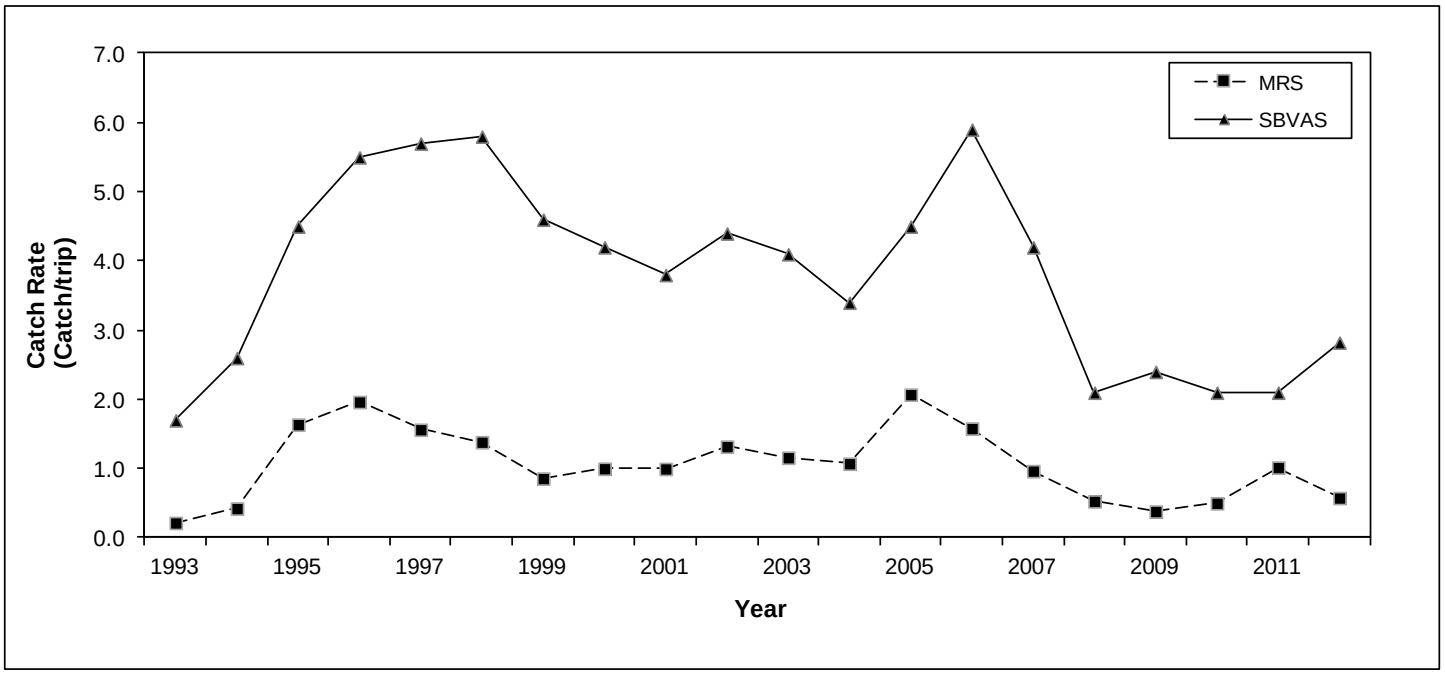

Figure 5-2. Comparison of catch rates generated by the Striped Bass Volunteer Angler Survey and Marine Recreational Survey of directed striped bass trips+ in New Hampshire waters, 1993-2012*.

+ Directed trips are defined as those where an angler indicated striped bass as one of the two primary species sought, or where striped bass were caught during a trip.
* 2012 MRS final estimates were not released at the time of this report.

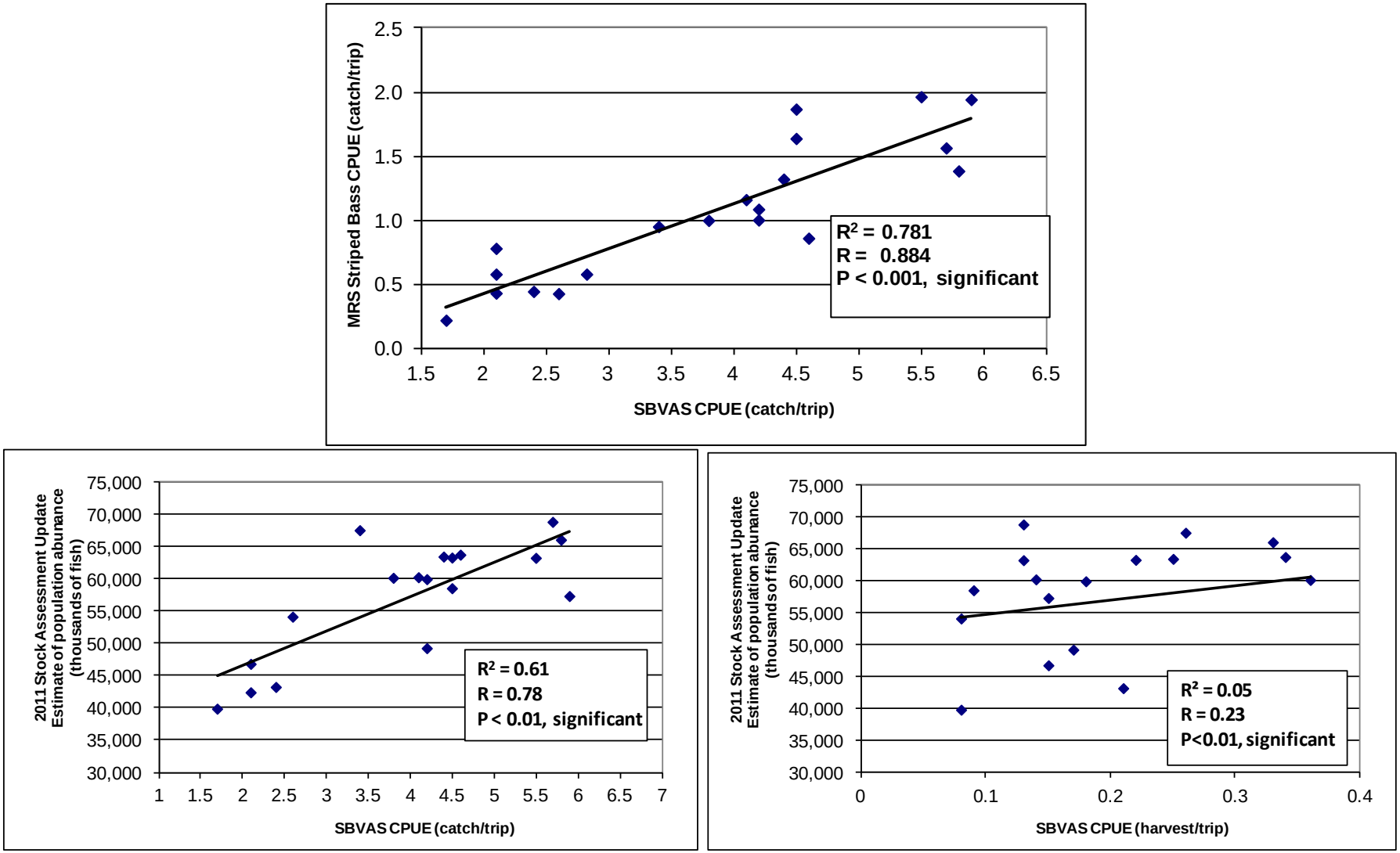

Figure 5-3. Linear Regressions of catch rates from the Striped Bass Volunteer Angler Survey, Marine Recreational Survey of directed striped bass trips+, and the most recent ASMFC Striped Bass Stock Assessment Update estimates of population abundance in New Hampshire waters, 1993-2012*.

+ Directed trips are defined as those where an angler indicated striped bass as one of the two primary species sought, or where striped bass were caught during a trip.
* 2012 MRS estimates were preliminary at the time of this report.

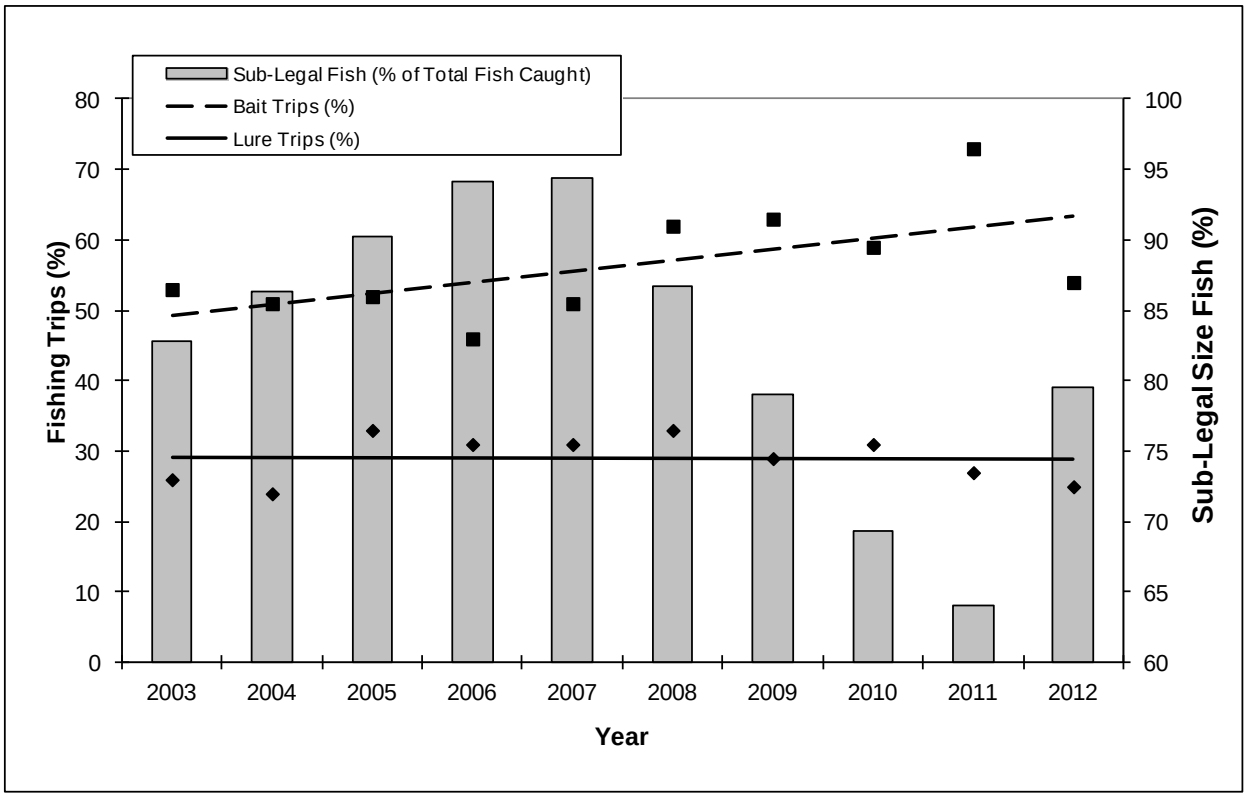

Figure 5-4. Comparison between terminal tackle selection and proportion of reported sub-legal size fish from the Striped Bass Volunteer Angler Survey, 2001-2012.

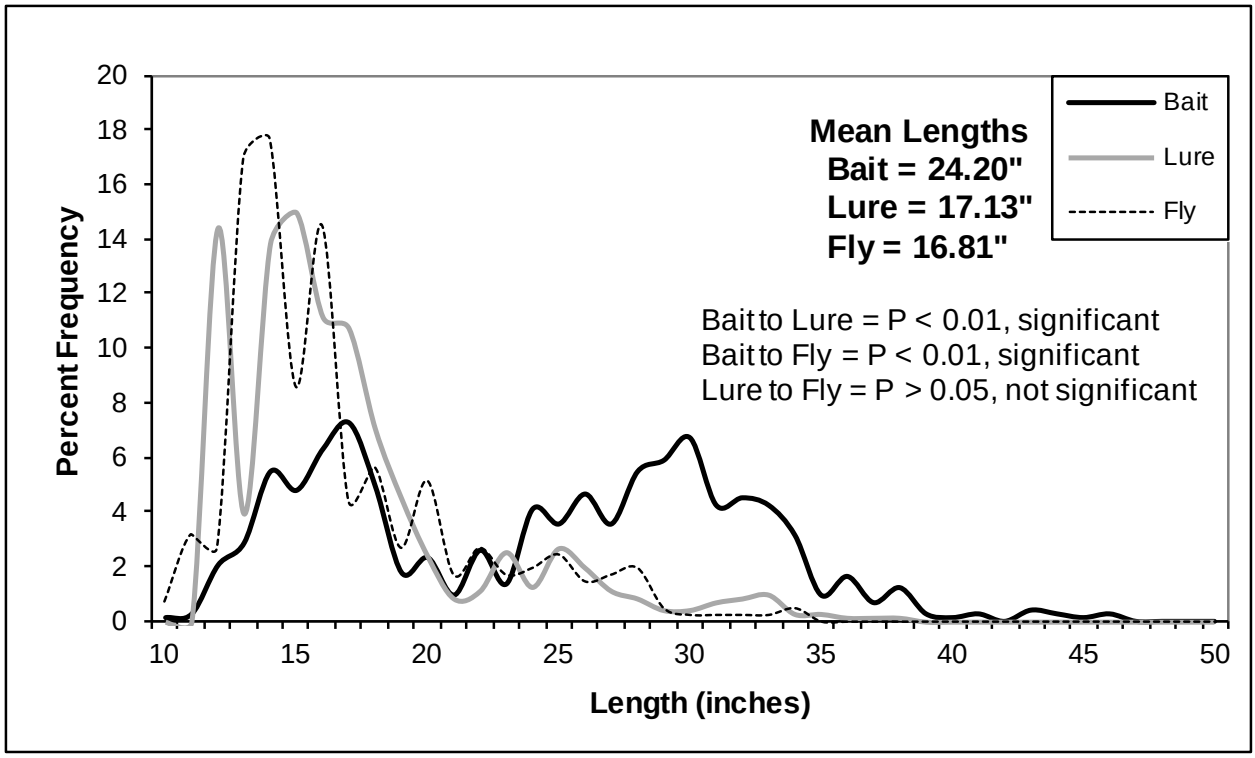

Figure 5-5. Length frequencies, mean lengths, and between-group comparisons* of striped bass caught using bait, lure, and fly from the Striped Bass Volunteer Angler Survey, 2012.

* Between-group comparisons were done using a One-Way ANOVA and Tukey's (HSD) Studentized Range post hoc tests.

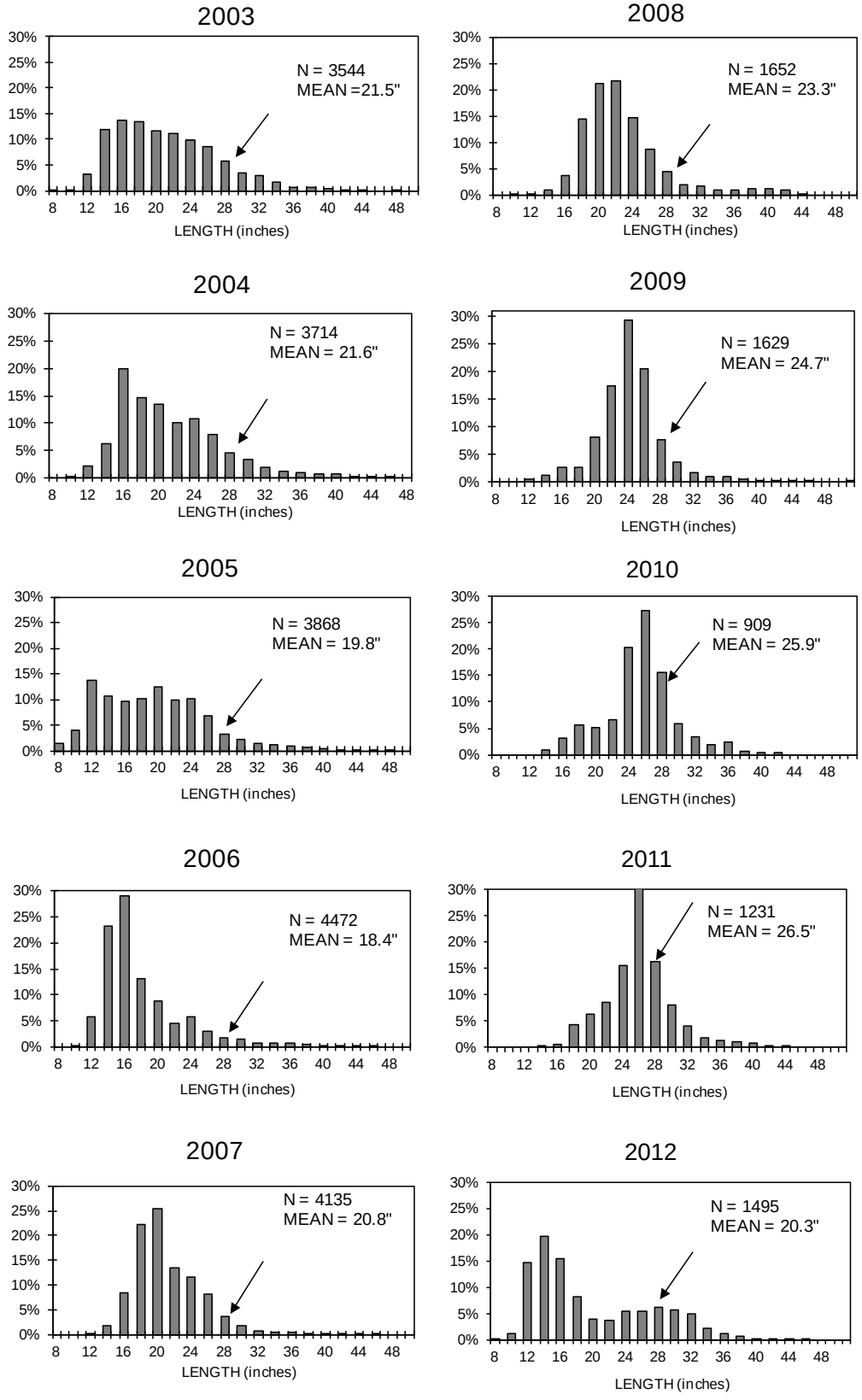

Figure 5-6. Length frequency comparisons of striped bass from the Striped Bass Volunteer Angler Survey, 2003-2012

Technical Report

Massachusetts Division of Marine Fisheries
Technical Report TR-55

Massachusetts Striped Bass Monitoring Report for 2012

G. A. Nelson

Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs
Department of Fish and Game
Massachusetts Division of Marine Fisheries

September 2013

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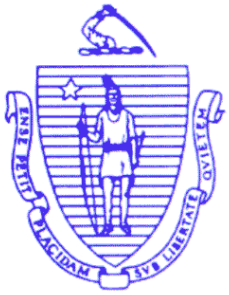

Massachusetts Striped Bass Monitoring Report for 2012

Gary Nelson
Massachusetts Division of Marine Fisheries
30 Emerson Ave.
Gloucester, MA 01930

September 2013

Commonwealth of Massachusetts
Deval Patrick, Governor
Executive Office of Energy and Environmental Affairs
Richard K. Sullivan, Jr., Secretary
Department of Fish and Game
Mary B. Griffin, Commissioner
Massachusetts Division of Marine Fisheries
Paul Diodati, Director

Summary: During 2012, the Massachusetts commercial fishery for striped bass sold about 61,509 fish weighing 1,219,665 pounds and kept approximately 4,885 fish for personal consumption. Total losses due to commercial harvesting (including release mortality) were 73,195 fish weighing 1,351,907 pounds. The recreational fishery harvested about 377,931 striped bass weighing over 5.4 million pounds. Total losses due to recreational fishing (including release mortality) were 466,987 fish weighing over 5.9 million pounds. Combined losses (including scientific losses) were 540,182 fish weighing over 7.2 million pounds, which reflects a 34% increase in numbers lost and a 37% increase in weight lost compared to 2011 (402,441 fish; 5.3 million pounds). The majority of losses, 86% by number and 81% by weight, was attributed to the recreational fishery.

Introduction

This report summarizes the commercial and recreational striped bass fisheries conducted in Massachusetts during 2012. Data sources used to characterize the state fisheries come from monitoring programs of the Massachusetts Division of Marine Fisheries (DMF) and the National Marine Fisheries Service (NMFS), which are considered to be essential elements of the long-term management approach described in Section 3 of the Atlantic States Marine Fisheries Commission's (ASMFC) Fisheries Management Report No. 41 (Amendment 6 to the Interstate Fishery management Plan for Atlantic Striped Bass (IFMP)).

Commercial Fishery in 2012

Season: July 12-August 9. No landings were permitted on Monday, Friday, or Saturday.

Sold: 1,219,665 pounds (against a harvest quota of 1,057,783 pounds).

Allowable Gear Type: Hook and line.

Minimum Size: 34 inches total length.

Trip Limit: 5 fish per day on Sunday and 30 fish per day on Tuesday-Thursday.

Licensing, Reporting, and Estimation of Landings. To purchase striped bass directly from fishermen, fish dealers are required to obtain special authorization from DMF in addition to standard seafood dealer permits. Dealer reporting requirement included weekly reporting to DMF or SAFIS system of all striped bass purchases. If sent to DMF, all landings information is entered into SAFIS by DMF personnel. Following the close of the season, dealers are also required to provide a written transcript consisting of purchase dates, number of fish, pounds of fish, and names and permit numbers of fishermen from whom they purchased. DMF personnel review dealer transactions and correct entries before calculating total landings.

Fishermen must have a DMF commercial fishing permit (of any type) and a special striped bass

Table 1. Attributes of the Massachusetts striped bass commercial fishery, 1990-2012.

		Purchased			
Year	Season (Fishing Days)	Pounds 000s	Number 000s	Dealer Permits	Fishing Permits
1990	93	160.6	6.3	95	1,498
1991	59	234.8	10.4	92	1,739
1992	39	239.2	11.3	135	1,861
1993	35	262.6	13.0	152	2,056
1994	24	199.6	10.4	150	2,367
1995	57	782.0	41.2	161	3,353
1996	42	696.8	38.3	179	3,801
1997	42	785.9	44.8	173	5,500
1998	28	822.0	45.3	180	5,540
1999	40	788.2	40.8	167	3,578
2000	36	779.7	40.2	137	3,283
2001	29	815.0	40.2	164	4,219
2002	21	924.9	44.9	132	4,598
2003	21	1055.4	55.7	151	4,867
2004	19	1206.3	60.6	130	4,376
2005	22	1104.7	59.5	162	4,159
2006	26	1312.1	69.9	136	3,980
2007	22	1040.3	54.3	160	3,906
2008	34	1160.1	61.1	167	3,821
2009	27	1138.3	59.3	178	4,020
2010	24	1224.4	60.3	178	3,951
2011	18	1163.8	61.5	189	3,965
2012	17	1219.7	61.5	186	3,965

fishing endorsement to sell their catch. They are required to file monthly trip level reports which include the name of the dealer(s) that they sell to and information describing their catch composition and catch rates.

Landings. The landings used here come from the SAFIS system. Commercial dealers bought 1,219,665 pounds (61,509 fish) of striped bass in 2012 (Table 1). Most striped bass were sold in Barnstable, Bristol, and Essex counties of Massachusetts. Commercial fishers kept an additional 4,885 fish weighing approximately 74,972 pounds for personal consumption.

Size Composition. Information from biological sampling, catch reports, and voluntary logs is used to characterize disposition of the catch, catch weight, and size composition by catch category. Data from 3,544 fish sampled from the 2012 commercial harvest and 2000 DMF diet study were used to construct a length-weight equation to estimate weight-at-size for individual bass. The following geometric regression was derived:

$$\log_{10}(W) = -3.462 + 3.006 * \log_{10}(L), \quad RMS = 0.0028$$

where W equals weight in pounds, L equals total length in inches, and RMS is the residual mean square error. This equation was used to estimate the arithmetic average weight for a given length by back-transforming the predicted weight as follows:

$$W = 10^{(-3.462 + 3.006 * \log_{10}(L) + RMS/2)}$$

Size composition of the commercial catch by category of disposition is presented in Appendix Tables 1A (numbers of fish) and 1B (pounds of fish). About 46% of all fish caught had lengths ≥34 inches.

Age and Sex Composition.. Seven hundred and ten fish sampled from the 2012 commercial harvest were used to sex and age the harvested fish. Age composition of harvest fish was estimated from a sub-sample of 299 fish. A weighted length frequency was generated by weighting the lengths measured in each county by county landings. The resulting length frequency was then applied to the commercial age-length key to generate the number of harvested fish by age. In addition, the age composition of fish released and consumed was estimated from length data reported in commercial angler logs and age-length key developed from samples collected from the recreational fishery. Age was determined from scales and sex was determined by visual inspection of gonadal tissue (Sykes Method). Age of harvested fish ranged from 6 to 15+ years, and 99.5% were females. About 77% of the sub-sample consisted of individuals from the 2000-2004 year classes (ages 8-12) (Figure 1). Peak numbers-at-age of the total catches (harvest plus releases plus consumed) were from the 2004 year-class (Figure 1).

Estimates of Total Catch and Harvest Rates. Estimates of harvest rates (pounds of fish harvested per hour) for the commercial fishery were developed in order to provide an index that may be indicative of fishing success. In 2011, DMF switched to trip-level reporting. Significant information has been lost due to the generalization of the report to cover all fisheries in Massachusetts. The only information now available is daily total hours fished, pounds of fish sold and consumed, and area fished. This information was used under a generalized linear model (GLM) framework to generate standardized indices (Hilborn and Walter, 1992). Each record represented the summarization of a permit's pounds harvested and hours fished by year, month, and area fished reduced to 4 regions (Cape Cod Canal, Southern MA, Cape Cod Bay, North MA). Only data from July-August were used to constraint analyses to the most recent duration of the fishing season. The harvest rates for each record was calculated by dividing the total pounds caught by the total number of hours fished. The harvest rate was standardized using the GLM model

$$\ln(y) = a + \sum_{i=1}^{n} b_i X_i + e$$

where y is the observed total catch or harvest rate, a is the intercept, b_i is the slope coefficient of the i^{th} factor, X_i is the i^{th} categorical variable, and e is the error term. Any variable not significant at $\alpha = 0.05$ with type-II (partial) sum of squares was dropped from the initial GLM model and the analysis was repeated. First-order interactions were not considered in the analyses. The back-transformed geometric mean for each year was estimated by

$$\hat{y} = \exp^{(LSM)}$$

where LSM is the least-squares natural log mean of each year.

Results of the GLM analyses of harvest rates are shown in Appendix Table 2. Although factors were significant, the variables accounted for only about 10% of the total variation in harvest rates.

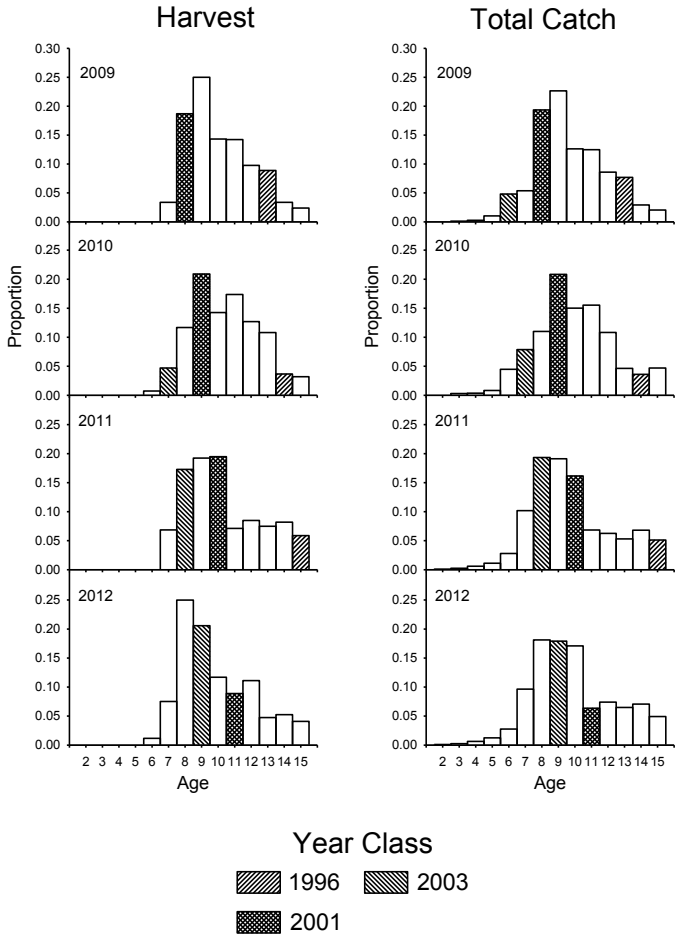

Figure 1. Age composition (proportion) of harvest and total catches from the Massachusetts commercial fishery. The large 1996, 2001, and 2003 Chesapeake Bay year-classes are highlighted.

Harvest rates steadily increased after 1999, peaked in 2004, dropped through 2008, increased slightly through 2010, and then dramatically increased in 2011 and remained at high levels in 2012 (Figure 2A). The dramatic increase in harvest rates for 2011 and 2012 is attributed to large increases in harvest rates by fishers in Cape Cod Bay and southern Massachusetts (Figure 2B). The reason for the increase was due to atypical, large concentrations of striped bass off Cape Cod, particularly Chatham, in 2011 and 2012 for unknown reasons which likely increased the vulnerability of striped bass to capture. In addition, the large 2003 year-class became nearly fully-recruited to the Massachusetts fishery (Figure 1) .

Characterization of Other Losses. Release mortality was estimated by using a hook-release mortality rate of 9% applied against the released fish in Appendix Tables 1A and 1B. Total losses due to release mortality were 6,801 fish weighing approximately 57,270 pounds.

Recreational Fishery in 2012

Season: None

Daily Bag Limit: Two fish per person

Allowable Gear Type: Hook and Line

Minimum Size: 28 inches total length

Licensing and Reporting Requirements: A recreational fishing permit is required in MA state waters.

Harvest levels: Harvest (A+B1) and total catch (A+B1+B2) estimates (Table 2) were provided by the NMFS Marine Recreational Information Program (MRIP). In 2011, new estimation methods were applied to data collected since 2003, but only small changes (range: -9.1 to 10.1%) were observed for Massachusetts data.

The MRIP estimate of total catch (including fish released alive) in 2012 was 1,367,440 striped bass, which is an 11% increased compared to the 2011 estimate (Table 2). The estimate of total harvest in

2012 was 377,931 fish, which is an increase in harvest of 48% compared to 2011. Total pounds harvested was over 5.4 million in 2012 (Table 2).

Size Composition. The length distributions of harvested and released fish were estimated from biological sampling conducted by MRIP in Massachusetts and from a volunteer angler program conducted by DMF. Volunteer recreational anglers were solicited to collect length and scale samples from striped bass that they captured each month (May-October). Each person was asked to collect a minimum of 5 scales from at least 10 fish per month and record the disposition of each fish (released or harvested) and fishing mode. Over 1,740 samples were received from 31 anglers. The size frequencies of measured fish are shown in Figure 3 by disposition and mode. The size frequency of released fishes was used to allocate MRIP release numbers by mode among size classes. Numbers-at-length and weight-at-length data by disposition are summarized in Appendix Tables 3A and 3B.

Age Composition. A sub-sample of 626 fish from the volunteer angler survey was aged and combined with commercial and tagging samples to produce an age-length key used to convert the MRIP and MA volunteer angler size distributions into age classes. Recreational samples were selected using a weighted random design based on the total number of striped bass caught in each wave and mode stratum (as determined by MRIP). Recreational harvest and total catches in 2012 catches of striped bass were comprised mostly of the 2003 and 2004 year-classes. (Figure 4).

Trends in Catch Rates. To examine trends in recreational angler catches, standardized catch rates (total number of fish per trip) for striped bass were calculated for all fish caught using a delta-Gamma model (Lo et al., 1992; Stefansson, 1996) which adjusts trip catches for the effects of year, wave, county, area fished, mode fished, and time spent fishing. A delta-Gamma model was selected as the best approach to estimate year effects after examination of model dispersion (Terceiro, 2003) and standardized residual deviance plots (McCullagh and Nelder, 1989). In the delta-Gamma model, catch data is decomposed into catch success/failure and positive catch components. Each component is analyzed separately using appropriate statistical techniques and then the statistical models are recombined to obtain year estimates. The catch success/failure was modeled as a binary response to the categorical variables using multiple logistic regression:

$$\text{logit}(p) = \log(p/1-p) = a + \sum_{i=1}^{n} b_i X_i + e$$

where p is the probability of catching a fish, a is the intercept, b_i is the slope coefficient of the i^{th} factor, X_i is the i^{th} categorical variable, and e is the error term. The function *glm* in *R* was used to estimate

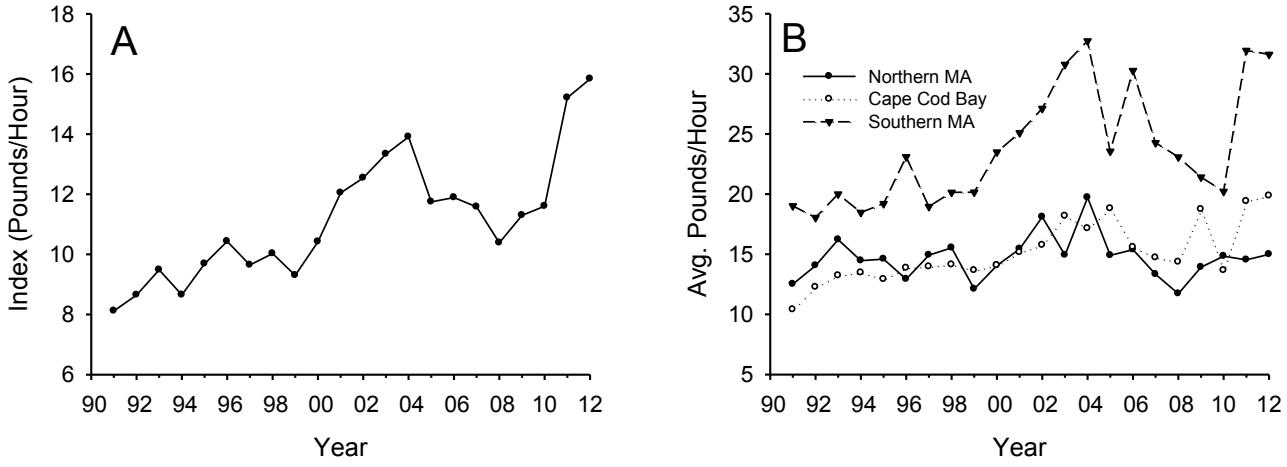

Figure 2. A) Harvest index (standardized pounds/hour) and B) average harvest rates by area for the Massachusetts commercial striped bass fishery, 1990-2011.

Table 2. MRIP estimates of striped bass harvest, releases, and total catch in Massachusetts.

	Harvest (A+B1)		Released (B2)	Total (A+B1+B2)
Year	Numbers	Weight (lbs)	Numbers	Numbers
1986	29,434	298,816	442,298	471,732
1987	10,807	269,459	93,660	104,467
1988	21,050	421,317	209,632	230,682
1989	13,044	295,227	193,067	206,111
1990	20,515	319,092	339,511	360,026
1991	20,799	440,605	448,735	469,534
1992	57,084	972,116	779,814	836,898
1993	58,511	1,113,446	833,566	892,077
1994	74,538	1,686,049	2,102,514	2,177,052
1995	73,806	1,504,390	3,280,882	3,354,688
1996	68,300	1,291,706	3,269,746	3,338,046
1997	199,373	2,891,970	5,417,751	5,617,124
1998	207,952	2,973,456	7,184,358	7,392,310
1999	126,755	1,822,818	4,576,208	4,702,963
2000	181,295	2,618,216	7,382,031	7,563,326
2001	288,032	3,644,561	5,410,899	5,698,930
2002	308,749	4,304,883	5,718,984	6,027,733
2003	407,100	4,889,035	4,361,710	4,768,810
2004	445,745	6,112,746	4,979,075	5,424,820
2005	340,742	5,097,821	3,988,679	4,329,421
2006	314,988	4,832,355	7,809,777	8,124,765
2007	315,409	5,136,580	5,331,470	5,646,879
2008	377,959	5,763,763	3,649,415	4,027,374
2009	344,401	4,786,895	2,282,601	2,627,002
2010	341,046	4,270,401	1,671,437	2,012,483
2011	255,507	3,504,522	973,192	1,228,699
2012	377,931	5,441,893	989,509	1,367,440

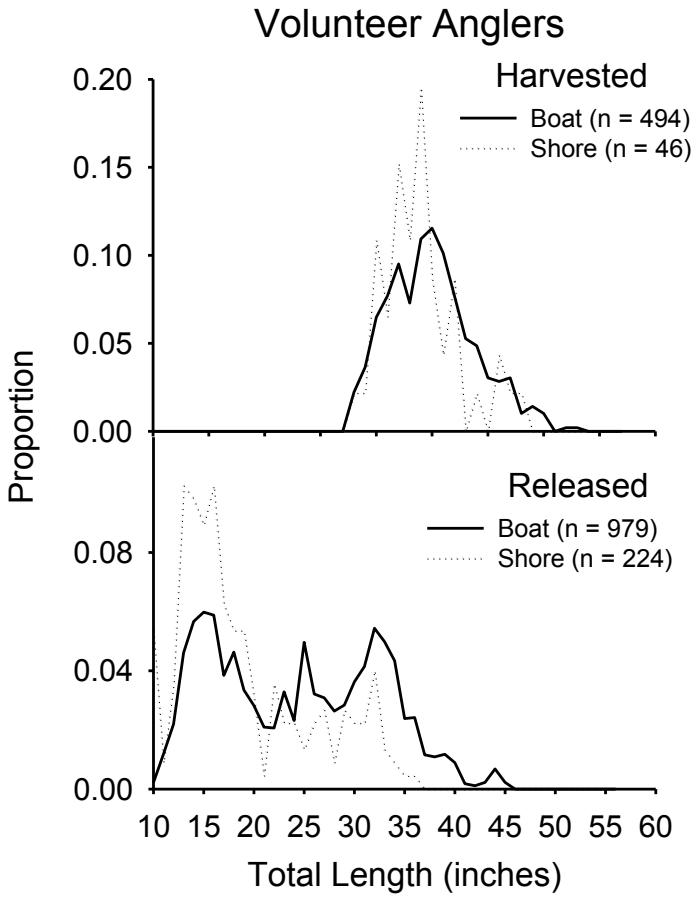

Figure 3. Sizes of striped bass caught by volunteer recreational anglers in 2012 by disposition and fishing mode.

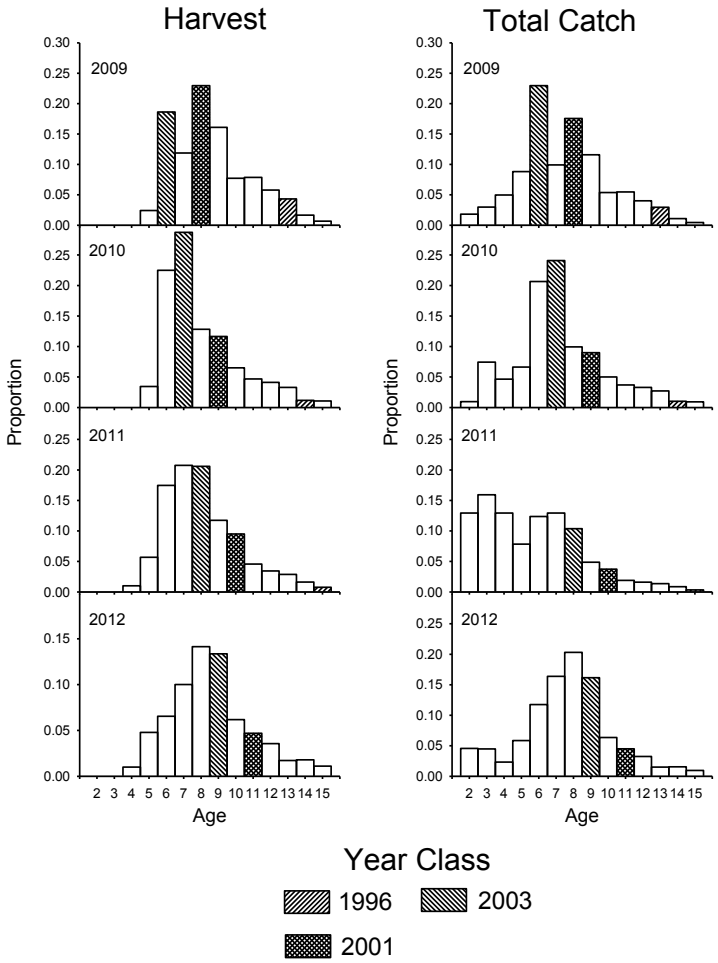

Figure 4. Age composition (proportion) of harvest and total catches from the Massachusetts recreational fishery. The large 1996, 2001, and 2003 Chesapeake Bay year-classes are highlighted.

parameters, and goodness-of-fit was assessed using partial and empirical probability plots.

Positive catches were modeled assuming a Gamma error distribution with a log link using function *glm* in *R:*

$$y = \exp^{(a+\sum_{i=1}^{n} b_i X_i)} + e$$

where y is the observed positive catch, b_i ,and X_i are the same symbols as defined earlier, and e is the Gamma error term. Any variable not significant at α=0.05 dropped from the initial GLM model and the analysis was repeated. First-order interactions were considered in the initial analyses but it was not always possible to generate annual means by the least-square methods with some interactions included (see Searle et al., 1980); therefore, only main effects were considered.

The annual index of striped bass total catch per trip was estimated by combining the two component models. The estimate in year i from the models is given by

$$\hat{I}_i = \hat{p}_i * \hat{y}_i$$

where p_i and y_i are the predicted annual responses from the least-squares mean estimates from the logistic and GLM models. Only data for those anglers who said they targeted striped bass were used in the analyses.

Results of the delta-Gamma model analyses are given in Appendix Tables 4A and 4B for 1986-2011. Intercept files for 2012 were not available when this report was constructed. Standardized catch rates for striped bass in Massachusetts waters increased from 1993 to 1998, declined through 2003, but increased in 2004 and 2005 (Figure 5). In 2006, catch rates jumped dramatically as the large 2003 year-class became vulnerable to the fishery. Since 2006, catch rates have declined (Figure 5).

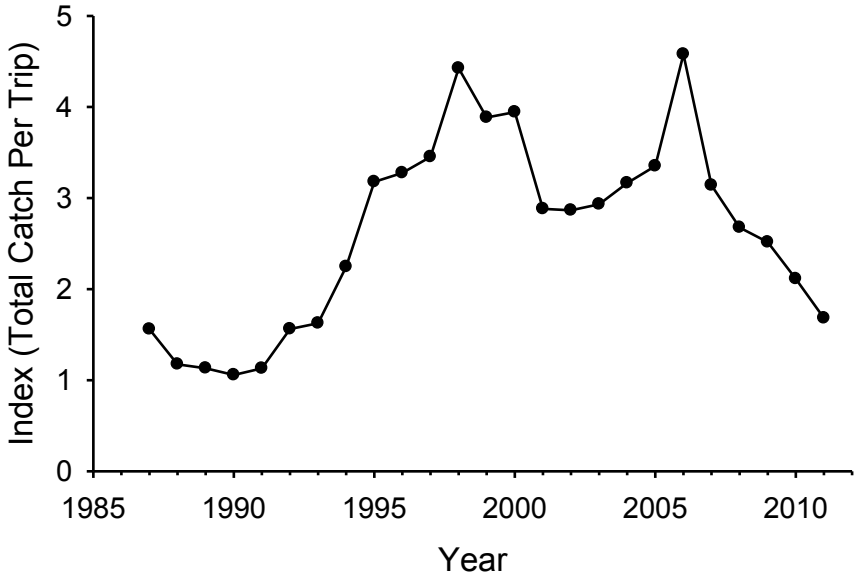

Figure 5. Standardized total catch rates (total number of fish caught per trip) of the recreational fishery for striped bass in Massachusetts waters, 1987-2011.

Characterization of Losses

The same methods and rates previously described in the commercial fishery section were used to estimate recreational losses. Losses due to hook-and-release were 89,056 fish (465,095 pounds) (Table 3).

Bycatch in Other Fisheries

During 1994, DMF sea-sampling efforts identified striped bass as by-catch in a Nantucket Sound springtime trawl fishery directed at long-finned squid (*Loligo pealei*). The bycatch estimate was about 3,100 fish (17,600 pounds). Anecdotal information was also reported which suggested that a single tow could land up to 19,000 pounds. DMF personnel sampled this fishery at sea during 1995-2000 and observed only incidental catches of striped bass. Limited sampling and low catch rates make it unreasonable to extrapolate sample information. DMF will continue to monitor potential sources of striped bass by-catch during 2013.

Estimated Total Losses in 2012

Total estimated loss of striped bass during 2012 was 540,182 fish weighing 7,258,896 pounds (Table 3), which is a 34% increase in numbers lost and a 37% increase in weight compared to 2011 (402,441 fish; 5,309,241 pounds). The majority of losses, 86% by number and 81% by weight, was attributed to combined losses in the recreational fishery.

Table 3. Estimates of striped bass losses occurring in Massachusetts waters during 2012.

FISHERY	NUMBER	POUNDS	MEAN WT.
Commercial			
Harvest*	66,394	1,294,637	19.5
Release Mortality	6,801	57,270	8.4
Recreational			
Harvest	377,931	5,441,893	14.4
Release Mortality	89,056	465,095	5.2
Total	540,182	7,258,896	

* includes fish taken for personal consumption

Table 4. Massachusetts striped bass removals-at-age matrix of 2012 by source.

	Recreational		Commercial		
Age	Release Mortality	Harvest	Release Mortality	Harvest*	Total
2	21,368	0	62	0	21,430
3	20,947	0	326	0	21,273
4	7,075	3,788	552	61	11,477
5	9,433	17,930	1,106	246	28,715
6	6,791	48,117	1,564	595	57,067
7	7,829	68,671	1,526	5249	83,276
8	7,562	87,293	1,084	11977	107,917
9	4,599	70,850	527	12730	88,707
10	1,301	28,391	46	12289	42,026
11	817	20,207	6	4572	25,602
12	543	14,657	1	5347	20,549
13	227	6,809	0	4677	11,714
14	318	6,977	0	5096	12,392
15	203	2,976	0	2759	5,938
16+	43	1,264	0	796	2,103

* includes fish taken for personal consumption

Removals-At-Age Matrix in 2012

The removals (numbers) due to release mortality and harvest by the recreational and commercial fisheries are apportioned by age and mortality source in Table 4. The 2003 (age 9), 2004 (age 8) and 2005 (age 7) year-classes incurred the highest losses in 2012 (Figure 6).

Age-Length Relationship

A von Bertalanffy growth model was fitted to age (years) and total length (inches) data from samples collected in the tagging study, the recreational fishery, and commercial fishery from 2012. The resulting equation and predicted relationship are shown in Figure 7.

Required Fishery-Independent Monitoring Programs

Massachusetts Tagging Study

DMF joined the Striped Bass Cooperative State-Federal Coast-wide Tagging Study in 1991. The study's primary objective has been to develop an integrated database of tag releases and recoveries that will provide current information related to striped bass mortality and migration rates. The Massachusetts tagging effort has focused on the tag and release of large fish that reach coast-wide legal sizes. To accomplish this job, DMF contracts several select charter boat captains to take DMF personnel on board to tag and release their catch during regularly scheduled fishing trips. Fish are caught in fall by trolling artificial baits in shoal

Figure 6. Total number of striped bass removals in 2012 by age. The 2003 year-class is indicated.

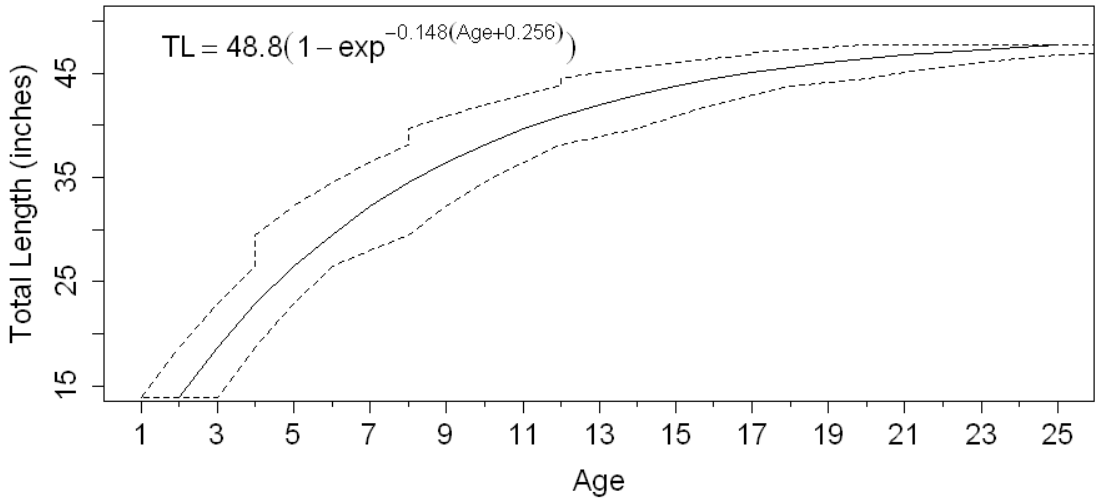

Figure 7. Mean length-age relationship (solid line) for striped bass captured in Massachusetts. Dotted lines represent the minimum and maximum ages found at a given length.

areas around Nantucket Island (Figure 8). Floy internal anchor tags provided by the United States Fish and Wildlife Service (USFWS) are used. Total length of each fish is recorded. Scales are removed from each fish for aging. The release data are made available to the Annapolis, Maryland office of USFWS, which coordinates regional tagging programs of state-federal participants.

Summary statistics compiled since the start of this study are shown in Table 5. Striped bass released in 2005-2011 were recaptured from mainly coastal waters in North Carolina through New Hampshire (Figure 9).

Planned Management Programs in 2013

Regulations

Massachusetts' recreational bag and minimum size limits will remain at 2 fish per day and 28-inches total length, respectively. For the commercial fishery, minimum size limit will remain at 34-inches and the quota will be reduced from 1,159,750 pounds to 997,869 pounds due to overharvest in 2012. The commercial fishery quota will be monitored using the SAFIS system. The commercial season will not open until July 14, 2013 and harvesting will be allowed only on Sunday with a daily bag limit of 5 fish, and Tuesday-Thursday

Table 5. Massachusetts tag summary statistics. SD = standard deviation.

			Number	Ave.	Ave.	SD	SD	Length Range			
Year	Trips	Boats	Tagged	Length (mm)	Length (in)	(mm)	(in)	Min (mm)	Min (in)	Max (mm)	Max (in)
1991	17	4	388	817	32.2	106.4	4.2	534	21.0	1300	51.2
1992	29	3	899	798	31.4	125.9	5.0	524	20.6	1267	49.9
1993	15	2	678	784	30.9	125.0	4.9	515	20.3	1210	47.6
1994	13	2	377	735	28.9	93.2	3.7	548	21.6	1028	40.5
1995	11	2	449	767	30.2	110.2	4.3	470	18.5	1178	46.4
1996	8	2	203	748	29.4	64.1	2.5	541	21.3	1077	42.4
1997	10	2	321	773	30.4	114.7	4.5	485	19.1	1090	42.9
1998	12	2	382	797	31.4	93.8	3.7	597	23.5	1055	41.5
1999	16	2	471	777	30.6	95.5	3.8	594	23.4	1108	43.6
2000	25	4	1095	752	29.6	102.6	4.0	510	20.1	1204	47.4
2001	14	3	456	786	30.9	102.5	4.0	503	19.8	1110	43.7
2002	12	3	239	764	30.1	103.6	4.1	487	19.2	1060	41.7
2003	15	3	655	825	32.5	92.1	3.6	602	23.7	1204	47.4
2004	25	7	784	707	27.8	193.1	7.6	316	12.4	1164	45.8
2005	19	4	752	726	28.6	210.5	8.3	299	11.8	1114	43.9
2006	11	4	390	813	32.0	94.2	3.7	565	22.2	1114	43.9
2007	16	3	530	848	33.4	105.2	4.1	600	23.6	1225	48.2
2008	13	2	456	821	32.3	104.6	4.1	530	20.9	1202	47.3
2009	15	3	501	840	33.1	101.8	4.0	572	22.5	1146	45.1
2010	13	3	329	825	32.5	84.0	3.3	668	26.3	1095	43.1
2011	15	3	504	831	32.7	91.9	3.6	580	22.8	1174	46.2
2012	15	3	643	852	33.5	87.7	3.5	524	20.6	1203	47.4

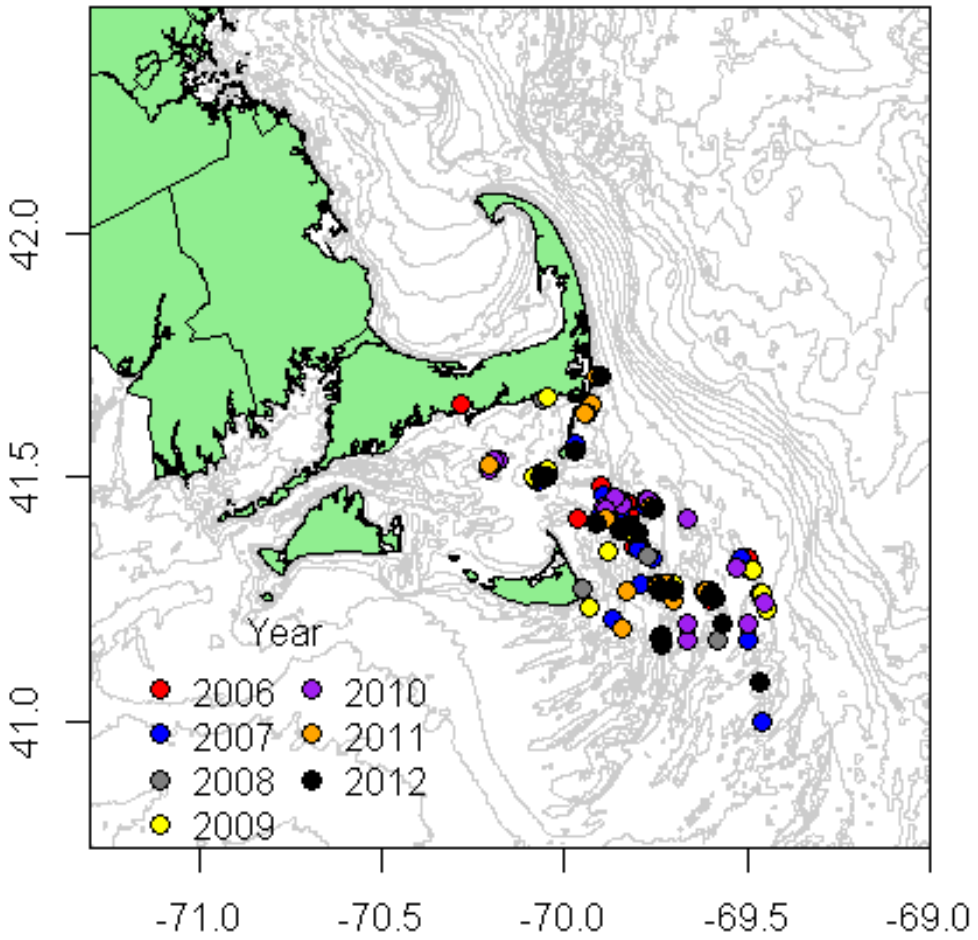

Figure 10. Map of DMF fall tagging locations during 2006-2012.

with a daily bag limit of 30 fish.

Monitoring Programs

All monitoring programs will continue in 2013.

Acknowledgements

The collection and quality of striped bass data would suffer greatly without the efforts of many DMF employees. Staff of the Fisheries Statistics section collected, entered, and compiled all commercial data. Jennifer Stritzel-Thomson coordinated the volunteer recreational angler data collection program, entered scale envelope data, and prepared data for analysis. Scott Elzey, Kate Rogers, and Kim Trull prepared scale samples. John Boardman aged all scale samples. John Boardman, Nick Buchan, and Brad Schondelmeier conducted the commercial sampling of stripers. Paul Caruso and John Boardman also coordinated and conducted the USFWS cooperative tagging study. Funding for this effort was provided by the Massachusetts Division of Marine Fisheries and Sport Fish Restoration Funds Grants F-57-R and F-48-R.

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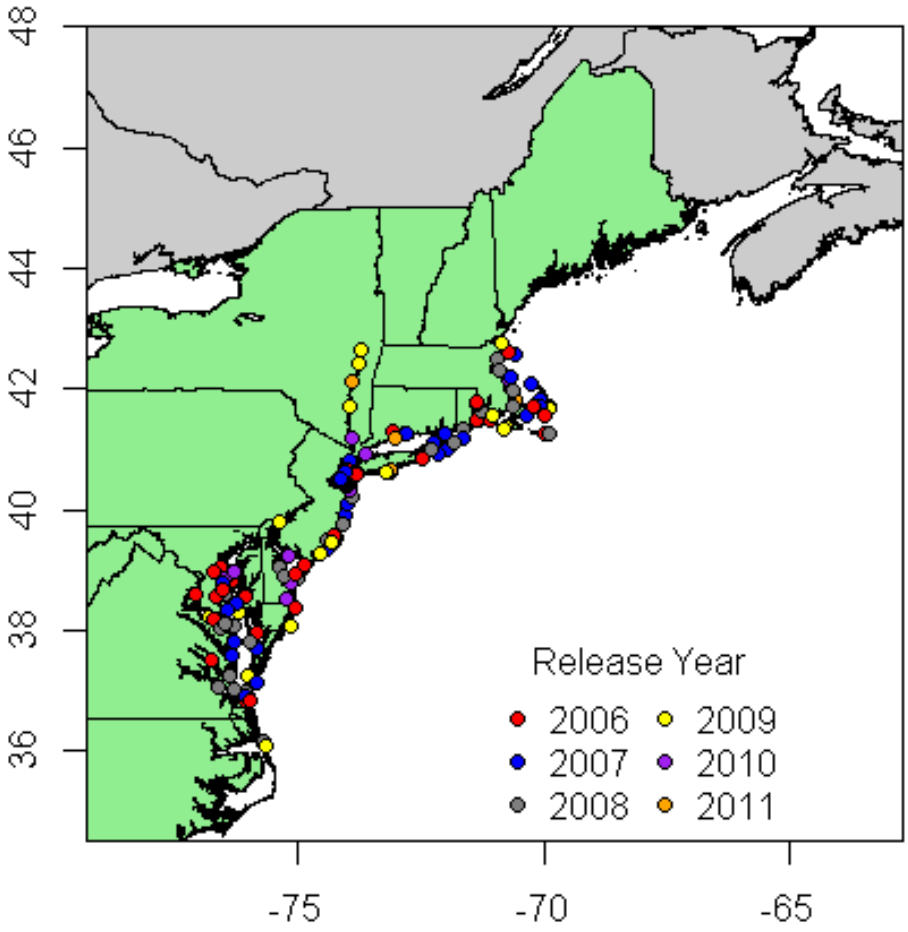


Figure 11. Map of recovery locations from 2006-2011 of DMF tagged striped bass by release year.

recreational catch rate data for some fish stocks off the northeast US coast. Fish. Bull. 101: 653-672.

Appendix

Appendix Table 1A. Estimated size distribution of the Massachusetts commercial striped bass catch (numbers of fish) in 2012.

TL (in.)	Harvested*	Released	Total	Percent	Cumulative Percent
11	0	0	0	0.00	0.00
12	0	0	0	0.00	0.00
13	0	0	0	0.00	0.00
14	0	164	164	0.12	0.12
15	0	55	55	0.04	0.15
16	0	438	438	0.31	0.46
17	0	657	657	0.46	0.93
18	0	328	328	0.23	1.16
19	0	547	547	0.39	1.54
20	0	930	930	0.66	2.20
21	0	328	328	0.23	2.43
22	0	876	876	0.62	3.05
23	0	438	438	0.31	3.35
24	0	3,338	3,338	2.35	5.70
25	0	1,751	1,751	1.23	6.94
26	0	2,955	2,955	2.08	9.02
27	0	4,323	4,323	3.05	12.06
28	169	7,825	7,994	5.63	17.70
29	311	5,527	5,837	4.11	21.81
30	367	9,904	10,271	7.24	29.04
31	339	9,412	9,751	6.87	35.91
32	627	15,157	15,785	11.12	47.03
33	1,737	8,098	9,836	6.93	53.96
34	8,545	1,532	10,077	7.10	61.06
35	10,141	55	10,196	7.18	68.24
36	9,711	876	10,587	7.46	75.70
37	5,842	0	5,842	4.11	79.81
38	5,353	55	5,408	3.81	83.62
39	4,981	0	4,981	3.51	87.13
40	3,520	0	3,520	2.48	89.61
41	4,359	0	4,359	3.07	92.68
42	3,117	0	3,117	2.20	94.87
43	2,795	0	2,795	1.97	96.84
44	1,838	0	1,838	1.29	98.14
45	1,565	0	1,565	1.10	99.24
46	447	0	447	0.31	99.56
47	339	0	339	0.24	99.79
48	191	0	191	0.13	99.93
49	101	0	101	0.07	100.00
50	0	0	0	0.00	100.00
51	0	0	0	0.00	100.00
52	0	0	0	0.00	100.00
Total	66,394	75,568	141,962		
Avg. Size	37.6	29.4	33.2		

* includes fish taken for personal consumption

Appendix Table 1B. Estimated weight distribution by size of the Massachusetts commercial striped bass catch (pounds) in 2012.

TL (in.)	Harvested*	Released	Total	Percent	Cumulative Percent
11	0	0	0	0.00	0.00
12	0	0	0	0.00	0.00
13	0	0	0	0.00	0.00
14	0	160	160	0.01	0.01
15	0	66	66	0.00	0.01
16	0	639	639	0.03	0.04
17	0	1,149	1149	0.06	0.10
18	0	683	683	0.03	0.13
19	0	1,338	1338	0.07	0.20
20	0	2,655	2655	0.13	0.33
21	0	1,085	1085	0.05	0.39
22	0	3,328	3328	0.17	0.55
23	0	1,902	1902	0.09	0.65
24	0	16,481	16481	0.82	1.47
25	0	9,775	9775	0.49	1.95
26	0	18,560	18560	0.92	2.88
27	0	30,415	30415	1.51	4.39
28	1,330	61,418	62748	3.12	7.52
29	2,710	48,207	50916	2.54	10.05
30	3,546	95,661	99207	4.94	14.99
31	3,612	100,325	103937	5.17	20.17
32	7,357	177,754	185111	9.22	29.38
33	22,350	104,181	126531	6.30	35.68
34	120,252	21,561	141813	7.06	42.74
35	155,704	840	156545	7.79	50.54
36	162,286	14,631	176917	8.81	59.34
37	106,007	0	106007	5.28	64.62
38	105,248	1,076	106324	5.29	69.92
39	105,885	0	105885	5.27	75.19
40	80,745	0	80745	4.02	79.21
41	107,699	0	107699	5.36	84.57
42	82,798	0	82798	4.12	88.69
43	79,694	0	79694	3.97	92.66
44	56,151	0	56151	2.80	95.46
45	51,176	0	51176	2.55	98.00
46	15,611	0	15611	0.78	98.78
47	12,630	0	12630	0.63	99.41
48	7,581	0	7581	0.38	99.79
49	4,265	0	4265	0.21	100.00
50	0	0	0	0.00	100.00
51	0	0	0	0.00	100.00
52	0	0	0	0.00	100.00
Total	1,294,637	713,888	2,008,526		
Avg. Weight	19.5	9.4	14.1		

Appendix Table 2. Results of the GLM analyses of total catch rates (pounds/hour) for the commercial striped bass fishery, 1991-2012.

Analysis of Deviance (Type III tests)

	SS	Df	F	Pr(>F)	
YEAR	1356	21	62.699	<0.00001	***
AREA	2232	2	1083.437	<0.00001	***
Residuals	53890	52312			

	Estimate	SE	t	Pr(>|t|)	
(Intercept)	1.94974	0.02644	73.753	0.0000	***
YEAR1992	0.06307	0.03547	1.778	0.0754	.
YEAR1993	0.15539	0.03533	4.398	0.0000	***
YEAR1994	0.06322	0.03527	1.793	0.0730	.
YEAR1995	0.17645	0.03153	5.595	0.0000	***
YEAR1996	0.25056	0.05134	4.88	0.0000	***
YEAR1997	0.17248	0.03051	5.654	0.0000	***
YEAR1998	0.21107	0.0311	6.788	0.0000	***
YEAR1999	0.1357	0.03177	4.271	0.0000	***
YEAR2000	0.24943	0.0323	7.722	0.0000	***
YEAR2001	0.39408	0.03237	12.176	0.0000	***
YEAR2002	0.43452	0.03186	13.639	0.0000	***
YEAR2003	0.49591	0.02941	16.86	0.0000	***
YEAR2004	0.53789	0.03551	15.149	0.0000	***
YEAR2005	0.3691	0.03215	11.479	0.0000	***
YEAR2006	0.3815	0.0304	12.55	0.0000	***
YEAR2007	0.35504	0.03087	11.501	0.0000	***
YEAR2008	0.24607	0.03084	7.978	0.0000	***
YEAR2009	0.33007	0.03059	10.788	0.0000	***
YEAR2010	0.35669	0.03277	10.884	0.0000	***
YEAR2011	0.62743	0.03686	17.024	0.0000	***
YEAR2012	0.66804	0.03333	20.045	0.0000	***
AREACCB	0.0105	0.01303	0.806	0.4203	
AREASMA	0.4235	0.01162	36.45	0.0000	***

Year	LSMEANS
1991	8.120635
1992	8.649326
1993	9.485825
1994	8.650604
1995	9.687683
1996	10.43297
1997	9.649309
1998	10.02898
1999	9.300879
2000	10.42116
2001	12.04312
2002	12.54011
2003	13.33404
2004	13.90565
2005	11.74589
2006	11.89251
2007	11.582
2008	10.38616
2009	11.29628
2010	11.60103
2011	15.20827
2012	15.83853

Appendix Table 3A. Estimated size distribution of the Massachusetts recreational striped bass catch (numbers of fish) in 2012.

TL (in.)	Harvested	Released	Total	Percent	Cumulative Percent
9	0	1,493	1,493	0.11	0.11
10	0	10,776	10,776	0.79	0.79
11	0	11,276	11,276	0.83	1.61
12	0	24,050	24,050	1.76	3.38
13	0	55,078	55,078	4.03	7.41
14	0	63,024	63,024	4.61	12.02
15	0	64,111	64,111	4.69	16.71
16	0	65,522	65,522	4.80	21.51
17	0	42,048	42,048	3.08	24.59
18	0	47,058	47,058	3.45	28.03
19	0	36,520	36,520	2.67	30.71
20	0	28,437	28,437	2.08	32.79
21	0	17,984	17,984	1.32	34.11
22	0	22,956	22,956	1.68	35.79
23	0	30,775	30,775	2.25	38.04
24	0	22,792	22,792	1.67	39.71
25	0	43,054	43,054	3.15	42.86
26	0	30,156	30,156	2.21	45.07
27	0	29,854	29,854	2.19	47.25
28	5,852	23,175	29,027	2.13	49.38
29	24,545	27,848	52,393	3.84	53.22
30	25,938	33,555	59,493	4.36	57.57
31	32,238	37,819	70,058	5.13	62.70
32	53,707	51,449	105,156	7.70	70.40
33	29,355	43,212	72,566	5.31	75.71
34	27,967	37,196	65,162	4.77	80.48
35	30,582	20,355	50,936	3.73	84.21
36	28,416	20,652	49,067	3.59	87.80
37	37,370	9,508	46,878	3.43	91.23
38	16,278	8,960	25,238	1.85	93.08
39	19,613	9,691	29,304	2.15	95.23
40	10,753	7,340	18,094	1.32	96.55
41	10,490	1,506	11,996	0.88	97.43
42	10,980	935	11,915	0.87	98.30
43	3,811	1,869	5,680	0.42	98.72
44	5,018	5,608	10,626	0.78	99.50
45	3,584	1,869	5,453	0.40	99.90
46	0	0	0	0.00	99.90
47	717	0	717	0.05	99.95
48	717	0	717	0.05	100.00
49	0	0	0	0.00	100.00
50	0	0	0	0.00	100.00
51	0	0	0	0.00	100.00
52	0	0	0	0.00	100.00
53	0	0	0	0.00	100.00
54	0	0	0	0.00	100.00
55	0	0	0	0.00	100.00
56	0	0	0	0.00	100.00
Total	377,931	989,509	1,367,440		
Avg. Size	34.6	23.3	26.4		

Appendix Table 3B. Estimated size distribution of the Massachusetts recreational striped bass catch (pounds) in 2012.

TL (in.)	Harvested	Released	Total	Percent	Cumulative Percent
9	0	360	360		
10	0	3,565	3,565	0.03	0.03
11	0	4,968	4,968	0.04	0.08
12	0	13,765	13,765	0.12	0.20
13	0	40,101	40,101	0.36	0.55
14	0	57,340	57,340	0.51	1.06
15	0	71,777	71,777	0.64	1.70
16	0	89,069	89,069	0.79	2.49
17	0	68,590	68,590	0.61	3.10
18	0	91,156	91,156	0.81	3.91
19	0	83,232	83,232	0.74	4.65
20	0	75,618	75,618	0.67	5.32
21	0	55,380	55,380	0.49	5.82
22	0	81,305	81,305	0.72	6.54
23	0	124,585	124,585	1.11	7.64
24	0	104,865	104,865	0.93	8.58
25	0	223,962	223,962	1.99	10.57
26	0	176,505	176,505	1.57	12.13
27	0	195,734	195,734	1.74	13.87
28	42,751	169,505	212,256	1.89	15.76
29	199,272	226,348	425,621	3.78	19.54
30	233,177	302,002	535,179	4.75	24.29
31	319,853	375,654	695,506	6.18	30.47
32	586,229	562,229	1,148,458	10.20	40.68
33	351,479	517,992	869,471	7.72	48.40
34	366,311	487,752	854,063	7.59	55.99
35	437,042	291,223	728,264	6.47	62.46
36	441,987	321,597	763,583	6.78	69.24
37	631,187	160,770	791,957	7.04	76.28
38	297,899	164,161	462,060	4.11	80.38
39	388,084	191,973	580,057	5.15	85.54
40	229,606	156,915	386,522	3.43	88.97
41	241,251	34,664	275,915	2.45	91.42
42	271,498	23,144	294,642	2.62	94.04
43	101,148	49,656	150,805	1.34	95.38
44	142,711	159,660	302,371	2.69	98.07
45	109,063	56,930	165,994	1.47	99.54
46	0	0	0	0.00	99.54
47	24,860	0	24,860	0.22	99.76
48	26,484	0	26,484	0.24	100.00
49	0	0	0	0.00	100.00
50	0	0	0	0.00	100.00
51	0	0	0	0.00	100.00
52	0	0	0	0.00	100.00
53	0	0	0	0.00	100.00
54	0	0	0	0.00	100.00
55	0	0	0	0.00	100.00
56	0	0	0	0.00	100.00
Total	5,441,893	5,814,051	11,255,944		
Avg. Weight	14.4	5.9	8.2		

Appendix Table 4A. Results of the Gamma regression analysis of MRFSS striped bass catch positive catches.

Anova Table (Type III)
Response: TOT_FISH

	Chisq	Df	Pr(>Chisq)	
YEAR	396.9	24	2.20E-16	***
AREA_X	38.87	2	3.62E-09	***
MODE_FX	438.68	2	2.20E-16	***
WAVE	285.46	2	2.20E-16	***
CNTY	122.21	7	2.20E-16	***
FFDAYS12C	583.96	12	2.20E-16	***
HOURS	996.11	11	2.20E-16	***

Coefficients:

	Estimate	SE	t	Pr(>|t|)	
(Intercept)	0.310836	0.23	1.346	0.1784	
YEAR1988	-0.18701	0.26	-0.733	0.4635	
YEAR1989	-0.25296	0.25	-1.017	0.3091	
YEAR1990	-0.24759	0.24	-1.033	0.3016	
YEAR1991	-0.10989	0.24	-0.459	0.6459	
YEAR1992	0.099214	0.23	0.427	0.6695	
YEAR1993	-0.05934	0.23	-0.256	0.7977	
YEAR1994	0.011011	0.23	0.048	0.9617	
YEAR1995	0.234839	0.23	1.029	0.3037	
YEAR1996	0.248867	0.23	1.089	0.2763	
YEAR1997	0.308673	0.23	1.353	0.1760	
YEAR1998	0.396061	0.23	1.74	0.0819	.
YEAR1999	0.341672	0.23	1.499	0.1339	
YEAR2000	0.38405	0.23	1.682	0.0926	.
YEAR2001	0.144812	0.23	0.635	0.5256	
YEAR2002	0.121912	0.23	0.533	0.5939	
YEAR2003	0.188598	0.23	0.825	0.4094	
YEAR2004	0.235133	0.23	1.026	0.3050	
YEAR2005	0.249698	0.23	1.088	0.2765	
YEAR2006	0.47737	0.23	2.088	0.0368	*
YEAR2007	0.212656	0.23	0.928	0.3534	
YEAR2008	0.119693	0.23	0.519	0.6035	
YEAR2009	0.076974	0.23	0.335	0.7379	
YEAR2010	0.014504	0.23	0.063	0.9500	
YEAR2011	-0.14819	0.23	-0.638	0.5233	
AREA_X2	-0.04989	0.03	-1.918	0.0552	.
AREA_X5	0.088647	0.02	4.76	1.95E-06	***
MODE_FX6	0.356715	0.04	10.174	2.00E-16	***
MODE_FX7	0.504551	0.02	21.833	2.00E-16	***
WAVE4	-0.30408	0.02	-16.868	2.00E-16	***
WAVE5	-0.1809	0.02	-8.085	6.55E-16	***
CNTY5	-0.14173	0.04	-3.625	0.00029	***
CNTY7	-0.2966	0.05	-6.045	1.52E-09	***
CNTY9	0.100331	0.02	4.842	1.30E-06	***
CNTY19	-0.10528	0.07	-1.478	0.13935	
CNTY21	-0.00019	0.04	-0.004	0.99644	
CNTY23	-0.02383	0.03	-0.885	0.37604	
CNTY25	-0.33941	0.06	-5.382	7.46E-08	***

Appendix 4A cont'd.

Coefficients:

	Estimate	SE	t	Pr(>|t|)	
FFDAYS12C10	0.057562	0.03	2.249	0.02449	*
FFDAYS12C20	0.178966	0.03	6.913	4.86E-12	***
FFDAYS12C30	0.178405	0.03	5.951	2.71E-09	***
FFDAYS12C40	0.325176	0.04	8.88	2.00E-16	***
FFDAYS12C50	0.368813	0.03	11.523	2.00E-16	***
FFDAYS12C60	0.416569	0.04	9.502	2.00E-16	***
FFDAYS12C70	0.43873	0.05	8.058	8.17E-16	***
FFDAYS12C80	0.479514	0.08	6.356	2.11E-10	***
FFDAYS12C90	0.537219	0.09	6.183	6.39E-10	***
FFDAYS12C10(	0.557673	0.03	16.269	2.00E-16	***
FFDAYS12C15(	0.61556	0.06	10.398	2.00E-16	***
FFDAYS12C20(	0.716863	0.07	10.326	2.00E-16	***
HOURS2	0.10434	0.05	2.13	0.03315	*
HOURS3	0.332073	0.05	7.163	8.12E-13	***
HOURS4	0.471311	0.05	10.321	2.00E-16	***
HOURS5	0.627422	0.05	13.455	2.00E-16	***
HOURS6	0.684968	0.05	14.535	2.00E-16	***
HOURS7	0.898316	0.05	17.456	2.00E-16	***
HOURS8	0.899721	0.05	16.566	2.00E-16	***
HOURS9	0.921528	0.07	12.514	2.00E-16	***
HOURS10	1.064556	0.08	12.695	2.00E-16	***
HOURS11	1.274576	0.17	7.359	1.92E-13	***
HOURS12	1.047941	0.1	10.381	2.00E-16	***

Year	lsmeans
1987	4.124
1988	3.421
1989	3.203
1990	3.220
1991	3.695
1992	4.555
1993	3.887
1994	4.170
1995	5.216
1996	5.290
1997	5.616
1998	6.129
1999	5.804
2000	6.056
2001	4.767
2002	4.659
2003	4.981
2004	5.218
2005	5.294
2006	6.648
2007	5.102
2008	4.649
2009	4.454
2010	4.185
2011	3.556

Appendix Table 4B. Results of the logistic regression analysis of MRFSS striped bass success/failure.

Anova Table (Type III)
Response: 0/1

	Chisq	Df	Pr(>Chisq)	
YEAR	1796.4	24	2.20E-16	***
AREA_X	208.5	2	2.20E-16	***
MODE_FX	4153.8	2	2.20E-16	***
WAVE	403.5	2	2.20E-16	***
CNTY	420.3	7	2.20E-16	***
FFDAYS12C	976.8	12	2.20E-16	***
HOURS	2859.1	11	2.20E-16	***

Coefficients:

	Estimate	SE	Z	Pr(>|z|)	
(Intercept)	-3.72	0.25092	-14.825	2.00E-16	***
YEAR1988	-0.1504	0.27318	-0.55	0.582016	
YEAR1989	-0.1071	0.27014	-0.397	0.691688	
YEAR1990	-0.2173	0.25912	-0.838	0.401761	
YEAR1991	-0.3219	0.25787	-1.248	0.211875	
YEAR1992	-0.1517	0.25216	-0.601	0.547567	
YEAR1993	0.16743	0.25135	0.666	0.505343	
YEAR1994	0.65303	0.24943	2.618	0.008842	**
YEAR1995	0.94284	0.24873	3.791	0.00015	***
YEAR1996	0.98525	0.24916	3.954	7.68E-05	***
YEAR1997	0.96559	0.24844	3.887	0.000102	***
YEAR1998	1.4528	0.24839	5.849	4.95E-09	***
YEAR1999	1.20279	0.24849	4.84	1.30E-06	***
YEAR2000	1.12264	0.249	4.509	6.53E-06	***
YEAR2001	0.9222	0.24848	3.711	0.000206	***
YEAR2002	0.9674	0.24936	3.88	0.000105	***
YEAR2003	0.85708	0.24905	3.441	0.000579	***
YEAR2004	0.93116	0.25048	3.718	0.000201	***
YEAR2005	1.04382	0.25092	4.16	3.18E-05	***
YEAR2006	1.29284	0.24986	5.174	2.29E-07	***
YEAR2007	0.96888	0.2507	3.865	0.000111	***
YEAR2008	0.80319	0.25187	3.189	0.001428	**
YEAR2009	0.75875	0.25093	3.024	0.002497	**
YEAR2010	0.51804	0.25246	2.052	0.040174	*
YEAR2011	0.38934	0.253	1.539	0.123827	
AREA_X2	-0.0365	0.03364	-1.084	0.278272	
AREA_X5	0.30139	0.02302	13.091	2.00E-16	***
MODE_FX6	2.65579	0.04775	55.622	2.00E-16	***
MODE_FX7	1.16216	0.02556	45.471	2.00E-16	***
WAVE4	-0.3661	0.02349	-15.584	2.00E-16	***
WAVE5	-0.5179	0.02763	-18.747	2.00E-16	***
CNTY5	-0.2585	0.04765	-5.425	5.80E-08	***
CNTY7	-0.1553	0.05911	-2.627	0.008618	**
CNTY9	0.37036	0.0254	14.583	2.00E-16	***
CNTY19	-0.3947	0.08288	-4.762	1.92E-06	***
CNTY21	0.12258	0.05331	2.299	0.021484	*
CNTY23	-0.1161	0.0323	-3.595	0.000325	***
CNTY25	0.11317	0.07681	1.473	0.140651	

Appendix Table 4B cont'd.

Coefficients:

	Estimate	SE	Z	Pr(>|z|)	
FFDAYS12C1(	0.13735	0.03075	4.467	7.93E-06	***
FFDAYS12C2(	0.40299	0.03193	12.622	2.00E-16	***
FFDAYS12C3(	0.49168	0.03747	13.12	2.00E-16	***
FFDAYS12C4(	0.58443	0.04696	12.444	2.00E-16	***
FFDAYS12C5(	0.73676	0.04154	17.736	2.00E-16	***
FFDAYS12C6(	0.6883	0.05654	12.175	2.00E-16	***
FFDAYS12C7(	0.82814	0.07247	11.428	2.00E-16	***
FFDAYS12C8(	0.86549	0.10254	8.44	2.00E-16	***
FFDAYS12C9(	0.66128	0.11061	5.978	2.25E-09	***
FFDAYS12C1(	0.91623	0.04538	20.19	2.00E-16	***
FFDAYS12C1:	0.95088	0.07778	12.225	2.00E-16	***
FFDAYS12C2(	0.90118	0.08963	10.054	2.00E-16	***
HOURS2	0.66125	0.04905	13.48	2.00E-16	***
HOURS3	1.05954	0.04699	22.55	2.00E-16	***
HOURS4	1.37227	0.04672	29.374	2.00E-16	***
HOURS5	1.53838	0.04872	31.576	2.00E-16	***
HOURS6	1.79159	0.05059	35.414	2.00E-16	***
HOURS7	1.99568	0.06068	32.889	2.00E-16	***
HOURS8	1.91584	0.06418	29.853	2.00E-16	***
HOURS9	2.22326	0.10135	21.937	2.00E-16	***
HOURS10	2.27352	0.11669	19.484	2.00E-16	***
HOURS11	1.67471	0.2263	7.4	1.36E-13	***
HOURS12	2.3006	0.13918	16.53	2.00E-16	***

Year	lsmeans
1987	0.37795
1988	0.3433
1989	0.35312
1990	0.32838
1991	0.30573
1992	0.34301
1993	0.41804
1994	0.53862
1995	0.60935
1996	0.6194
1997	0.61476
1998	0.72203
1999	0.66919
2000	0.65122
2001	0.60443
2002	0.61518
2003	0.58876
2004	0.60657
2005	0.63311
2006	0.68882
2007	0.61553
2008	0.57565
2009	0.56476
2010	0.50495
2011	0.4728

Rhode Island
Department of Environmental Management

DIVISION OF FISH AND WILDLIFE
401 423-1920
FAX 401 423-1925
3 Fort Wetherill Rd
Jamestown, RI 02835

TO: Kate Taylor, Fishery Management Plan Coordinator, ASMFC

FROM: Nicole Lengyel, RI DEM, Striped Bass TC Member

DATE: April 1, 2013

SUBJECT: 2012 Striped Bass Compliance Report

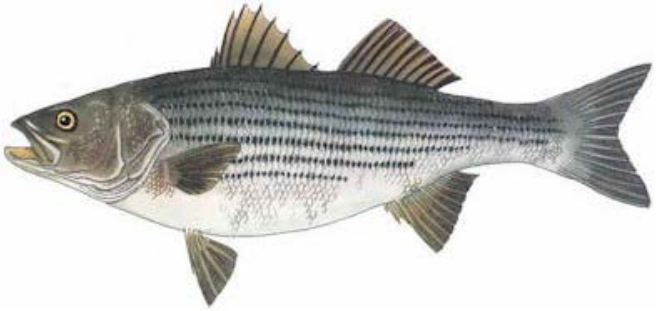
Please find a copy of Rhode Island's annual 2012 compliance report for striped bass attached to this memo. If you have any questions, you may contact me directly at 401.423.1940.

cc: M. Gibson
J. McNamee

Annual Compliance Report to the
Atlantic States Marine Fisheries Commission

Striped Bass Fisheries and Management in Rhode Island

Review of 2012



Submitted By:
Nicole Lengyel
RI DEM Marine Fisheries
April 2013

ATLANTIC STRIPED BASS

I. Introduction

The striped bass has historically been one of the most important recreational and commercial fishery species in Rhode Island. The commercial fishery for striped bass is allocated an annual quota, which is divided between the rod and reel and floating fish trap gears. In 2012, the commercial rod and reel or General Category fishery landed 148,042 lb of striped bass, while commercial floating fish traps landings totaled 91,871 lb. The Rhode Island total catch by recreational anglers was 851,460 lb (NMFS, pers. comm.) of striped bass in 2012 more than three times the weight of total landings for the commercial fishery. Recreational harvest of striped bass in Rhode Island decreased from 88,635 (NMFS, pers. comm.) fish in 2011 to 60,351 (NMFS, pers. comm.) fish in 2012. As of 2012, all RI-licensed seafood dealers and commercial harvesters are required to report trip-level data.

II. Request for *di minimis,* where applicable

The state of Rhode Island does not wish to apply for *de minimis* status.

III. Previous calendar year's fishery and management program

A. Harvest and losses (refer to Table 9 in Amendment 6 to the Atlantic Striped Bass FMP)

1. Commercial fishery

a. Characterization of fishery (seasons, cap, gears, regulation)

Annual commercial landings of striped bass are dictated by an annual quota allocation. In Rhode Island, the quota is divided between a general category (61%) and the floating fish traps (39%). Within each gear type, a percentage of the quota is allotted to separate sub-periods in the calendar year (see section III.C.1 for details). Trends in the seasonality of landings in the general category are strongly tied to the quota availability. The majority of striped bass landed during the first sub-period for the general category are typically caught within a month and a half of the opening day for each sub-period. The floating fish trap fishery is open year round, though trap fisherman typically set their traps in May and fish through mid- to late October. In 2012, 99% of the fish trap's quota allocation was harvested.

The start date of the first sub-period for the general category was June 6th with a minimum size of 34". The start of the second sub-period was September 11th with a minimum size of 34" (RIMF Reg. Part 12.3 2013b). The possession limit during both sub-periods for the general category was five fish per vessel per calendar day. Allocation of the general category quota between the sub-periods remained the same (75/25). During both sub-periods, the fishery was closed each calendar

week from 12:00 AM Friday until 11:59 PM Saturday and commercial possession and sale of striped bass on these days was prohibited.

b. Characterization of directed harvest

i. Landings and method of estimation

Rhode Island commercial landings of striped bass were available from Rhode Island's SAFIS database (see section III.C.1; N. Lengyel, RIDFW Marine Fisheries Section, pers. comm.). In 2012, a total of 239,913 lbs of striped bass were landed in Rhode Island by commercial fisheries. Of this total, the commercial floating fish trap fishery catch was 91,871 lbs and 148,042 lbs were taken by the general category, which is primarily rod and reel.

ii. Catch composition

(1) Length frequency

The RIDFW samples striped bass caught by commercial floating fish traps and rod and reel fisheries. Every individual striped bass observed is measured for fork length (cm) and weighed (pounds). The fork length measurements were converted to inches and then to total lengths using:

$$TL = 0.03 + 1.07\ FL \qquad (1)$$

The proportion of striped bass at length caught in the commercial fisheries was assumed equal to the proportion of striped bass at length sampled from the commercial landings by gear type. The total number of striped bass commercial landings was estimated for each fishery by using the sample numbers and weights to extrapolate to the total weight landed. The length frequency for each gear was expanded to the estimated number of striped bass caught for the respective gear, providing estimates of the length distribution of commercial striped bass landings for both the rod and reel and floating fish trap fisheries. In 2012, the RIDFW collected 163 striped bass lengths from the commercial fish traps and 87 from the rod and reel fishery (N. Lengyel, RIDFW Marine Fisheries Section, pers. comm.).

(2) Age frequency

Scales are removed from a sub-sample of striped bass that is weighed and measured in the RIDFW's commercial fisheries sampling program. Ageing of the scale samples collected in 2012 is complete and the ages were used to create an age-length key (ALK) using total length. The RI ALK was supplemented with an ALK obtained from MA DMF (G. Nelson, MA DMF, pers. comm.) to fill in holes in the key. The key was

applied to the commercial length frequencies to estimate the commercial fishery catch-at-age for each gear.

(3) Sex

Rhode Island's commercial fishery sampling program does not record the sex of striped bass sampled.

c. Characterization of other losses (poaching, bycatch, etc.)

Information on other striped bass losses in Rhode Island's commercial fisheries is not available or is unknown.

2. Recreational fishery

a. Characterization of fishery (seasons, cap, gears, regulations)

In 2012 the recreational fishery for striped bass in Rhode Island was subject to a 28 in. minimum size limit and a possession limit of 2 fish per person per day. The recreational fishery for striped bass is open year-round, though it is most active during waves 3 through 5 (NMFS, pers. comm.). The majority of the harvest (Type A + B1) in numbers is taken by the private/rental boat mode. The estimated number of striped bass released alive (Type B2) by recreational anglers usually exceeds the number harvested in a given year. Over the last year, the number of live releases has been, on average, 4 times larger than the recreational harvest.

b. Characterization of directed harvest

i. Landings and method of estimation

Data characterizing striped bass caught by recreational anglers in Rhode Island were obtained from MRIP (NMFS, pers. comm.). Rhode Island's recreational fishery for striped bass harvested (Type A + B1) 60,351 striped bass in 2012. The weight of the 2012 recreational harvest was estimated to equal 851,460 lb.

ii. Catch composition

(1) Length frequency (legal catch)

Currently, the only source of fishery-dependent sampling of striped bass caught in Rhode Island recreational fisheries is MRIP. Typically the length distribution of Rhode Island's recreational harvest (Type A + B1) of striped bass is based on the MRIP sample length measurements. Due to the relatively high percent standard error (PSE) associated with the MRIP length frequency data for 2012, as well as the limited size distribution,

sample length measurements for RI's recreational fishery were based on the 2011 American Littoral Society's (ALS) release data for Rhode Island (G. Shepherd, NMFS, pers. comm.). When ALS release data for 2012 becomes available, the length frequency data will be updated. Data for 2011 were converted to total length using equation 1 and then truncated to only legal sized fish equal or greater than 28" total length. The sample numbers at length were expanded to the estimate of recreational harvest to provide the length frequency distribution of recreationally harvested striped bass for 2012.

(2) Age frequency

The age composition of Rhode Island's recreational harvest was based on age sample data provided by the MA DMF as well as age data collected in RI. The combined RI-MA age-length key was applied to the recreational harvest expanded numbers at length to estimate the recreational harvest catch-at-age for striped bass (see compliance worksheet).

c. Characterization of other losses (poaching, hook and release mortality, etc.)

i. Estimate and method of estimation

MRIP provides estimates of the number of striped bass released alive (Type B2) by recreational anglers (NMFS, pers. comm.). In 2012, the number of striped bass released alive in Rhode Island recreational fisheries was an estimated 244,993 fish. A discard mortality rate of 9% was applied to the number of live releases to estimate the number of dead discards. The estimated number of dead discards in Rhode Island during the 2012 recreational fishery was 22,049 fish.

ii. Estimate of catch composition

The size structure of striped bass released from Rhode Island's recreational fishery was based on the 2011 American Littoral Society's (ALS) release data for Rhode Island (G. Shepherd, NMFS, pers. comm.). When the 2012 ALS data becomes available, the released alive size structure for RI will be updated. The proportion of recreational releases at length was assumed equal to the proportion at length of striped bass sampled in the 2011 ALS tagging program. In 2011, length data were available from 670 striped bass released in Rhode Island waters. The proportion at length, based on the ALS samples, was expanded to the estimated number of dead discards to represent the length frequency of striped bass released from the recreational fishery in 2012 that did not survive.

The combined RI-MA ALK that was used to estimate the age of Rhode Island's recreational harvest was also applied to the length frequencies of the

striped bass dead discards to estimate recreational catch-at-age of dead discards from the recreational fishery (see compliance worksheet).

3. Other losses

   The RIDFW is not aware of any striped bass losses other than those discussed above.

4. Harvest and losses - including all above estimates in numbers and weight (pounds) of fish, and mean weight per fish for each gear type.

   The estimated numbers, weights (pounds), and mean individual weights (pounds) of striped bass caught in Rhode Island waters in 2012 are summarized in the following table.

		Total		Individual
Fishery	**Gear/Type**	**Number**	**Weight (lb)**	**Average Weight (lb)**
Commercial	Rod & Reel	6,363	148,042	23
	Floating Fish Traps	8,590	91,871	11
Recreational	Harvest	60,351	851,460	14.1
	Dead Releases	22,049	N/A	N/A

B. Required fishery independent monitoring programs (refer to Table 7 and 8 in Amendment 6 to the Atlantic Striped Bass FMP).

1. Description of requirement as outlined in Atlantic Striped Bass Amendment 6

   According to section 3.1.2 of Amendment 6 to the Interstate Fishery Management Plan for Atlantic Striped Bass, hereafter referred to as “Amendment 6”, the state of Rhode Island is not required to conduct an annual juvenile abundance index survey (ASMFC 2003). Rhode Island is also not required to perform a spawning stock assessment survey, as stipulated in section 3.2 of Amendment 6. Rhode Island does not currently have a tagging program for striped bass.

C. Copy of regulations that were in effect, including a reference to the specific compliance criteria as mandated in the FMP.

1. Commercial

   A commercial fishing license is required to take striped bass for commercial purposes from Rhode Island waters. Gillnetting for striped bass is not permitted in Rhode Island waters (RIMF Reg. Part 12.6 2013b). Rhode Island regulations stipulate that striped bass must be identified with a special commercial tag before being sold (RIMF Reg. Part 12.4 2013b). These tags are provided by the RIDFW.

Striped bass commercial fisheries in Rhode Island are managed by gear category—a general category, which is primarily rod and reel, and the floating fish traps. In accordance with section 4.3.1 of Amendment 6 (ASMFC 2003), Rhode Island has established a minimum size limit of 26 in. for striped bass caught by commercial floating fish traps (RIMF Reg. Part 7.5 2013a; RIMF Reg. Part 12.1, 12.5 2013b). The minimum size limit for the general category is 34 in. (RIMF Reg. Part 12.3 2013b). Rhode Island is allocated an annual quota for the commercial landings of striped bass, as discussed in section 4.3.2 of Amendment 6 (ASMFC 2003). Rhode Island divides the commercial quota between the general category (61%) and the floating fish traps (39%) (RIMF Reg. Part 12.5 2013b). Following ASMFC Striped Bass Board approval in August 2007 the commercial floating fish trap minimum size changed from 28" to 26".

The commercial quota for the general category for 2012 was available during two sub-periods within the year (RIMF Reg. Part 12.3 2013b). Commercial fishing for striped bass was closed to the general category from January 1st to June 5th. The first sub-period began June 6th and was set to end August 31st. Due to the entire sub-period allocation being harvested relatively quickly, the sub-period closed early on June 26th. During this sub-period, 75% of the general category quota was available and the possession limit was five fish per calendar day in this sub-period. The remaining 25% of the quota was available in the second sub-period, from September 11th through December 31st. Again, due to the entire sub-period allocation being harvested quickly, the sub-period closed early on September 19th. Each license holder was permitted five fish per calendar day during the second sub-period. Projections were used to determine when the quota would be harvested, which triggered the early closures of the fishery.

The entire (100%) floating fish trap quota was available January 1st through December 31th, (RIMF Reg. Part 12.5 2013b), during which time there was no possession limit. The floating fish traps harvested 99% of their quota in 2012 therefore an early closure was not necessary.

As of March 2006, all RI-licensed seafood dealers are required to submit electronic reports to the Standard Atlantic Fisheries Information System, or SAFIS (RIMF Reg. Part 19.14 2006). SAFIS requires seafood dealers to collect trip level information on commercial catches landed and purchased in Rhode Island. In addition to SAFIS, all commercial harvesters are required to record trip level catch and effort in harvester logbooks. Both SAFIS and the RI harvester logbook follow the data standards developed by the Atlantic Coastal Cooperative Statistics Program (ACCSP).

2. Recreational

As of January, 2010, Rhode Island does require a license for recreational fishing in marine waters. Recreational fishing for striped bass was permitted throughout the year in 2012. In accordance with section 4.2.1 of Amendment 6 (ASMFC 2003), Rhode Island instituted a minimum size limit of 28 inches (RIMF Reg. Part 7.5

2013a; RIMF Reg. Part 12.1 2013b) and a possession limit of 2 fish per person per day (RIMF Reg. Part 12.1 2013b) for striped bass caught in the recreational fishery.

D. Harvest broken down by commercial (by gear type where applicable) and recreational, and non-harvest losses (when available).

Harvest of striped bass in Rhode Island waters in 2012 by fishery in gear is summarized in the following table:

Fishery	Gear/Type	Number	Weight (lb)
Commercial	Rod & Reel	6,363	148,042
	Floating Fish Traps	8,590	91,871
Recreational	Harvest	60,351	851,460
	Dead Releases	22,049	N/A

E. Review of progress in implementing habitat recommendations.

Unknown.

IV. Planned management programs for the current calendar year

A. Summarize regulations that will be in effect (copy of current regulations of different from III C)

1. Commercial

RI-licensed seafood dealers are required to report data on commercial catches landed and purchased in Rhode Island. Commercial harvesters are required to record catch and effort data in harvester logbooks. RI-licensed seafood dealers are required to tag each striped bass purchased. Additionally, for each tag issued, the dealer must report whether the tag was used, broken, or un-used. If a tag was used, the dealer must report the purchase date, individual weight, tag number, license #, and fisherman name for each tag.

General Category:

There will be slight changes to the management of the general category within the striped bass commercial fisheries in 2013. The start date of the first sub-period for this category will remain June 6th (RIMF Reg. Part 12.3 2013b). The start date of the second sub-period for this category will be September 8th (RIMF Reg. Part 12.3 2013b). The possession limit during both sub-periods for the general category will be five fish per vessel per calendar day. Allocation of the general category quota between the sub-periods will be 70/30. During both sub-periods, the fishery will be closed each calendar week from 12:00 AM Friday until 11:59 PM Saturday and commercial possession and sale of striped bass on these days will be prohibited.

Fish Trap:

Rhode Island submitted a proposal in 2007 for lowering the current minimum size limit in the commercial floating fish traps fishery to 26" while reducing the fish trap quota to 93,586 lb. The request was approved the ASMFC Striped Bass Management Board.

2013 Striped Bass General Category

Period	Period Percentage	Period Allocation	2012 Overage	Final Period Allocation
June 6 - Aug 31	70%	102,464	1,166	101,298
Sept 8 – Dec 31	30%	43,913	500	43,414
2013 Total	100%			144,712

2013 Striped Bass Fish Trap

Period	Period Percentage	Period Allocation
Jan 1 -Dec 31	100%	93,586
2013 Total		93,586

2. Recreational

   There are no changes planned regarding the regulation of recreational fishing for striped bass in Rhode Island during 2012. The minimum size limit of 28 in and possession limit of 2 striped bass per person per day will remain in effect.

B. Summarize monitoring programs that will be performed

In 2013, SAFIS reporting requirements will remain in effect for all RI-licensed seafood dealers. This includes trip-level reporting of catches landed and purchased in Rhode Island. Commercial harvesters will keep logbooks for recording trip-level catch and effort directed in commercial fisheries.

The RIDFW commercial dockside sampling program will continue to collect striped bass samples from the commercial floating fish traps and rod and reel fisheries.

All RI-licensed seafood dealers will be required to tag each striped bass purchased and submit reports back to the Division of fish and Wildlife with the information as stated in IV-A-1.

C. Highlight any changes from the previous year

The start date of the second sub-period for the general category will be September 8th. Allocation of the general category quota between the sub-periods will be 70/30. Stricter requirements for submission of striped bass tag reports will be implemented in 2013.

References

ASMFC (Atlantic States Marine Fisheries Commission). 2003. Amendment 6 to the Interstate Fishery Management Plan for Atlantic Striped Bass. Prepared by the ASMFC Atlantic Striped Bass Plan Development Team, February 2003. ASMFC, Fishery Management Report No. 41, Washington, D.C. 81 p.

RIMF (Rhode Island Marine Fisheries). 2006. Rhode Island Marine Fisheries Statutes and Regulations—Part XIX: Fish/Shellfish Dealer Regualtions. Adopted by the Rhode Island Department of Environmental Management, January 20, 2006, Providence, RI. 13 p.

_____. 2013a. Rhode Island Marine Fisheries Statutes and Regulations—Part VII: Minimum Sizes of Fish/Shellfish. Adopted by the Rhode Island Department of Environmental Management, March 22, 2013, Providence, RI. 55 p.

_____. 2013b. Rhode Island Marine Fisheries Statutes and Regulations—Part XII: Striped Bass. Adopted by the Rhode Island Department of Environmental Management, March 22, 2013, Providence, RI. 8 p.

_____. 2013c. Rhode Island Marine Fisheries Statutes and Regulations—Part XIX: Fish/Shellfish Dealer Regualtions. Adopted by the Rhode Island Department of Environmental Management, January 20, 2006, Providence, RI. 13 p.

State of Connecticut
2013 Compliance Report for Striped Bass
July 24, 2013

I. Introduction

According to the provisions of the Striped Bass Plan, all coastal states that intend to harvest striped bass in 2013 must first submit a 2012 fishing report to the Atlantic States Marine Fisheries Commission (ASMFC). The objectives of the 2012 Connecticut fishing report are to:1) summarize the estimated total 2012 recreational catch (harvested and released) and harvest of striped bass taken in Connecticut waters; 2) provide catch-at-age matrices based on age-length keys and a representative subsample of length measurements of the 2012 striped bass recreational catch and harvest; 3) estimate the 2012 non-harvest losses of striped bass resulting from hook-release and poaching mortality from the recreational fisheries; and 4) summarize the fisheries-independent abundance indices (geometric mean catch/tow) for striped bass from 1984 through 2012 based on the Connecticut multispecies Long Island Sound Trawl Survey (LISTS). The catch-at-age matrix for the 2012 Connecticut recreational landings has been derived annually from striped bass age-length keys from Long Island Sound and the south shore of New York provided by the NY DEC. The 2012 catch-at-age matrix is provided separately to ASMFC via a spread sheet (objective 2).

II. Request for *de minimus*, where applicable.

N/A

III. Previous calendar year's fishery and management program.

a. Volunteer Angler Survey

The striped bass catch/effort (trips), length and age frequency data needed to satisfy Objective 2 were obtained from the Connecticut Volunteer Angler logbooks that have been reported to the State at the end of each year, (Crecco 1992) . A total of 51 anglers submitted logbooks in the 2012 Volunteer Angler Survey. Forty-six fishermen fished for striped bass and expended 838 fishing trips in 2012, of which 463 (55.3%) were boat trips and 375 (44.7%) were trips made from shore (Table 1). Shore trips caught 627 stripers in 2012, of which 93.8% (588 fish) were released. Boat trips caught 949 stripers and released 83.9% (796 fish) of their catch (Table 1). Catch-per-unit-effort (CPUE) for striped bass, a relative measure of fishing success, was 22% greater for the boat fishery (mean CPUE = 2.05 fish/trip) than for the shore fishery (mean CPUE = 1.67 fish/trip). The percentage of successful trips (i.e. trips where at least one striped bass was caught) in 2012 was about 14% higher for shore fishermen (57.9%) than for boat fishermen (50.8%). In the last few years the mean CPUE for the boat fishery was about 10% greater than the CPUE for the shore-based fishery.

b. Recreational Catch Statistics

Estimates of the mean total catch (A, B1 and B2) and harvest (A, B1) for striped bass in the 2012 Connecticut recreational fishery were derived directly from the National Marine Fisheries Service Marine Recreational Information Program (MRIP). The standard error (SE) and coefficient of variation (CV) about the mean 2012 recreational catch and harvest were also estimated from MRIP data.

c. Recreational Catch and Harvest

The 2012 total catch in number (A, B1 and B2) of striped bass (329,500 fish) was the lowest catch since 1993 (Tables 2 and 3). The 2012 catch was about 90% lower than the record high 2008 total catch (3,212,946 fish) and about 51% below the 2011 catch (675,655) (Table 3, Figure 1).

The 2012 striped bass harvest (64,573 fish) was about the same as the 2011 harvest (63,288 fish) however this is 32% less than the previous 10 year average (Table 3). The 2012 recreational harvest in weight of 843,443 pounds (Table 4) was about 11% higher than in 2011, but 33 % lower than the 2010 harvest (1,259,008 lbs) (Table 4, Figure2). Average pounds harvested in the recreational fishery in the previous 10 year period were 1,386,413 pounds (Figure2).

d. Nonharvest Losses

Nonharvest losses of catchable striped bass (size range: 8" to 52") in the 2012 recreational fishery, resulting from hook-release and poaching mortalities, were estimated by the method outlined by Shepherd (1992). The best estimate of poaching losses was derived by multiplying released stripers in the MRIP (B2 catch) by 0.013, whereas the best estimate of hook-release losses was estimated by multiplying the released catch (B2 catch) by 0.09.

The 2012 nonharvest loss due to poaching in the Connecticut recreational fishery was 3,444 fish (0.013 *264,927 fish), (Table 5). The 2012 hook-release loss was 23,843 fish (0.09 * 264,927 fish). As a result, the total recreational nonharvest loss in 2012 was 27,287 striped bass between 8" and 52".

Given that commercial fishing for striped bass is prohibited in Connecticut waters, non-harvest losses due to poaching and net discard from non-directed commercial fishing activities in Connecticut waters are very difficult to estimate. Beginning in 2001, commercial discard losses of striped bass have been estimated for each state by the Striped Bass Stock Assessment Subcommittee.

e. Length and Age Frequency

The length frequency distribution of striped bass caught in Connecticut waters in 2012 was based on 1,247 length measurements (inches TL to the nearest 0.5") from the Volunteer Angler Survey. In addition, length frequencies were derived on legal-size (28"+) stripers that were released and harvested.

The length frequency of the 2012 recreational catch in Connecticut waters based on the Volunteer Angler Survey ranged from 8.0 in. to 52.0 in. (mean length = 22.1", SE = 0.19). Legal-size (28"+) striped bass from volunteer anglers in 2012 comprised 24.7% (355 fish) of the total catch. Of the 355 legal-size stripers caught by volunteer anglers in 2012, 172 fish (48.5%) were released. The average length of a harvested striper was 33.0" (SE = 0.31). The average length of released and legal-size striped bass was 32.1" (SE = 0.26).

f. Activity and results of fishery independent monitoring.

The Connecticut Marine Fisheries Division has annually conducted a bottom trawl survey within Long Island Sound (LIS) from 1984 through 2012. The stratified random design for this multi-species trawl survey is described in Gottschall et al. (2011). The average abundance index of striped bass from LIS in numbers and biomass (lbs.) between 1984 and 2012 was expressed as the geometric mean catch/tow from April through June. The Sound-wide trawl survey is also conducted annually during fall (September-October), but these data were not used to monitor striped bass abundance because fewer stripers have been caught in annual fall surveys. The standard error (SE) about the geometric mean abundance indices in the spring surveys cannot be estimated directly from back-transformed data. As a result, approximate precision estimates (SE values) on the geometric mean were derived by multiplying the ratio of the log transformed standard errors (log SE) to the log transformed means (Log Mean) by the geometric means (GM Mean):

$$SE = (\text{Log SE} / \text{Log Mean}) * \text{GM Mean}. \quad (3)$$

Striped bass relative abundance (geometric mean catch/tow) in numbers from LIS remained relatively low between 1984 and 1988, then mean indices increased steadily thereafter to high levels in 1999 (1.10 fish / tow) (Table 6, Figure 3). After 1999, the striped bass trawl index varied erratically from 2000 to 2008 (Table 6). Striped bass relative abundance decline slightly in 2000 and 2001 then reached peak (1.30 fish / tow) abundance in 2002 (Figure 3). Abundance dropped again in 2003 and 2004 by about 57% before increasing to the second highest index in 2005 (0.1.17 fish / tow). The 2007 index (1.02 fish / tow) was the fourth highest in the time series, however, abundance declined 41% to just above average in the following two years. Abundance then dropped to below average levels in 2010 and has remained relatively steady at about 12% below average for the last two years.

Striped bass relative abundance in biomass (mean kgs. / tow) within LIS also rose from 0.47 lbs./ tow in 1992 to peak biomass levels in 2002 (3.56 lbs./ tow) before declining by about 37% in 2003 (2.23 lbs./ tow) (Table 6, Figure3). The 2007 biomass index (2.21 lbs./ tow) was the fifth highest in the time series and was around 9% higher than the 2006 biomass index (2.02 lbs./ tow) (Table 6). The 2009 biomass index (1.40 lbs. / tow) was slightly higher than the 2008 (1.34 lbs. / tow), however, in 2010, biomass dropped to 0.98 lbs. /tow and then increased to 1.37 lbs. / tow in 2011. In 2012, biomass has decreased to the lowest index in the time series since 1995 (0.89 lbs. /tow), (Figure3).

g. Copy of regulations that were in effect

The State of Connecticut prohibits commercial fishing for striped bass in all waters of the state. Regulations on the Connecticut recreational fishery for striped bass in 2012 consisted of a 28" minimum length limit and a daily possession limit of two fish per day. For specific regulations see Appendix 1 (section 26-159a-2 and 265-159a-40). In 2011, the State began a spring (May 1 to June 30, 2011) striped bass recreational fishery (Connecticut bonus striped bass fishing program) in the Connecticut River. A voucher system was set up to allow one striped bass (one fish per voucher / two per day) to be retained under a slot limit (22.0 to 27.9 in.). Vouchers may only be used in state waters and must be filled out immediately upon harvest. This program was approved by the Atlantic States Marine Fisheries Commission's Striped Bass Management Board and currently uses the State's unused annual commercial quota (23,750 pounds). The quota of 4,025 fish (average weight in the slot = 5.90 pounds) is monitored on a weekly basis through this program. In 2012, the program opened up to all Connecticut waters - see Appendix 2: Declaration of regulation change 13-01. For a full description and results of the 2012 fishery see Appendix 3 (Connecticut bonus striped bass fishing program overview and summary, 2012).

IV. Planned management programs for the current calendar year.

a. Regulations

Striped bass regulations in Connecticut for the recreational fisheries will not change in 2013. The 2013 regulations will consist of a 28" minimum length limit for the recreational fishery, and a daily possession limit of two fish per day for the recreational fishery (see Appendix 1, sections 26-159a-2 and 26-159-4). There is no commercial Striped bass fishery allowed in Connecticut. In 2011, the State began a spring (May 1 to June 30, 2011) striped bass recreational fishery in the Connecticut River under a slot limit (22.0 to 27.9 in.) using the State's unused annual commercial quota (23,750 pounds). The quota of 4,025 fish (average weight in the slot = 5.90 pounds) will be monitored weekly as in past years by a voucher system. For the 2013 season a declaration of regulation change (13-01) was enacted for this provision and passed on March 20 2013 (Appendix 2).

b. Summarize monitoring programs that will be performed.

Same as in 2012.

III. Plan specific requirement.

None

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Crecco, V. A. 1992. Recreational catch and nonharvest losses of striped bass in Connecticut, 1992. Report to the ASMFC, 12p.

Jones, P. W. 1989. Evaluation of Amendment 3 of the ASMFC Interstate Striped Bass Management Plan. Report to the ASMFC, 61p.

Shepherd, G. 1992. Revised estimates of poaching of striped bass from the MRFSS, 1987-1991. (April 20,1992) Report to the ASMFC, 3p.

Gottschall, K, and D Pacileo. 2011. Marine finfish survey (Job 2). In: A study of marine recreational fisheries in Connecticut. Annual progress report (F54R), Ct DEEP/Fisheries Division, Old Lyme, Ct. 131p.

Table 1. Total number of striped bass kept and released, number of targeted fishing trips and average catch per trip (CPUE) for the shore and boat fishery from the 2012 Connecticut Volunteer Angler Survey.

Mode	Fish Kept	Released	Trips	CPUE[1/]
Boat	153	796	463	2.05
Shore	39	588	375	1.67
Total	192	1,384	838	1.88

[1/] CPUE = Total Catch (kept + released fish)/ Trips.

Table 2. Total Connecticut striped bass catch and released numbers, and trips (directed and non-directed), 1981-2012.

Year	Total Catch	SE	Released #	SE	Angler Trips	SE
1981	27,783	11,141	16,637	6,671	1,240,160	126,496
1982	693,268	397,936	643,187	369,189	1,933,243	610,905
1983	42,826	19,400	0	0	1,257,282	150,874
1984	36,854	20,380	31,176	17,240	1,345,365	126,464
1985	42,297	13,535	26,947	8,623	1,546,744	157,768
1986	12,254	6,053	10,494	5,184	1,626,970	133,412
1987	78,957	21,713	78,435	21,570	1,441,079	128,256
1988	28,204	7,559	25,532	6,843	1,249,656	128,715
1989	131,147	23,213	125,370	22,190	1,360,386	134,678
1990	95,572	15,769	89,490	14,766	1,220,135	115,913
1991	306,383	127,149	301,476	125,113	1,673,785	167,379
1992	301,413	58,474	292,259	56,698	1,841,730	191,540
1993	290,571	40,971	271,318	38,256	1,217,634	115,675
1994	506,896	115,065	489,967	111,223	1,108,788	121,967
1995	545,384	158,707	507,123	147,573	1,245,385	146,955
1996	1,114,452	261,896	1,051,612	247,129	1,468,820	149,820
1997	787,346	137,786	722,707	126,474	1,132,237	143,794
1998	1,090,407	236,618	1,026,192	222,684	1,291,536	171,774
1999	759,829	157,285	704,024	145,733	1,318,543	181,959
2000	979,557	161,627	926,366	152,850	1,507,800	147,764
2001	1,161,872	169,633	1,107,707	161,725	1,722,806	146,439
2002	748,036	95,001	696,976	88,516	1,649,678	128,675
2003	939,020	141,792	843,037	127,299	1,563,769	131,357
2004	929,568	261,209	826,724	232,309	1,559,549	177,789
2005	1,902,918	420,545	1,761,628	389,320	1,693,402	159,180
2006	1,101,915	153,166	986,701	137,151	1,488,083	108,630
2007	1,103,186	239,391	984,637	213,666	1,718,601	120,302
2008	3,212,946	751,829	3,104,780	726,519	1,975,111	136,283
2009	1,222,154	349,536	1,161,278	332,126	1,419,066	126,297
2010	763,340	147,325	670,534	129,413	1,525,904	155,642
2011	675,655	234,452	612,367	212,491	1,308,651	147,878
2012	329,500	57,992	264,927	46,627	1,326,243	147,213

Table 3. Estimates of total catch and harvest of striped bass in the 2012 Connecticut recreational fishery

Parameter	Estimate	SE	CV	Source
Total catch (numbers)	329,500	57,992	17.6	MRIP
Harvest (numbers)	64,573	16,079	24.9	MRIP
Harvest (pounds)	843,443	216,765	25.7	MRIP
Released (numbers)	264,927	46,627	17.6	MRIP

Table 4. Estimated Connecticut striped bass recreational harvest in numbers and weight (lbs) and the corresponding standard errors (SE) based on MRIP from 1981 to 2012.

Year	Harvest #	SE	Harvest lbs.	SE
1981	11,146	3,901	34,795	13,187
1982	50,081	23,538	110,964	51,043
1983	42,826	19,400	310,798	150,737
1984	5,678	2,981	91,704	61,167
1985	15,350	10,852	41,143	27,319
1986	1,760	848	21,536	14,666
1987	522	315	13,306	10,419
1988	2,672	1,331	47,535	19,299
1989	5,777	2,403	100,688	46,115
1990	6,082	2,062	193,010	66,202
1991	4,907	1,919	125,310	52,380
1992	9,154	2,838	196,278	65,361
1993	19,253	3,735	400,067	75,213
1994	16,929	4,757	355,829	101,767
1995	38,261	8,724	671,647	166,568
1996	62,840	11,814	915,417	179,422
1997	64,639	11,958	920,466	175,809
1998	64,215	13,357	989,922	212,833
1999	55,805	15,123	824,030	226,608
2000	53,191	8,511	515,963	91,841
2001	54,165	7,854	628,044	110,536
2002	51,060	8,833	600,483	121,298
2003	95,983	11,614	1,251,538	175,215
2004	102,844	21,700	1,617,561	357,481
2005	141,290	41,822	2,173,638	643,397
2006	115,214	29,840	2,030,878	536,152
2007	118,549	26,674	1,468,499	365,656
2008	108,166	17,739	1,868,335	298,934
2009	60,876	9,071	835,970	142,115
2010	92,806	23,666	1,259,008	415,473
2011	63,288	14,366	758,216	173,631
2012	64,573	16,079	843,443	216,765

Table 5. Estimates of striped bass harvest and nonharvest losses from the recreational fishery in 2012. The total harvest and average weight of the harvest are from the MRIP.

Recreation	Number	Weight (lbs.)	Mean Weight
Total harvest	64,573	843,443	13.1
Hook-release	23,843	90,160	3.8
Poaching	3,444	13,023	3.8
Total recreational nonharvest losses	27,287	103,183	3.8

1/ hook-release = striped bass released * 0.09.

2/ poaching = released fish * 0.013.

3/ average weight of the recreational discards was estimated by applying the average lengths from released stripers in the Volunteer Angler Survey into a length-weight regression for Chesapeake stripers (Jones 1989).

Table 6. Striped bass relative abundance indices (geometric mean catch/tow) in number and biomass (kgs.) based on the Connecticut Long Island Sound Trawl Survey during spring (April-June), 1984-2012.

Year	# Tows	Mean #	SE #	Mean Biomass (lbs.)	SE Biomass
1984	32	0.022	0.022		
1985	46	0.000	0.000		
1986	116	0.000	0.000		
1987	120	0.053	0.017		
1988	120	0.036	0.016		
1989	120	0.063	0.019		
1990	120	0.162	0.043		
1991	120	0.146	0.036		
1992	80	0.220	0.057	0.473	0.120
1993	120	0.273	0.050	0.652	0.120
1994	120	0.296	0.052	0.699	0.119
1995	120	0.594	0.083	0.807	0.117
1996	120	0.635	0.092	1.206	0.169
1997	120	0.855	0.106	1.841	0.209
1998	120	0.972	0.123	1.882	0.215
1999	120	1.105	0.123	3.090	0.304
2000	120	0.840	0.103	1.808	0.217
2001	120	0.607	0.092	1.431	0.199
2002	120	1.304	0.130	3.562	0.323
2003	120	0.871	0.099	2.232	0.251
2004	119	0.556	0.077	1.351	0.186
2005	120	1.172	0.140	2.445	0.268
2006	80	0.612	0.098	2.017	0.291
2007	120	1.020	0.119	2.205	0.248
2008	120	0.568	0.082	1.339	0.184
2009	120	0.598	0.106	1.395	0.208
2010	78	0.397	0.087	0.979	0.202
2011	92	0.476	0.099	1.373	0.254
2012	120	0.433	0.072	0.891	0.143

Figure 1. Estimated Connecticut striped bass recreational Catch and harvest in numbers based on MRIP from 1981 to 2012.

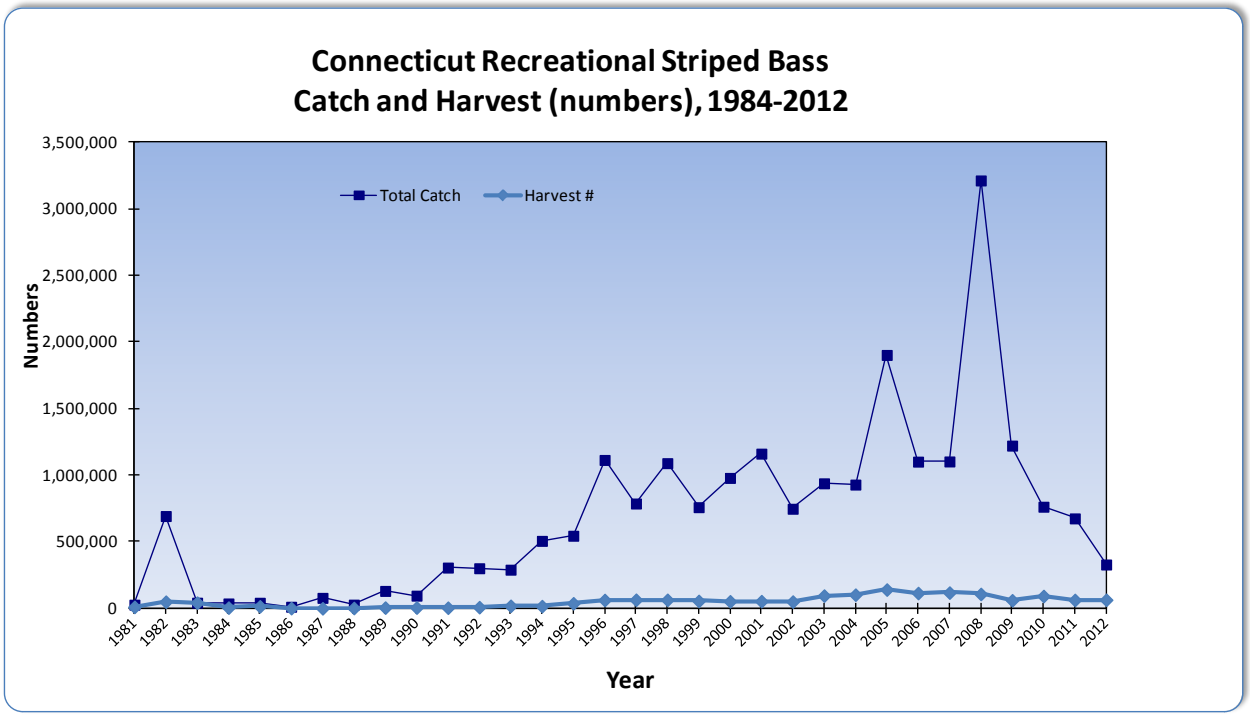


Figure 2. Estimated Connecticut striped bass recreational harvest in numbers and weight (lbs) based on MRIP from 1981 to 2012.

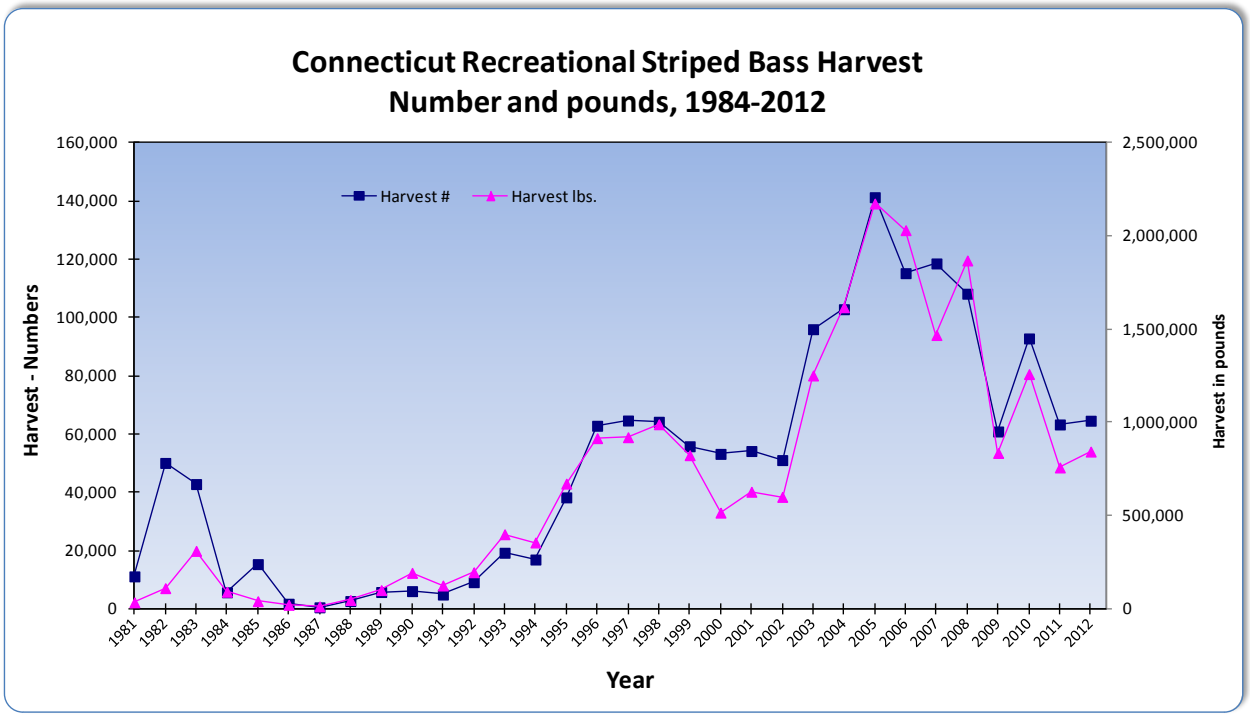
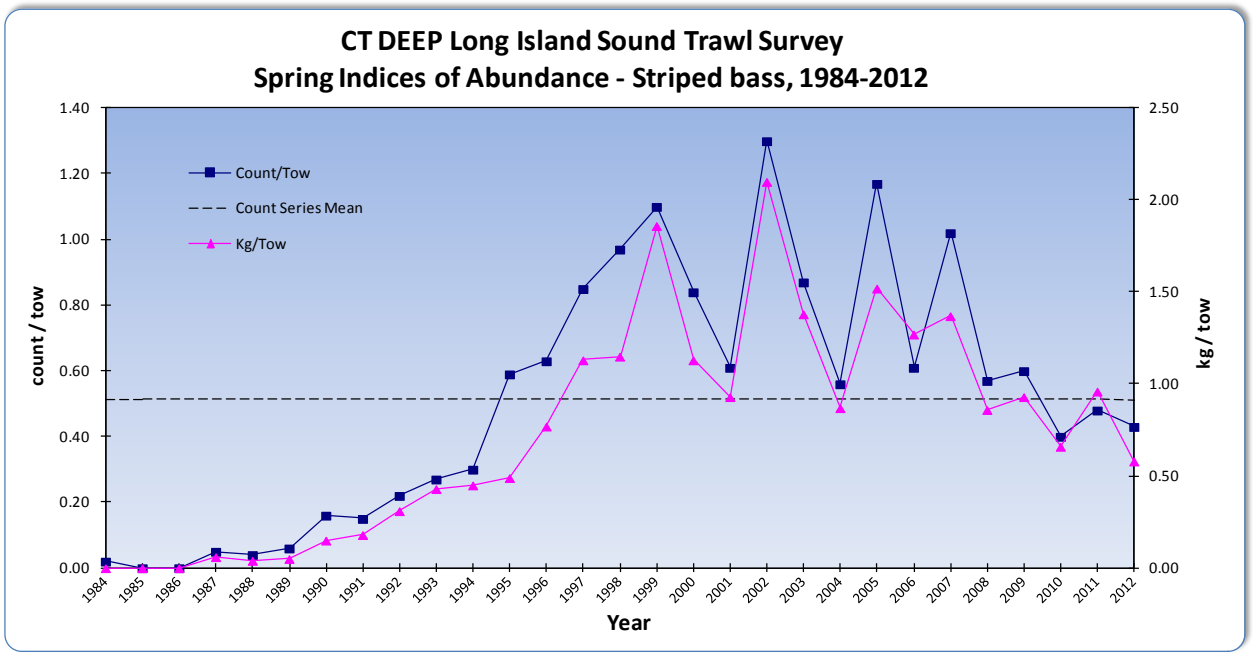


Figure 3. Striped bass relative abundance indices (geometric mean catch/tow) in number and biomass (kgs.) based on the Connecticut Long Island Sound Trawl Survey during spring (April-June), 1984-2012.



Appendix 1. Connecticut fishing regulations for striped bass.

26-159a-2. Striped bass (Morone saxatilis)

(a) (a) The minimum legal length and daily creel limit for striped bass shall be as specified in sections 26-159a-4 and 26-159a-7, respectively, of the Regulations of Connecticut State Agencies.

(b) (b) No person shall sell, exchange, or offer for sale or exchange any striped bass taken from the waters of this state. Striped bass taken from the waters of a state in which commercial striped bass fishing is allowed may only be possessed for commercial purposes in Connecticut provided they meet the minimum length specified in section 26-159a-4 of the Regulations of Connecticut State Agencies and each fish is affixed with that state's valid, current commercial striped bass tag.

(c) (c) No person shall possess, sell, exchange, or offer for sale or exchange any striped bass, regardless where taken, less than the minimum length, except that artificially reared hybrid striped bass (one parent Morone saxatilis) which are less than the minimum length, may be possessed and sold under the following conditions:

(1) (1) such fish, when offered for sale, shall be accompanied by documentation showing that such fish were propagated in a licensed commercial fish hatchery; and

(2) (2) such documentation shall include the name and address of the owner of the hatchery of origin, the number and description of fish received in the current shipment, and the shipping date and date of receipt of the current shipment.

(d) (d) Striped bass shall not be taken except by angling and the use of a gaff in the taking of striped bass is prohibited.

(e) (e) Any striped bass taken contrary to the provisions of this section shall, without avoidable injury, be returned immediately to the waters from which taken, provided that notwithstanding the provisions of sections 26-159a-4 and 26-159a-7 of the Regulations of Connecticut State Agencies, anglers participating in a tagging program approved by the Commissioner of Environmental Protection may apply tags to and release striped bass sixteen inches or greater in total length.

(f) (f) The provisions of this section shall not be construed to restrict the number of legally acquired fish that may be kept in storage in the home or other storage facilities.

(g) (g) No person shall land or possess on the waters of this state or on any parcel of land, structure, or portion of a roadway abutting tidal waters of this state any striped bass from which the head or tail has been removed or which has otherwise been rendered unidentifiable as a striped bass or unable to be measured.

Effective July 26, 1996. Amended; 05/9/2000 by emergency regulation to implement slot limit for private recreational anglers and modified two fish possession limit for anglers on P/C vessels; expired 01/04/2001, rule reverted to 2 @ 28" until final regulation adopted. Final regulation adopted 02/27/2001. Amended 12/272006 reduced dealer tagging requirements, authorized tagging programs.

26-159a-4. Minimum lengths

(h) (a) No person, while on the waters of this state or on any parcel of land, structure, or portion of a roadway abutting tidal waters of this state shall possess or land any fish of the following species taken by sport fishing methods, regardless of where taken, if it is less than the identified length as measured from the tip of the snout to the end of the tail:

(3) (13) Striped bass (Morone saxatilis): 28 inches.

(i) (b) Any of said species taken contrary to subsection (a) of this section shall, without avoidable injury, be returned immediately to the water from which taken. Culling or high-grading, as defined in section 26-142a-16 of the Regulations of Connecticut State Agencies, is prohibited, except in fishing tournaments granted an exemption by the Commissioner of Environmental Protection pursuant to section 26-159a-26 of the Regulations of Connecticut State Agencies. This subsection shall not be construed to prevent tagging and release of fish, other than striped bass, under a tagging program consistent with the Atlantic States Marine Fisheries Commission's standards for scientific tagging programs.

Appendix 2. Connecticut bonus striped bass fishing program regulation change, 2013.

www.ct.gov/deep

Declaration of Regulation Change (13-01)

Under authority of Section 26-25 of the Connecticut General Statutes the commissioner may, when he finds that the harvest level for a species exceeds or fails to meet the harvest level for efficient management of such species, declare a closed season or extend the open season for the sport fishing of such species. In addition, under the authority of 26-159a of the Connecticut General Statutes and Section 26-159a-22 of the Regulations of Connecticut State Agencies, the Commissioner of Energy and Environmental Protection is authorized to establish or adjust, by declaration, closed seasons, length limits, creel limits, trip limits and trip limit adjustment values in order to comply with interstate fishery management plans adopted by the Atlantic States Marine Fisheries Commission or the U.S. Department of Commerce.

Under the authority of RCSA Sec. 26-159a-22 the sport fishing minimum length and creel (possession) limits are modified as follows:

RECREATIONAL FISHERY MEASURES FOR 2013
26-159a-2. Striped bass (Morone saxatilis)
(h) Bonus Striper Fishing Program. Between May 1 and June 30, inclusive, striped bass at least 22 inches but less than 28 inches total length may be possessed provided the angler:

(1) has in their possession a 2013 Bonus Striped Bass Voucher issued by the department for each such fish possessed;
(2) immediately upon retention of such fish, permanently records on the voucher in ink, the date of capture and length of fish harvested;
(3) retains the voucher with the fish until such fish is taken to the home or other location where the fish is to be consumed;
(4) takes not more than two such fish per day regardless of the number of vouchers the angler may possess.

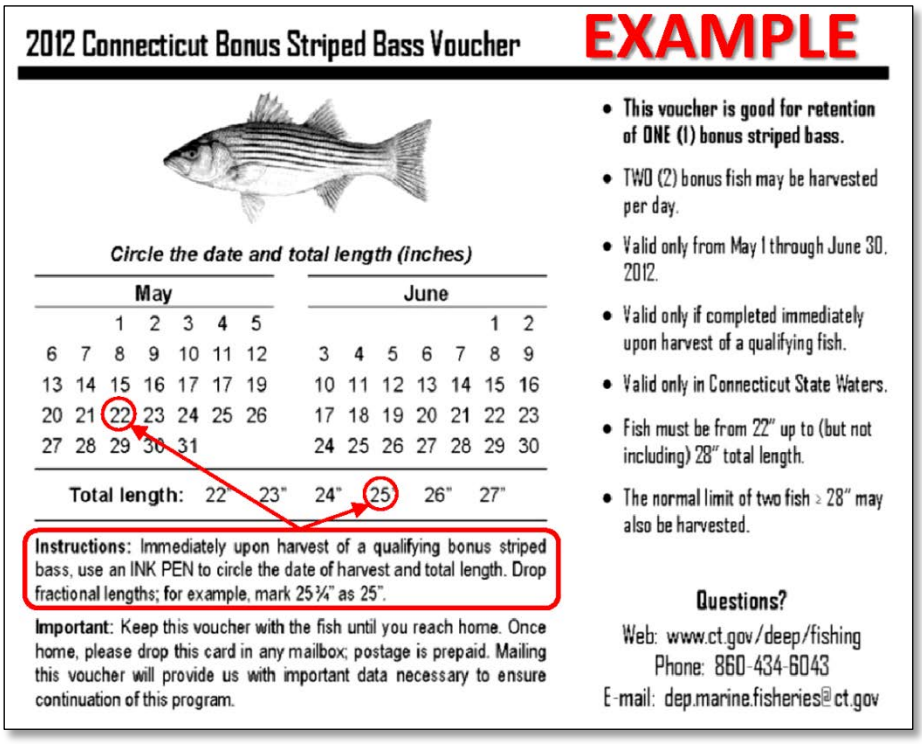
(i) Nothing in this Declaration shall be construed to prevent an angler participating in the Bonus Striper Fishing Program from also possessing up to two striped bass, 28 inches or larger in total length as provided in Section 26-159a-4 (Minimum Lengths) and in Section 26-159a-7 (Creel Limits).

Appendix 3. Connecticut bonus striped bass fishing program overview and summary, 2012.

2012 BONUS STRIPED BASS FISHING PROGRAM

Updated Monday, May 07, 2012

Program Background. The Bonus fishery is an opportunity to harvest a limited number of smaller (22 < 28 inch) striped bass during May and June 2012 in state waters, both in the Marine and Inland Districts of ***Connecticut state waters only***. The Bonus fishery was approved by the Atlantic States Marine Fisheries Commission's Striped Bass Management Board which oversees the conservation of the species throughout its range. Amendment 6 to the Striped Bass Fishery Management plan currently allocates a 23,750 pound commercial striped bass quota to Connecticut which is being used in this program to provide this additional recreational fishing opportunity since commercial striped bass harvest is prohibited in this state. The unused commercial quota equates to 4,025 fish available for harvest under this program.



Program Objectives / Ways to Use the Voucher

While striped bass vouchers may be used by any angler throughout state waters, we are especially encouraging their use in our major rivers where striped bass in the bonus slot size can be major predators on blueback herring (state listed as a Species of Special Concern in July 2010) and alewife. Both of those forage species have been under statewide closure since 2002 due to stock concerns. Anglers are also encouraged to use this program to introduce a friend, neighbor or child to fishing: "Share the Experience – *Take Someone Fishing*". The department is also interested in encouraging and enhancing urban and shore fishing opportunity which the bonus striper program is especially well suited for. Bass fishermen generally may want to hold onto a voucher to use if an undersized fish intended for release is deep hooked or otherwise unlikely to survive. Alternatively, anglers should consider taking a smaller bonus fish home for a meal and releasing the larger (28"+) "spawner" fish.

Program Regulations

- One voucher is good for one (1) bonus striped bass.
- A bonus striper is at least 22 inches but less than 28 inches.
- Two (2) bonus fish may be harvested per day, provided you have a voucher for each fish.
- Open Season: May 1 through June 30, 2012 only.
- **Important:** To be valid, ***the Voucher card must be filled out immediately upon harvest of a qualifying striped bass***. See the illustration above. Failure to complete the voucher immediately disqualifies the fish from the 28 inch minimum size exception under this program.
- Vouchers must be retained with the striped bass until the fish is taken to your home or other location where it is to be consumed.

- Mail the voucher back to Marine Fisheries. The voucher is already addressed and postage paid for return on the reverse side. It's free, so please mail it back to assure continuation of this program.
- Vouchers are valid in Connecticut state waters only.
- The normal limit of two (2) striped bass 28 inches or greater may also be harvested.

For current Connecticut Recreational Fishing Regulations
Anglers should consult the new 2012 Connecticut Anglers Guide which is now available at Town Clerks Offices, many DEEP offices and at tackle stores selling fishing licenses. Anglers can purchase their fishing licenses online or at participating town halls, DEEP field offices and fishing tackle vendors. Additional information on the Connecticut River Bonus Striped Bass Program, the 2012 Angler's Guide and the online licensing system can all be accessed on the DEEP website at: www.ct.gov/deep/fishing.

Voucher Distribution
A total of 4,025 vouchers have been made available at a dozen agency-owned facilities across the state including: DEEP Offices, selected state parks and Environmental Centers listed below. Approximately two dozen participating Sportsmen License Agents are offering a limited quantity of vouchers (40 each). **There is no fee for the vouchers**. A limit of two vouchers per day will be issued to each angler appearing in person. Anglers 16 years or older must have a valid fishing license to receive vouchers. Anglers under age 16 appearing in person will also receive two vouchers. Vouchers will also be distributed by the DEEP's Environmental Conservation (ENCON) Police during routine patrols, through Riverfront Recapture Rangers (Great River Park in East Hartford and Riverside Park and Charter Oak Landing in Hartford), via the Connecticut Aquatic Resources Education (CARE) program and Marine Fisheries Creel Agents. Distribution began April 10, 2012 and will continue into May and June or as long as supplies last.

CT DEEP state offices and parks where Striped Bass Bonus Fishery vouchers are being made available. ***A status of "Out" indicates that that particular DEEP office is out of vouchers.***

Status	Location	Hours
Out	Marine Headquarters (Old Lyme)	M-F 8:00 am-4:00 pm
Out	Eastern Area Headquarters (Marlborough)	M-F 8:30 am-4:00 pm
Out	Western Area Headquarters (Harwinton)	M-F 8:30 am-4:00 pm
Out	Franklin Wildlife Management Area (Franklin)	M-F 8:30 am-4:30 pm
Out	Session Woods Wildlife Mgmt Area (Burlington)	M-F 8:30 am-4:00 pm
Out	Dinosaur State Park Exhibit Center	Tues.-Sun. 9 am-4:30 pm
Out	Kellogg Environmental Center	Tues.-Sat. 9 am-4:30 pm
Out	Rocky Neck State Park*	8:00 am to sunset
Out	Hammonasett Beach State Park*	8:00 am to sunset
Out	Harkness Memorial State Park*	8:00 am to sunset
Out	Sherwood Island State Park*	8:00 am to sunset
DEEP Main Office, 79 Elm St, Hartford		
Out	License & Revenue	M-F 9:00 am-4:00 pm
Out	DEEP Store	M-F 9:00 am-3:30 pm

*Please see coastal state parks links for off-season hours of operation.

Participating License Agents where Striped Bass Bonus Fishery vouchers have been made available. ***Note: these agents were provided with only 40 vouchers each. DEEP is not tracking what they have on hand, so please check with them directly for availability.***

License Agent	Mailing Address	Town	State	Zip
AW Marina Bait & Tackle	178 Pequot Ave	New London	CT	06320
Bobby J's Bait & Tackle	354 New Haven Ave	Milford	CT	06460
Cabela's	475 East Hartford Blvd, N.	East Hartford	CT	06118
Captain Morgan Bait & Tackle	5 Old Post Road	Madison	CT	06443
CT Outfitters	512 Silas Deane Highway	Wethersfield	CT	06109
Dee's Bait & Tackle	93 Clay St	New Haven	CT	06513
Dick's Sporting Goods	110 Albany Tpke	Canton	CT	06019
Fisherman's Paradise Bait & Tackle	195 S. Montowese St	Branford	CT	06405
Fishin Factory III	238 East Main St	Middletown	CT	06457
Hillyers Bait & Tackle	374 Rope Ferry Rd	Waterford	CT	06385
Master Bait & Tackle	439 Main St	East Haven	CT	06512
Northwest Sporting Goods	178 Rowley St	Winsted	CT	06098
Pete's Place	124 Jefferson St	Stamford	CT	06902
Stratford Bait & Tackle	1076 1/2 Stratford Ave	Stratford	CT	06615
Ted's Bait & Tackle	35 Ferry Place	Old Saybrook	CT	06475
WeTU Bait & Tackle	617 Lantern Hill Rd	North Stonington	CT	06443
Yankee Bait & Tackle	88 Main St	Enfield	CT	06082

Town Hall Agents	Mailing Address	Town	State	Zip
Coventry Town Hall	1712 Main St	Coventry	CT	06238
Deep River Town Hall	174 Main St	Deep River	CT	06417
East Granby Town Hall	PO Box 1858	East Granby	CT	06026
Glastonbury Town Hall	PO Box 6523	Glastonbury	CT	06033-6523
Groton Town Hall	45 Fort Hill Rd	Groton	CT	06340
Meriden City Hall	142 East Main St	Meriden	CT	06450
New Fairfield Town Hall	4 Brush Hill Rd	New Fairfield	CT	06812
Norwich City Clerk’s Office	100 Broadway, Rm 215	Norwich	CT	06360
Southington Town Hall	PO Box 152	Southington	CT	06489
Watertown Town Hall	37 DeForest St	Watertown	CT	06795
Willington Town Office Building	40 Old Farms Rd	Willington	CT	06279

Program Results

The 2012 Connecticut bonus striped bass fishing program cataloged almost three times as many returns over the initial program start year in 2011. In 2012, there were 4,000 striped bass vouchers distributed and 220 returns received during the two month timeframe (Table 1). Connecticut DEEP Offices distributed the most vouchers (1,080 vouchers), followed by tackle shops (720 vouchers) and Connecticut environmental conservation officers distributing vouchers "on-site" (480 vouchers). Vouchers were also distributed through town halls (400 vouchers), Riverfront recapture on the Connecticut River (400 vouchers), and state parks and beaches (480 vouchers). The remaining 440 vouchers were distributed through State personnel with the Marine Angler Survey, fishing education classes, and fishing shows.

During the first year of the program there were 34 "protest" vouchers filled out and sent in from people not agreeing to the concept of using Connecticut's commercial allocation, however no vouchers were sent in during the 2012 program with that designation. During both 2011 and 2012 there were four other vouchers sent back with either "no-fish taken" or they just didn't use the voucher. Overall, distributions made by the Marine Angler Survey personnel had the highest rate of return with 11.0%, followed closely by interpretive facilities at state parks (9.3%) and State Parks with beaches and fishing access points (8.3%). On average there was a 5.7% return rate in 2012. The total fish reported in this program account for only 0.015% of the entire Atlantic coast harvest and 0.341% of Connecticut's harvest in 2012.

Table 7. Voucher distribution and returns, 2012.

Site Type	Vouchers	Returns	Return Rate
Marine Angler Survey	200	22	11.0%
Parks / Interpretive Facilities	300	28	9.3%
Parks / State Beaches	180	15	8.3%
DEEP OFFICES	1,080	78	7.2%
Bait&Tackle	720	51	7.1%
Fishing Education	60	4	6.7%
Fishing Show	180	7	3.9%
Riverfront Recapture	400	7	1.8%
Town Hall	400	5	1.3%
ENCON	480	3	0.6%
	4,000	220	5.7%

Participants are allowed to harvest two bonus stripers per day (one fish per voucher) between May 1 and June 30th, and striped bass must be within a slot limit between 22 inches and less than 28". Fish sizes reported on 2012 vouchers were between the length of 22" and 29" with the mean of 24.81 inches (SE = 0.11). Of the 220 fish reported in 2012, two fish were reported above the 28" slot (2 @ 29") and no 28" fish were cataloged (Figure 1). Length - weight parameters were calculated from information provided by the New York DEC 2012 Ocean Haul Survey and applied to fish at length reported from this program to get an estimate of total pounds harvested under this program. Additionally, age keys were developed and applied to reported harvest from the bonus fishery to calculate a catch-at-age. A total harvest weight of 1,062 lbs was calculated from the fish reported with an average weight of 4.83 lbs per fish. The majority of the fish reported were age 4 (59.4%) and accounted for 591.11 lbs (55.66%) of the total. Only 7.21% of the fish were above age 6 and 5.23% were less than 4 years old (Table 2).

During the start of the 2012 program, reports of catch increased up to ten fish per day up to the fifth day and then varied without trend from zero to nine fish up until the last few days of the program when catches peaked at 16 fish on June 29 (Figure 2). This differed from 2011 where two peaks were observed in mid-May (14-16th) and the end of May (26-27).

Table 2. Connecticut Bonus Striped Bass Fishing Program catch and weight at age of harvested fish, 2012

	Age								
	0	1	2	3	4	5	6	7	8
Total # at age	0	0	0	11.51	130.71	27.03	34.87	12.31	3.56
Total wt @ age	0	0	0	41.50	591.11	134.59	202.83	72.46	19.48
Avg. wt @ age	0	0	0	3.60	4.52	4.98	5.82	5.89	5.47
Avg. len @ age inches (TL)	0	0	0	22.83	24.35	25.07	26.31	26.41	25.82

Figure 1. Connecticut Bonus Striped Bass Fishing Program length frequency of harvested fish, 2012.

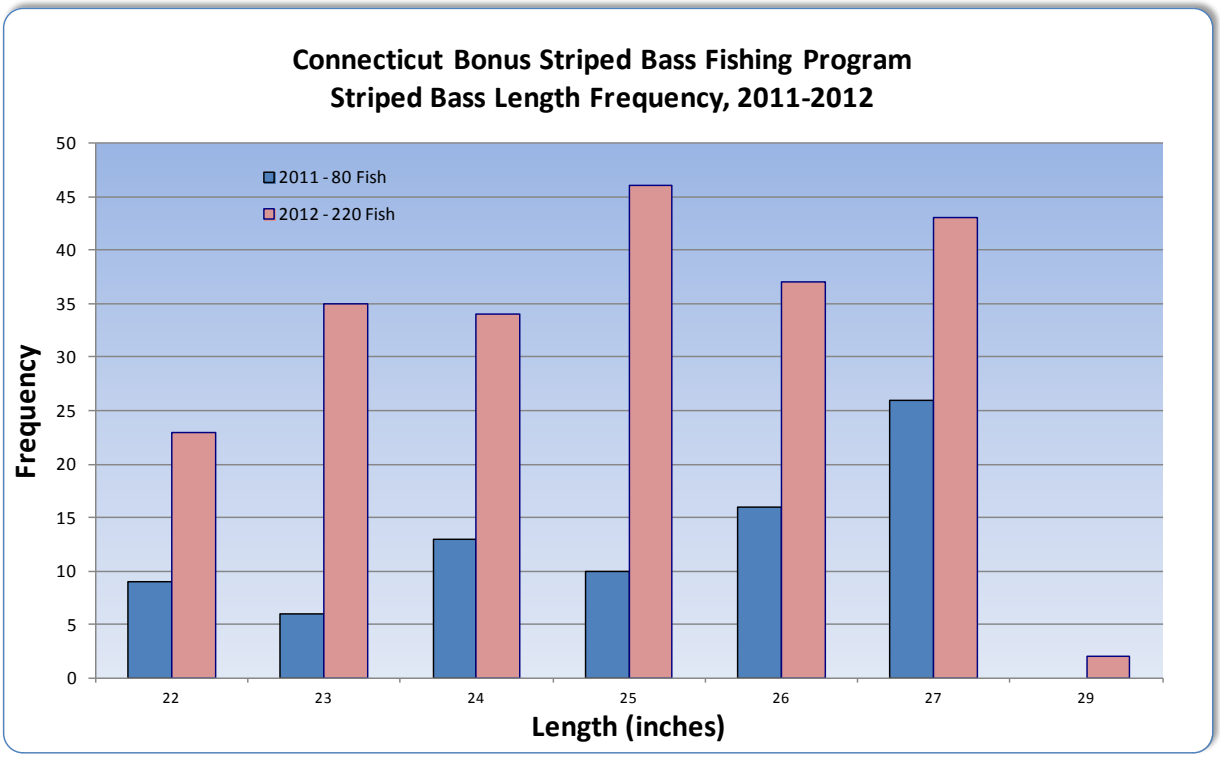
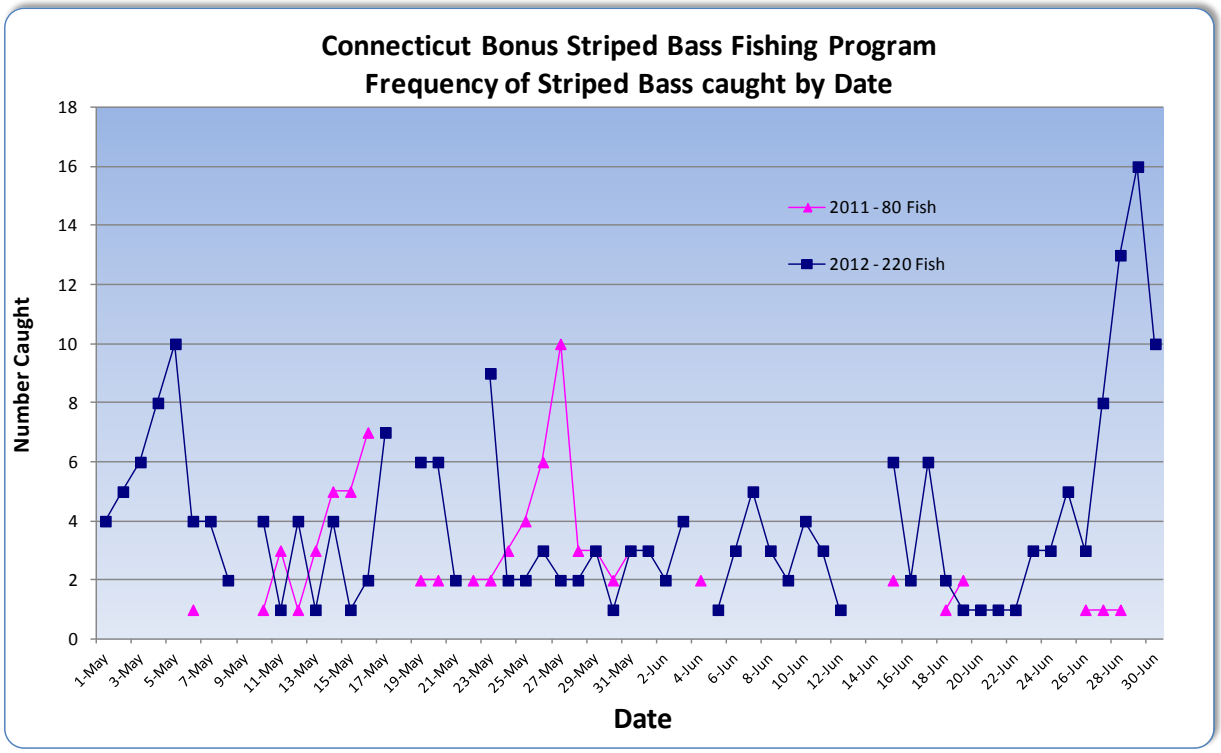


Figure 2. Connecticut Bonus Striped Bass Fishing Program catch per day for the two month period (May 1 – June 30), 2012.



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2013 New York State Compliance Report to the Atlantic States Marine Fisheries Commission on the Harvest, By-Catch, and Fishery Independent Surveys for Atlantic Striped Bass

Prepared by:

The Diadromous Fisheries Investigation and Management Unit, and The Hudson River Fisheries Unit

I. Harvest and Losses:

A. Commercial Fishery:

a. Coastal Regulations:

1. Characterization of Fishery (Season, Cap, Gears, and Regulations):

Permit: Required.

Size Limit: 24 inches to 36 inches total length.

Harvest Cap: 828,293 pounds.

Gear Restrictions: Gears allowed include gill nets (6 to 8 inch stretched mesh), pound nets, and Hook and Line. Gillnets with mesh <6 or >8 inches stretched mesh, are allowed a 7 fish by-catch trip limit per vessel; trawl vessels are allowed a 21 fish trip limit per vessel. No gill nets are allowed Great South Bay, South Oyster Bay, or Hempstead Bay.

Open Season: July 1 to December 15.
Season will close if projected harvest cap is exceeded.

b. Hudson River Regulations:

Commercial sale of striped bass has been banned in the Hudson River since 1976 due to PCB contamination.

2. Characterization of Directed Harvest:

a. Landings and Method of Estimation:

1. Method of Estimation:

Fishermen are required by regulation to tag each striped bass harvested, and to file trip reports of tag use. Landings data are obtained directly from the trip reports (Tables 1 and 2). A commercial fishery monitoring program was conducted in 2012 during which 353 striped bass were sampled at packing houses, wholesale and retail markets, and in the field.

Based on the weekly report data, New York's harvest was 681,399 pounds, which was 120,456 pounds less than the allowable quota. Fishing was greatly curtailed after the occurrence of Super Storm Sandy in late October.

b. Catch Composition:

The size and age distribution of the 2012 commercial harvest was determined through the commercial monitoring program. Scales were collected for age determination. The age and size frequencies are reported in Tables 3 and 5.

i. Age Frequency:

Table 3 provides the age frequency of the commercial harvest estimated from the commercial monitoring samples. Ages ranged from 3 to 12 years. The majority of the harvest (93%) was among fish ages 5 through 9, comprising the 2003 through 2007 year classes.

Weight at age for the commercial harvest was developed from the 2012 commercial monitoring data. The number of fish by age in the harvest (Table 3) were multiplied by the average weight at age, to estimate the weight of the 2012 commercial harvest (Table 4). Any differences in the total harvest weight as estimated using these methods versus the reported harvest weight are probably due to slight variations due to method, sampling error, and rounding.

ii. Length Frequency:

Striped bass sampled from the 2012 commercial harvest ranged from 24 to 37 inches total length (TL) (Table 5). The most prevalent among the samples were fish in the 25 to 33 inch range which accounted for 87% of the harvest. For comparison to the commercial harvest length frequency, Table 6 provides length frequency information from the commercial monitoring samples versus samples collected from the American Littoral Society's (ALS) Tagging Program. The ALS samples are from New York's marine waters, and were collected from recreational anglers.

iii. Weight at Length, and Weight at Age:

Weight, length, and age information by year is needed to develop catch at age matrices of striped bass mortalities for the models. Weight at length, and weight at age equations from 1987 to 2006 from the N.Y. Ocean Haul Seine (OHS) Survey, and from the 2007 – 2011 Ocean Trawl surveys, are presented in Tables 7 (7a) and 8 (8a). (NY did a limited Ocean Trawl Survey in 2008, and was unable to obtain striped bass weight data). No trawl survey was conducted in 2012.

iv. Sex Composition

No sex composition information is available.

c. Estimation of Effort:

Participation in New York's commercial striped bass fishery for 2012 was limited to fishers who held striped bass permits in any year between 1984 through 1995. In 2012, 473 fishermen participated in the striped bass commercial fishery. Table 9 provides a summary of their catch per unit of effort, by participant, by trip, by gear.

3. Characterization of Losses (Poaching, Bycatch, etc.):

a. Open Season Bycatch Mortality Estimates and Method of Estimation:

I. Marine District Gill Net Fishery:

1. Open Season Bycatch Mortality Estimates:

Based upon the weekly reports from the striped bass commercial gill net fishers, a direct estimate of bycatch losses was made. The reported bycatch of striped bass was 268 fish. Using the bycatch mortality figure reported by Seagraves and Miller (1989) of 0.47, the estimate of bycatch loss during the open season is 126 striped bass. The estimated weight lost is derived by using a mean weight of 3.2 pounds/fish (Young, 1990). The estimated weight of the bycatch loss is 403 pounds.

ii. Hudson River Bycatch in Shad and Bait Gill Nets:

In the past, the commercial gill net fishery in The Hudson River estuary occurred in the spring and exploited spawning stocks of American Shad. Striped bass were taken as a bycatch in this fishery, but could not be sold, due to PCB contamination. Fish were caught by drifted and fixed gears. As of 2010, both commercial and recreational shad fishing is no longer permitted, either in Hudson River or in Marine Waters.

In order to continue to monitor striped bass bycatch in the Hudson River, we will now be compiling information on the reported number of striped bass taken in the bait (primarily river herring) gill net fishery (Table 10).

iii. Marine District Pound Net Fishery:

1. Open Season Bycatch Mortality Estimates:

Based upon the weekly reports from the pound nets a direct estimate of bycatch was made. The reported by-catch was 0 striped bass. There are no reliable estimates of bycatch mortality from pound nets, although it is assumed to be low. In past annual reports to ASMFC a 5% bycatch mortality rate was used (Young,1990). Therefore, for consistency, the 5% bycatch mortality for pound nets will be used again. The estimated bycatch loss from pound nets is 0 fish. The mean weight of these fish is estimated at 2.0 pounds (Young, 1990). The estimated weight of bycatch loss in pound nets is 0 pounds.

iv. Hook and Line Fishery (Coastal);

1. Open Season Bycatch Mortality Estimates:

A direct estimate of the commercial hook and line bycatch is taken from the weekly reports filed during the open season. Commercial hook and line striped bass fishermen reported a by-catch of 1,693 striped bass. In past reports we have used an 8% hook and release mortality rate for the commercial hook and line fishery. We believe that 8% is too low due to changes in the nature of the commercial hook and line fishery for striped bass. Anecdotal reports suggest that many of the commercial hook and line fishers are fishing with bait. Diodati (1991) estimated a 13% hook and release mortality rate due to single hooks (range from 9.6 to 29.4 % depending on hooking site) as compared to 2.8% for treble hooks (the weighted average was 7.9%). Therefore, a mortality rate of 13% will be applied to discards from the commercial hook and line fishery. The estimated loss of striped bass from the hook and line commercial fishery during the open season is 220 fish, which converts to 1,100 lbs, using an average weight of 5.0 lbs/fish (Young, 1990).

v. Hook and Line Bycatch Losses (Hudson River):

No commercial season. All estimates of bycatch are attributed to the recreational fishery.

vi. Marine District Trawl Fishery:

1. Open Season Bycatch Mortality:

Based upon the weekly reports from trawl gear a direct estimate of bycatch mortality was made. The reported bycatch was 142 striped bass. Using an estimated bycatch mortality of 0.35 (Crecco, 1990) the estimated by-catch mortality is 50 striped bass. Using an average weight of 3.2 pounds/fish (Young, 1990), the bycatch mortality in weight was 160 pounds.

b. Closed Season Bycatch Mortality Estimates:

No information was collected which could be used to reliably estimate the discard losses during the closed season for striped bass. In past reports, a variety of methods were employed to estimate these losses. Since the nature of the fishery for striped bass has changed over time, it is thought that these methods are no longer valid for estimating discard losses in any of New York's commercial fisheries. Other information, unavailable at this time, including direct measurements obtained from observer data collected over broad geographic and temporal scales, will be necessary to produce reliable estimates of discard losses in these fisheries. Collection of these data will require significant funding from Federal and State agencies, as well as cooperation from the regulated industries.

c. Estimated Catch Composition (length/age) of by-catch:

Table 6 presents ALS data which were collected during the open commercial season in the open area. These data display the length distribution of the total catch, including fish outside the commercial slot limit, which would be subject to discard mortality.

B. Recreational Fishery:

1. Characterization of the Fishery (seasons, cap, gears, regulations).

a. Marine District Regulations:

I. Licensed Party/Charter Boat anglers:

Minimum Length 28 “, possession limit 2 fish.

II. All other Anglers:

Minimum Length 28" - 40", possession limit 1 fish,
and
>40" - possession limit: 1 fish.

Open Season: April 15 to December 15.

Fish may be taken by angling or spearing only.

b. Hudson River Regulations:

Minimum Length: 18" total length.

Possession Limit: 1 fish.

Open Season: March 16 to November 30.

c. Delaware River Regulations:

Minimum Length: 28" total length.

Possession Limit: 2 fish.

Open Season: all year.

2. Characterization of Directed Harvest:

Marine District:

a. Landings and Method of Estimation:

NOAA provides estimates of striped bass recreational harvest in New York's coastal waters. MRIP estimates for 2012 indicate that 302,140 striped bass were harvested in New York during 2012 with a proportional standard error (PSE) of 17.6 (NOAA/NMFS website). The MRIP estimated total weight of the 2012 harvest was 4,393,816 pounds (PSE = 16.7), resulting in an average weight per harvested fish of 14.5 pounds. Fishing was greatly curtailed after the occurrence of Super Storm Sandy in late October.

b. Catch Composition:

ii. Length Frequency

Length data provided by New York recreational anglers was available from the American Littoral Society (ALS) tag releases for 2012. Table 11A presents the length frequency by period (Jan-June; July-Dec) from ALS tag releases in New York for 2012. Length measurements were converted from fork length (FL) to total length (TL) using the equation TL(inches) = (FL(inches)* 1.07)+ 0.03)(Western Long Island striped bass data). Due to the conversion and use of inch increments, two increments ("bins") were empty (30" and 45"). The missing bins were estimated by averaging the values in bins before and after missing values. The percentages were then rescaled back to 100% (Table 11B). Table 12 provides the adjusted length frequency.

An estimate of the 2012 recreational harvest by length is presented in Table 13. Harvest numbers were multiplied by the relative frequency of fish (derived from total length conversion of MRIP fork length data) to estimate the number of fish harvested by length.

I. Age Frequency:

New York conducts a Cooperative Anglers program which collects scale samples from recreational anglers. Cooperative Anglers program samples, accompanied by age samples collected from the Western Long Island survey were used to develop age-length keys for 2012 (Table 14). The age/length keys were used to estimate recreational harvest by age, as presented in Table 15. To determine harvested weight at age, average weight at age was fitted with the Ln-transformed regression equation using data from 2012 MRIP, and re-scaled to the MRIP harvest estimates. Weight estimates by age are presented in Table 15A.

c. Estimation of Effort:

The MRIP effort time series indicates that there were a total of 3,609,406 angler trips conducted in 2012. This represents a 13.4% decrease from the number of total angler trips taken in 2011. 960,597 (27%) of the 2012 trips were directed for striped bass, compared to 1,211,236 (29%) of the 2011 trips.

3. Characterization of Losses (Poaching, Hook and Release, etc.)

a. Estimate and Method of Calculation:

The MRIP provide the estimates of striped bass catch (A+B1+B2); harvest (A+B1); and releases (B2's) for New York waters. Poaching and bycatch mortalities were estimated as described in Shepherd (1992).

In the past, NY poaching mortality had been estimated as 1.3% of the released fish (Shepherd, 1992). Using this method, in 2012, the number of released fish from MRIP, the B2's, (529,448) would be multiplied by the poaching rate (1.3%) to give an estimated 6,883 poaching mortality of fish. An average of 5 pounds per fish would be used to estimate the total weight of striped bass which were subject to poaching, yielding an estimate of 34,415 pounds. However, this number represents “honest poaching”, i.e., short fish that may have been taken inadvertently, and not fish that were deliberately illegally harvested. At the present time, we have no good estimates for illegal poaching rates or its associated mortality.

Bycatch mortality was estimated as 9% of the released fish. This produces a by-catch mortality of 47,651 fish for 2012 (Table 17).

The length distribution of the by-catch mortalities was estimated using adjusted ALS data for all fish caught (Table 16). Length frequency was converted to age using age-length keys from Tables 14A and 14B. Mean weight by age was estimated using the Ln-transformed regression equation from 2012 MRIP data. An estimate of the total weight of the bycatch mortality losses was calculated as 242,784 pounds (Table 17A).

4. Party/Charter Trip Reports:

Regulations governing fares on specially permitted party and charter boats allow two fish greater than twenty-eight inches in possession. Party/charter boat captains who obtained this special permit were required to send in reports for each trip where they catch a striped bass.

a. Landings and Method of Estimation:

MRIP estimates for the party and charter harvest (A+B1) was 69,280 fish at 1,172, 668 pounds, for a mean weight of 16.9 pounds per fish in 2012. MRFSS/MRIP data are shown in Table 18 and Figures 4 and 4a. Data from NYS DEC Party/Charter trip reports are still being analyzed.

b. Catch Composition:

Biological information was collected on the party/charter boat harvest, and has been collected through voluntary log books in the marine district that can be subset for fishers who fished by boat.

c. Estimation of Effort:

Area fished information was examined from NYS DEC party/charter vessel trip reports, and the majority of the trips were taken on the eastern end of Long Island (77%), which was divided between those trips taken on the North Fork near Orient Point (32%) and the South Fork near Montauk (45%). MRIP data report 57,671 directed party/charter striped bass trips taken in 2012.

Hudson River Estuary:

a. Estimate and Method of Calculation:

A creel survey was conducted for the entire Hudson River during the Spring of 2005 (March 16 through June 17). Data from this survey have been released in a comprehensive report (Normandeau, 2007). No creel survey was conducted in 2012.

b. Catch Composition:

Length and age information were collected during the Hudson River recreational creel survey. Data on harvest have been released in a comprehensive report (Normandeau, 2007). No creel survey was conducted in 2012.

Delaware River Estuary:

a. Estimate and Method of Calculation:

There is no estimate of harvest of striped bass from the Delaware River at the present time.

C. Table of Harvest and Losses:

See Table 19.

II. Required Fishery Independent Monitoring Programs:

A. New York conducts one juvenile abundance survey; a sub-adult survey; a spawning stock survey; an adult coastal stock survey; and participates in the coastal tagging program as outlined in the striped bass fisheries management plan (FMP).

B. New York has undertaken two juvenile surveys in the past; one using a 200 foot beach seine, and another using a 26 foot head rope Carolina wing trawl in the Hudson River estuary. A sub-adult survey in Western Long Island is conducted from May through October using a 200 foot beach seine.

A spawning stock survey is conducted each spring on the Hudson River spawning grounds using either a 500 foot, or a 1,000 foot haul seine. All striped bass greater than 457 mm (18 inches TL) collected during the spawning stock survey are tagged. Supplemental collections of striped bass for tagging are made annually by electro-fishing. However, electro-fishing gear appears to be less efficient in collecting larger individuals and thus does not provide an unbiased size or sex composition of the spawning stock. No collections by electro-fishing were made in 2012.

A coastal adult stock assessment is conducted each fall off eastern Long Island using a 1,800 foot ocean haul seine. Trawl surveys were conducted in 2007 through 2011 instead of an ocean haul seine. The trawls were conducted aboard an 80-foot research vessel. The trawl gear used a 25 m head rope, 30.5 m foot rope, and 12 cm stretch mesh in the wings tapering to 8 cm mesh in the rear and 3 cm stretch mesh in the cod end. Trawls were towed at an average depth of 37 feet, for an average duration of 16 minutes. More detailed descriptions of these programs are found in progress and completion reports submitted to the funding agencies, which are available upon request. No trawl survey was conducted in 2012.

C. Results:

1. Juvenile Indices:

Table 20 and Figure 5 provide a summary of the Hudson River juvenile indices collected by beach seine. The 2012 Hudson River geometric mean beach seine index of striped bass abundance was 5.68, which was below the long term (1979-2012) average of 13.27, and also below the 25^{th} percentile value of 8.60 for the 1979 - 2009 time series, as per Addendum II to Amendment 6 of the Atlantic Striped Bass Interstate Fishery Management Plan (7.60 for the 1979-2012 time series). 2011 and 2012 values may be low due to the effects of Hurricane Irene and Tropical Storm Lee. Due to debris and flooding, the sampling crew could not go out until one week later than scheduled in 2011.

There was an increase in sedimentation, and a decrease in submerged aquatic vegetation found at the sample sites in 2011 and 2012. Sampling for the Hudson River young of the year striped bass survey began earlier in the season, and expanded to 9 weeks, in 1985. Table 20 summarizes juvenile indices from both the current 6 week survey (sampling weeks 4 -9, as per Addendum II of the FMP) as well as the index derived from the full 9 weeks of the survey (sampling weeks 1-9). NY is considering using the 9 week JAI as the annual juvenile abundance index sometime in the future. Table 21 presents the yearling abundance indices from the Western Long Island beach seine survey. The 2012 yearling index was 0.90, which was below the time series average (1.24). Table 22 presents three time series of YOY indices for WLI, based on different subsets of the data. Catch of YOY striped bass in bays adjacent to Long Island Sound suggest an expansion of the nursery area out of the Hudson River.

2. Spawning Stock Assessment:

Spawning stock assessment survey results for length frequency, by sex, are in Table 23. No data was collected during 2002 due to staffing shortages. Spawning stock age structure for male and female fish is presented in Table 24.

3. Adult Coastal Stock Characterization:

Adult coastal stock characterization survey results are presented in Tables 6, 25, and 26. Table 25 presents age frequencies for striped bass caught from the 1987 – 2006 Ocean Haul Seine survey, and the 2007 – 2011 Trawl survey. Table 26 presents geometric mean abundance indices by age from the Ocean Haul Seine and Ocean Trawl surveys.

4. Tagging:

New York State is an active participant in the USFWS striped bass coastal tagging program. The following lists the number of striped bass tagged by program for 2012.

Hudson River Spawning Stock Survey -	707
Western Long Island Yearling Survey-	501
Hudson River Juvenile Survey-	0

III. Fishery Dependent Monitoring Programs:

In the past, New York conducted a sea sampling program on the Hudson River American Shad gill net fishery in the spring. Reporting of the Hudson shad fishery bycatch data was discontinued in 2010. Also in 2010, the NYSDEC closed the commercial gill net fishery in the river due to the poor condition of the Hudson American Shad stock.

Some bycatch occurs for smaller fish in the small mesh gill net fishery for river herring. Data from this time series will continue to be reported.

IV. Plans for 2013 Fisheries:

A. Commercial Fishery:

The 2012 striped bass commercial quota was reduced to 801,855 pounds, due to the overage of fish caught in 2011. For 2013, the quota has been increased to 828,293 pounds, as per the ASMFC FMP.

B. Recreational Fishery:

a. Coastal Regulations:

At this time, no regulatory changes are planned for 2012. A New York State salt water recreational fishing license system was implemented in October 2009. It has now been replaced by a no-fee registry.

b. Hudson River Regulations:

Minimum Length: 18" total length

Possession Limit: one fish

Open Season: March 15 to November 30

ASMFC adoption of Amendment VI to the fisheries management plan made several changes to the management of Atlantic striped bass. First, Amendment VI eliminated references to producer areas and the minimum sizes allowed therein, with exceptions allowed for the Chesapeake Bay and the Albermarle Sound/Roanoke River. Second, the Amendment requires all States/Jurisdictions to implement management measures for the recreational fishery that restricts individuals to a 2-fish creel limit and a 28-inch minimum size limit. In December 2003, the ASMFC Management Board approved a proposal from NY showing that 1 fish of 18 inch minimum total length is the conservation equivalent of 2 fish at 28 inch minimum length.

New York is contemplating a proposal to either increase the minimum total length limit to twenty-eight inches, or to have slot limit size options, and to keep the creel limits at one fish.

No changes to the season length are contemplated. However, New York will include in its proposal a requirement for use of circle hooks in bait fisheries, a prohibition on the use of treble hooks, and will propose a mandatory requirement of for-hire fishing businesses to participate with the ACCSP for-hire survey. It is uncertain when regulation changes will be promulgated.

c. Delaware River Regulations

No changes are planned for 2012.

V. Changes for 2013 Monitoring:

The Western Long Island sub-adult survey is now being funded under the Dingell-Johnson Sport Fish Restoration Act (Wallop-Breaux). The coastal ocean trawl survey was funded under a grant from NOAA/NMFS, which expired on August 31, 2012. It is unclear when, or if, this survey can continue.

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Table 1. Summary of Striped Bass Commercial Harvest from 1990 through 2012 for all Gears Combined.

Year	Slot Size Limit (Inches)	Slot Quota (pounds)	Harvest (Pounds)	Harvest (Number)	By-Catch (Number)	Average Weight per Fish (Pounds)
1990	24 - 28	128,287	81,870	11,785		6.95
1991	24 - 29	128,287	105,163	15,064		6.98
1992*	24 - 39	189,639	226,611	20,353	57,089	11.13
1993	24 - 36	134,684	109,362	11,185	37,376	9.78
1994*	24 - 36	171,656	171,279	15,357	69,990	11.15
1995*	24 - 36	681,745	500,784	43,705	48,244	11.46
1996*	24 - 36	590,155	504,350	40,523	107,366	12.45
1997*	24 - 36	590,155	460,762	37,594	53,170	12.26
1998*	24 - 36	590,155	484,900	45,149	45,657	10.74
1999	24 - 36	590,155	491,790	49,914	65,407	9.85
2000	24 - 36	590,155	542,659	54,895	53,433	9.89
2001*	24 - 36	590,155	633,095	58,296	39,108	10.86
2002*	24 - 36	547,215	518,573	47,143	27,458	11.00
2003*	24 - 36	828,293	753,261	68,354	31,532	11.02
2004*	24 - 36	828,293	741,668	70,367	52,664	10.54
2005	24 - 36	828,293	689,821	70,560	22,156	9.78
2006	24 - 36	828,293	688,446	73,528	130,854	9.36
2007 [2]	24 - 36	828,293	731,461	78,518	21,683	9.32
2008	24 - 36	828,293	653,100	73,263	5,419	8.91
2009*	24 - 36	828,293	789,891	82,574	5,190	9.57
2010*	24 - 36	828,293	782,402	81,896	3,018	9.55
2011 [2]	24 - 36	828,293	855,271	87,405	3,920	9.79
2012	24 - 36	801,855 [1]	681,399	66,897	2,103	10.19

* - adjusted harvest weight

[2] - updated

[1] quota reduced in 2012, due to 2011 overage

Table 2. 2012 Striped Bass Commercial Fisheries Landings and Discards by Gear Data Results From Trip Report Database

Gear	Harvest (Lbs)	Harvest (#)	Bycatch (#)
GILL NET	306,806	29,970	268
HOOK AND LINE	304,237	29,713	1,693
OTTER TRAWL	52,747	5,110	142
TRAP OR POUND NET	17,610	2,104	0
Total	681,399	66,897	2,103

Table 3. Estimated Age Frequency of Striped Bass Harvested By New York Commercial Fishery, 2012.

Age	YearClass	Frequency	%Frequency
3	2009	190	0.28
4	2008	2,281	3.41
5	2007	16,187	24.20
6	2006	7,830	11.70
7	2005	14,297	21.37
8	2004	12,394	18.53
9	2003	11,236	16.80
10	2002	1,153	1.72
11	2001	1,137	1.70
12	2000	194	0.29
Total		66,897	100.00

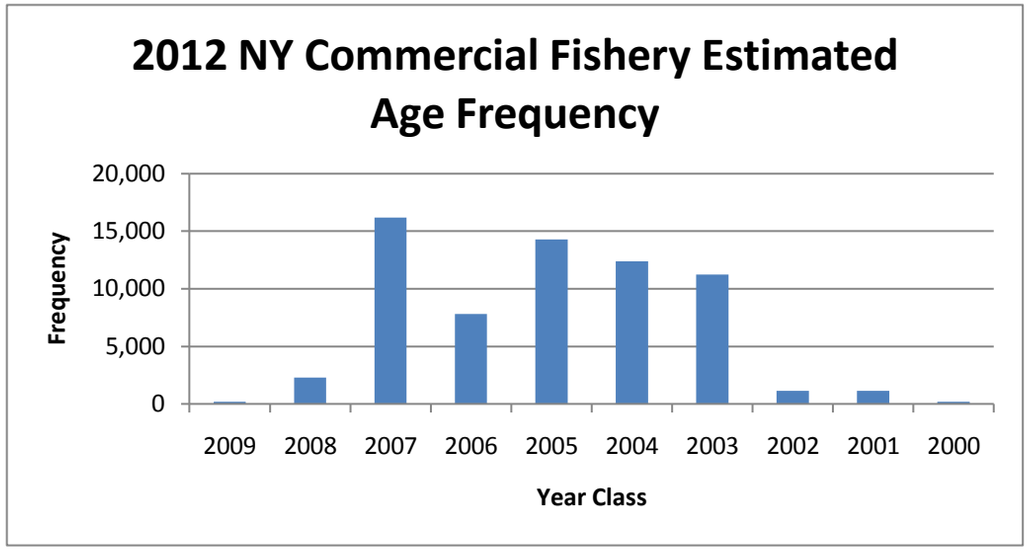

Figure 1. 2012 NY Commercial Striped Bass Fishery estimated age frequency, by year class.

Table 4. 2012 New York Commercial Striped Bass Harvest (Lbs) by Age.

Age	YearClass	Harvest #	Avg Wt (Lbs)	Harvest (lbs)
3	2009	190	5.53	1,048
4	2008	2,281	6.88	15,702
5	2007	16,187	7.47	120,907
6	2006	7,830	8.68	67,976
7	2005	14,297	10.14	144,902
8	2004	12,394	12.43	153,996
9	2003	11,236	13.08	146,966
10	2002	1,153	12.85	14,813
11	2001	1,137	11.34	12,899
12	2000	194	11.29	2,191
Total		66,897		681,399

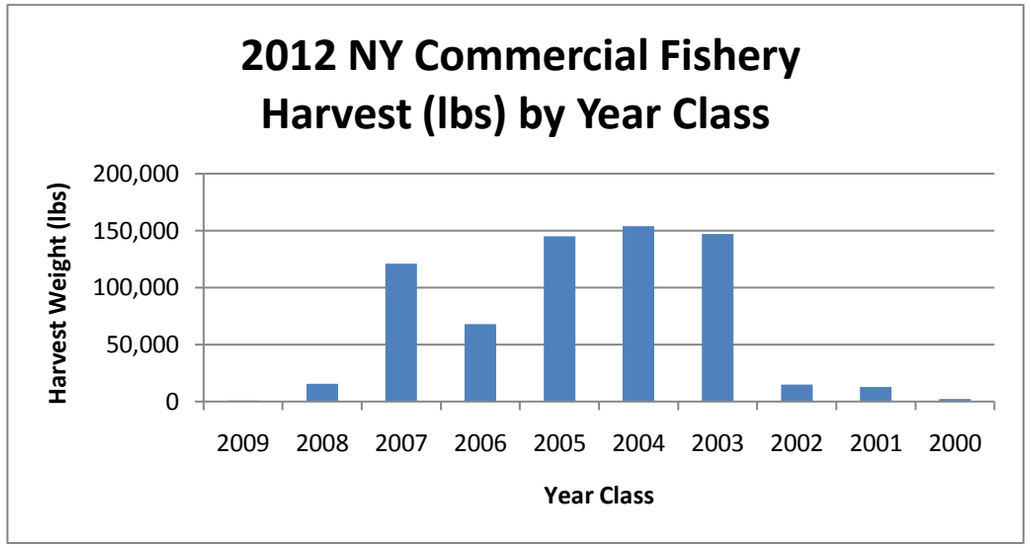

Figure 2. 2012 NY Commercial Striped Bass fishery harvest (lbs), by year class.

Table 5. 2012 NY Striped Bass Total Length Frequency From Commercial Sampling

TL (Inch)	Frequency	% Frequency
24	6	1.70
25	29	8.22
26	30	8.50
27	48	13.60
28	30	8.50
29	25	7.08
30	36	10.20
31	42	11.90
32	36	10.20
33	32	9.07
34	22	6.23
35	11	3.12
36	5	1.42
37	1	0.28
Total	353	100.00

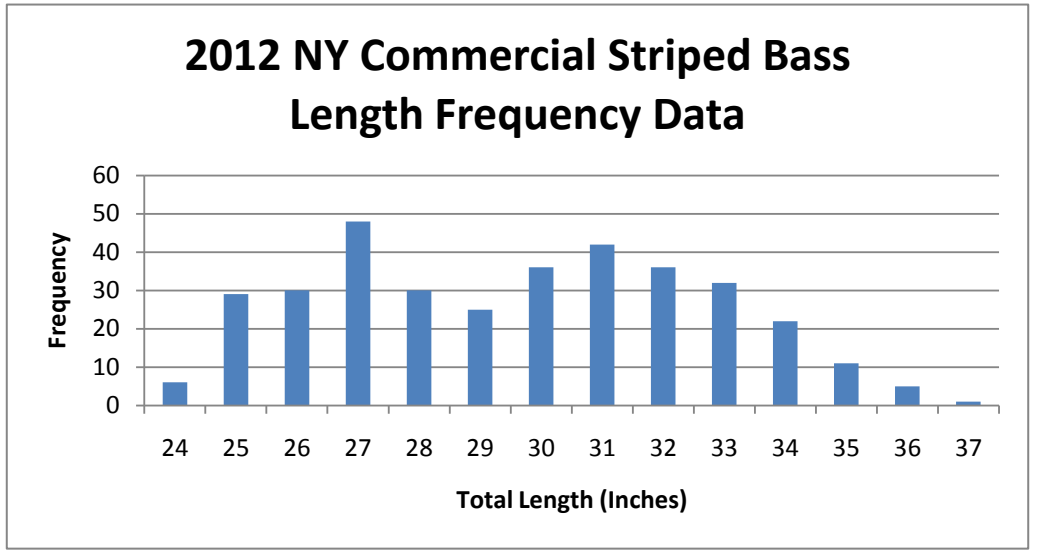

Figure 3. 2012 NY Commercial Striped Bass Length Frequency Data.

Table 6. 2012 NY Striped Bass Total Length Frequency - Commercial Monitoring vs NY ALS Tag Releases.

TL (inches)	Commercial Monitoring	NY ALS * (July - Dec)
10	0	0
11	0	4
12	0	9
13	0	24
14	0	0
15	0	47
16	0	90
17	0	115
18	0	94
19	0	69
20	0	48
21	0	41
22	0	39
23	0	40
24	6	39
25	29	46
26	30	34
27	48	16
28	30	21
29	25	20
30	36	0
31	42	4
32	36	10
33	32	16
34	22	10
35	11	0
36	5	3
37	1	7
38	0	3
39	0	5
40	0	8
41	0	5
42	0	0
43	0	3
44	0	3
45	0	0
46	0	2
47	0	3
48	0	2
49	0	0
50	0	0
51	0	0
52	0	0
Total	353	880

* unadjusted ALS data

Table 7. Weight-Length Regression Parameters for the Ocean Trawl Surveys : 2007 - 2011.

Year	a'	a	b	N
2007	-17.3602	2.89E-08	2.844	729
2008*				
2009	-17.8164	1.83E-08	2.916	130
2010	-16.778	5.17 E-08	2.746	387
2011	-20.0915	1.88 E-09	3.242	120

* No weight data for 2008. No trawl survey in 2012.

Table 7a. Weight - Length Regression Parameters from the Ocean Haul Seine Survey for 1987 - 2006.
where W(Kg.) = a*L(mm)^b

Year	a'	a	b	N
1987	-16.9604	4.31E-08	2.77768	1948
1988	-17.6505	2.16E-08	2.88423	2098
1989	-17.3127	3.03E-08	2.83014	1195
1990	-17.1043	3.73E-08	2.79382	2042
1991	-17.8017	1.86E-08	2.90321	1788
1992	-18.1683	1.29E-08	2.96454	1605
1993	-17.853	1.76E-08	2.91345	2201
1994	-17.6743	2.11E-08	2.89258	1709
1995	-17.8144	1.83E-08	2.90203	1484
1996	-18.1523	1.31E-08	2.95374	2198
1997	-17.7472	1.96E-08	2.88747	1662
1998	-18.0409	1.46E-08	2.93527	1577
1999	-17.3032	3.06E-08	2.82133	1396
2000	-17.617	2.23E-08	2.87261	1507
2001	-18.0739	1.41E-08	2.93486	1052
2002	-17.557	2.37E-08	2.8613	1155
2003	-17.4699	2.59E-08	2.85857	819
2004	-17.5504	2.39E-08	2.85692	1519
2005	-17.5431	2.41E-08	2.8557	1037
2006	-17.4868	2.54E-08	2.84588	1208
87 - '06	-17.9434	1.61E-08	2.92483	31200

Table 8. Gompertz Weight (kg) at Age Parameters for Ocean Trawl Survey. 2007 - 2011.

Year	Wo	G	g
2007	0.672	3.23	0.1134
2008*			
2009	0.301	3.95	0.1623
2010	1.241	3.96	0.0487
2011	1.559	31.08	0.0050

$W(t)=W0*e^{(G(1-e(-gt)))}$

*No weight data for 2008. No trawl survey in 2012.

Table 8a. Gompertz Weight (Kg.) at Age Parameters from the Ocean Haul Seine Survey for 1987 - 2006.

Year	Wo	G	g
1987	0.405	3.34	0.178
1988	0.869	40.53	0.0056
1989	0.176	5.2	0.1467
1990	0.389	3.2	0.2119
1991	0.911	38.6	0.0056
1992	1.111	37.05	0.0052
1993	0.769	6.13	0.0474
1994	0.39	4.63	0.1127
1995	0.641	5.48	0.063
1996	0.217	4.96	0.13
1997	0.00091	9.35	0.3634
1998	0.175	4.81	0.1541
1999	1.119	5.35	0.0703
2000	0.867	4.38	0.1139
2001	0.495	3.79	0.1179
2002	0.581	5.12	0.0654
2003	0.323	4.06	0.1439
2004	0.76	38.86	0.0056
2005	0.95	21.47	0.009
2006	0.386	45.76	0.0067

Table 9. Catch Per Unit Effort (Mean Catch per Trip)
For NY Commercial Fishery, 2012

	CPUE	Average Weight/Trip		Number of Trips
Gear	**Mean Catch/Trip**	**Mean (lbs)**	**StDev (lbs)**	**N**
Gill Net	37.8	386.9	487.6	793
Hook and Line	14.5	148.2	177.0	2,053
Otter Trawl	8.8	90.6	91.9	582
Trap or Pound Net	9.3	77.6	190.0	227
All Gear Combined	18.3	186.4	290.6	3,655

Table 10 Hudson River bycatch of striped bass reported* in the bait (primarily river herring) gill net fishery.

Year	Number**
1980	
1981	
1982	
1983	
1984	
1985	
1986	
1987	
1988	
1989	
1990	
1991	
1992	
1993	
1994	
1995	23
1996	36
1997	92
1998	148
1999	235
2000	1051
2001	721
2002	787
2003	277
2004	308
2005	382
2006	722
2007	640
2008	399
2009	311
2010	304
2011	303
2012^	790

* Reporting rate unknown

** weight unknown

^ Draft, data in QA/QC

Table 11 A. 2012 ALS New York State Total Length (Unadjusted)

TL(in)	Jan-June	July-Dec	Total
10	2	0	2
11	3	4	7
12	58	9	67
13	75	24	99
14	0	0	0
15	86	47	133
16	104	90	194
17	150	115	265
18	91	94	185
19	66	69	135
20	59	48	107
21	59	41	100
22	39	39	78
23	45	40	85
24	41	39	80
25	44	46	90
26	46	34	80
27	26	16	42
28	18	21	39
29	17	20	37
30	0	0	0
31	17	4	21
32	13	10	23
33	26	16	42
34	24	10	34
35	15	0	15
36	9	3	12
37	12	7	19
38	5	3	8
39	0	5	5
40	3	8	11
41	0	5	5
42	3	0	3
43	0	3	3
44	0	3	3
45	0	0	0
46	0	2	2
47	0	3	3
48	0	2	2
Grand Total	1,156	880	2,036

Table 11 b. 2012 ALS New York State Total Length (re-scaled per cent)

TL(in)	Jan-June	July-Dec	Total
10	0.16%	0.00%	0.09%
11	0.24%	0.43%	0.32%
12	4.63%	0.97%	3.07%
13	5.98%	2.58%	4.53%
14	6.42%	3.82%	5.31%
15	6.86%	5.05%	6.09%
16	8.30%	9.68%	8.88%
17	11.97%	12.37%	12.14%
18	7.26%	10.11%	8.47%
19	5.27%	7.42%	6.18%
20	4.71%	5.16%	4.90%
21	4.71%	4.41%	4.58%
22	3.11%	4.19%	3.57%
23	3.59%	4.30%	3.89%
24	3.27%	4.19%	3.66%
25	3.51%	4.95%	4.12%
26	3.67%	3.66%	3.66%
27	2.07%	1.72%	1.92%
28	1.44%	2.26%	1.79%
29	1.36%	2.15%	1.69%
30	1.36%	1.29%	1.33%
31	1.36%	0.43%	0.96%
32	1.04%	1.08%	1.05%
33	2.07%	1.72%	1.92%
34	1.91%	1.08%	1.56%
35	1.20%	0.00%	0.69%
36	0.72%	0.32%	0.55%
37	0.96%	0.75%	0.87%
38	0.40%	0.32%	0.37%
39	0.00%	0.54%	0.23%
40	0.24%	0.86%	0.50%
41	0.00%	0.54%	0.23%
42	0.24%	0.00%	0.14%
43	0.00%	0.32%	0.14%
44	0.00%	0.32%	0.14%
45	0.00%	0.27%	0.11%
46	0.00%	0.22%	0.09%
47	0.00%	0.32%	0.14%
48	0.00%	0.22%	0.09%
Grand Tota	100.00%	100.00%	100.00%

Table 12. 2012 New York State Adjusted ALS Sample Total Length Frequency

TL(in)	Jan-June	July-Dec	Total
10	2	0	2
11	3	4	7
12	53	9	62
13	69	23	92
14	74	34	108
15	79	44	124
16	96	85	181
17	138	109	247
18	84	89	173
19	61	65	126
20	54	45	100
21	54	39	93
22	36	37	73
23	41	38	79
24	38	37	75
25	41	44	84
26	42	32	75
27	24	15	39
28	17	20	36
29	16	19	35
30	16	11	27
31	16	4	20
32	12	9	21
33	24	15	39
34	22	9	32
35	14	0	14
36	8	3	11
37	11	7	18
38	5	3	7
39	0	5	5
40	3	8	10
41	0	5	5
42	3	0	3
43	0	3	3
44	0	3	3
45	0	2	2
46	0	2	2
47	0	3	3
48	0	2	2
Grand Total	1,156	880	2,036

Table 13. MRIP Estimated TL Frequency of 2012 NY Recreational Striped Bass Harvest

Tl (in)	Total (#)
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	1,329
22	
23	
24	
25	
26	
27	873
28	8,358
29	23,798
30	19,265
31	13,599
32	42,080
33	56,783
34	34,249
35	20,077
36	12,672
37	7,493
38	10,470
39	6,265
40	15,357
41	9,359
42	1,152
43	2,144
44	2,041
45	1,684
≥ 46	13,092
Total	302,140

Estimated length-frequency landings using 2012 MRIP (final) numbers, and re-scaled MRIP length-frequencies

Table 14.

2012 CA & WLI Age TL Key
Season 1: Jan - June
Portion Age at Total Length

TL(in)	Age 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+	Sample Size
6		0.78	0.22														18
7		0.94	0.06														17
8		0.75	0.25														4
9		0.50	0.50														8
10		0.17	0.83														23
11		0.04	0.93	0.04													28
12			0.92	0.08													25
13			0.89	0.11													19
14			1.00														11
15			0.55	0.45													11
16			0.50	0.50													8
17			0.11	0.89													9
18			0.08	0.77	0.15												13
19				0.92	0.08												13
20				0.30	0.60	0.10											10
21				0.36	0.18	0.36	0.09										11
22				0.18	0.45	0.36											11
23					0.36	0.55	0.09										11
24					0.20	0.80											10
25					0.16	0.74	0.05	0.05									19
26						0.92	0.08										13
27						0.67		0.11	0.11	0.11							9
28						0.70	0.20		0.10								10
29					0.11	0.56	0.11	0.11	0.11								9
30								1.00									6
31							0.10	0.50	0.10	0.20		0.10					10
32							0.21	0.43	0.21	0.07		0.07					14
33								0.14	0.43	0.43							7
34								0.20	0.30	0.20			0.10	0.20			10
35									0.40	0.60							5
36										0.50		0.50					2
37										0.50	0.50						4
38																	0
39												0.75	0.25				4
40											0.50	0.50					2
41													1.00				1
42												1.00					1
43												1.00					1
44																	0
45																1.00	1
46																	0
47																	0
48																	0
49																	0
50																	0
>50																	0
Total	0.00	0.11	0.30	0.14	0.07	0.17	0.03	0.06	0.04	0.04	0.01	0.02	0.01	0.01	0.00	0.00	388

2012 CA & WLI Age TL Key
Season 2: July - Dec
Portion Age at Total Length

TL(in)	Age 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+	Sample Size
6	0.07	0.93															14
7		1.00															25
8		0.98	0.02														44
9		0.90	0.10														42
10		0.83	0.17														29
11		0.46	0.54														28
12		0.30	0.65	0.04													23
13		0.06	0.94														31
14			1.00														20
15			0.94	0.06													18
16			0.89	0.11													18
17			0.62	0.35		0.04											26
18			0.60	0.27	0.13												15
19			0.13	0.81	0.06												16
20				0.69	0.25	0.06											16
21				0.63	0.19	0.13		0.06									16
22				0.20	0.30	0.50											10
23				0.30	0.20	0.40			0.10								10
24				0.07	0.50	0.36	0.07										14
25					0.26	0.53	0.16	0.05									19
26					0.08	0.50	0.08	0.25	0.08								12
27					0.27	0.45	0.18	0.09									11
28					0.17	0.50		0.17	0.17								6
29					0.17	0.33	0.50										6
30						0.22	0.22	0.22	0.22	0.11							9
31						0.29	0.14	0.29	0.14	0.14							7
32								0.33	0.17	0.50							6
33							0.14		0.14	0.43		0.29					7
34							0.13	0.25	0.38	0.25							8
35								0.33		0.67							3
36									0.33	0.67							3
37																	0
38									1.00								1
39																	0
40																	0
41																	0
42																	0
43																	0
44																	0
45																	0
46																	0
47																1.00	1
48																	0
49																	0
50																	0
>50																	0
Total	0.00	0.32	0.29	0.11	0.06	0.09	0.03	0.03	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	514

Table 15. MRIP 2012 New York Striped Bass Recreational Harvest by Age

Age (yrs)	Total Harvest (#)
0	
1	
2	
3	689
4	4,072
5	21,273
6	23,967
7	51,217
8	57,734
9	72,077
10	10,779
11	23,029
12	12,925
13	8,621
14	8,216
15	7,093
16	224
17+	225
Total	302,140

Ages Based on 2012 CA/WLI/MA>35" Survey Keys.
Lengths based on re-scaled MRIP length-frequency data.
Harvest numbers estimated by MRIP 2012 Data.

Table 15 A. MRIP 2012 New York Striped Bass Recreational Harvest By Weght.

Age (yrs)	Total Harvest (#)	Mean Weight (lbs)	Total Harvest (lbs)
0			
1			
2			
3	689	3.64	2,510
4	4,072	8.38	34,134
5	21,273	8.78	186,828
6	23,967	10.76	257,902
7	51,217	11.73	601,009
8	57,734	13.30	767,664
9	72,077	14.10	1,016,341
10	10,779	19.87	214,198
11	23,029	16.91	389,369
12	12,925	22.01	284,487
13	8,621	20.50	176,689
14	8,216	28.41	233,418
15	7,093	30.50	216,320
16	224	28.13	6,296
17+	225	29.63	6,653
Total	302,140		4,393,816

Average weight calculated from Ln-transformed regression of 2012 MRIP Data.
Total Harvest (lbs) calculated from 2012 MRIP reported weight.

Table 16. MRIP 2012 Total Length Frequency of New York Striped Bass Recreational Bycatch Mortality

Tl (in)	Total (#)
1	
2	
3	
4	
5	
6	
7	
8	
9	0
10	2
11	7
12	62
13	92
14	108
15	124
16	181
17	247
18	173
19	126
20	100
21	93
22	73
23	79
24	75
25	84
26	75
27	39
28	36
29	35
30	27
31	20
32	21
33	39
34	32
35	14
36	11
37	18
38	7
39	5
40	10
41	5
42	3
43	3
44	3
45	2
≥ 46	7
	2,036

Lengths based on 2012 ALS length frequency data for striped bass of all sizes
Bycatch kill estimated from 2012 MRIP B2's (9% B2's)

Table 17. 2012 MRIP New York Striped Bass Recreational Bycatch Mortality at Age

Age (yrs)	Total Bycatch (#)
0	
1	361
2	15,818
3	12,174
4	4,696
5	7,435
6	1,322
7	1,642
8	1,431
9	1,443
10	249
11	413
12	232
13	173
14	139
15	107
16	8
17+	7
Total	47,651

Ages based on CA/WLI/MA>35" age-length keys
Lengths based on 2012 ALS length-frequency data
Bycatch mortality estimated by MRIP 2012 Data (9% B2's)

Table 17A. MRIP 2012 New York Striped Bass Recreational Bycatch Mortality by Weight

Age (yrs)	Total Bycatch (#)	Mean Weight (lbs)	Total Weight (lbs)
0			
1	361	0.91	328
2	15,818	1.79	28,289
3	12,174	2.96	36,056
4	4,696	4.93	23,163
5	7,435	6.65	49,442
6	1,322	8.97	11,849
7	1,642	11.21	18,412
8	1,431	13.72	19,636
9	1,443	16.23	23,425
10	249	22.07	5,500
11	413	19.80	8,176
12	232	25.00	5,796
13	173	23.01	3,987
14	139	32.44	4,523
15	107	34.52	3,692
16	8	31.83	262
17+	7	34.07	248
Total	47,651		242,784

Ages based on CA/WLI/MA >35" age-length keys
Bycatch mortality estimated by MRIP 2012 Data (9% B2's)
Average weight calculated from Ln-transformed regression of 2012 MRIP data

Table 18 . MRFSS/MRIP Party/Charter Boat Data

MRFSS /MRIP Party and Charter Boats

Year	Harvest Number	Harvest Pounds	Harvest Mean Wt.	Total Catch #
1995	65,589	1,512,422	23.1	284,522
1996	93,358	2,160,667	23.1	340,272
1997	110,718	2,110,779	19.1	287,764
1998	31,256	531,584	17	102,526
1999	74,712	1,182,484	15.8	191,681
2000	137,982	2,131,396	15.4	326,269
2001	96,537	1,794,679	18.6	196,540
2002	84,023	1,217,387	14.5	133,172
2003	106,622	548,125	5.1	164,065
2004	79,767	1,207,707	6.7	137,228
2005	119,895	1,951,495	14.2	185,849
2006	78,788	1,364,891	15.5	138,306
2007	250,616	4,345,292	15	466,447
2008	162,953	2,477,580	14.2	310,039
2009	178,453	2,522,137	13.4	350,298
2010	171,184	2,501,257	13.9	292,979
2011	389,438	5,157,178	13.2	1,235,940
2012	69,280	1,172,668	16.9	106,812

MRIP estimate

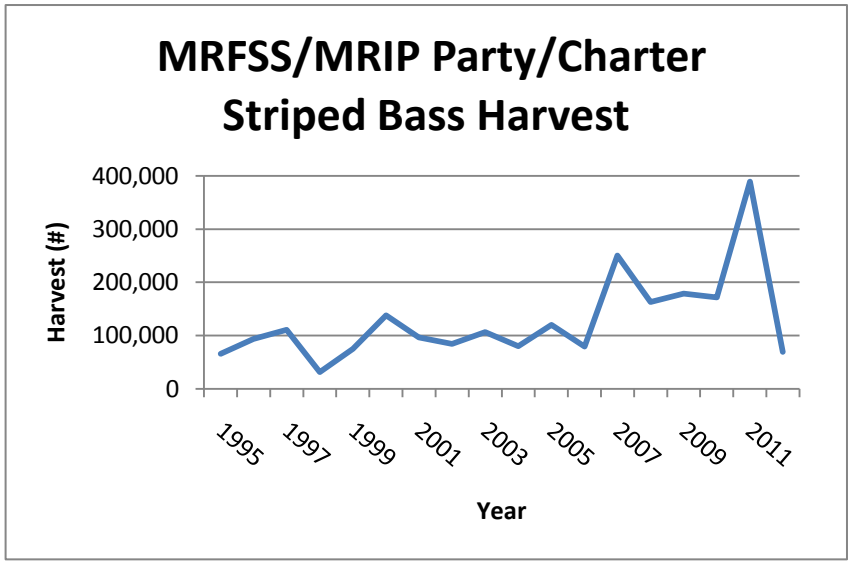

Figure 4. MRFSS /MRIPParty/Charter Harvest, 1995 - 2012.

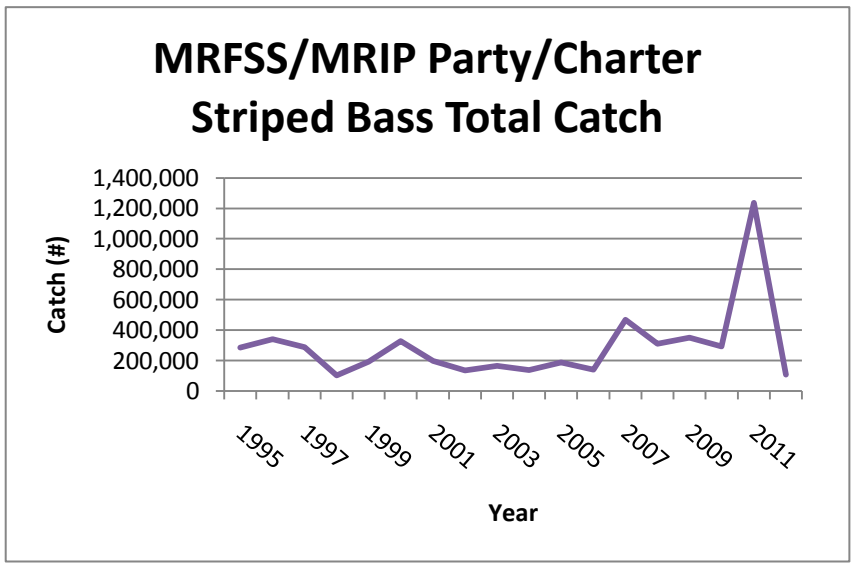

Figure 4a. MRFSS /MRIP Party/Charter Catch, 1995 - 2012.

Table 19. MRIP Estimates of Striped Bass Harvest and Losses in New York for 2012.			
Category	Number	Total Weight	Average Weight
Legal Commercial Harvest	66,897	681,399	10.19
Commercial Bycatch			
Coastal Gill Nets, Open Season	126	403	3.20
Coastal Gill Nets, Closed Season+			
Pound Nets, Open Season	0	0	
Pound Nets, closed Season+			
Hook and Line, Open Season	220	1,100	5.00
Trawls, Open Season	50	160	3.20
Recreational Fishery			
Legal Recreational Harvest, Hudson River+			
Legal Recreational Harvest, Coastal Waters	302,140	4,393,816	14.54
Recreational Bycatch			
Catch and Release Mortality, Hudson River +			
Poaching, Hudson+			
Catch and Release Mortality, Coastal	47,651	242,784	5.10
Poaching, Coastal +			
Sum	417,084	5,319,662	
Hudson River Shad Net Fishery closed in 2010.			
"+ - n/a, not available"			

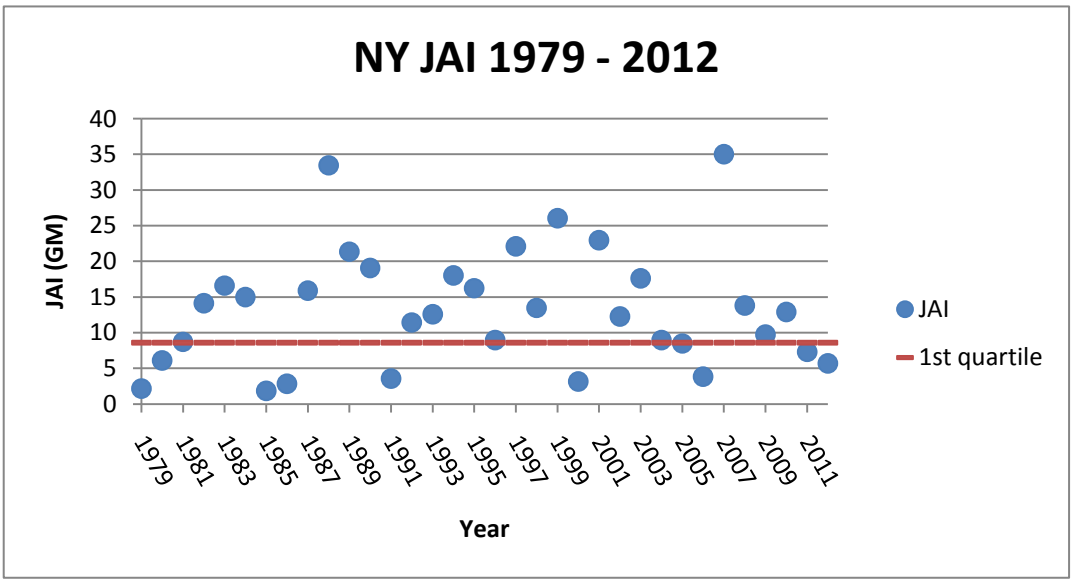

Figure 5. NY JAI for 1979 - 2012.

Table 20. Hudson River Index of Relative Abundance
YOY Striped Bass from 1979 - 2012.

6 - week Index (sampling weeks 4 - 9)

year	hauls	zero hauls	catch	geo_mean	UCI	LCI
1979	117	39	584	2.15	2.84	1.59
1980	150	34	3586	6.1	8.11	4.53
1981	132	11	2830	8.71	11.08	6.81
1982	143	8	4362	14.13	17.57	11.32
1983	147	7	7108	16.59	21.33	12.85
1984	146	6	5418	15	18.65	12.03
1985	146	53	562	1.85	2.36	1.42
1986	145	35	883	2.84	3.59	2.21
1987	150	13	9100	15.9	21.01	11.98
1988	145	2	7584	33.46	40.1	27.89
1989	150	4	6291	21.35	26.41	17.23
1990	142	2	5392	19.08	23.72	15.31
1991	139	30	938	3.55	4.45	2.8
1992	146	5	2525	11.43	13.55	9.62
1993	150	7	3974	12.59	15.67	10.08
1994	144	3	4139	18.01	21.47	15.08
1995	147	2	4027	16.23	19.16	13.72
1996	133	6	1958	8.96	10.77	7.42
1997	135	6	6769	22.1	28.36	17.17
1998	127	5	2910	13.47	16.53	10.95
1999	102	0	5277	26.03	32.83	20.6
2000	134	31	1052	3.15	4.04	2.42
2001	135	11	12317	22.97	31.01	16.94
2002	137	5	2949	12.26	14.88	10.07
2003	146	9	5140	17.62	22.13	13.99
2004	144	8	2078	8.97	10.76	7.45
2005	148	21	5181	8.48	11.25	6.34
2006	148	28	1232	3.82	4.78	3.02
2007	147	2	11986	35.02	42.84	28.59
2008	138	5	3645	13.8	16.99	11.17
2009	148	13	3698	9.73	12.23	7.7
2010	144	6	3544	12.9	15.83	10.48
2011	117	15	1734	7.3	9.36	5.65
2012	111	15	1580	5.68	7.42	4.31

9 - week Index (sampling weeks 1 - 9)

year	hauls	zero hauls	catch	geo_mean	UCI	LCI
1985	216	73	984	2.15	2.62	1.73
1986	217	39	1889	4.19	5.05	3.45
1987	225	13	18649	25.12	31.34	20.09
1988	220	2	15488	42.16	48.89	36.33
1989	225	4	13397	28.42	33.92	23.79
1990	217	2	12591	29.8	35.63	24.9
1991	214	32	3254	6.52	7.95	5.32
1992	221	5	5874	16.93	19.52	14.67
1993	225	7	12587	23.32	28.38	19.13
1994	218	3	9553	26.06	30.26	22.43
1995	220	2	7350	20.08	23.07	17.46
1996	203	6	4340	12.8	14.92	10.97
1997	187	7	10967	27.41	33.69	22.26
1998	196	5	6617	19.29	22.85	16.26
1999	170	0	9683	33.22	39.25	28.09
2000	209	31	4818	7.21	8.98	5.76
2001	208	12	16103	26.36	32.7	21.22
2002	209	6	4617	13.23	15.36	11.37
2003	220	9	16115	32.17	39.17	26.39
2004	218	10	3596	9.95	11.57	8.54
2005	220	25	7727	10.39	12.94	8.31
2006	221	35	2232	4.84	5.79	4.02
2007	221	2	18145	39.56	46.37	33.72
2008	212	5	6199	16.48	19.3	14.05
2009	196	13	6012	12.79	15.56	10.48
2010	216	6	12125	23.43	28.29	19.37
2011	182	15	4701	12.23	14.99	9.95
2012	184	15	3395	9.31	11.25	7.69

Sampling expanded to 9 weeks in 1985

1979-2009 Average	13.72
1979-2009 25th percentile	8.60
1979-2012 Average	13.27
1979-2012 25th percentile	7.60
1985-2009 Average	14.51
1985-2009 25th percentile	8.96
1985-2012 Average	13.88
1985-2012 25th percentile	8.19

1985-2009 Average	19.62
1985-2009 25th percentile	10.39
1985-2012 Average	19.12
25th percentile	10.28

Indices may be low due to the effects of Hurricane Irene and Tropical storm Lee in 2011.

Table 21. Western Long Island index of Relative Abundance Yearling Striped Bass from 1985 - 2012.

Year	#Seines	YRL GM	LCI	UCI
1984	99	0.96	0.59	1.40
1985	42	0.61	0.24	1.09
1986	80	0.30	0.15	0.47
1987	109	0.21	0.09	0.34
1988	83	0.81	0.45	1.27
1989	80	1.78	1.16	2.58
1990	92	0.37	0.21	0.55
1991	111	1.26	0.84	1.78
1992	91	1.34	0.90	1.89
1993	108	0.75	0.48	1.06
1994	96	1.43	0.89	2.13
1995	81	1.29	0.85	1.83
1996	79	1.54	0.96	2.30
1997	58	1.00	0.58	1.53
1998	54	2.10	1.27	3.23
1999	88	2.05	1.45	2.80
2000	102	1.56	0.99	2.30
2001	83	2.16	1.51	2.96
2002	96	2.53	1.86	3.37
2003	107	1.19	0.88	1.56
2004	99	2.41	1.76	3.20
2005	75	0.64	0.36	0.99
2006	85	2.02	1.39	2.80
2007	95	0.58	0.35	0.85
2008	97	1.24	0.84	1.74
2009	89	0.33	0.20	0.48
2010	87	0.45	0.28	0.65
2011	98	2.00	1.34	2.83
2012	96	0.90	0.63	1.22
Average		1.24		

Table 22. Western Long Island Index of Relative Abundance (geometric mean) YOY Striped bass from 1985 - 2012

	July through October+				July through August				August			
YEAR	SEINES*	GM (fish/haul)	LCI**	UCI	SEINES*	GM (fish/haul)	LCI**	UCI	SEINES*	GM (fish/haul)	LCI**	UCI
1984	25	0.0			25	0.0			14	0.0		
1985	4	0.0			4	0.0			4	0.0		
1986	21	0.0			21	0.0			5	0.0		
1987	33	0.1	0.0	0.3	26	0.1	0.0	0.3	9	0.3	0.0	0.9
1988	21	0.9	0.1	2.2	11	1.8	0.2	5.7	4	2.5	0.0	27.4
1989	34	0.4	0.1	0.8	19	0.8	0.2	1.7	12	1.6	0.6	3.2
1990	23	0.2	0.0	0.5	19	0.2	0.0	0.6	7	0.8	0.0	2.3
1991	18	2.8	1.2	5.6	18	2.8	1.2	5.6	7	3.7	0.5	13.5
1992	29	3.4	2.0	5.4	14	3.1	1.2	6.6	7	3.7	0.7	12.3
1993	23	3.0	1.4	5.7	23	3.0	1.4	5.7	8	14.1	5.1	36.3
1994	30	0.5	0.1	1.0	18	0.5	0.0	1.3	7	2.0	0.4	5.4
1995	14	0.6	0.1	1.3	14	0.6	0.1	1.3	8	1.2	0.3	2.9
1996	26	2.4	1.2	4.3	13	3.7	1.6	7.7	3	34.8	14.7	80.7
1997	22	2.8	1.2	5.6	7	0.1	0.0	0.3	3	0.3	0.0	0.8
1998	30	2.4	1.1	4.4	13	3.2	0.8	9.1	6	21.8	8.7	52.9
1999	23	7.9	4.1	14.6	15	20.7	10.6	39.6	4	44.7	11.4	167.2
2000	45	30.3	16.6	54.8	25	120.4	59.5	242.7	10	51.1	26.4	98.0
2001	41	11.3	6.7	18.7	18	44.3	22.7	85.7	10	18.3	8.6	37.7
2002	35	1.6	0.9	2.4	17	2.2	1.0	3.9	8	2.0	0.8	4.0
2003	45	3.6	2.4	5.2	25	3.9	2.2	6.5	10	4.5	2.3	8.1
2004	50	0.4	0.1	0.7	30	0.4	0.0	0.9	10	0.2	0.1	0.3
2005	45	2.4	1.5	3.8	20	3.0	1.3	6.0	10	4.8	1.5	12.5
2006	46	0.7	0.3	1.3	23	1.1	0.3	2.5	12	3.0	0.8	7.6
2007	48	5.9	3.9	8.6	24	8.3	4.8	14.1	12	9.4	4.1	20.0
2008	52	0.0	0.0	0.1	28	0.0			12	0.0		
2009	48	0.2	0.1	0.4	24	0.2	0.0	0.3	12	0.1	0.0	0.5
2010	46	4.43	3.01	6.36	24	8.19	5.24	12.52	18	7.34	4.53	11.56
2011	48	0.83	0.43	1.36	24	0.60	0.18	1.17	12	0.77	0.06	1.95
2012	47	0.09	0	0.23	24	0.16	0	0.45	12	0.26	0	0.94

+ Used in comparison to the Hudson River YOY Striped Bass Abundance Index

* 200' seine hauls only, Little Neck and Manhasset Bays

** if LCI < 0 then LCI was set to 0

Table 23 **Length-frequency of the striped bass spawning stock collected by haul seine in the Hudson River Estuary 1985-2012. No data collected in 2002.**

Total Length	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Male																												
<300			1																		1	2	1	1	1	1	3	12
300-319			1																									
320-339					1																							2
340-359								1						2	1				1			1			1			
360-379	1		3			4	1	4		2	1	3	1	3			4		1	3	3	3			1		1	
380-399	3	4		6	4		4	10	2	3	4	4	1	4	1	1	7		3	8	6	7	1	1	1	2		1
400-419	6	5	10	7	2	3	6	17	11	6	5	5	2	6	4	5	11		7	12	11	3	3	10	2	9	4	3
420-439	5	10	6	23	15	2	5	26	3	2	6	3	2	11		5	16		3	28	14	9	8	20	3	12		5
440-459	6	7	9	22	6	6	13	17	15	7	10	8	2	11	3	6	12		5	16	16	4	13	13	5	9	4	6
460-479	6	16	23	31	9	3	7	9	10	7	11	4	1	5	2	5	9		5	13	15	10	13	11	8	5	3	1
480-499	4	9	23	38	14	5	5	24	4	7	8	7	1	8	6	4	6		5	17	22	9	14	14	11	15	3	3
500-519	1	8	34	47	18	5	5	26	11	7	10	4		10	5	8	4		17	21	27	9	19	15	9	16	3	6
520-539	6	9	48	33	21	8	8	24	7	8	7	7	2	10	6	10	5		21	14	36	11	18	18	9	15	7	5
540-559	3	12	44	39	15	7	6	39	11	5	15	5	2	8	5	11	6		17	18	32	19	15	20	14	22	4	9
560-579	3	5	46	61	29	4	10	27	20	6	9	5	2	6	7	5	5		23	18	32	25	18	17	6	12	5	10
580-599	2	7	41	58	36	10	7	28	15	3	14	8	2	7	4	10	10		17	24	28	28	23	13	10	15	4	11
600-619	4	10	24	53	27	12	1	28	16	6	11	20	5	3	3	14	5		14	20	38	23	21	23	8	13	2	4
620-639	5	11	29	60	28	11	4	21	11	13	14	20	1	3	5	8	3		9	17	26	32	19	22	6	18	4	10
640-659	2	8	34	64	33	8	7	24	10	7	11	10	3	2	1	7	12		8	20	35	22	22	20	10	14	3	5
660-679	3	9	17	41	20	9	5	26	10	11	18	21	3	8	5	5	8		12	18	31	18	15	27	10	19	4	4
680-699	1	3	17	28	22	9	5	22	10	13	7	29	3	5	3	3	15		18	19	33	9	17	20	10	13	4	7
700-719	1	6	13	24	20	6	7	19	9	16	10	24	2	7	3	5	10		17	22	32	21	14	17	14	9	5	6
720-739	1	3	10	8	13	12	10	25	16	12	17	20	2	6	5	1	7		13	15	30	16	11	14	7	8	1	4
740-759			4	13	12	6	8	29	15	8	8	32	3	4		6	6		13	16	31	14	10	8	13	10		7
760-779	1		9	10	7	11	3	24	10	4	11	28	2	3	9	4	6		17	12	27	9	13	13	12	9	2	2
780-799	1		5	6	3	5	4	16	10	3	10	19	2	7	8	2	9		13	17	27	9	9	8	6	11	2	7
800-819			4	4	1	6	3	21	11	8	16	13		1	5	4	11		9	10	26	7	7	2	6	10	2	5
820-839			2		3	1	3	18	13	6	6	15	1	4	2	6	11		3	9	12	5	3	3	3	1	1	8
840-859			2	3	1	1	6	12	7	8	2	10		2	2	2	7		8	9	10	2	3	5	3	2		4
860-879			2	5	2	1	3	11	9	4	5	12	2	2	1	2	7		3	8	7	4	3	3	2	5		5
880-899		1		2		2	2	4	3	1		4		2		2	4		5	5	10	3			1	7	1	2
900-919			2	2	1			6	1	4	5	5		1	1		8		3	4	9	1		2	1		2	2
920-939			2	2		2	2	4		2	4	5		2	1		5		2	5	3	1	1	1	1		1	3
940-959			2	1	3			2	1	3	1	2		1			2			4	2		1	1			1	3
960-979				1					1	1					1	1	1		2	4	3	2		2				
980-999									1	1	1						3		2	1	4			1	1			
1000-1019	1											1								1					1			
1020-1039																			1		1							
1040-1059					1														1	1	1							
1060-1079																												
1080-1099								1																				
>1100		1																			1							
Total	66	144	467	692	367	159	150	565	273	194	257	353	47	154	99	142	235		298	429	642	338	315	345	195	282	76	162

Table 23 **Length-frequency of the striped bass spawning stock collected by haul seine in the Hudson River Estuary 1985-2012. No data collected in 2002.**

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Female																												
<300																												
300-319																												
320-339																												
340-359																												
360-379																												
380-399																												
400-419																	1											
420-439												1			1													
440-459									1														1					1
460-479	2						1						1															
480-499	2								1													1						
500-519																							1					
520-539	3					1																1						1
540-559								1																1				1
560-579		1	2		1	1		1	1		1	1	1			1							1	1				
580-599	2		1	5	3		1					1					1							1		1		
600-619	3		3	5	2	3	1	2		1						1					1	2						1
620-639	1	1	5	5	3	2		2	2			1					2					4	1	2	1			3
640-659	1	2	3	11	8	4	2	2	1	1	1			1	1	2			1	1		1	1	1		1		5
660-679		3	7	8	9	2				3	1					1			2	1		2			1	3		5
680-699	1	2	11	10	18	4	2			1	2	1		1		2	1		2		3	4	2	1	1	7	2	5
700-719		6	21	22	21	5	5	2	2	2	2	2					1		3	1	1	5	2	2		4	2	8
720-739	1	4	13	21	28	17	2	5	1	3	3	1		4			4		2	2	2	6	3	7	2	3	2	8
740-759		1	23	22	26	11	5	4		3	11	7	6	2	1	3	3		5	12	7	8	9	15	8	5	10	18
760-779	3	1	18	27	28	24	11	9	5	10	6	10	4	7	5	4	2		6	11	16	31	11	13	19	9	13	23
780-799	1	2	22	28	19	23	12	21	4	14	14	15	2	17	7	6	4		23	22	14	26	18	13	19	10	9	20
800-819			18	22	27	35	16	34	5	12	28	13	6	15	15	11	3		20	23	19	33	29	18	20	21	11	56
820-839	2	1	13	31	27	33	20	51	12	15	14	17	9	12	12	12	4		24	18	14	34	36	23	30	23	12	49
840-859		2	15	14	31	33	23	51	24	20	20	26	7	26	14	17	4		23	25	18	47	48	32	36	24	8	43
860-879		1	9	13	25	24	20	52	29	28	21	22	8	15	16	25	10		19	30	26	40	44	36	41	24	14	47
880-899			10	13	20	15	15	51	30	28	13	21	6	21	21	24	6		15	15	13	36	31	39	38	15	15	47
900-919			9	8	17	12	12	41	23	17	19	24	5	33	11	18	7		17	12	11	47	18	17	43	21	13	43
920-939			9	2	11	9	7	29	21	18	11	16	6	21	13	9	9		19	12	10	23	15	19	34	23	6	30
940-959			12	2	6	18	5	20	11	19	16	9	4	13	10	13	10		11	9	12	15	8	8	17	12	7	32
960-979	1		12	5	10	6	3	17	13	10	12	8	5	17	15	8	3		13	8	10	12	8	10	15	13	8	18
980-999	1		4	8	4	2	2	5	6	8	8	4	2	11	7	4	4		15	19	8	12	3	6	5	7	5	19
1000-1019			4	8	7	2	1	5	4	6	3	3	3	12	6	6	9		16	8	6	9	4	7	10	3	2	11
1020-1039			2	7	4	1	1	10	2	2	2	3	3	7	4	4	3		4	4	2	5	3	3	2	6	2	4
1040-1059	1		5	3	1		3	6		2	5		1	8	1	1	1		5	3	3	7	4	3		1	1	6
1060-1079			2		3	1	1	5			2	2		3		1	3		2	1	2	5	2	1	2	3	1	3
1080-1099			6	1	2	1	1	2	1	2			1	4	2		1		2	3	3	3	3	1		1	1	
1100-1119				1	1			1	1					2					4	1		1		1	1			1
1120-1139			2					1	1		1						1		2				2	1			1	
1140-1159						2							1		1		1		1									
1160-1179																1						1		1			1	1
1180-1199			1											1			1											
>1200						1															1			1				1
Total	25	27	262	302	362	292	172	430	201	225	216	208	81	253	163	174	99		256	241	202	421	308	284	345	240	146	510

Table 24 **Age structure (number at age) of striped bass spawning stock collected by haul seine in the Hudson River Estuary.**

* Age structure for 1996 - 1999, 2003-12 estimated using a length-age key.

No data collected in 2002.

FEMALE

Year	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
1985			2	5	11	2	4	2	1											27
1986				4	3	8	6	5	1											27
1987				11	61	68	38	33	21	10	7	5	2	2		1			1	260
1988				7	29	119	73	21	23	12		7	1	2	1					295
1989				6	68	70	93	59	20	19	5	2	2	2						346
1990				1	29	69	68	57	32	8	4	1	2							271
1991					1	29	46	43	27	12	5	4		1						168
1992			1	2	6	30	117	115	66	39	18	2	2	1						399
1993				4	4	9	29	54	42	30	11	2		1						186
1994				1	3	28	29	39	64	29	11	6	1							211
1995					5	26	53	25	17	29	12	8	2	2						179
1996			0	1	10	33	50	48	34	20	6	3	1	1	0					207
1997					2	5	22	13	8	7	3	5	2	1						68
1998				0	7	28	47	53	44	29	13	7	1	3	0	0				233
1999				0	4	20	35	37	32	20	8	4	1	1	0	0				162
2000			0	1	6	22	40	41	32	19	7	3	1	1	0					174
2001				1	5	11	17	19	19	12	6	3	1	2	0	0			0	97
2002																				0
2003				1	10	38	53	50	45	29	13	7	3	4	0	0			0	255
2004				1	12	41	56	48	39	26	10	6	1	1	0	0				241
2005				1	11	34	47	41	32	21	8	4	1	1	0	0				201
2006				4	24	69	99	90	65	40	15	8	2	3	0	0				420
2007			0	2	14	53	84	67	44	24	10	5	2	1	0	0			0	306
2008			0	5	35	76	74	44	25	14	5	3	2	1	0					283
2009				1	13	48	83	83	62	34	12	5	1	2	0					345
2010				2	13	37	56	52	40	25	9	5	1	1	0	0				240
2011				1	9	26	33	30	22	14	5	3	2	1	0	0			0	146
2012				5	31	84	120	108	80	50	16	8	2	3	0					508

MALE

Year	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
1985		5	20	17	13	17	7	1	2	2		1		1						86
1986		22	37	36	26	12	4	4	2							1				144
1987	1	11	118	107	95	62	27	27	12	3		1								464
1988		6	113	246	119	98	50	16	23	5	2									678
1989		13	23	73	110	53	41	20	8	7				1						349
1990		11	19	7	35	38	15	15	8	3										151
1991		23	37	7	4	24	21	10	14	7		1								148
1992		17	114	115	41	24	72	63	37	20	12	3								518
1993		12	23	58	51	21	21	33	27	8	7			1						262
1994		6	20	18	31	41	14	20	9	10	4	1								174
1995		6	41	53	32	31	26	19	7	3	8	2								228
1996		9	25	45	51	57	53	51	36	17	8	2		0						353
1997		8	3	5	9	7	5	5	2		1									45
1998		8	44	53	48	43	34	30	20	9	6	2		1						297
1999		4	16	18	14	13	12	11	7	2	2	0		0						99
2000		6	26	33	23	17	13	11	7	3	2	0		0						142
2001		17	37	36	28	24	26	27	20	11	7	2		0						235
2002																				0
2003		8	44	53	48	43	34	30	20	9	6	2		1						296
2004		23	73	83	63	52	42	38	28	15	10	2		1						429
2005		19	90	118	103	89	75	65	42	20	12	3		1						639
2006		11	47	78	60	50	35	26	17	7	5	1		0						336
2007		10	51	73	58	44	31	23	15	6	2	0		0						314
2008		19	67	81	61	43	29	21	13	6	3	0		0						344
2009		6	29	36	32	29	23	19	12	6	2	1		0						194
2010		11	50	61	48	37	28	23	15	6	2	0		0						281
2011		3	14	16	13	9	6	5	4	2	1	0		0						73
2012		7	20	27	21	18	16	16	13	7	3	1		0						150

Table 25. 1987-2011 Age Frequency of Adult Coastal Striped Bass Stocks Captured by Ocean Haul Seine/Ocean Trawl During the Fall

Age	Year 1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
1	13	36	7			1		3	5	1	8		1	1		8									
2	97	438	223	193	319	81	307	181	761	202	437	427	139	341	70	515	182	107	380	57	11		14	1	
3	390	411	296	671	566	619	721	580	306	1482	322	396	872	242	424	228	317	791	104	782	108	14	14	21	2
4	617	392	146	533	423	433	551	253	200	265	628	205	203	576	124	173	84	352	346	75	773	59	35	36	13
5	532	378	212	169	116	196	241	252	67	134	100	401	71	190	189	68	67	100	121	153	135	184	15	93	11
6	179	215	152	167	55	51	165	141	55	45	49	79	51	59	81	92	23	52	27	47	207	23	29	85	23
7	61	73	106	148	82	30	60	82	22	30	15	26	12	54	52	59	44	16	14	14	58	23	13	109	18
8	16	40	27	93	99	63	36	44	15	17	19	19	7	8	58	23	37	18	6	7	21	5	10	12	38
9	10	10	8	30	62	51	42	45	11	7	13	14	9	8	12	26	26	13	9	4	16	5	6	11	3
10		5	9	10	27	32	37	51	13	7	8	2	11	4	11	3	21	4	8	1		3	6	8	7
11	1	2	2	3	6	13	21	22	13	1	5	4	5	2	6	6	11	4	6	3	2	1	3	2	3
12			1		3	5	8	22	4	8	7	4	3	3	3	2	3	3	3		3	1	3		
13	1	4	1	1	2	1	3	5	5	1		3	1	2	6	3	3		4			2			
14	1	1	1	1	3	2	1	4	1	1		2	3	2	2	1	4	1				1			
15		7	3		2	5	2	2	1		3		1	1			1		2						
16		3		1	4	1		2						1	2				2						
17		2		2	4	1	1	5																	
18	1	3	1		1		1	4							1										
19		1					2	1																	
20		1																							
21		1					1																		
22					2																				
N aged	1,919	2,023	1,195	2,022	1,776	1,585	2,200	1,699	1,479	2,201	1,614	1,582	1,389	1,494	1,041	1,207	823	1,461	1,032	1,143	1,334	321	148	378	118
total tagged	1,741	1,870	947	1,118	1,093	1,376	1,920	1,611	1,385	1,905	1,691	1,547	1,352	1,485	1,027	1,188	801	1,443	986	1,150	1,343	268	130	364	120
total Caught	3,812	2,892	1,248	4,586	9,725	4,918	3,120	5,745	7,016	15,884	25,585	26,875	3,735	9,758	6,322	7,123	11,286	11,563	9,579	14,226	1,715	N/A	150	387	154

Table 25. Date Standard Geometric Mean Catch at Age
from the New York Ocean Haul Seine Survey 1987- 2006, and Ocean Trawl Survey 2007 - 2011.

	cpue by Age						
Year	2	3	4	5	6	7	8+
1987	1.13	6.93	12.77	9.91	3.14	1.24	0.4
1988	6.41	7.64	5.53	4.72	2.42	0.62	0.93
1989	1.86	2.73	1.5	1.62	1.04	0.95	0.4
1990	1.89	9.19	9.52	3.54	3.06	1.73	1.85
1991	5.23	9.26	6.16	1.31	0.42	0.64	2.27
1992	1.49	7.84	4.85	2.28	0.62	0.27	1.68
1993	3.81	9.43	7.09	1.71	0.8	0.23	1.24
1994	2.22	4.26	2.46	2.12	1.31	0.86	2.56
1995	3.2	3.52	3.32	0.94	0.86	0.46	0.69
1996	11.75	105.61	16.13	4.64	1.33	1.03	0.64
1997	20.24	23.79	44.23	6.56	1.81	0.36	1.04
1998	19.6	31.02	17.91	29.83	3.82	0.95	1.31
1999	1.97	17.75	4.87	1.68	1.24	0.14	0.5
2000	7.79	11.81	26.54	9.43	2.23	2.25	0.8
2001	1.49	12.94	4.19	6.05	2.09	0.78	0.87
2002	7.33	5.14	4.19	1.83	1.67	1.3	1.1
2003	11.51	20.76	7.12	5.25	2.31	3.68	8.35
2004	5.46	62.09	29.79	6.84	2.42	0.83	1.44
2005	9.72	5.09	16.41	5.45	1.34	0.55	0.93
2006	3.9	38.77	4.44	9.81	2.59	0.88	0.55
2007*	0.23	1.52	8.87	2.94	4.46	1.34	1.2
2008*	0	0.41	2.05	5.18	0.76	0.61	0.61
2009*	0.15	0.26	0.78	0.35	0.68	0.27	0.73
2010*	0.02	0.44	0.68	1.35	1.51	1.73	0.69
2011*	0	0.06	0.44	0.36	0.75	0.59	1.73

*From 2007 - 2011, Ocean Trawl Surveys were conducted, instead of Ocean Haul Seine Surveys.

** 2001 Year Class ** 2003 Year Class

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF FISH & WILDLIFE

Striped Bass Fisheries Management Measures,
Harvest and Resource Monitoring: 2012
&
Striped Bass Management Programs: 2012

April 2013

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Submitted to the Atlantic States Marine Fisheries Commission as a requirement to the Interstate Fishery Management Plan for Striped Bass

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In accordance with the Interstate Fisheries Management Plan for Atlantic Striped Bass (Plan), the State of New Jersey's Division of Fish and Wildlife (Division) herein submits its annual report on striped bass fishery dependent and independent monitoring programs conducted with state waters during 2012, as well as anticipated management measures for 2013.

I. FISHERY DEPENDENT MONITORING

A. Commercial Fishery (Striped Bass Bonus Program)

Since there is no netting and no sale of striped bass in New Jersey, the commercial allocation forms the basis of the Striped Bass Bonus Program (SBBP). The quota for 2012, allocated by the Atlantic States Marine Fisheries Commission (ASMFC), was 321,750 pounds.

1. Characterization of Fishery

As defined by regulation, recreational anglers intending to take one striped bass measuring not less than 28 inches in length in addition to the normal possession limit (see section IB1, p.6) had to apply on-line to the Division for a "fish possession permit". Applicants receive one non-transferable permit to be filled out immediately upon capture of the bonus fish. The used permit and harvest information must be reported on-line and anglers are eligible to obtain an additional permit if available.

2. Characterization of Catch and Harvest

The SBBP accounted for 325 fish harvested during the 2012 calendar year for a cumulative weight of 6,285 pounds. This represents a total harvest of 2.0% of the 2012 quota allocation (Table 1). Total lengths of fish harvested ranged from 28 to 52 inches with a mean of 34.3 inches (Figure 1). The weight of harvested fish ranged from 7 to 50 pounds with a mean of 19.3 pounds (Figure 2).

The 2012 harvest continues a trend of harvests that are well below the long-term average. Changes in the administration of the SBBP over the last few years and Superstorm Sandy in October 2012 contributed to the second lowest estimate of the time series.

3. Characterization of Other Losses

The New Jersey American shad commercial gill net fishery takes place primarily during the months of March and April. This period coincides with the presence of large concentrations of striped bass migrating along the coast and in Delaware Bay. Most commercial shad nets for the directed fishery in Delaware Bay are 5.5" to 6" stretch mesh. Striped bass bycatch mortality has been a resource and management problem for many years although this has been tempered somewhat with the closure of the directed shad fishery in ocean waters and the attrition of shad fishers within Delaware Bay.

Reliable estimates on striped bass bycatch mortality were calculated for 2000 through 2012 (Table 2 and previous reports). Data were derived from mandatory American shad commercial fishery logbooks that included directed fisheries within Delaware Bay as well bycatch fisheries in New Jersey's coastal areas. Prior to 2000, the Division utilized the National Marine Fisheries Service (NMFS) annual American shad landings data for all non-harvest loss calculations.

Commercial fishers accounted for 27,506 pounds of American shad landings in 2012. The percentage of drift gear versus fixed gear was 51.6 % and 48.54 %, respectively. Mortality rates of striped bass in drift gear (0.1 %) and fixed gear (4.2 %) were also developed from the 2012 logbooks. Mortality rates were multiplied by the reported number of striped bass caught by commercial shad fishers to estimate the total striped bass mortality in numbers. Total striped bass

mortality was multiplied by the 2012 mean weight of striped bass calculated from field investigations in Delaware Bay (7.79 pounds) resulting in a non-harvest loss estimate of 1,310 pounds.

Information regarding length and age frequencies of striped bass representative of the bycatch in the American shad commercial fishery can be found in section IIB2, Table 12 and Figure 10. Striped bass biological characterization from the Delaware Bay Tagging Program (DBTP) is similar in terms of season and gear as that of the American shad commercial fishery.

B. Recreational Fishery

1. Characterization of Fishery

New Jersey striped bass management is governed primarily by statute. The current recreational management measures were signed into law (N.J.S.A 23:5-45-1) in 2006 to comply with Amendment #6 to the Plan. Another important piece of legislation was the inclusion of a prohibition on the sale of striped bass in 1991. The following were New Jersey's striped bass management measures for 2012:

Size Limits:	Effective January 1, 2009 through December 31, 2012 2 fish greater than or equal to 28 inches
Possession Limit:	2 striped bass – all waters
Closed Seasons:	January and February in all intra-coastal waters; April and May in the lower Delaware River (spawning ground closure)
Gear Restrictions:	Anglers fishing with natural bait in the Delaware River are required to use non-offset circle hooks from April 1 through May 31.

2. Characterization of Catch and Harvest

Recreational fishery catch statistics obtained (queried 3/7/13) from the Marine Recreational Information Program (MRIP) for 2012 include:

Total Catch (number):	561,703 striped bass	PSE – 21.1
Total Harvest (number):	161,919 striped bass	PSE – 28.2
Total Harvest (weight):	2,376,866 pounds	PSE – 27.9
Mean Weight of Harvest:	14.68 pounds	

Past MRIP recreational catch and harvest estimates are included in Table 3. All harvest estimates include sub-legal harvest (estimated under poaching in section IB3), illegal harvest outside state waters (federal waters) and harvest that should be credited as New Jersey's commercial harvest (SBBP). At this time, it is unknown as to the extent of this miscalculation, but the final estimate may need adjusting in the future.

Age 7 to 9 and age 13+ striped bass were the most harvested age classes, comprising 79% of the harvest in terms of numbers of fish and 67% of the harvest by weight.

Additional recreational catch statistics were calculated utilizing voluntary logbooks of recreational anglers who participated in the SBBP. Requested data include date, area, number hours fished, lengths from all striped bass kept or released, and the type of fishery utilized. The catch size composition is provided on 1,100 striped bass for 2012 with fish less than 18 inches dominating the catch (Figure 3). Catch and harvest, by region, can be found in Figures 4 and 5, respectively.

Recreational anglers in the south back bay and all ocean regions accounted for the highest percentage of catch in 2012, while the majority of fish were harvested in the North-ocean region.

Catch per effort data, including standard error, from New Jersey's recreational fishery from 1991-2012 was also compiled from voluntary logbooks (Table 4). The 2012 CPUE of 1.97 ranked second highest in the time series which averaged 1.48.

3. Characterization of Other Losses

Recreational poaching losses are estimated as 1.3% of the total sub-legal catch. Using the voluntary logbooks, fish less than 28 inches accounted for 57.1% of the total catch in 2012. The MRIP estimate for New Jersey total catch (A1+B1+B2) in 2012 was 561,703 striped bass, of which 320,528 are estimated as sublegal. The poaching estimate is therefore 1.3% or 4,167 striped bass.

The hook and release mortality estimate is derived from Bonus Program voluntary logbooks, Party and Charter Boat logbooks and MRIP catch statistics. The length frequency data of released fish from logbooks are used and then scaled to the B2 component of the MRFSS estimates to develop the total released bass-at-length by season (spring and fall) and by mode (shore/private and party/charter). A 2012 New Jersey age-length key is developed by season, using age data from a number of different fishery dependent and independent programs within NJ, to develop the total striped bass release-at-age.

A 9% hook and release mortality is then applied to the total release-at-age data to determine the estimated number of striped bass killed through hook and release. A conservative estimate of 9% hook and release mortality is justified since the majority of the yearly catch in New Jersey comes in Waves 5 (Sept-Oct) and 6 (Nov-Dec) of the MRFSS. The high salinity, low water temperature conditions during these waves support the conservative estimate. The total number of striped bass killed by hook and release mortality in the recreational fishery for 2012 was estimated to be 35,981 fish, with a total weight of 316,164 pounds. Age 3 striped bass were the most discarded, in total number and age 5 in total weight (Figure 6a and 6b, respectively).

Table 5 summarizes all striped bass fisheries dependent and independent losses in number and weight for New Jersey in 2012. Total losses of striped bass are estimated as 199,739 fish and 2,708,720 pounds.

II. FISHERY INDEPENDENT MONITORING

In accordance with the Plan, New Jersey is required to:

A) Conduct a juvenile abundance survey for striped bass in the Delaware River in order to provide a juvenile abundance index, and

B) Tag the coastal mixed migratory population of striped bass in the Delaware Bay during the late winter/early spring as part of the USFWS Coastal

Cooperative Tagging Program.

A. Delaware River Young-of-Year Recruitment Survey

1. Methods and Materials

Since 1980, the Division has conducted a striped bass survey in the Delaware River to provide an annual index of striped bass juvenile abundance. Field sampling utilized a bagged, 100-foot long by 6-foot deep by ¼-inch mesh beach seine. All striped bass caught were quantified and measured. Basic water quality parameters that included water temperature, salinity and dissolved oxygen were also recorded.

By 1987, the survey evolved into a sampling scheme that consisted of sixteen fixed stations twice a month from mid-July through mid-November, with two seine hauls at each station during each event. This format was followed consistently from 1987–1990. After a thorough statistical analysis of the first ten years of data, the consulting firm, Versar Inc, provided a number of recommendations for the survey design. They included: a) sampling season from August through October; b) utilizing both fixed and random stations; c) concentrating fifty percent of the sampling effort to Region II; and d) eliminating replicate samples. These recommendations were incorporated into the sampling protocol from 1991–1997. A fixed station format was followed during the 1998-2012 seasons, where 32 stations (Table 6) were sampled twice a month from August through October. Occasionally due to tidal extremes, sediment, or construction, alternate sites are sampled. Alternate stations used in 2012 are also included in Table 6 for reference.

The Delaware River recruitment survey area (Figure 7) is divided into three distinct habitats:

1) Region I -- brackish, tidal water extending from the springtime saltwater/freshwater interface to the Delaware Memorial Bridges
2) Region II -- brackish to fresh tidal water extending from the Delaware Memorial Bridges to the Schuylkill River at the Philadelphia Naval Yard, and
3) Region III -- tidal freshwater from Philadelphia to the fall line at Trenton

Regions I and II represent the historical striped bass spawning grounds. Saltmarsh vegetation predominates along the Region I shoreline while Region II is primarily urban with a shoreline heavily developed for commerce and industry. Region III is sporadically developed by industry with considerable freshwater marsh.

Current juvenile abundance is reported as the number of striped bass per seine haul from August through October. Estimates for each region and all yearly data were pooled for a whole river index (calculated as a geometric mean index).

2. Results

During the 2012 sampling season, 117 age zero striped bass were caught in 192 seine hauls, producing a whole river geometric mean CPUE index of 0.34. This ranks as the 27th highest index in the time-series and is well below the time-series average of 1.00, as well as the average of the last ten years of 1.31 (Table 7 and Figure 8). Striped bass occurred in 59 out of the 192 samples taken (26%) with individual young-of-year (yoy) catches ranging from 0 to 17 bass.

Production was below average for all regions in 2012. The Region II index (0.33) ranked among the lowest (30^{th}) in the time series, while the Region III index (0.29) was only slightly below average (Table 8). In most years, the greatest catches of striped bass yoy typically occurred

during August. In 2012, October's catches (0.39) were slightly higher than catches in August (0.36) which were both above average of 0.34 for the year (Table 9). Figure 9 demonstrates how the August yoy influences the overall index, especially during years with high recruitment. One exception to this was in 1995, when the September index was greater than August, although catches were strong during the entire sampling period.

There were 101 yearling striped bass caught for a geometric mean CPUE of 0.31 (Table 10). The number of yearlings ranked seventh in the time-series.

The Delaware River Recruitment Survey continues to reflect the overall population of striped bass along the East Coast. The annual recruitment index has been utilized to validate the annual CPUE estimates from the Delaware Division of Fish and Wildlife's Delaware River striped bass spawning stock survey and New Jersey's Ocean Trawl Survey (OTS).

B. Striped Bass Tagging in Delaware Bay

1. Methods and Materials

New Jersey joined the efforts of other agencies by entering the U.S. Fish and Wildlife Service's (USFWS) Cooperative Coastal Striped Bass Tagging Program in 1989. Sampling was initiated in areas of Delaware Bay where striped bass had been reported as bycatch in the shad gill net fishery. Gill nets (5 to 6 inch stretch mesh), 600 foot long by 8 to 12 feet deep, were utilized in Delaware Bay during March through April of 2012. Gill nets were allowed to set no longer than one hour and fifteen minutes with an average soak time of 33 minutes. Striped bass in good condition were processed as follows: fork and total lengths (millimeters) recorded, scale samples taken, tagged using internal anchor/external streamer tags provided by the USFWS and then released. A subsample of tagged fish was weighed. In addition, a subsample of fish caught was retained for biological characterization including otolith removal. Basic water quality parameters, net specifications, duration of the sets and other data as outlined by the USFWS were also recorded.

2. Results

During late winter and early spring of 2012, New Jersey tagged 182 striped bass in the Delaware Bay (Table 11). An additional 6 samples were collected for biological characterization. All fish ranged in total length from 19 to 38 inches, with a mean size of 25.0 inches (Figure 10). A subsample of fish (146) was weighed ranging from 3 to 22 pounds with a mean weight of 7.8 pounds. Striped bass sampled for biological characterization resulted in 1 female and 5 males. An age/length key (Table 12) was developed from aged scale samples (n = 173). Table 13 represents the age frequency composition for striped bass collected in Delaware Bay, utilizing the age key from Table 12. The majority of the fish collected (86%) were ages 5 through 8 years old, with the 2007 year class (age 5) accounting for 51% of the fish sampled.

During 2012, 196 recaptures were reported from the 33,811 striped bass that were tagged and released in the Delaware Bay from 1989–2012 (Table 14 and previous reports). Late spring and early summer were the prime seasons for recaptures, reflecting fishing effort (Table 15). Recapture locations ranged from Rudee Inlet in Virginia to off the coast of Scarborough, Maine. Recaptures of tagged fish were recorded from as little as 34 days to 18 years at large. Sport fishing accounted for 77% of the returns, commercial fishing 23% and research 1%. Thirty-four percent of the recaptures were released alive. There have been 8,347 tag returns reported during the twenty-four years of tagging in Delaware Bay, of which 70% have come from Massachusetts, New York and New Jersey waters, while only 9% occurred south of the Delaware Bay (Figure 11).

C. New Jersey Ocean Trawl Survey

1. Methods and Materials

The New Jersey Ocean Trawl Survey (OTS) is a multispecies survey that started in August 1988 and samples the near shore waters from the entrance of New York Harbor south to the entrance of the Delaware Bay five times a year (January, April, June, August and October). There are 15 strata with 5 strata assigned to 3 different depth regimes; inshore (3 to 5 fathoms), mid-shore (5 to 10 fathoms), and off-shore (10 to 15 fathoms). Station allocation and location is random and stratified by strata size (Figure 12).

The survey net is a two-seam trawl with forward netting of 4.7 inch stretch mesh and rear netting of 3.1 inches stretch mesh. The codend is 3.0 inches stretch mesh and is lined with a 0.25 inch bar mesh liner. Each trawl is 20 minutes long and at the end of each tow, the total weight of each species is measured in kilograms and the length of all individuals, or a representative sample by weight for large catches, is measured to the nearest centimeter. A series of water quality parameters, such as surface and bottom salinity, temperature and dissolved oxygen, are also recorded at the start of each tow. Scale samples are taken from a subsample of fish caught from all five cruises and then processed at the lab.

In 2005, New Jersey conducted a thorough evaluation of the striped bass data collected in the OTS, as required by the ASMFC Striped Bass Technical Committee. The analysis determined the survey adequately tracts coastal cohorts and is highly correlated with multiple other coastal and estuarine (recruitment) surveys. A new aggregated index (ages 2:13), as well as an index-at-age (age 2 through 8 and 9:13 aggregate), was developed in 2005 and approved by the Technical Committee. The results were then used for the first time in the 2005 coast wide stock assessment. These indices continue to use only the April cruise information; however, the survey has been re-weighted due to the removal of the offshore strata data and is now calculated as a geometric mean index.

2. Results

During the 2012 sampling season, there were 463 striped bass caught, with 337 caught during the April cruise (73%), and a majority of those (90%) were caught in the inshore and mid-shore strata (Figure 13). There were 196 age samples collected and processed during the 2012 sampling season. The final April 2012 age-aggregated geometric mean CPUE index was 3.482, which ranks 11th in the 24-year time series. The index was above the average of 3.78 and was the highest in five years (Table 16, Figure 14).

Of the 137 age samples collected, age 7 through age 9 striped bass (2005-2003 year class) accounted for 53% of the striped bass caught in April, while ages 2 and 3 (2010 and 2009 year class) were also well-represented (23%). The strong 2003 year class can be tracked in the 2012 age-specific indices, while the other age classes, younger or older, do not show any real trend when compared to the 2009-2012 April indices (Figure 15). The average (TL) size of striped bass caught in 2012, all cruises included, was 24.9 inches with a range of 5 to 39 inches (Figure 16). A similar average size (24.0) and range (5 to 38 inches) was caught during the April survey.

III. STRIPED BASS MANAGEMENT PROGRAM FOR 2013

A. Regulations for Striped Bass Management for 2013

There are no anticipated changes to the recreational striped bass regulations (size, season or bag limit) or the striped bass Bonus Program for 2013.

B. Striped Bass Monitoring Programs

1. Fishery Dependent Monitoring

The SBBP quota, 321,750 pounds, will continue to be monitored weekly to ensure the quota is not exceeded. Bureau personnel will continue to collect biological samples, scales and/or otoliths and weights, from striped bass.

SBBP logbooks, as well as the on-line reporting system, for individuals will continue in 2013. Length frequency of kept and released striped bass, CPUE estimates by area, month and mode, and harvest and catch rates will be determined from the data collected by the reporting forms.

Effective June 8, 2012, the NJDEP Division of Fish and Wildlife indefinitely suspended the Party/Charter Boat facet of the Striped Bass Bonus Program. This does not impact the individual angler facet of the SBBP nor does it affect the current recreational fisheries regulations for striped bass. Recreational anglers without a SBBP permit, including those fishing on for-hire vessels, can still harvest two striped bass per day at 28 inches or larger. Party/Charter Boat anglers can still harvest a 'bonus' bass if they obtain a SBBP permit from the Division's website prior to their fishing trip and have the permit in possession while fishing on the for-hire vessel.

2. Fishery Independent Monitoring

New Jersey will continue monitoring juvenile abundance in the Delaware River. All striped bass will be counted and measured after each seine haul. A juvenile abundance index, geometric mean, will be calculated to continue the time series of striped bass recruitment in the Delaware River for use in the coast wide stock assessment.

New Jersey will also continue winter/spring tagging of striped bass in Delaware Bay. All fish caught in good condition will be measured, weighed, scale samples will be taken and tagged with USFWS tags and then released. This information will be provided to the USFWS for use in the coast wide tagging assessment and in evaluating New Jersey’s striped bass fishery.

Lastly, Bureau personnel will be continuing the Ocean Trawl Survey. All striped bass, in all 5 survey cruises, will be measured and weighed and a sub-sample will be aged. A weighted age-aggregate and age-specific geometric mean CPUE index will be calculated for the April survey for continued use in the coast wide stock assessment.

3. Additional Information

In 2010, New Jersey instituted new protocols for biological sampling in order to streamline the collection process and eliminate duplicate data or data not being used for the coastal assessment. A recent decrease in sample sizes necessitated a change in the methods used to collect samples resulting in the development of a new long-term plan.

By targeting fishing tournaments and party/charter boats in the spring and fall of 2012, New Jersey collected 69 scale samples and 13 otolith samples during seven tournaments. The size range of these fish was 28 to 47 inches with a mean size of 40.6 inches. The sample size was much lower than previous years due to the cancelation of many fall tournaments after Superstorm Sandy. New Jersey plans to continue this sampling in 2013.

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Table 1. Summary of New Jersey's striped bass bonus harvest information: 1996-2012

Year	# Harvested	Weight Harvested (lbs)	Mean Length (inches)	Mean Weight	Quota	% of Quota
1996	233	4,050	35.7	17.4	225,000	1.8
1997	344	7,678	36.8	22.3	225,000	3.4
1998	473	11,149	37.2	23.6	225,000	5
1999	574	13,174	36.2	23.1	225,000	5.9
2000	2,488	42,794	33.7	17.2	225,000	19
2001	4,583	79,774	33.5	17.4	225,000	35.5
2002	4,855	82,050	33.0	16.9	225,000	36.5
2003	6,101	121,410	35.0	20.0	321,750	37.7
2004	4,602	81,870	32.8	17.8	321,750	25.4
2005	2,047	29,866	31.7	14.6	321,750	9.3
2006	1,127	23,656	34.9	21.0	321,750	7.4
2007	708	13,615	34.0	19.2	321,750	4.2
2008	367	7,345	34.3	20.0	321,750	2.3
2009	526	10,330	34.2	19.3	321,750	3.2
2010	728	12,833	34.5	17.6	321,750	4.0
2011	916	16,332	34.0	17.8	321,750	5.1
2012	325	6,285	34.3	19.3	321,750	2.0

Table 2. Estimated striped bass bycatch and non-harvest loss from the American shad gill net fishery: 2006-2012*

	2006	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
American Shad Commercial Landings NMFS (1996-1999); State (2000-2012)	68,308	66,418	30,146	13,999	13,360	12,084	27,506
# Pounds of Shad Landed per Striped Bass Caught	3.9	7.1	2.8	1.0	2.5	4.9	29.5
# of Striped Bass Caught	17,570	9,346	10,635	14,021	5,352	2,483	933
Striped Bass Mortality	2,791	1,638	1,035	626	1,194	492	168
Mean Weight of Striped Bass in By-Catch (pounds)	8.0	9.2	10.4	6.8	7.7	8.9	7.8
Striped Bass Non-Harvest Loss (pounds)	22,328	15,070	10,764	4,257	9,170	4,379	1,310

* Data from 2000 through 2005 can be found in previous reports or by request

Table 3. New Jersey striped bass recreational catch statistics MRIP: 1981-2012

Year	Total Catch (#)	Total Harvest (#)	%	Total Harvest (lbs)	Mean Weight (lbs)	Year	Total Catch (#)	Total Harvest (#)	%	Total Harvest (lbs)	Mean Weight (lbs)
1981	44,200	19,306	43.7	85,363	4.4	1997	804,534	67,800	8.4	821,784	12.1
1982	145,941	58,294	39.9	327,024	5.6	1998	577,293	88,973	15.4	1,333,330	15.0
1983	245,719	127,912	52.1	1,662,402	13.0	1999	1,389,692	237,010	17.1	3,342,372	14.1
1984	66,555	13,625	20.5	58,616	4.3	2000	1,287,591	402,302	31.2	4,286,040	10.7
1985	18,669	13,145	70.4	190,555	14.5	2001	1,525,858	560,208	36.7	5,341,867	9.5
1986	36,999	36,999	100	644,393	17.4	2002	1,131,554	416,455	36.8	4,133,678	9.9
1987	65,976	9,279	14.1	159,555	17.2	2003	1,317,727	391,842	29.7	4,258,557	10.9
1988	498,447	12,141	2.4	136,373	11.2	2004	1,926,901	424,208	22.0	5,548,167	13.1
1989	267,269	1,312	0.5	25,521	19.5	2005	1,630,424	411,531	25.2	5,958,454	14.5
1990	299,262	44,878	15.0	588,974	13.1	2006	2,399,897	509,602	21.2	7,067,533	13.9
1991	204,497	38,300	18.7	643,571	16.8	2007	2,078,951	289,657	13.9	3,718,451	12.8
1992	454,933	41,426	9.1	746,344	18.0	2008	1,618,865	309,412	19.1	4,696,090	15.2
1993	373,188	64,935	17.4	874,296	13.5	2009	1,083,536	283,026	26.1	4,238,319	15.0
1994	602,924	34,877	5.8	438,080	12.6	2010	1,010,753	320,413	31.7	5,382,743	16.8
1995	948,944	254,055	26.8	3,141,222	12.4	2011	1,277,206	393,193	30.8	6,197,026	15.8
1996	904,118	127,952	14.2	1,736,508	13.6	2012*	561,703	161,919	28.8	2,376,866	14.7

*preliminary data

Table 4. New Jersey's striped bass recreational CPUE from bonus logs: 1991-2012

Year	# of Directed Trips	# of Striped Bass Caught	# of Logs Analyzed	CPUE (Catch/Trip)	St. Err.
1991	7,883	8,800	601	1.11	0.020
1992	15,690	14,017	2,053	0.89	0.018
1993	11,374	12,395	1,249	1.09	0.023
1994	6,654	5,778	817	0.87	0.024
1995	5,114	5,628	643	1.10	0.027
1996	5,310	7,234	737	1.36	0.029
1997	5,125	6,385	815	1.25	0.031
1998	7,174	12,914	670	1.80	0.040
1999	7,877	12,708	820	1.61	0.030
2000	12,294	15,959	1,400	1.30	0.018
2001	12,573	19,476	1,500	1.55	0.020
2002	22,196	29,088	2,485	1.31	0.014
2003	21,996	31,595	2,539	1.44	0.015
2004	12,859	19,684	1,493	1.53	0.021
2005	15,306	24,589	2,043	1.61	0.027
2006	27,661	49,856	3,151	1.80	0.021
2007	10,076	17,988	911	1.79	0.033
2008	2,748	4,921	334	1.79	0.057
2009	1,875	3,570	247	1.90	0.058
2010	1,249	1,922	184	1.54	0.068
2011	1,156	3,115	211	2.00	0.047
2012	559	1,100	86	1.97	0.093

Table 5. Preliminary striped bass harvest loss estimates for New Jersey: 2012

	Losses in Number	Mean Weight (pounds)	Losses in Pounds
Commercial Harvest (Bonus Program)	325	19.34	6285
Commercial Discards (Shad bycatch estimate)	168	7.79	1,310
Recreational Harvest (MRIP estimate)	161,919	14.68	2,376,866
Recreational Discards Catch & Release Mortality	35,981	8.79	316,164
Recreational Poaching	1,337	6.02	8,049
Monitoring (NJDEP samples)	6	7.42	46
Total	199,736		2,708,720

Table 6. Delaware River Recruitment Survey sampling station locations: 2012

Region	Station Code	Name	Rivermile	Latitude	Longitude
I	29	Augustine Beach	53.5	3930.435	7534.617
I	1	Clay Beach	55.4	3930.955	7531.622
I	2	Oakwood Beach	58.7	3933.418	7531.079
I	3	Fort Mott	61.4	3936.092	7533.155
I	4	Gambles Gut	63.4	3938.318	7535.886
I	5	New Castle	65.9	3939.422	7533.984
I	6	Penns Beach	66.2	3938.908	7531.956
I	35	Pennsville	66.3	3938.987	7531.907
I	7	Churchtown	67.7	3940.246	7530.79
II	30	Helms Cove	70.9	3942.847	7528.722
II	33	South Penns Grove	71.9	3944.566	7528.172
II	8	Rodneys Hideout	73	3944.425	7528.261
II	9	Oldmans Point	74.8	3945.758	7527.693
II	10	Naaman Creek	77.6	3947.762	7527.136
II	11	Raccoon Creek	80.7	3948.668	7522.871
II	12	Old Canal Corner	82.4	3949.61	7521.241
II	13	Chester Island	83.5	3950.393	7520.542
II	14	Sand Ditch	84.9	3950.531	7518.672
II	36	South Tinicum Island	86.1	3951.222	7518.076
II	15	Tinicum Island	86.9	3951.132	7516.836
II	16	Tinicum Island (NE; Pa SIDE)	87.5	3951.27	7516.36
II	31	Bramell Point	87.6	3950.487	7516.162
II	17	UPS Beach	88	3951.443	7515.407
II	34	Paulsboro	88.9	3951.031	7514.671
II	19	Mantua Creek	89.8	3951.175	7513.5
II	20	Pebble Beach	92.6	3952.498	7511.577
II	21	Eagle Point	94.4	3952.685	7510.647
III	22	Pennsauken Creek	105.8	3959.89	7503.186
III	23	Pompestron Creek	108.8	4001.237	7500.397
III	24	Hawk Island	111.8	4002.72	7458.514
III	25	Cornwells Heights	114.8	4004.415	7455.069
III	26	Edgewater Park	116.5	4004.365	7453.4
III	27	Burlington Island	118.5	4005.222	7451.395
III	28	Landreth Channel	120.4	4006.276	7449.95
III	32	Newbold Island	125.7	4007.671	7446.07

Table 7. Delaware River striped bass indices of relative abundance: 1980–2012

Year	# of Hauls	YOY (n)	Arithmetic Mean	Proportion of Positive Hauls	Geometric Mean	Standard Error	95% Confidence Interval Lower Limit	95% Confidence Interval Upper Limit	Range
1980	20	2	0.10	0.10	**0.07**	0.05	-0.03	0.18	0 - 1
1981	13	0	0.00	0.00	**0.00**	0.00	0.00	0.00	0 - 0
1982	26	4	0.15	0.12	**0.10**	0.05	-0.01	0.23	0 - 2
1983	22	2	0.09	0.09	**0.07**	0.04	-0.02	0.16	0 - 1
1984	29	18	0.62	0.34	**0.37**	0.10	0.14	0.65	0 - 5
1985	56	5	0.09	0.02	**0.03**	0.03	-0.03	0.10	0 - 5
1986	46	23	0.50	0.30	**0.32**	0.07	0.16	0.51	0 - 4
1987	96	150	1.56	0.28	**0.53**	0.08	0.30	0.78	0 - 32
1988	96	60	0.63	0.29	**0.35**	0.05	0.21	0.49	0 - 11
1989	96	321	3.34	0.53	**1.07**	0.09	0.73	1.48	0 - 125
1990	96	218	2.27	0.55	**1.05**	0.08	0.74	1.41	0 - 43
1991	256	270	1.05	0.30	**0.47**	0.04	0.35	0.59	0 - 22
1992	258	985	3.82	0.50	**1.18**	0.06	0.93	1.46	0 - 94
1993	204	1,183	5.80	0.60	**1.78**	0.08	1.39	2.23	0 - 185
1994	204	473	2.32	0.52	**0.96**	0.06	0.74	1.19	0 - 35
1995	204	1,552	7.61	0.61	**1.98**	0.08	1.54	2.50	0 - 211
1996	204	892	4.37	0.58	**1.70**	0.08	1.34	2.12	0 - 67
1997	205	461	2.25	0.51	**1.01**	0.06	0.79	1.25	0 - 34
1998	166	582	3.51	0.54	**1.31**	0.08	1.00	1.67	0 - 108
1999	192	932	4.85	0.63	**1.90**	0.08	1.51	2.36	0 - 130
2000	192	1,164	6.06	0.57	**1.78**	0.08	1.36	2.26	0 - 113
2001	192	511	2.66	0.56	**1.20**	0.06	0.95	1.49	0 - 55
2002	192	249	1.30	0.35	**0.53**	0.05	0.39	0.69	0 - 27
2003	192	1,670	8.70	0.66	**2.47**	0.09	1.93	3.11	0 - 277
2004	192	573	2.98	0.44	**1.13**	0.07	0.86	1.45	0 - 32
2005	190	474	2.49	0.58	**1.22**	0.06	0.97	1.51	0 - 26
2006	192	246	1.28	0.43	**0.67**	0.05	0.52	0.84	0 - 16
2007	192	520	2.71	0.63	**1.41**	0.06	1.14	1.72	0 - 36
2008	160	395	2.47	0.56	**1.26**	0.07	0.98	1.58	0 - 31
2009	192	1,101	5.73	0.61	**1.92**	0.08	1.50	2.42	0 - 146
2010	192	487	2.54	0.60	**1.30**	0.06	1.04	1.59	0 - 28
2011	173	707	4.09	0.53	**1.41**	0.08	1.08	1.79	0 - 96
2012	192	117	0.61	0.31	**0.34**	0.04	0.24	0.44	0-17
AVG		495	2.68	0.43	**1.00**	0.06	0.75	1.25	

1980 – 1990: fixed station design with replicate sets; second half of July through first half of November
1991 – 1997: fixed and random station design with no replicate sets; August through October
1998 – 2012: fixed station design with no replicates; August through October

Table 8. Delaware River recruitment index, geometric mean, by region: 1980–2012

YEAR	Region I	Region II	Region III	Whole River	HAULS
1980	0.08	0.00	0.00	0.07	20
1981	0.00	0.00	0.00	0.00	13
1982	0.10	0.41	0.00	0.10	26
1983	0.00	0.59	0.00	0.07	22
1984	0.08	1.57	0.52	0.37	29
1985	0.00	0.16	0.00	0.03	56
1986	0.04	1.20	0.17	0.32	46
1987	0.82	1.02	0.06	0.53	96
1988	0.38	0.60	0.17	0.35	96
1989	1.58	2.42	0.19	1.07	96
1990	1.13	2.73	0.32	1.05	96
1991	0.28	0.83	0.06	0.47	256
1992	0.85	1.36	1.20	1.18	258
1993	2.39	2.65	0.32	1.78	204
1994	0.98	1.33	0.36	0.96	204
1995	1.60	3.81	0.31	1.98	204
1996	2.80	2.18	0.39	1.70	204
1997	1.43	1.21	0.36	1.01	205
1998	0.75	2.01	0.78	1.31	166
1999	1.44	3.27	0.60	1.90	192
2000	2.71	2.64	0.20	1.78	192
2001	0.95	1.79	0.55	1.20	192
2002	0.21	0.83	0.37	0.53	192
2003	8.30	1.98	0.76	2.47	192
2004	4.57	0.78	0.17	1.13	192
2005	3.84	0.68	0.77	1.22	190
2006	1.25	0.67	0.26	0.67	192
2007	2.47	1.68	0.36	1.41	192
2008	0.87	1.61	1.06	1.26	192
2009	4.27	2.10	0.45	1.92	192
2010	3.91	1.17	0.21	1.30	192
2011	5.00	0.80	0.54	1.41	173
2012	0.39	0.33	0.29	0.34	192
1980-2012	1.68	1.41	0.36	1.00	

Table 9. Delaware River recruitment index, geometric mean, by month: 2012

Month	Region I	Region II	Region III	Whole River
August	0.34	0.18	0.85	0.36
September	0.30	0.27	0.17	0.25
October	0.55	0.56	0.00	0.39
Year	0.39	0.33	0.29	0.34

Table 10. Delaware River striped bass age-1 relative abundance: 1980–2012

Year	Geometric Mean	95% Confidence Interval Lower Limit	95% Confidence Interval Upper Limit		Year	Geometric Mean	95% Confidence Interval Lower Limit	95% Confidence Interval Upper Limit
1980	0.035	-0.037	0.112		1997	0.327	0.224	0.439
1981	0.000	0.000	0.000		1998	0.152	0.078	0.231
1982	0.000	0.000	0.000		1999	0.284	0.197	0.377
1983	0.032	-0.033	0.102		2000	0.112	0.063	0.163
1984	0.116	0.004	0.240		2001	0.064	0.025	0.104
1985	0.079	0.009	0.154		2002	0.181	0.116	0.250
1986	0.056	-0.007	0.123		2003	0.077	0.042	0.113
1987	0.112	0.045	0.184		2004	0.110	0.065	0.156
1988	0.124	0.060	0.192		2005	0.079	0.040	0.120
1989	0.143	0.084	0.205		2006	0.154	0.101	0.209
1990	0.265	0.177	0.360		2007	0.051	0.019	0.084
1991	0.154	0.085	0.228		2008	0.310	0.224	0.402
1992	0.238	0.172	0.307		2009	0.076	0.039	0.115
1993	0.130	0.076	0.186		2010	0.16	0.098	0.225
1994	0.315	0.215	0.423		2011	0.126	0.079	0.175
1995	0.081	0.040	0.124		2012	0.308	0.222	0.400
1996	0.077	0.042	0.113					

Table 11. Striped bass tagging effort in Delaware Bay: 2012

Date	Number of Sets	Number of Hours Fished	Number of Bass Caught	Number of Bass Tagged
3/12/2012	6	3.0	33	33
3/13/2012	5	2.4	29	29
3/14/2012	5	2.25	61	58
3/15/2012	4	2.5	35	31
3/19/2012	5	2.42	18	18
3/22/2012	5	2.5	2	2
3/30/2012	1	0.67	0	0
4/5/2012	4	2.08	11	11
TOTAL	**35**	**17.82**	**189**	**182**

Table 12. Spring age-length key of striped bass collected in Delaware Bay: 2012

	PERCENT AT AGE							
Total Length (inch)	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
19		100.0						
20	42.9	42.9	14.3					
21	0.0	87.5	12.5					
22	11.8	52.9	23.5	11.8				
23	8.0	64.0	12.0	12.0		4.0		
24		70.0	6.7	13.3	10.0			
25		73.3	23.3		3.3			
26		53.8	15.4	7.7	23.1			
27		20.0	40.0		40.0			
28		12.5	25.0	37.5	12.5	12.5		
29				50.0	50.0			
30						100.0		
31					33.3	33.3	33.3	
32				33.3	50.0	16.7		
33					50.0	25.0	25.0	
34						25.0	75.0	
35				33.3	33.3	33.3		
36								100.0
37								
38							100.0	

Table 13. Age frequency of striped bass collected in Delaware Bay: 2012

AGE	MEAN LENGTH (TL/inches)	YEAR CLASS	FREQUENCY	PERCENT FREQUENCY
4	22.1	2008	7	4.0
5	24.1	2007	88	50.9
6	24.7	2006	24	13.9
7	26.9	2005	18	10.4
8	29.0	2004	19	11.0
9	31.0	2003	10	5.8
10	34.5	2002	6	3.5
11	36.9	2001	1	0.6
TOTAL			173	100

Table 14. Delaware Bay striped bass tag release/recapture matrix: 1997-2012*

		Number Recaptured By Year																
Release Year	**Number Released**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**Total Recaptured**
1997	508	58	22	20	5	9	7	4	2		5							132
1998	853		97	48	45	29	19	12	4	6	2	2						264
1999	1,865			146	115	76	51	29	24	25	16	4	3	1	1			491
2000	2,399				202	159	85	72	44	16	17	9	5	2	7	3	1	622
2001	2,386					224	124	91	54	35	19	9	7	4	1	1	1	570
2002	1,832						104	96	61	27	27	8	11	6	2	4	1	347
2003	2,395							200	131	88	41	29	23	14	5	4	4	539
2004	1,885								198	109	64	33	29	26	8	3	5	475
2005	1,329									120	64	39	28	16	15	5	2	289
2006	1,470										114	79	45	35	23	15	11	322
2007	1,152											102	54	42	32	29	8	267
2008	1,478												113	91	57	45	18	324
2009	2,239													181	134	70	39	424
2010	1,195														84	49	49	182
2011	756															50	41	91
2012	182																13	13
Total**	33,811	438	420	366	452	561	424	539	538	439	379	320	323	419	373	280	196	8,347

* Data from 1989 through 1996 can be found in previous reports or by request

** Total is for the entire time series

Table 15. Number of striped bass tagged in Delaware Bay and recaptured during 2012, by state and month

State	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Maine							3						3
Massachusetts					15	18	28	4	1	3			69
New Hampshire								1					1
Rhode Island					3	2	2	2	2	3			14
Connecticut					2	3	2		1				8
New York				5	4	5	6	4	2	7		1	34
Pennsylvania													0
New Jersey				16	6	5	1			1	7	5	41
Delaware			1		3								4
Maryland	3		1	3	1		1					1	10
Virginia	5										2		7
Unknown		3							1	1			5
Total	8	0	2	24	34	33	43	11	6	14	9	7	196

Table 16. April Ocean Trawl Survey striped bass geometric mean per tow: 1989–2012

Year	GM CPUE (unweighted)	95% Confidence Intervals		GM CPUE (weighted)
		Lower Limit	Upper Limit	
1989	0.470	0.077	1.006	0.234
1990	0.659	0.148	1.399	1.130
1991	0.872	0.318	1.660	1.414
1992	0.655	0.269	1.158	0.648
1993	0.586	0.213	1.074	0.670
1994	1.145	0.605	1.867	1.470
1995	6.814	3.555	12.405	5.239
1996	5.442	2.706	10.199	5.880
1997	5.670	2.691	11.053	6.541
998	7.798	4.480	13.125	5.974
1999	3.385	1.705	6.108	3.675
2000	6.527	4.166	9.968	5.730
2001	2.049	1.160	3.303	1.677
2002	1.403	0.556	2.713	2.148
2003	6.373	3.563	10.913	7.783
2004	6.073	3.657	9.742	6.050
2005	7.016	3.459	13.411	6.412
2006	2.127	0.845	4.300	2.605
2007	3.572	1.870	6.284	3.503
2008	1.401	0.665	2.463	1.381
2009	1.576	0.731	2.833	2.236
2010	0.778	0.146	1.756	0.731
2011	1.788	0.880	3.135	2.074
2012	2.787	1.056	5.976	3.482
Time series avg.	3.207	1.647	5.744	3.279

* Table does not include offshore station data

Figure 1. Percent length frequency (tl, in) of Striped Bass Bonus Program harvest: 2012

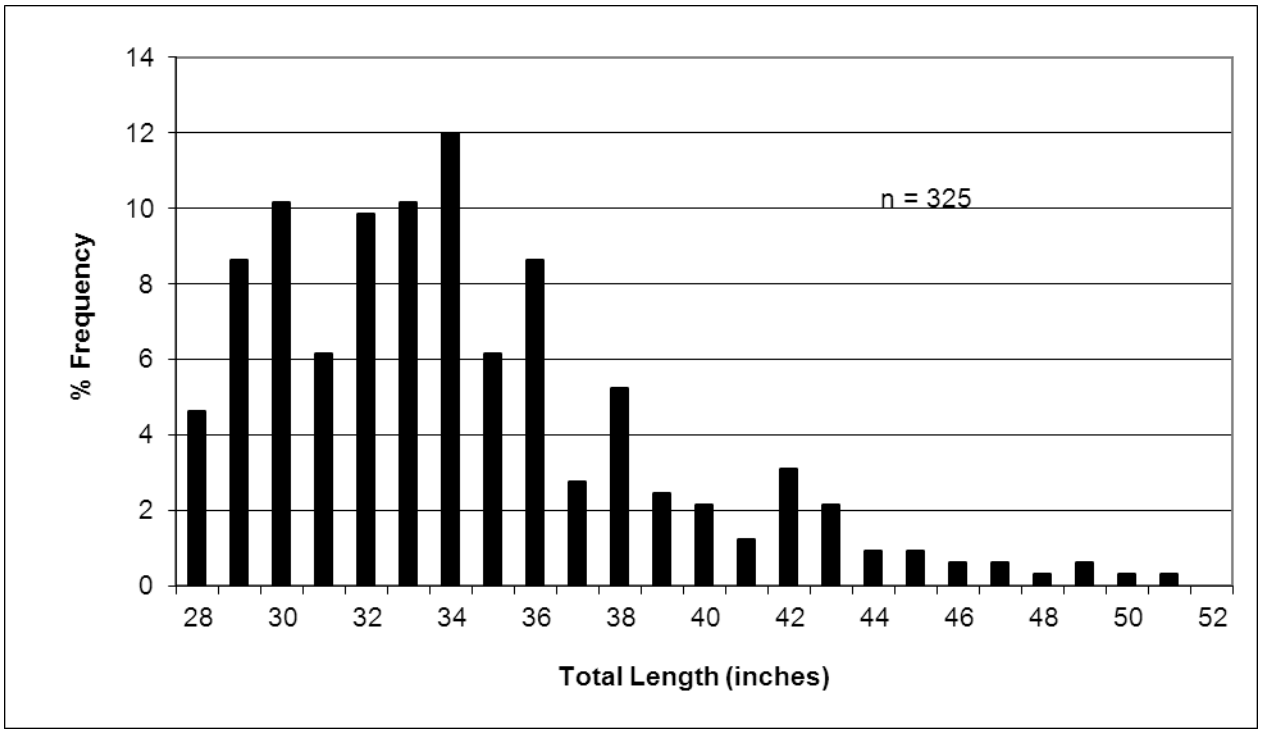


Figure 2. Percent weight frequency (lbs) of Striped Bass Bonus Program harvest: 2012

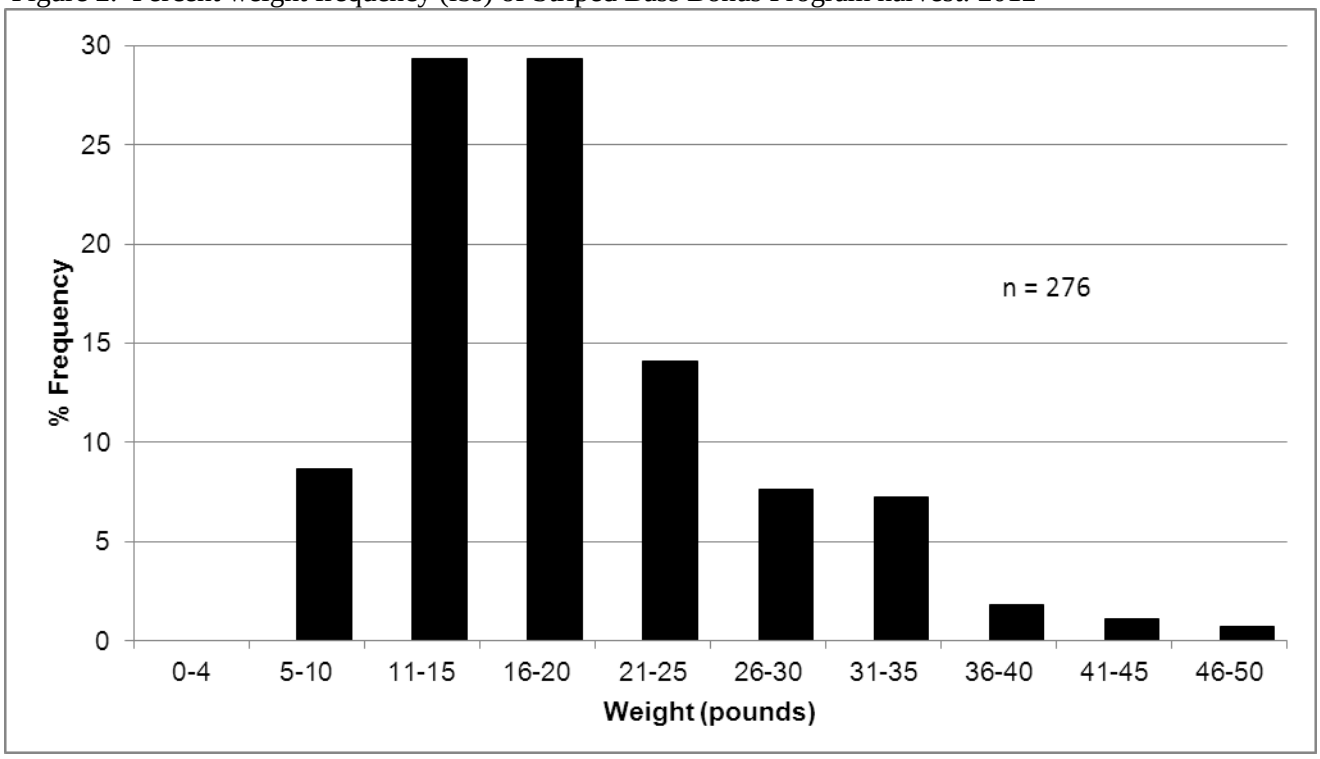


Figure 3. Percent length frequency (tl, in) of Striped Bass Bonus Program catch: 2008–2012

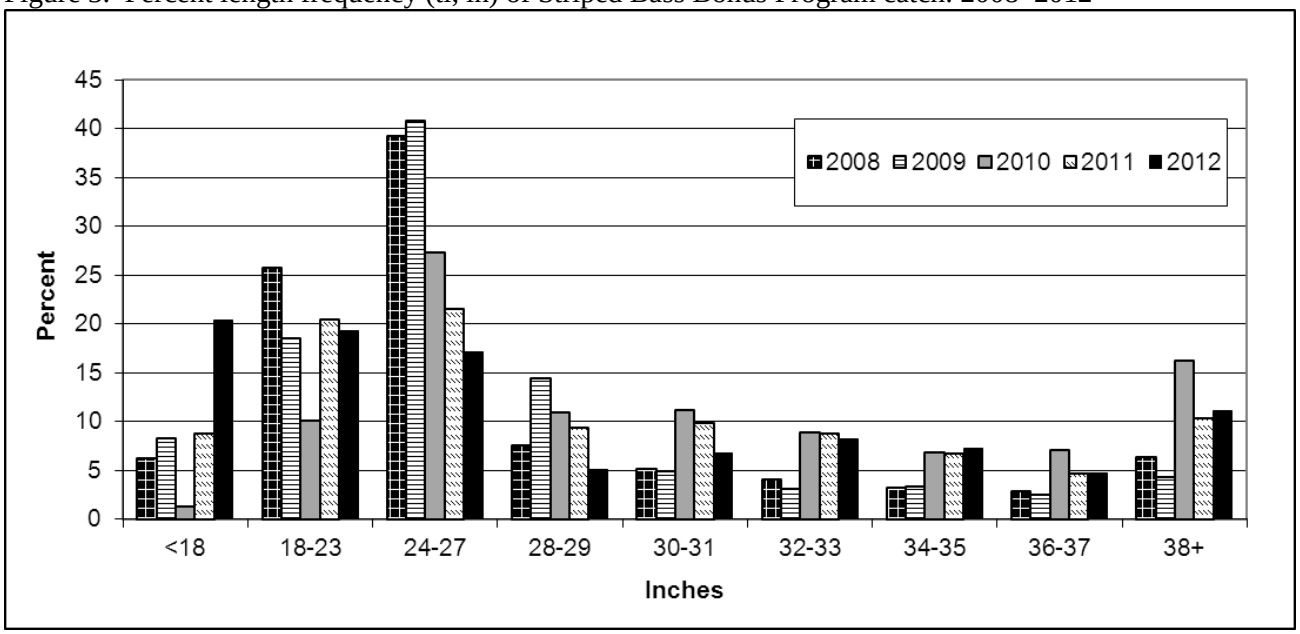


Figure 4. New Jersey Striped Bass Bonus Program regional catch: 2012

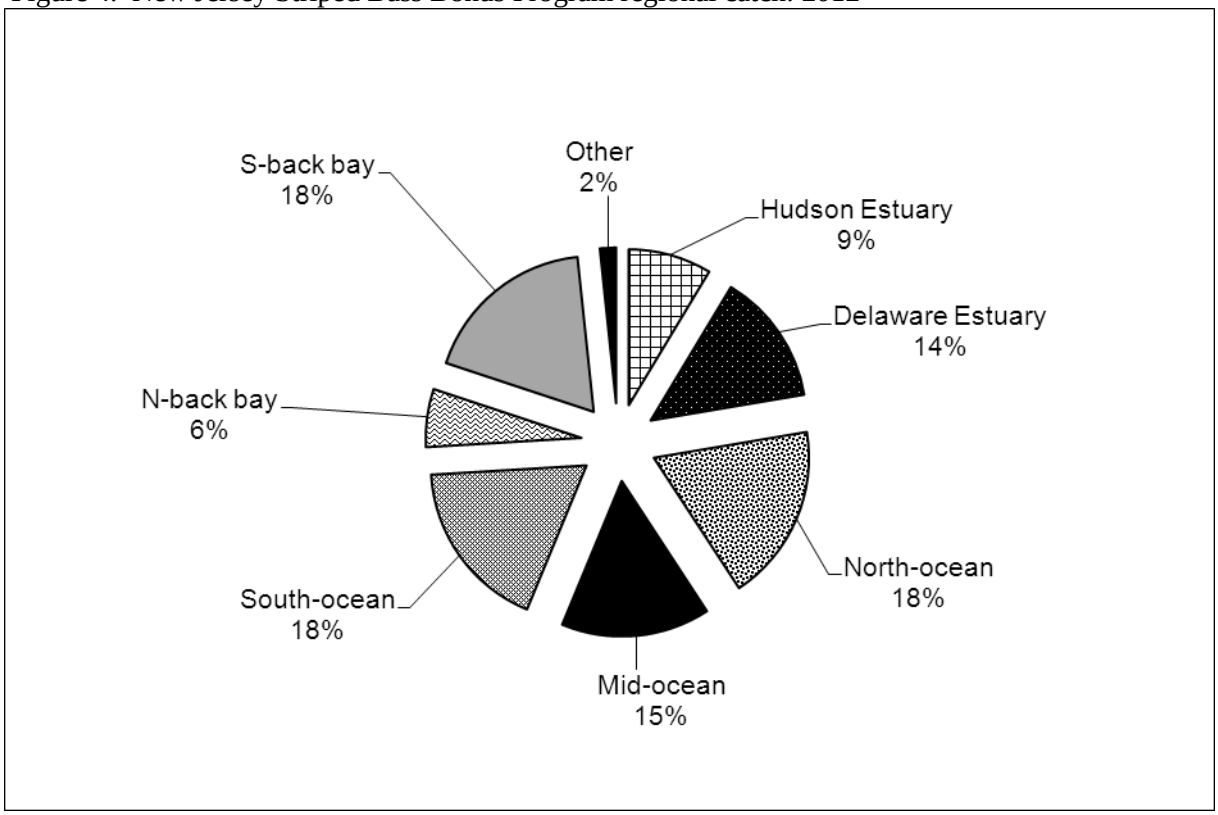


Figure 5. New Jersey Striped Bass Bonus Program regional harvest: 2012

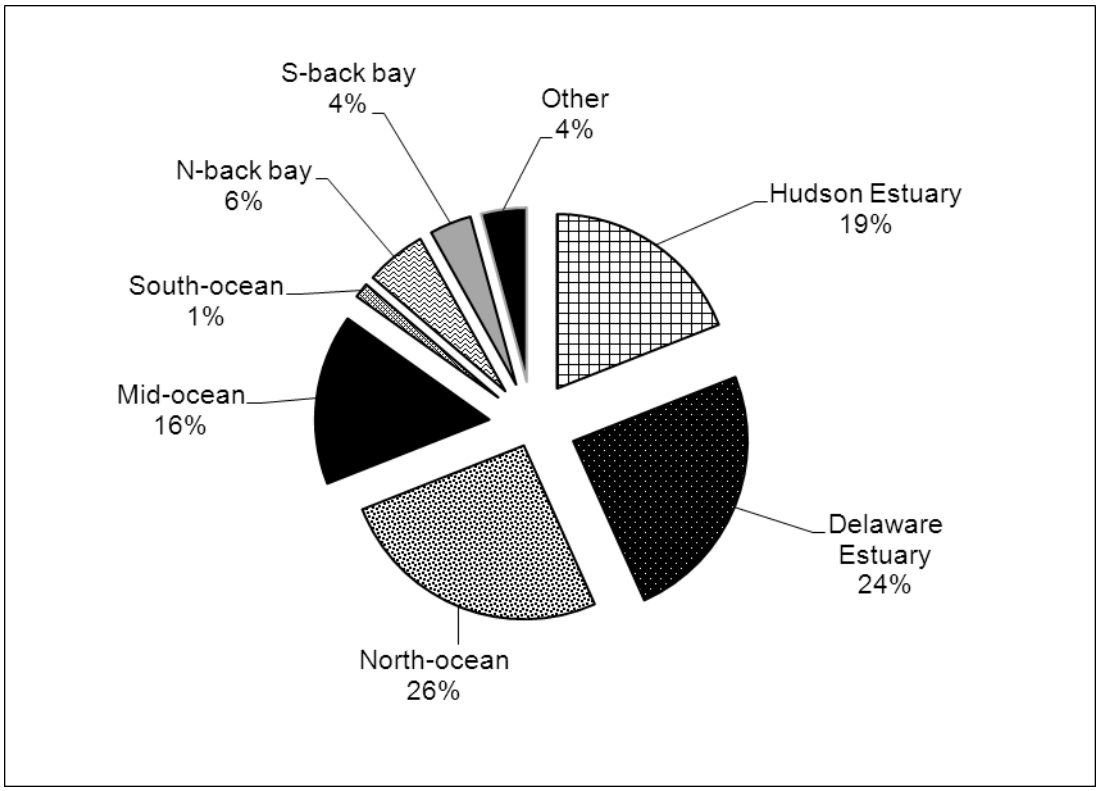
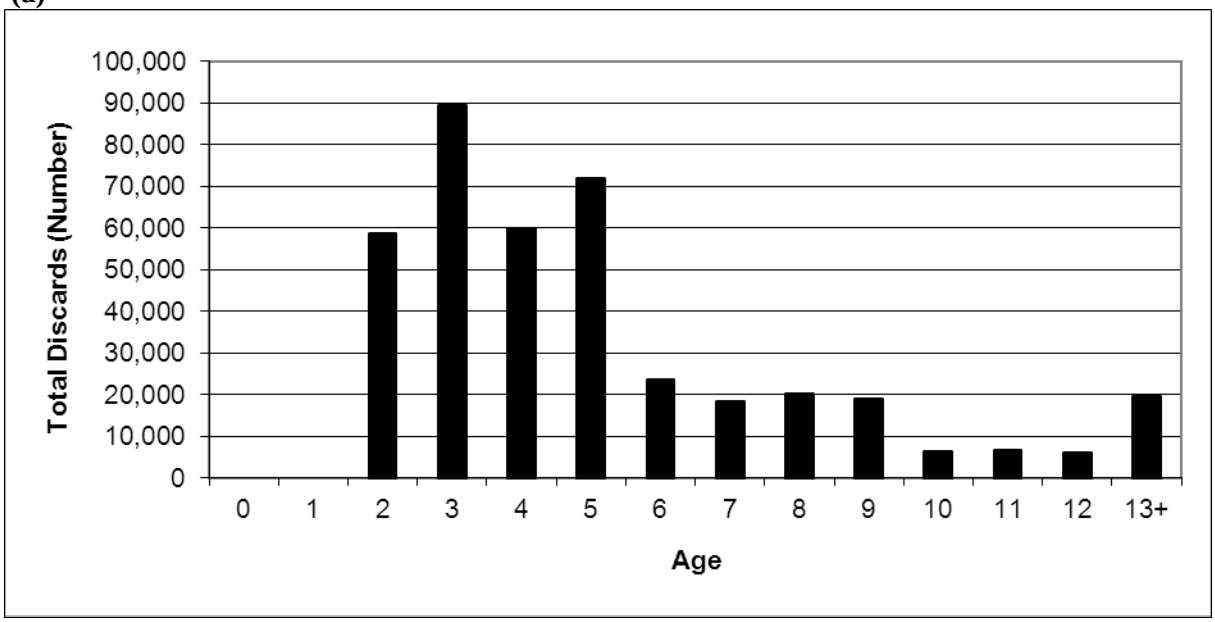


Figure 6. New Jersey recreational striped bass discards at age, by number (a) and weight (b): 2012

(a)



(b)

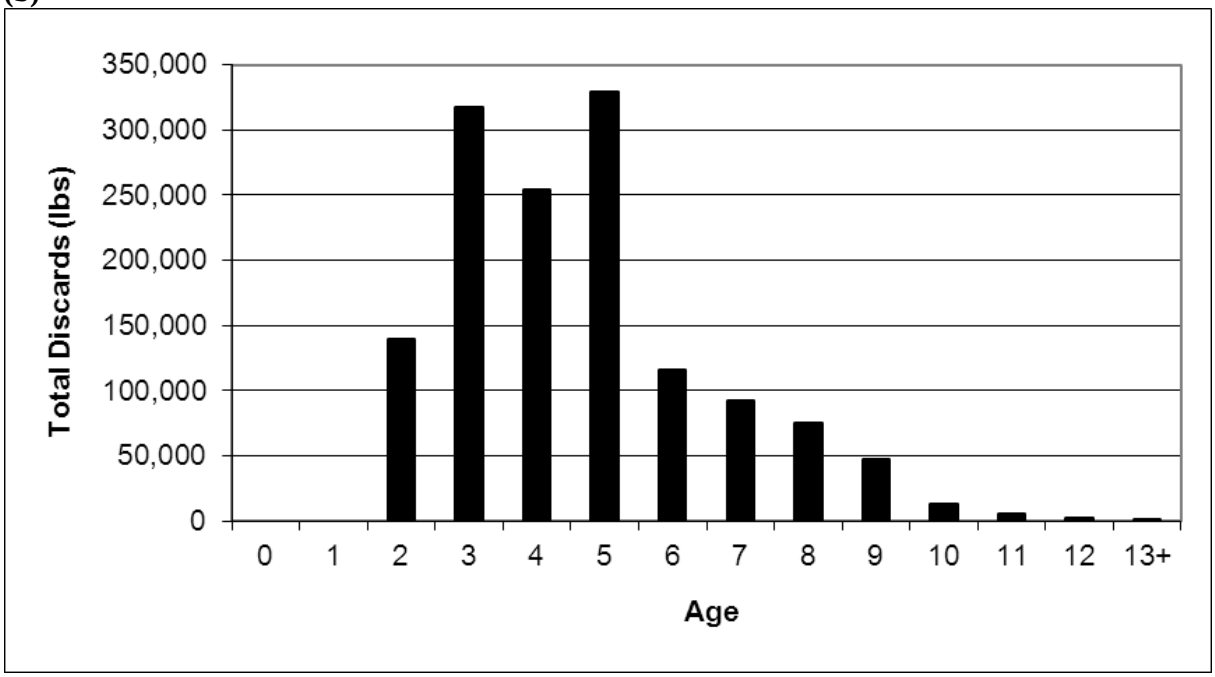


Figure 7. Delaware River Recruitment Survey sampling stations: 2012

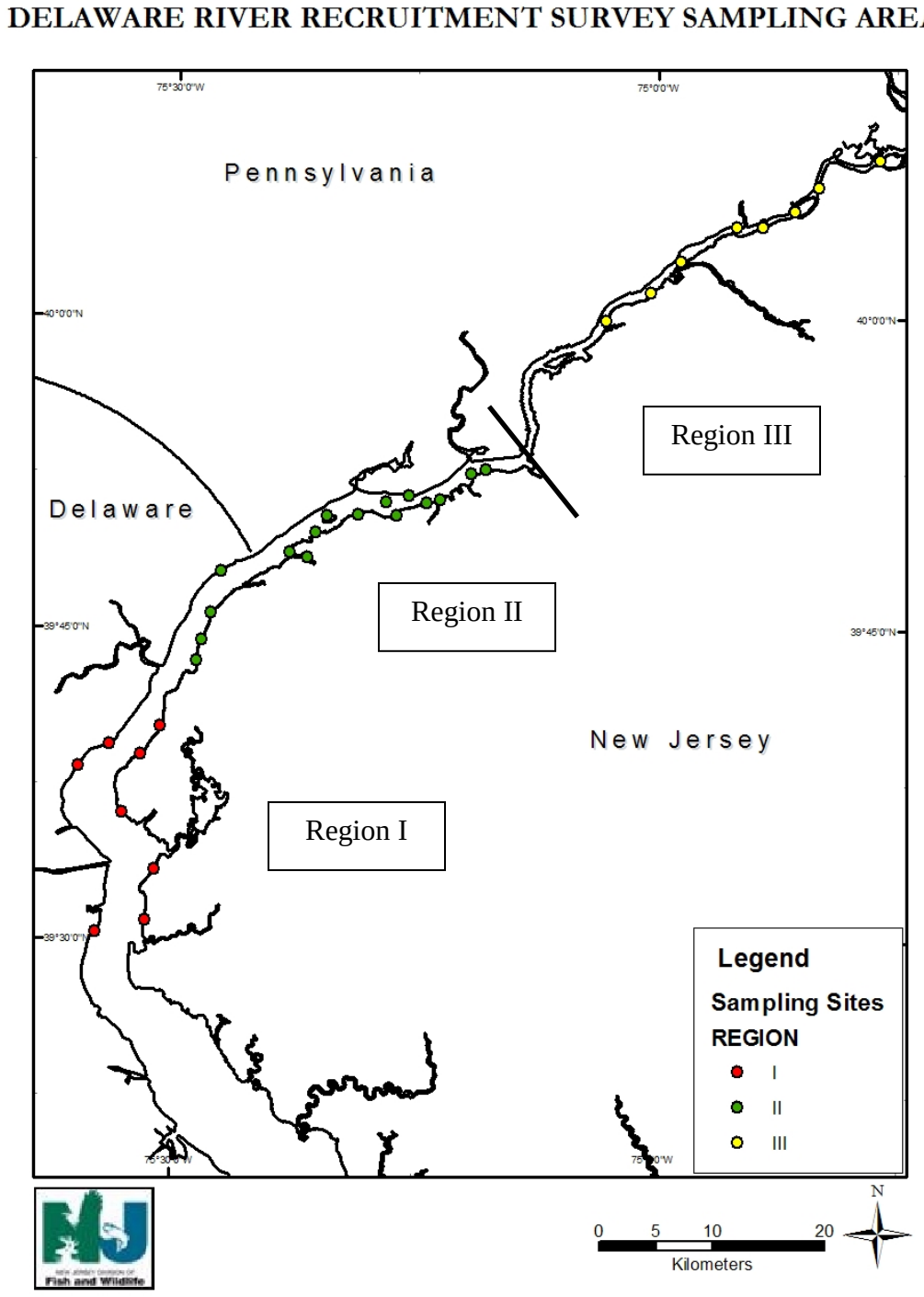
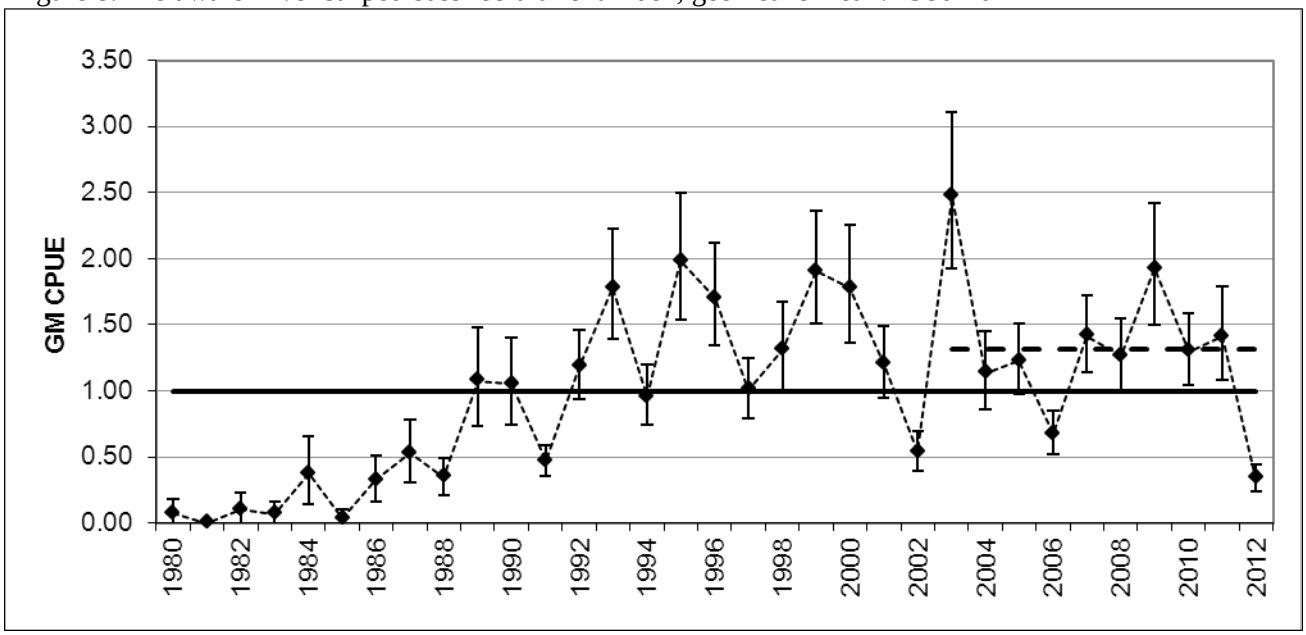


Figure 8. Delaware River striped bass recruitment index, geometric mean: 1980-2012



*Bars represent 95% confidence intervals
*Solid line represents time series (1980–2012) average
*Dashed line represents the last ten years (2003–2012) average

Figure 9. Delaware River striped bass recruitment, geometric mean, by month: 1980-2012

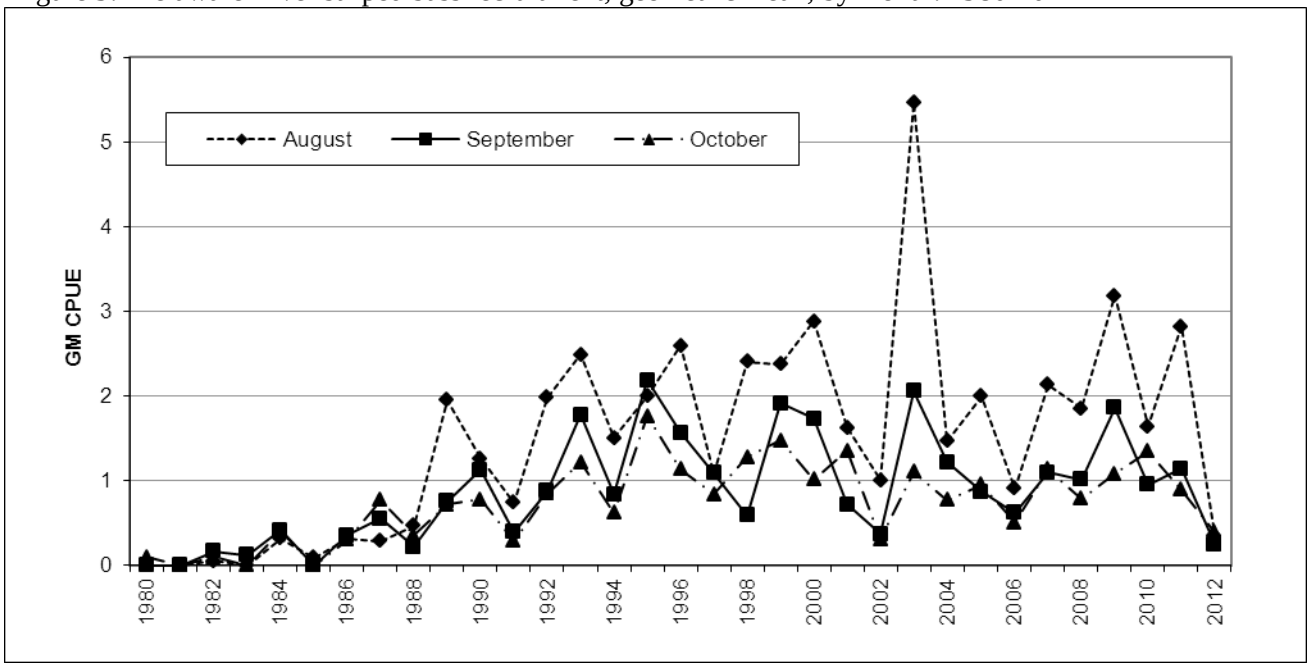


Figure 10. Percent length frequency of striped bass from Delaware Bay: spring 2012

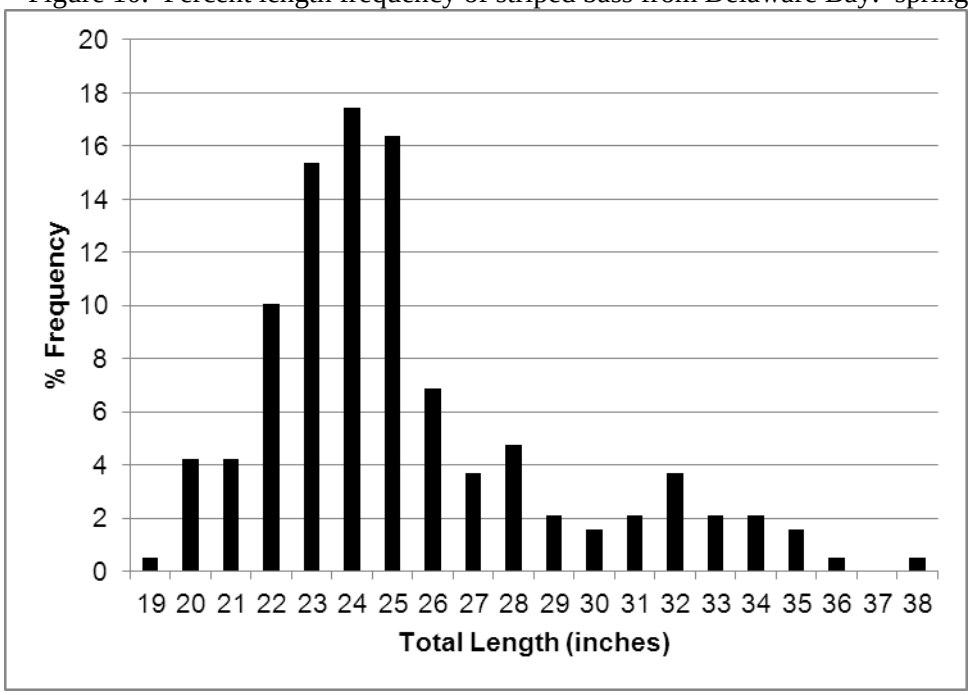


Figure 11. Tag recaptures of striped bass tagged in Delaware Bay: 1989–2012

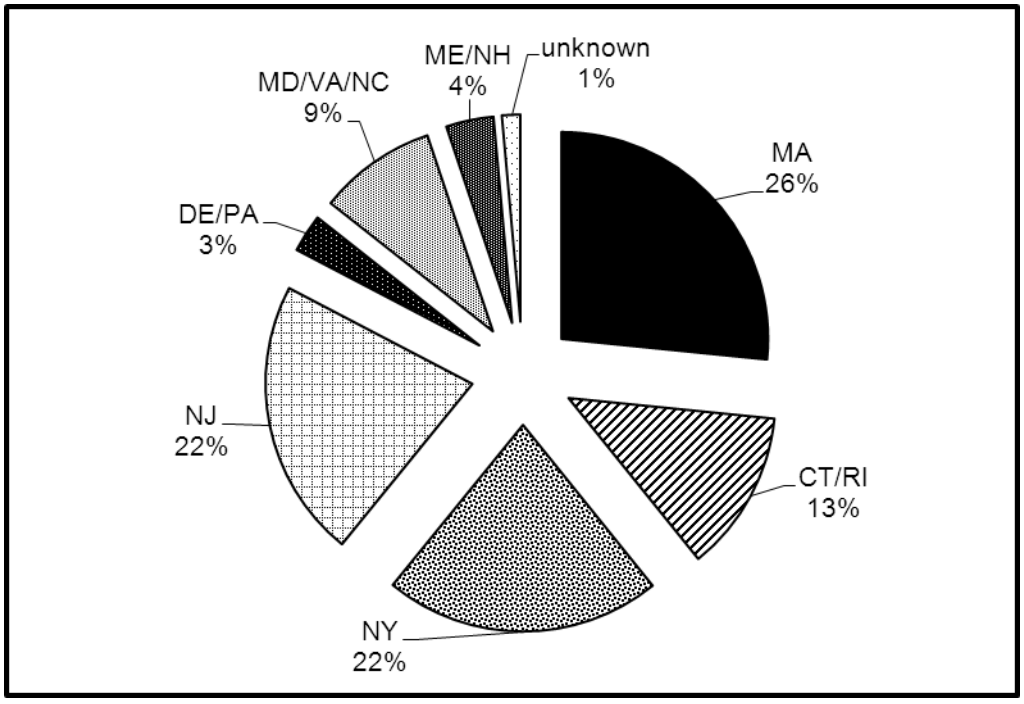
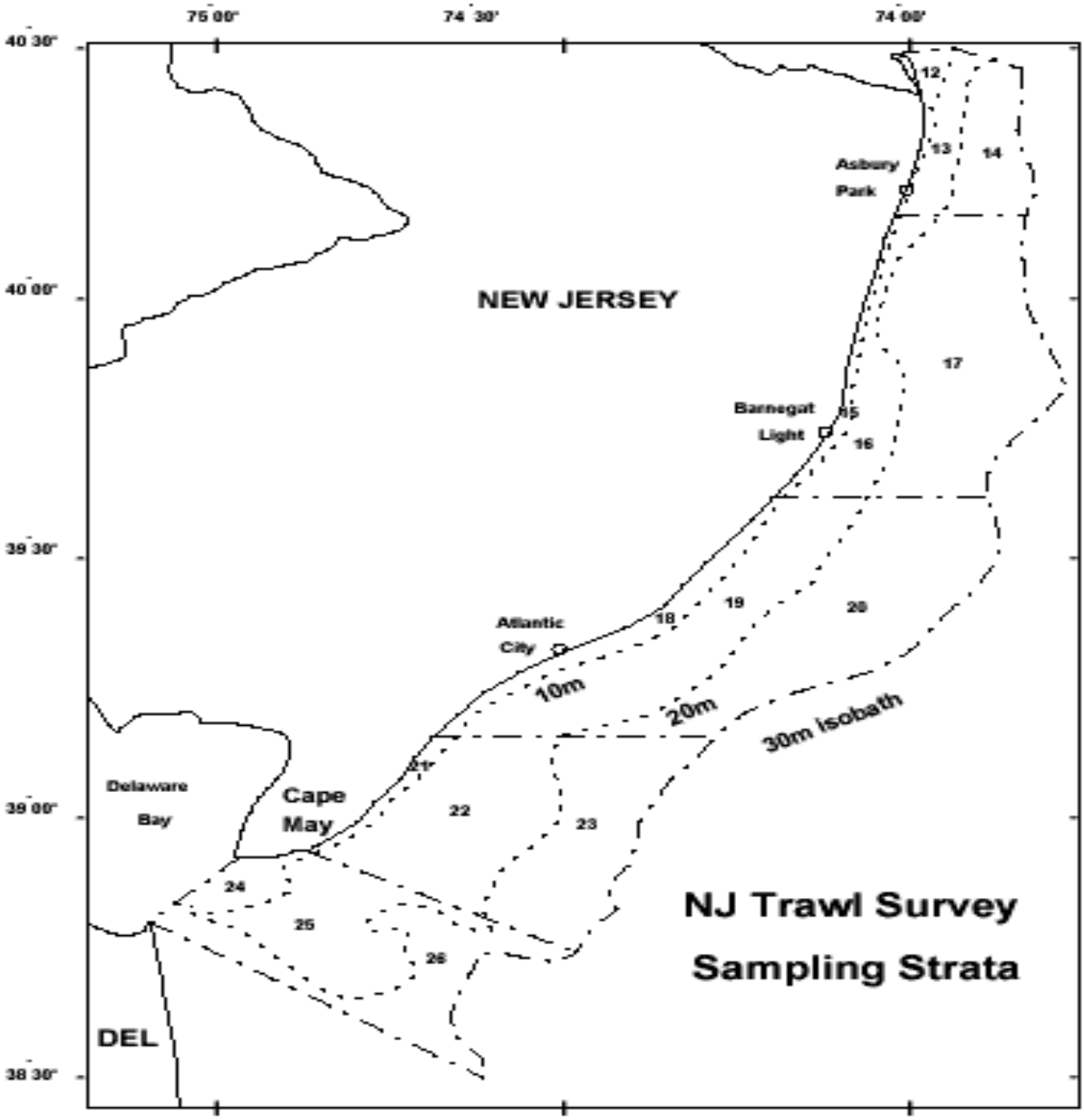


Figure 12. New Jersey Ocean Trawl Survey area: 2012



* Strata correspond to those of the National Marine Fisheries Service's spring and fall groundfish surveys

Figure 13. April Ocean Trawl Survey number of striped bass caught, by region: 1988-2012

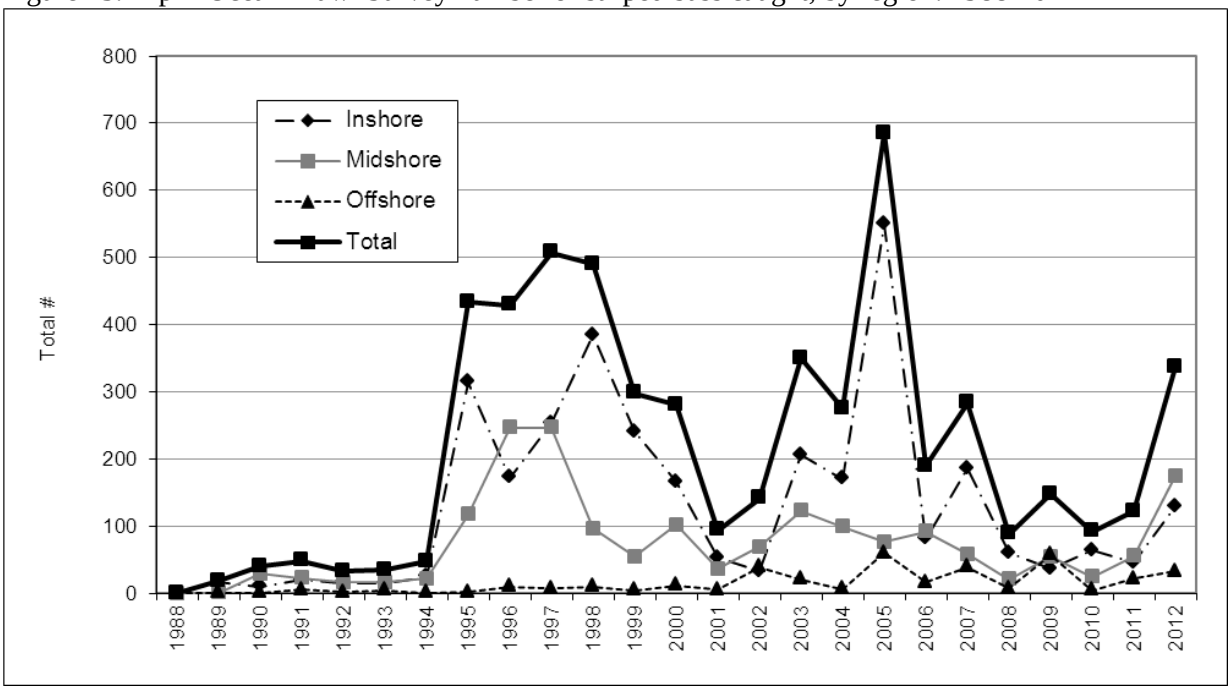
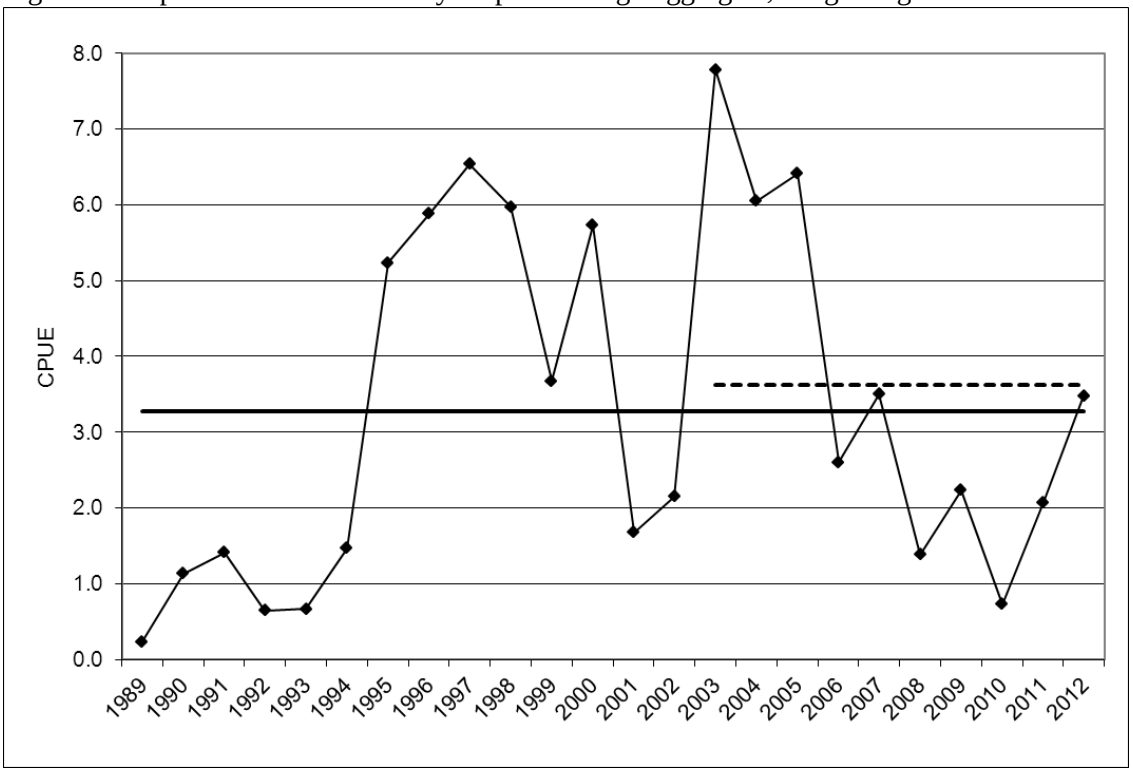


Figure 14. April Ocean Trawl Survey striped bass age-aggregate, weighted geometric mean: 1989-2012



- No offshore strata included
- Solid line indicates time series (1989–2012) average
- Dashed line indicates the last ten years (2003–20112) average

Figure 15. April Ocean Trawl Survey 2009-2012 striped bass age-specific indices

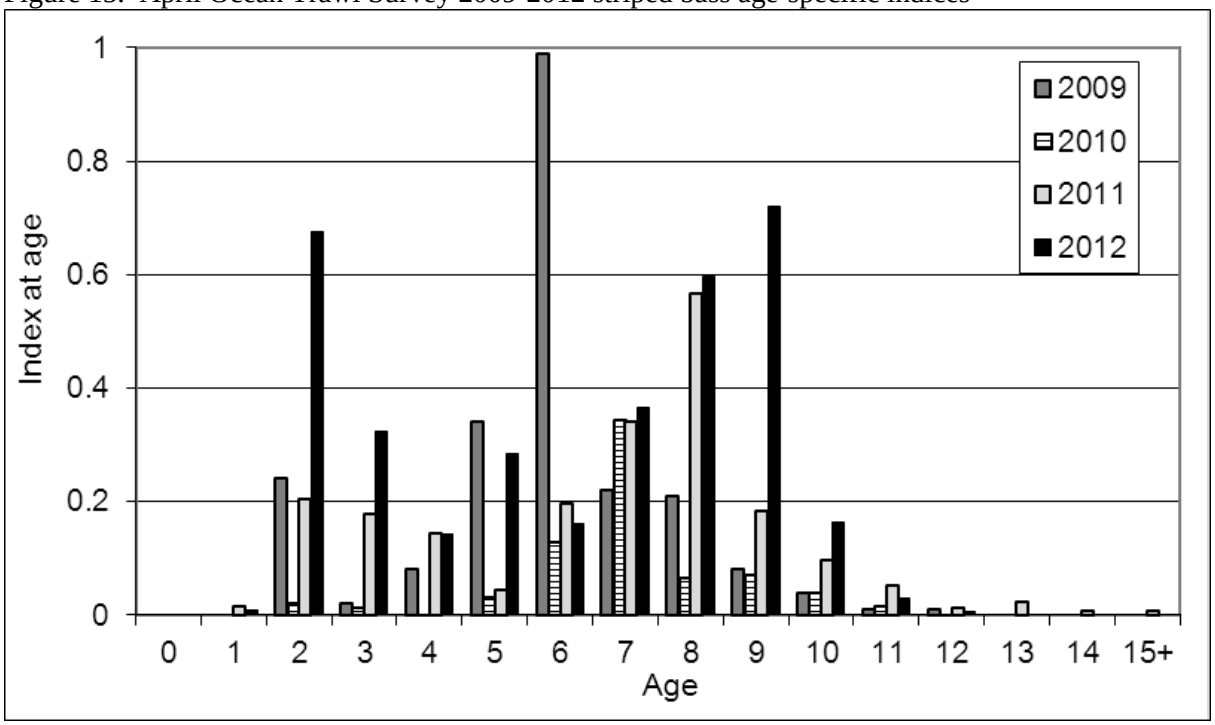
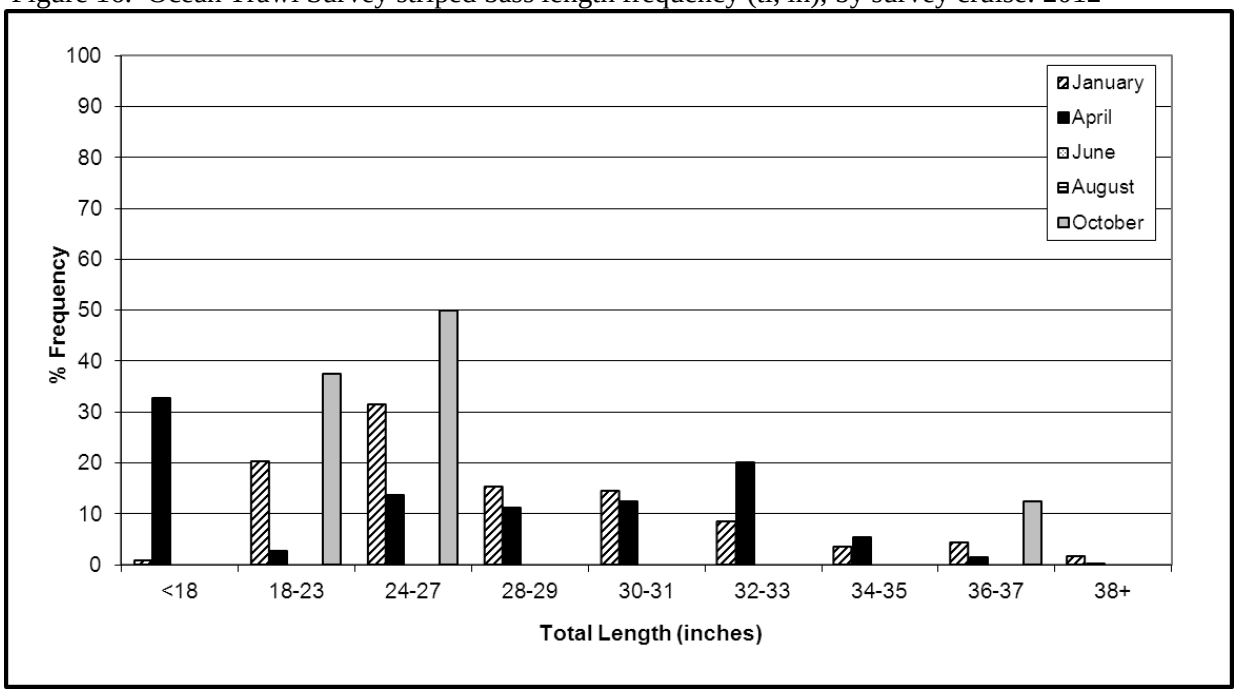


Figure 16. Ocean Trawl Survey striped bass length frequency (tl, in), by survey cruise: 2012



PENNSYLVANIA
ANNUAL STATE REPORT FOR STRIPED BASS
2012

Pennsylvania Fish and Boat Commission
Bureau of Fisheries
Division of Fisheries Management

I. Introduction

II. The spawning stock assessment via electrofishing was continued in 2012. Each of the 21 fixed index sites was sampled twice, which represented a return to the standard 1995 through 2003, 2005, 2007, and 2009-2011 sampling design. The temporary sampling of the 21 historic index sites once each in 2008, 2006, and 2004 was implemented after ASMFC approval in 2003 in order to free up field time to search for additional sites upstream of the spawning stock assessment area where spawning may also be occurring during the narrow spawning window.

In 2012, the minimum size and daily creel limit remained at 28" and two fish per day, respectively, for the non-tidal portion of the Delaware River and was open to year around fishing. This applied to the segment of the river that extended from the Calhoun Street bridge upstream. The bridge, which connects Morrisville, Pa. with Trenton, NJ, is slightly upstream from Trenton Falls, the head-of-tide, but represented a good line of demarcation for enforcement purposes.

In the tidal portion of the Delaware River (Delaware Estuary) the change in the season and size limits was continued from 2009, the year of implementation. Instead of being closed from January 1 through February 28, and again from April 1 through May 31, the season was opened to year-around fishing. Additionally, a slot limit was in place from April 1 through May 31, which permitted the harvest of two fish per day within the 20 inch to 26 inch length range. During the rest of the year, the size and daily creel limits were 28 inches and two fish per day, respectively. These slot regulations extended from the Pennsylvania/Delaware State line upstream to the Calhoun Street Bridge described above.

III. Request for *de minimis*, where applicable.

Pennsylvania does not request *de minimis* status at this time.

IV. Previous calendar year's fishery and management program

A. Fishery Dependent Monitoring Programs

i. Commercial Fishery

(1) Characterization of the commercial fishery

- No commercial fishery for striped bass exists in Pennsylvania, nor may striped bass be taken from the wild and sold, traded, exported, or otherwise offered for sale or barter whether dead or live.

ii. Recreational Fishery

(1) Seasons:

Upstream from Calhoun Street Bridge, just above Trenton Falls– Open year 'round, 28 inch minimum length limit, 2 fish per day creel limit.

- From the Pennsylvania/Delaware State line upstream to Calhoun Street Bridge – the above 28 inch minimum length limit, 2 fish per day creel limit regulations apply from June through March. From April 1 through May 31 a 20-26 inch harvestable slot, two fish per day creel limit applies.

(2) Characterization of directed harvest
- No work done in 2012 to characterize recreational harvest.

iii. Other Losses (Poaching, Hook & Release Mortality, Bycatch, etc.)
- No work was done to characterize losses; however, conservation officers cited anglers for violations representing 111 striped bass. Additionally, officers found 43 illegally taken fish that had been discarded by anglers; therefore, the maximum detected illegal harvest was 154 striped bass in 2012.

iv. Total Harvest & Losses
- Estimates of harvest and other losses were not conducted.

B. Fishery Independent Monitoring Programs
- Required Monitoring: Annual spawning stock assessment establishing reliable estimates of abundance (CPUE), age and length distribution, and sex composition for the Delaware River, for the stretch from the state line upstream to Poquessing Creek on the Pa. side or just upstream from Rancocas Creek on the NJ side.

- Description of Work Performed: PA Fish and Boat Commission personnel flat bottom boat electrofished 21 fixed striped bass index sites twice within a 28-mile reach of the Delaware River/Estuary from May 4 –May 21. Each electrofishing run was one thousand seconds as recorded on the electrofishing unit. Limitations of the sampling gear and weather dictated the order of sites sampled, as on the water travel speed was slow and some sites were unsafe or inefficient to work in windy conditions. Catch per unit effort (CPUE) values were calculated for the index sites. Bass were measured and sexed. Scale samples were removed from a representative number for later aging. When possible and efficient, striped bass greater than or equal to 400 mm in total length were tagged with USFWS internal anchor tags. No additional fish were tagged upstream from the 28 mile reach at Trenton Falls although tagging has frequently occurred at that location in the past.

i. Results

(1) Juvenile indices
  (a) Not available

(2) Spawning stock assessment
  See attached report prepared by Gregory Murphy of the Area 6 Fisheries Management Office
  (a) See Figure 3. Length-frequency distribution of male and female striped bass captured from the Delaware Estuary… during May 4 –May 21, 2012 in the attached report.
  (b) See Table 2. Age frequency distribution… in the aforementioned report.
  (c) During the May 4 –May 21, 2012 site index work, male striped bass comprised 69 percent of the fish collected and females comprised 5 percent. Sex was undetermined in 25 percent of fish collected due to the large number of small, immature fish captured associated with previously good year classes (2011, 2010).

(3) Stock characterization
  (a) Not available

(4) Tagging

(a) Three hundred and seventy-two striped bass ranging in lengths from 402 mm to 1,130 mm total length were given USFWS internal anchor tags. Male and female striped bass comprised 87 percent and 10 percent of the tagged fish, respectively. Tagged striped bass ranged in ages from 3 to 16 years.

(5) Research Removals

(a) Ten striped bass were sacrificed for contaminant analysis by the Pennsylvania Dept. of Environmental Protection, including five slot size males (20 to 26 inches) and five males greater than 28 inches.

IV. Planned management programs for the current calendar year (2013)

A. Summarize regulations that will be in effect.

- A 20 to 26 inch harvestable slot limit in conjunction with a two fish per day creel limit will be in effect during April and May, 2013 from the Pennsylvania/Delaware state line upstream to the Calhoun Street Bridge, which is located just upstream from the head-of-tide and joins Morrisville, Pennsylvania with Trenton, New Jersey. Furthermore, a 28 inch minimum length limit and a two fish per day creel limit will be in effect in all other months of the year, and there will be no closed season. Regulations for the rest of the river (upstream from Calhoun Street Bridge) will remain unchanged from the previous 28 inch length limit and two fish per day creel limit with a year around open season.

B. Summarize monitoring programs that will be performed.

- Pennsylvania will continue sampling the striped bass spawning stock in 2013 at the 21 fixed index sites with sampling being conducted twice at each fixed site.

C. Highlight any changes from the previous year.

- None

Michael L. Kaufmann
March 6, 2013

Distribution

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R. Lorantas, WW Unit Leader

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R. Bednarchik, SE Regional Law Enforcement Manager

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PA FISH AND BOAT COMMISSION
COMMENTS AND RECOMMENDATIONS
February 13, 2013

WATER: Delaware Estuary – Sections 02, 03, and 04

EXAMINED: May 4 – May 21, 2012

BY: G. Murphy and M. Kaufmann

Bureau Director Action: _____ Date: _____

Division Chief Action: _____ Date: _____

WW Unit Leader Action: _____ Date: _____

==========

AREA COMMENTS:

As required by the Atlantic States Marine Fisheries Commission (ASMFC), the Pennsylvania Fish and Boat Commission (PFBC) began yearly sampling of the Delaware River striped bass spawning stock in 1992. This was done in conjunction with the sampling efforts of Delaware and New Jersey as part of the overall monitoring of the striped bass population recovery along the east coast. Electrofishing index sites were evaluated in 1994 and 1995, with 21 sites established in 1995. In 1997, the Delaware River Basin Fish and Wildlife Cooperative Technical Committee and the ASMFC declared the Delaware River striped bass stock restored to historical population levels based on high juvenile recruitment, high spawning stock biomass, and low fishing mortality rates. In spring 2012, the sampling of 21 electrofishing index sites continued in order to 1) assess the striped bass spawning stock utilizing a portion of the Delaware Estuary which borders Pennsylvania and New Jersey, and 2) tag striped bass in conjunction with the coast-wide cooperative tagging program managed by the U.S. Fish and Wildlife Service for exploitation and migration studies being conducted by the ASMFC.

A time series high total of 726 striped bass were collected from the 21 index sites in 2012. An additional 44 striped bass were captured during ancillary collections in an attempt to increase the number of tags deployed. In comparison to long term averages, the mean catch rate for total catch was significantly higher in 2012, while the mean catch rates for fish ≥300 mm TL and fish ≥700 mm TL were not significantly different in 2012. The mean catch rates for total catch, fish ≥300 mm TL, and fish ≥700 mm TL were 38.89 fish/hr (95% CI=22.09–60.34 fish/hr; n=726), 21.73 fish/hr (95% CI=10.64–36.62 fish/hr; n=476), and 3.16 fish/hr (95% CI=1.28–5.70 fish/hr; n=76), respectively. The corresponding long-term average catch rates for total catch, fish ≥300 mm TL, and fish ≥700 mm TL were 17.99 fish/hr (95% CI=14.50–21.84 fish/hr), 12.24 fish/hr (95% CI=10.32–14.33 fish/hr), and 2.33 fish/hr (95% CI=1.93-2.77 fish/hr), respectively. Regression analyses revealed no significant trend between year and mean catch rate for total catch ($F_{1,15}$=0.35; p=0.56), fish ≥300 mm TL, ($F_{1,15}$=1.3; p=0.27), and fish ≥700 mm TL ($F_{1,15}$=1.9; p=0.18).

A total of 372 striped bass were tagged by the PFBC in 2012. The tagged striped bass ranged from 402 to 1,130 mm TL and 3 to 16 years of age. Males, females, and fish of unknown sex comprised 87% (n=323), 10% (n=36), and 3% (n=13) of the tagged striped bass, respectively.

The PFBC has tagged a total of 3,946 striped bass in the Delaware Estuary since 1995. Seventeen percent (n=683) of the 3,946 tagged striped bass have been recaptured and 12 fish have been recaptured twice. Recreational anglers, including those on charter boats, have accounted for 90% (n=612) of the tag returns, while commercial fishermen have accounted for 7% (n=49). Three percent (n=22) of the tag returns have been credited to other collections. Fifty percent of the recaptured fish have been released; 49% have been harvested; and 1% have been found dead, dying, or have been used for scientific research. Recreational and commercial fishermen have harvested 48% and 78% of their respective striped bass catches.

Throughout the years of tagging approximately 75% of the striped bass tagged by the PFBC have been caught in New Jersey (43%), Maryland (17%), and Delaware (15%), while the remaining 25% have been caught in Pennsylvania (7%), Massachusetts (5%), New York (4%), Virginia (3%), Rhode Island (3%), North Carolina (1%), and Connecticut (<1%). State of recapture has not been reported for one percent of the tag returns (Figure 4). There has been no annual increase in the number of tag returns from Pennsylvania since implementation of the 508 to 660 mm (two fish per day) slot limit on the Delaware Estuary in 2009.

AREA RECOMMENDATIONS:

1. Continue monitoring the striped bass spawning stock in 2013 at the 21 index sites extending from Rancocas Creek (RM 109.76) downriver to Raccoon Creek (RM 80.66).

2. Continue the effort to determine the upriver limit of major spawning activity by sampling a potential spawning area at Trenton Falls, the head-of-tide. This work will also increase the number of striped bass tagged in 2013.

3. Assess potential high catch sampling areas to find a suitable replacement for the index site located along the upper Navy Yard (STB23) that will be lost due to the container ship terminal development project, known as the Southport Project, planned for that sampling site.

This work made possible by funding from the Sport Fish Restoration Act Project F-57-R Fisheries Management.

Pennsylvania Fish and Boat Commission
Bureau of Fisheries
Fisheries Management Division

Delaware Estuary

Rancocas Creek (RM 109.76) downriver to Raccoon Creek (RM 80.66)

Striped Bass Spawning Stock Survey - 2012

Prepared by
G. Murphy

Fisheries Management Database Name: Delaware Estuary
Lat/Lon: 39°48’00”/75°25’00”

Survey Period: May 4 – May 21, 2012 Prepared: February, 2013

Introduction

As required by the Atlantic States Marine Fisheries Commission (ASMFC), the Pennsylvania Fish and Boat Commission (PFBC) began yearly sampling of the Delaware River striped bass *Morone saxatilis* spawning stock in 1992. This was done in conjunction with the sampling efforts of Delaware and New Jersey as part of the overall monitoring of the striped bass population recovery along the east coast. Potential electrofishing index sites were evaluated in 1994 and 1995, with 21 sites established in 1995. In 1997, the Delaware River Basin Fish and Wildlife Cooperative Technical Committee and the ASMFC declared the Delaware River striped bass stock restored to historical population levels based on high juvenile recruitment, high spawning stock biomass, and low fishing mortality rates. In spring 2012, the sampling of 21 electrofishing index sites continued in order to 1) assess the striped bass spawning stock utilizing a portion of the Delaware Estuary which borders Pennsylvania and New Jersey and 2) tag striped bass in conjunction with the coast-wide cooperative tagging program managed by the U.S. Fish and Wildlife Service (USFWS) for exploitation and migration studies being conducted by the ASMFC.

Methods

Daytime boat electrofishing was conducted at 21 index sites in the Delaware Estuary between the mouth of Rancocas Creek in Burlington County, New Jersey (RM 109.76) and the mouth of Raccoon Creek in Gloucester County, New Jersey (RM 80.66) to develop an index of

striped bass spawning stock abundance (Figure 1). Sampling occurred between May 4 and 21, 2012. Each index site was sampled twice, which represented a return to the 1995 to 2003, 2005, 2007, and 2009 to 2011 sampling design in which the 21 index sites were sampled twice, and a departure from the 2004, 2006, and 2008 sampling design in which each index site was sampled once. This was done to reduce variability in catch rates that was pronounced when each site was sampled only once (Hosack and Kaufmann 2008).

Since 1995, five of the 21 index sites have been permanently replaced for logistical reasons (one site) or a consistent paucity of striped bass (four sites), defined as only zero to two striped bass of any length having been caught over a series of years. In 1998, the most upriver index site near Neshaminy Creek was relocated approximately 9.7 km (6.0 mi) downriver to the proximity of Rancocas Creek. By replacing one site with another, both of which had provided similar catch rates, the field time of the survey crew was substantially reduced and the efficiency of the survey was improved. In 2002, following three years of low catches, the index site located along the northern side of Chester Island was moved upriver approximately 1.0 km (0.62 mi) to the breakwater site located between Chester and Monds Islands. In 2003, following five years of very low catches, the index site located directly downriver from Pennypack Creek was moved upriver approximately 3 km (1.86 mi) to the vicinity of Rancocas Creek. In 2007, following six consecutive years of low catches, the index site located at Woodbury Creek was moved downriver approximately 5.4 km (3.4 mi) to a large shallow shoal located immediately upriver from Little Tinicum Island (RM 87.58). In 2008, a near-by site located along an unnamed island off the mouth of the Schuylkill River was used to temporarily replace the Big Timber Creek site. This site was equally unproductive as the Big Timber Creek site had usually been since the outset of this survey. No fish were captured along the island and sampling returned to the Big Timber Creek site. In 2010, following four years of low catches, the most downriver sampling location near the Commodore Barry Bridge was shifted downriver approximately 1.9 km (1.24 mi) to the mouth of Raccoon Creek.

The electrofishing boat was rigged with a pair of fixed boom electrodes. Each boom supported four dropper style copper anodes suspended in a square array. The electrical power source was a 5,000-watt Honda generator combined with a Smith-Root model GPP electrofisher. The electrofishing unit was typically operated between 6 and 7 amps of pulsed direct current in water depths ranging from 0.6 to 3.7 m (2 to 12 ft). Electrofishing was conducted by traveling in a serpentine pattern with the direction of tidal flow.

The 21 index sites were each sampled twice for 1,000 seconds each time as recorded on the electrofishing unit, which represented the period of time electric current passed through the water column. The overall effort was 11.67 hrs for the 42 sampling runs. In

instances where striped bass were common and the 1,000 second electrofishing effort was complete, ancillary collections were made to capture additional fish for tagging. All catch rates were calculated based on the 1,000 second runs only and did not include striped bass captured during ancillary collections.

Captured striped bass were processed and released. The total length (TL) of each fish was measured to the nearest millimeter (mm). Scale samples were taken for subsequent age and growth analysis when processing time and climatic conditions were determined to be such that fish would not be subjected to unnecessary stress. Scales were collected from mid-way between the lateral line and the juncture of the hard and soft dorsal fins.

Most striped bass ≥400 mm TL (15.7 in) were tagged with USFWS anchor tags. Fish 400 to 599 mm TL were implanted with small tags and fish ≥600 mm TL were implanted with large tags. Only fish ≥600 mm TL were tagged in 1995, the first year that the PFBC participated in the coast-wide cooperative tagging program. Striped bass were not tagged if they were injured, diseased, or would comprise a batch of less than three fish of the appropriate size for tagging.

Descriptive age and growth statistics of the striped bass spawning population were determined using scales. In preparation for age analyses, scales were cleaned, if needed, and pressed on warm acetate slides using an Anne Arbor Rolling Press Model 110. The impressions were projected using a Bausch and Lomb micro projector for evaluation. Annuli were determined using the standard criteria described by Lagler (1956). Un-aged fish were assigned ages based on 25 mm length groups using an age-length key that was constructed from the 2012 data. For fish belonging to 25 mm length groups where multiple ages were collected, ages were assigned based on the discrete probability distributions derived from the age-length key.

A square root transformation was used to calculate mean catch rates and associated 95% confidence intervals (CI) according to the procedure described by Sokal and Rohlf (1969). Mean catch rates and CI's were back-transformed to a linear scale. Additional details on the statistical procedures used to assess striped bass catch rates were presented in Kaufmann and Soldo (1995). Simple linear regression analysis (α=0.05) was used to analyze catch rates for temporal trends and for comparisons to the New Jersey Division of Fish and Wildlife's (NJDFW) juvenile striped bass index.

Results / Discussion

A time series high total of 726 striped bass were collected from the 21 index sites in 2012. An additional 44 striped bass were captured during ancillary collections to increase the number of tags deployed. Males, females, and fish of unknown sex comprised 69% (n=504), 5% (n=38), and 25% (n=184) of the total catch from the

index sites, respectively. The inability to determine sex was primarily due to the collection of small, immature fish, which were very abundant in 2012.

The record high number of striped bass captured in 2012 may have been influenced by increased salinity concentrations in the lower spawning grounds of the Delaware Estuary. Although salinity thresholds for spawning tend to vary among systems, striped bass typically spawn where salinities are less than 5 ppt. Highly successful spawning has been observed in the Chesapeake and Delaware Canal at salinities of 0.70 to 1.50 ppt (Bain and Bain 1982). The lack of precipitation in the winter and early spring of 2012 allowed the salt line to advance upstream farther than usual during the spring spawning period (April and May). Consequently, this may have concentrated spawning striped bass farther upstream than usual and increased catch rates in Pennsylvania. Other fish species more commonly associated with brackish or marine environments were also observed farther upstream and/or in greater numbers than usual for May, including Atlantic menhaden *Brevoortia tyrannus* and Atlantic needlefish *Strongylura marina*. Menhaden are an unusual occurrence during May in the stretch of the Estuary where sampling was taking place.

Index Sites

In comparison to long term averages, the mean catch rate for total catch was significantly higher in 2012, while the mean catch rates for fish ≥300 mm TL and fish ≥700 mm TL were not significantly different in 2012 (Figure 2). The mean catch rates for total catch, fish ≥300 mm TL, and fish ≥700 mm TL were 38.89 fish/hr (95% CI=22.09–60.34 fish/hr; n=726), 21.73 fish/hr (95% CI=10.64–36.62 fish/hr; n=476), and 3.16 fish/hr (95% CI=1.28–5.70 fish/hr; n=76), respectively. The corresponding long-term average catch rates for total catch, fish ≥300 mm TL, and fish ≥700 mm TL were 17.99 fish/hr (95% CI=14.50–21.84 fish/hr), 12.24 fish/hr (95% CI=10.32–14.33 fish/hr), and 2.33 fish/hr (95% CI=1.93-2.77 fish/hr), respectively. Regression analyses revealed no significant trend between year and mean catch rate for total catch ($F_{1,15}$=0.35; p=0.56), fish ≥300 mm TL, ($F_{1,15}$=1.3; p=0.27), and fish ≥700 mm TL ($F_{1,15}$=1.9; p=0.18).

Male striped bass have consistently accounted for the majority of the catch over the years. Males were collected at a mean rate of 23.9 fish/hr (95% CI=12.1–39.5 fish/hr) and accounted for 69% of the total catch in 2012. This percentage was similar to the long-term average of 70%, which ranged from 62% to 81% between 1996 and 2011.

Male striped bass ranged from 139 to 1,010 mm TL (Figure 3) and 1 to 15 years of age in 2012 (Table 1). Age-5 males (2007 year class) were collected at the highest rate (CPUE=3.95 fish/hr; Tables 1 and 2).

Female striped bass were collected at a mean rate of 1.7 fish/hr (95% CI=0.7–3.1 fish/hr) and comprised five percent of the total catch in 2012. This percentage was lower than the long-term average of 15%, which ranged from 5% to 35% between 1996 and 2011.

Female striped bass ranged from 492 to 1,134 mm TL (Figure 3) and 4 to 16 years of age in 2012 (Table 1). Age-9 females (2003 year class) were collected at the highest rate (CPUE=0.50 fish/hr) (Tables 1 and 2). Females age-7 and older accounted for 71% (n=27) of the females collected in 2012. Berlinsky et al. (1995) found that the maturity schedule for female striped bass was 12% at age-4, 34% at age-5, 77% at age-6, and 100% at age-7.

The PFBC's striped bass spawning stock survey had historically affirmed the NJDFW's juvenile striped bass index with high seine catches of age-0 striped bass corresponding to high catches of adult striped bass from the same cohort in subsequent survey years. As in more recent years, there was little consistency with this trend in 2012. Among year classes that had at least partially entered the coastal sport fishery (age-6 and older) where there was a 28 inch (711 mm) minimum length limit, fish from the large 2000 year class and time series high 2003 year class were under-represented. Sampling error associated with the small sample size may have obscured differences in abundance among year classes. Additionally, the relatively stable seine catch of age-0 striped bass in the late 1990s and 2000s, with the exception of 2000 and 2003 when there were strong year classes, has made it more difficult to identify and follow individual year classes by length alone as they move through the population (Table 3).

Despite the high catch rates of adult striped bass on the spawning grounds in 2012, the NJDFW's 2012 juvenile index was exceptionally low (0.61 fish/haul) and may have been influenced by Hurricane Sandy. Catch rates were not high prior to the hurricane, but decreased substantially afterwards. In addition, a few weeks of sampling were lost, which may have negatively impacted the index (H. Corbett, NJDFW, personal communication).

Tagging Program

The PFBC tagged 372 striped bass in the Delaware Estuary during 2012. The tagged fish ranged from 402 to 1,130 mm TL and 3 to 16 years of age. Males, females, and fish of unknown sex comprised 87% (n=323), 10% (n=36), and 3% (n=13) of the tagged fish, respectively.

A total of 3,946 striped bass have been tagged by the PFBC since 1995. Of those, 3,832 (2,914 males, 851 females, and 67 sex unknown) have been tagged in the tidal Delaware River; 111 (37 males, 61 females, and 13 sex unknown) have been tagged in the tidal Schuylkill River; and 3 females have been tagged in the non-

tidal Delaware River.

Seventeen percent (n=683) of the 3,946 striped bass tagged by the PFBC have been recaptured and 12 fish have been recaptured twice. Forty-nine percent (n=334) of the recaptured striped bass have been harvested and 50% (n=340) have been released. The disposition of the remaining one percent has varied. Recreational anglers, including anglers on charter boats, have accounted for 90% (n=612) of the tag returns and 88% (n=295) of the total harvest. Commercial fishermen have accounted for seven percent (n=49) of the tag returns and eleven percent (n=38) of the total harvest. Three percent (n=22) of the tag returns have been credited to other collections. Recreational anglers and commercial fishermen have harvested 48% and 78% of their respective striped bass catches.

Males, females, and fish of unknown sex have comprised 68% (n=464), 29% (n=198), and 3% (n=21) of the total tag returns, respectively. Tag return rates for male and female striped bass have been 16% and 23%, respectively. Additionally, 42% and 64% of recreational anglers who have returned tags from males and females, respectively, have harvested the fish. Recreational and commercial fishermen combined have selectively harvested female over male striped bass at a ratio of 1.5 to 1.0, which indicates the potential for disproportionate fishing mortality on the female segment of the population. This ratio is likely influenced by the large number of tagged males that are below legal length (711 mm) in many fisheries along the coast, which would prohibit their harvest.

Throughout the years of tagging approximately 75% of the striped bass tagged by the PFBC have been caught in New Jersey (43%), Maryland (17%), and Delaware (15%), while the remaining 25% have been caught in Pennsylvania (7%), Massachusetts (5%), New York (4%), Virginia (3%), Rhode Island (3%), North Carolina (1%), and Connecticut (<1%). State of recapture has not been reported for one percent of the tag returns (Figure 4). There has been no annual increase in the number of tag returns from Pennsylvania since implementation of the 508 to 660 mm (two fish per day) slot limit on the Delaware Estuary in 2009.

A total of 45 tag returns for slot size striped bass have been reported since 2009. Eighty percent (n=36) of those fish have been recaptured outside of Pennsylvania’s allowable harvest area for slot size fish (Pennsylvania’s portion of the Delaware River from the Pennsylvania state line upriver to the Calhoun Street Bridge) or outside of the permitted harvest period for slot size fish (April 1 to May 31). The remaining nine fish (7 males, 1 female, and 1 sex unknown) have been caught within the allowable harvest area during the permitted harvest period. The majority of those fish (n=7) have been recaptured by recreational anglers. The remaining fish (n=2) have been recaptured by the PFBC while conducting subsequent striped bass electrofishing surveys. Only one

(11%) of the nine fish recaptured within the allowable harvest area and during the permitted harvest period has been reported as having been harvested.

Management Recommendations

1. Continue monitoring the striped bass spawning stock in 2013 at the 21 index sites extending from Rancocas Creek (RM 109.76) downriver to Raccoon Creek (RM 80.66).

2. Continue the effort to determine the upriver limit of major spawning activity by sampling a potential spawning area at Trenton Falls, the head-of-tide, as time allows. This work will also increase the number of striped bass tagged in 2013.

3. Assess potential high catch sampling areas to find a suitable replacement for the index site located along the upper Navy Yard (STB23) that will be lost due to the planned container ship terminal development project scheduled for the site, known as the Southport Project.

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Table 1. Mean catch rates (fish/hr) and associated 95% confidence intervals of male and female striped bass collected from the 21 index sites on the Delaware Estuary between May 4 and 21, 2012.

Age	Year Class	Mean Catch Rate (fish/hr) and 95% CI		
		Male	Female	Sexes Combined
1	2011	1.14 0.49-1.96	-	1.14 0.49-1.96
2	2010	2.38 0.82-4.54	-	2.38 0.82-4.54
3	2009	3.77 1.67-6.56	-	3.77 1.67-6.56
4	2008	2.96 1.26-5.23	0.05 0.00-0.14	2.99 1.26-5.29
5	2007	3.95 1.57-7.24	0.12 0.00-0.32	4.02 1.58-7.40
6	2006	1.86 0.67-3.47	0.30 0.02-0.64	2.14 0.79-3.97
7	2005	1.43 0.45-2.76	0.28 0.03-0.57	1.78 0.65-3.28
8	2004	0.85 0.11-1.88	-	0.85 0.11-1.88
9	2003	0.78 0.21-1.53	0.50 0.13-0.97	1.33 0.51-2.41
10	2002	0.45 0.04-0.98	0.17 0.00-0.40	0.58 0.07-1.24
11	2001	0.54 0.08-1.13	-	0.54 0.08-1.13
12	2000	0.28 0.03-0.57	0.05 0.00-0.14	0.30 0.02-0.64
13	1999	0.07 0.00-0.23	0.09 0.00-0.24	0.14 0.00-0.39
14	1998	0.07 0.00-0.23	-	0.07 0.00-0.23
15	1997	0.05 0.00-0.14	-	0.05 0.00-0.14
16	1996	-	0.14 0.00-0.32	0.14 0.00-0.32

Notes:
Sexually immature fish were not included in Table 1.
hr = hour
CI = Confidence interval

Table 2. Age frequency distribution and mean total length at capture of male and female striped bass collected from the 21 index sites on the Delaware Estuary between May 4 and 21, 2012.

Age	Year Class	No. Fish Collected		Percent	Mean Total Length at Capture (mm)	
		Male	Female		Male	Female
1	2011	23	-	4.2	182	-
2	2010	63	-	11.6	262	-
3	2009	85	-	15.7	358	-
4	2008	68	1	12.7	427	492
5	2007	99	3	18.8	506	577
6	2006	46	7	9.8	565	605
7	2005	37	6	7.9	599	651
8	2004	27	-	5.0	650	-
9	2003	19	11	5.5	717	871
10	2002	12	4	3.0	786	887
11	2001	14	-	2.6	793	-
12	2000	6	1	1.3	824	1,003
13	1999	2	2	0.7	985	1,128
14	1998	2	-	0.4	968	-
15	1997	1	-	0.2	935	-
16	1996	-	3	0.6	-	1,113

Notes:
Sexually immature fish were not included in Table 2.
mm = millimeter

Table 3. Juvenile index of relative abundance for age-0 striped bass collected from the Delaware River by the New Jersey Division of Fish and Wildlife from 1980 to 2012.

Year	No. of Seine Hauls	No. of Age-0 Striped Bass Collected	Arithmetic Mean	Proportion of Positive Hauls	Geometric Mean	SE	Lower 95% CI	Upper 95% CI	Range
1980	20	2	0.10	0.100	0.07	0.05	0.00	0.18	0 - 1
1981	13	0	0.00	0.000	0.00	0.00	0.00	0.00	0 - 0
1982	26	4	0.15	0.115	0.10	0.05	0.00	0.23	0 - 2
1983	22	2	0.09	0.091	0.07	0.04	0.00	0.16	0 - 1
1984	29	18	0.62	0.345	0.37	0.10	0.14	0.65	0 - 5
1985	56	5	0.09	0.018	0.03	0.03	0.00	0.10	0 - 5
1986	46	23	0.50	0.304	0.32	0.07	0.16	0.51	0 - 4
1987	96	150	1.56	0.281	0.53	0.08	0.30	0.78	0 - 32
1988	96	60	0.63	0.292	0.35	0.05	0.21	0.49	0 - 11
1989	96	321	3.34	0.531	1.07	0.09	0.73	1.48	0 - 125
1990	96	218	2.27	0.552	1.05	0.08	0.74	1.41	0 - 43
1991	256	270	1.05	0.301	0.47	0.04	0.35	0.59	0 - 22
1992	258	985	3.82	0.500	1.18	0.06	0.93	1.46	0 - 94
1993	204	1,183	5.80	0.603	1.78	0.08	1.39	2.23	0 - 185
1994	204	473	2.32	0.520	0.96	0.06	0.74	1.19	0 - 35
1995	204	1,552	7.61	0.613	1.98	0.08	1.54	2.50	0 - 211
1996	204	892	4.37	0.583	1.70	0.08	1.34	2.12	0 - 67
1997	205	461	2.25	0.512	1.01	0.06	0.79	1.25	0 - 34
1998	166	582	3.51	0.536	1.31	0.08	1.00	1.67	0 - 108
1999	192	932	4.85	0.630	1.90	0.08	1.51	2.36	0 - 130
2000	192	1,164	6.06	0.573	1.78	0.08	1.36	2.26	0 - 113
2001	192	511	2.66	0.557	1.20	0.06	0.95	1.49	0 - 55
2002	192	249	1.30	0.354	0.53	0.05	0.39	0.69	0 - 27
2003	192	1,670	8.70	0.656	2.47	0.09	1.93	3.11	0 - 277
2004	192	573	2.98	0.443	1.13	0.07	0.86	1.45	0 - 32
2005	190	474	2.49	0.584	1.22	0.06	0.97	1.51	0 - 26
2006	192	246	1.28	0.427	0.67	0.05	0.52	0.84	0 - 16
2007	192	520	2.71	0.630	1.41	0.06	1.14	1.72	0 - 36
2008	160	395	2.47	0.563	1.26	0.07	0.98	1.58	0 - 31
2009	192	1,101	5.73	0.615	1.92	0.08	1.50	2.42	0 - 146
2010	192	487	2.54	0.604	1.30	0.06	1.04	1.59	0 - 28
2011	173	707	4.09	0.526	1.41	0.08	1.08	1.79	0 - 96
2012	192	117	0.61	0.307	0.34	0.04	0.24	0.44	0 - 17

Notes:
Source: H. Corbett, New Jersey Division of Fish and Wildlife
1980-1990: Fixed station design with replicate sets; second half of July through first half of November (bi-monthly sampling)
1991-1997: Fixed and random station design with no replicate sets; August through October (bi-monthly sampling)
1998-2010: Fixed station design with no replicates; August through October (bi-monthly sampling)
2012: Sampling impacted by Hurricane Sandy; catches not high before hurricane but decreased substantially afterwards; a few weeks of sampling were lost
CI = Confidence interval
SE = Standard error

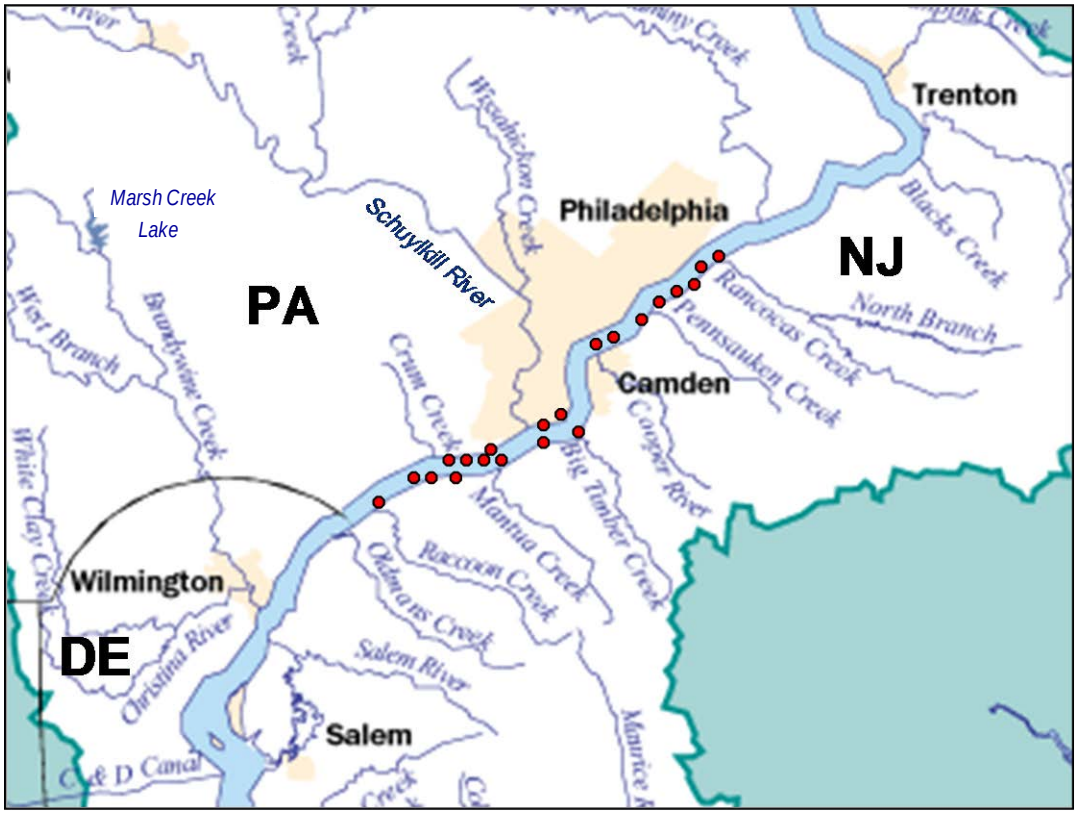

Figure 1. Map of the 21 index sites sampled between Rancocas Creek (RM 109.76) and Raccoon Creek (RM 80.66) on the Delaware Estuary between May 4 and 21, 2012. Adapted from the Delaware River Basin Commission.

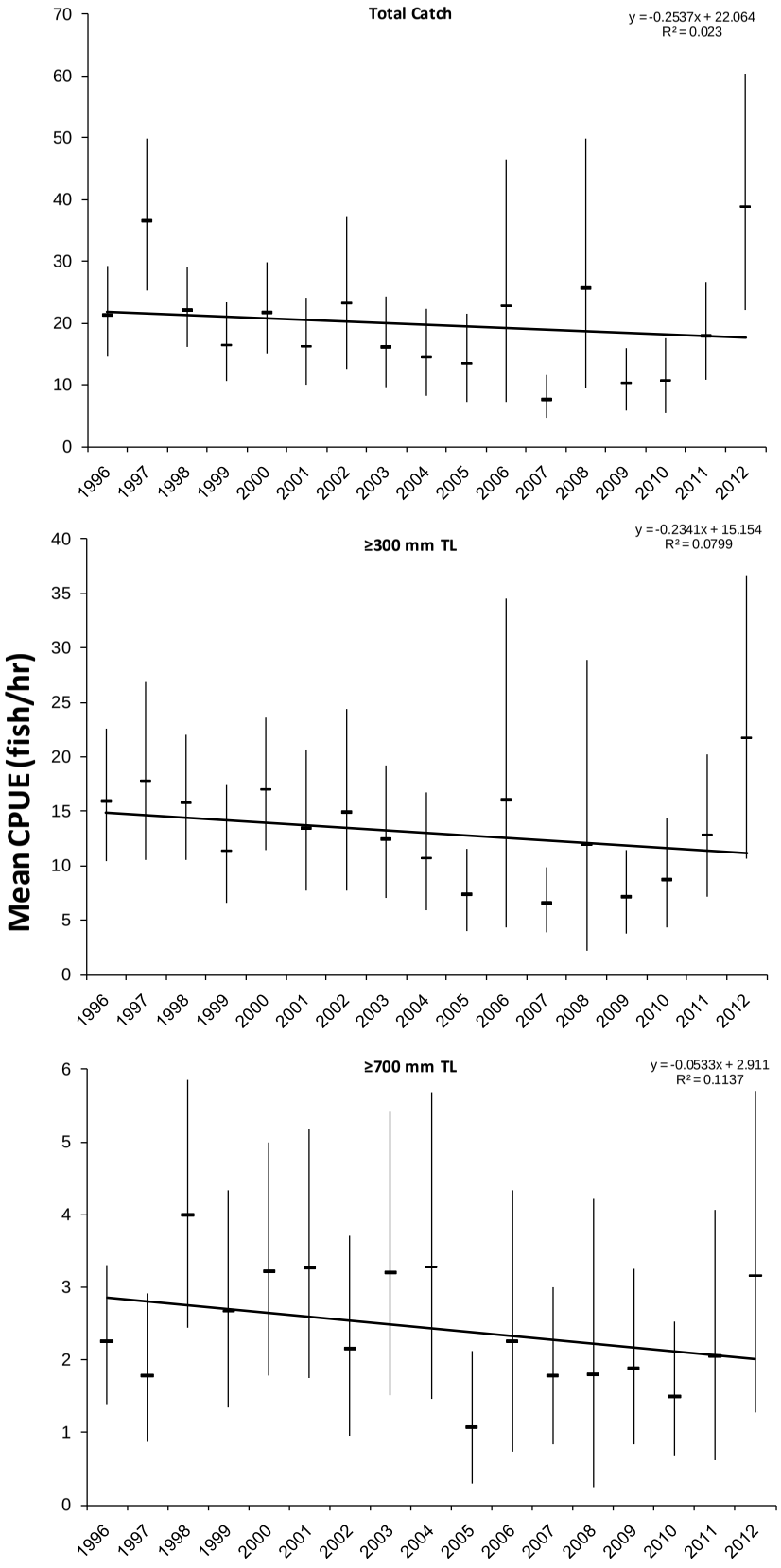

Figure 2. Mean catch rates and corresponding 95% confidence intervals with accompanying trend lines for striped bass collected from the 21 index sites on the Delaware Estuary between 1996 and 2012.

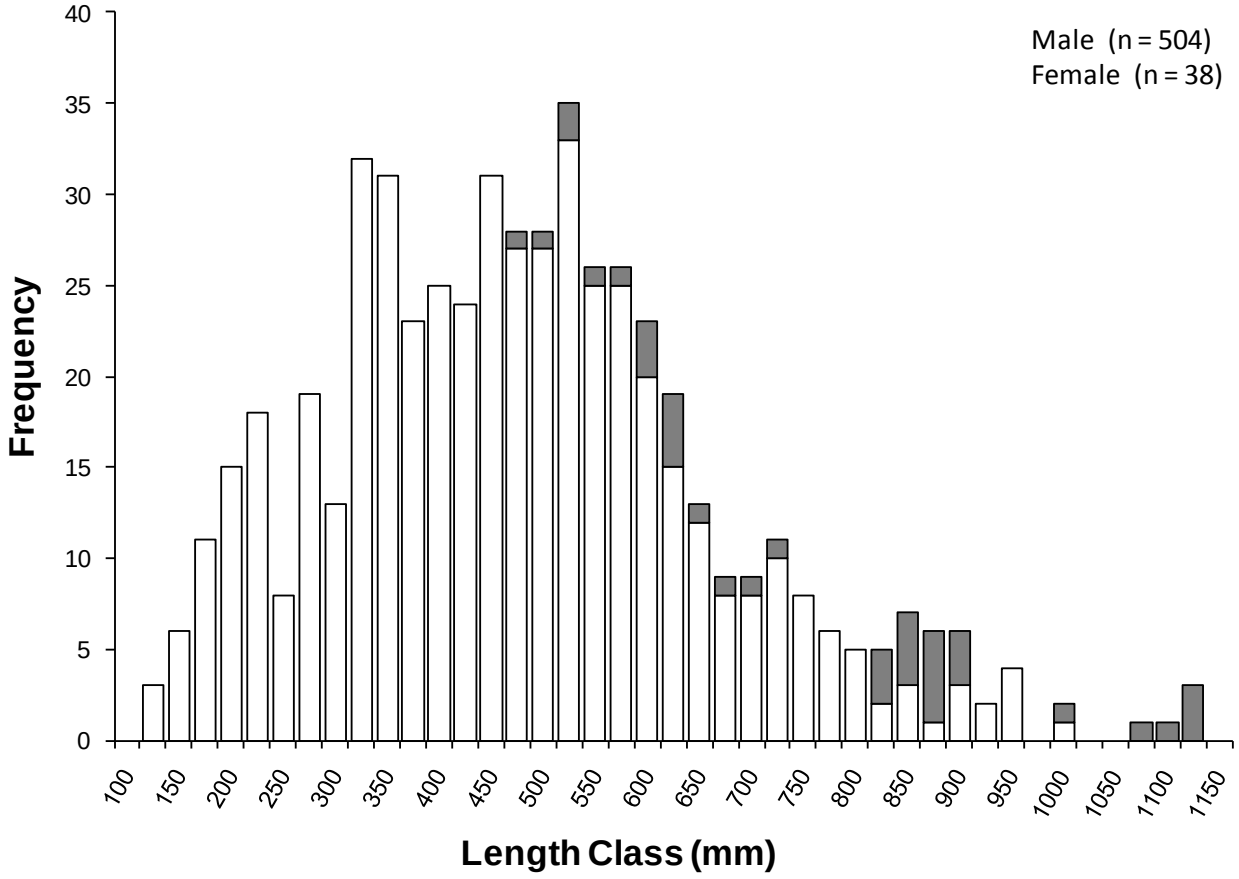

Figure 3. Length-frequency distribution of male (white bars) and female (gray bars) striped bass collected from the 21 index sites on the Delaware Estuary between May 4 and 21, 2012.

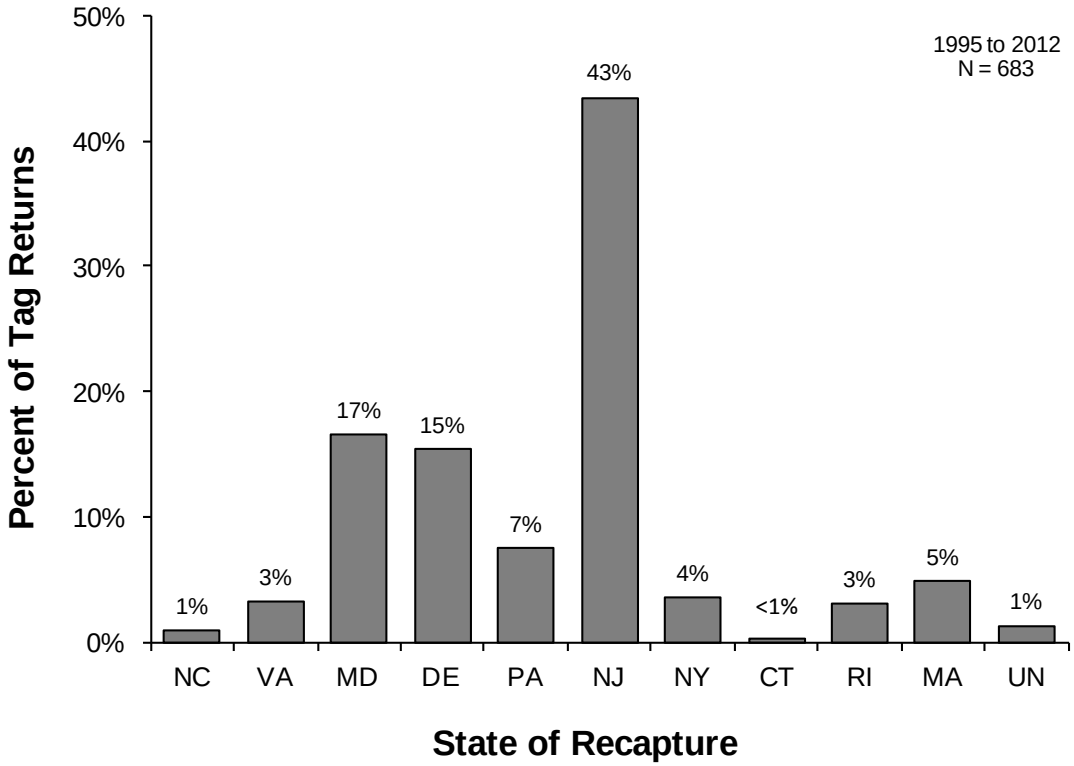

Figure 4. Percentage of tag returns by state for striped bass implanted with U.S. Fish and Wildlife Service anchor tags by the Pennsylvania Fish and Boat Commission during spawning stock surveys on the Delaware Estuary between 1995 and 2012. UN = unknown recapture location.

DELAWARE'S 2013 STRIPED BASS HARVEST AND COMPLIANCE REPORT TO THE ATLANTIC STATES MARINE FISHERIES COMMISSION

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June 2013

Annual report compiled for the Atlantic States Marine Fisheries Commission in accordance with Amendment VI of the Striped Bass Management Plan

I. Introduction

Total reported commercial landings for 2012 was 194,324 lbs., which was 100% (+877 lbs.) of the commercial cap mandated by the ASMFC. Reported commercial gill net and commercial hook and line landings totaled 15,738 striped bass. The average weight of all striped bass landed by commercial fisheries was 12.3 pounds.

Delaware's 2012 recreational total catch of striped bass, including releases, as estimated by MRIP, was 136,407; this was a 6% increase over the 2011 total catch, but well below the 2002 through 2012 mean annual total catch of 189,437. Total loss from the recreational fishery, including discard mortality, was estimated to be 34,312 fish.

There were no changes to striped bass regulations for 2012. The 2012 regulations appear in the next section.

II. 2012 Fishery and Management Program

A. Fishery Dependent Monitoring Programs

i. Commercial Fishery

1. 2012 Regulations

Seasons

The 2012 spring commercial gill net fishery was open from February 15 through May 31 (Table 1). The gill net quota was 183,775 pounds, 95% of the state commercial quota. If less than 98% of the total gill net quota was landed in the spring season, a fall gill net season would be held from November 15 through December 31 for the remaining quota. The commercial hook and line season ran from April 1 through December 31, with an allocation of 19,345 lbs, 10% of the total quota.

Spawning Area Closure

No commercial or recreational harvest was allowed in April and May on the spawning grounds including the Chesapeake and Delaware Canal, the Delaware River north of the Canal, or the Nanticoke River. The Nanticoke River (Delaware's portion)

was open to harvest of striped bass from Feb 15th to March 31st, but closed during the spawning season in April and May.

Individual Transferable Quota (ITQ) and Tagging Requirements

All licensed gill netters were allocated an equal share of the quota in pounds. The gill net quota (183,775 lbs) was divided by the number of licensed gill netters who applied for quota (111) to establish the ITQ for the spring fishery (1,656 lbs). The individual quotas were transferable, provided the transfer was made prior to the issuance of the tags. The number of tags required to fill an individual quota was estimated by dividing the total quota by the expected average weight of striped bass to be landed for that gear type and season.

All striped bass in the possession of a commercial fisher were required by regulation to have a Delaware Division of Fish and Wildlife (DDFW)-issued numbered tag locked through the jaw and gill. If a commercial fisher needed additional tags to fill his quota, DDFW verified the balance of the quota remaining from reports submitted to DDFW by the weigh stations. All unused tags were returned to DDFW with a written report of landings within 30 days of the closure of the spring and fall fishing seasons.

Weigh Station Reporting

Commercial fishers were required to bring all landed striped bass to one of several weigh stations located throughout the state. The weigh-stations recorded the aggregate weight and applied a second locking tag to each striped bass landed. The weigh stations maintained written logs of the date landed, number of fish, total daily weight, and also reported each fisherman's daily catch through an Interactive Voice Reporting (IVR) system.

Anticipated Changes to Regulations

No changes in commercial regulations are planned for 2013 at this time.

2. 2012 Commercial striped bass harvest

a. Landings and method of estimation

Harvest was tabulated directly from the mandatory catch reports submitted by the fishermen and compared to the poundage reported by the weigh stations. Fishermen were required to submit daily catch records at the end of the season, and weigh-stations reported each fisherman's harvest at the end of each day. There was no independent verification of the total weights fishermen or weigh stations entered.

Gill net effort was calculated as the average number of yards fished by each fisherman per day, multiplied by the number of days fished.

Total reported commercial landings for 2012 was 194,324 lbs. (Table 1), which was 877 lbs or 0.45 % over the commercial cap mandated by the ASMFC. Reported commercial gill net and commercial hook and line landings totaled 15,738 striped bass. The average weight of all striped bass landed by commercial fisheries was 12.3 pounds.

The reported landings in the spring gill net fishery comprised 14,025 striped bass with a total weight of 174,003 pounds which left 9,772 pounds remaining of the gill net quota (Tables 1). The reported spring gill net landings represented 90 % of Delaware's total commercial striped bass landings for 2012. Reported striped bass landings from the Delaware Bay accounted for 88 % of the spring total. There were no spring gill net landings reported for the Atlantic Ocean in 2012.

The spring gill net fishery caught 95% of the quota allotted to the gill net fishery, thus allowing for a limited fall gill net fishery in 2012. The reported landings from the fall gill net fishery comprised 858 striped bass with a total weight of 9,168 lbs. Combined spring and fall gill net fishery landings accounted for 99% of the gillnet quota.

The reported landings for the commercial hook and line fishery were 11,153 pounds (Table 1). The reported commercial hook and line catch comprised 6 % of the total 2012 reported striped bass commercial landings. Hook and line reports indicated landings of 855 fish, which results in an estimated mean weight of 13.0 lbs.

b. Catch composition

The commercial harvest was sampled for size, age and sex composition by DDFW personnel who visited fish wholesalers as landings arrived. Additional samples were purchased from the wholesalers and processed at the fisheries lab for a total of 146 samples. Striped bass were sexed in the field by use of forceps, measured for total and fork length and weighed (kg). The additional purchased striped bass samples were sexed by examining the gonads, measured for total and fork length, weighed (kilograms), stomach contents were removed and both scale and otolith samples were removed for age comparison, although only scale ages were reported for consistency. For both the spring and fall gill net landings and hook and line fisheries, scale samples were used to estimate the age distribution of all fish using the proportions at age.

Sampled striped bass ages ranged from 5 to 13 years (Table 3). The dominant age classes were 6, 7, and 8 which accounted for 64% of the aged samples.

The minimum legal commercial length limit was 508 mm (20 inches) with no maximum length. Sampled fish ranged from 399 mm to 1055 mm, with a mean length of 786 mm and from 1.86 kg to 13.78 kg with a mean weight of 5.71 kg (Table 3).

One hundred and nine of the sexed striped bass were female (75%), 27 were male (18%) and sex could not be determined in 10 (7%) samples.

c. Effort

The spring 2012 gill net fishery had 497 trips taken and 191,166 yards of net fished (Table 1). Catch per unit effort was 28.68 fish landed per trip (Table 2).

The 2012 commercial hook and line fishery had 142 trips taken targeting striped bass (Table 1). There were 7.1 striped bass caught per trip, but this is an over estimate since it does not account for trips when no striped bass of legal size were landed.

ii. Recreational Fishery

1. Regulations

The creel limit was two fish per day with a minimum size of 28” TL, except for July and August. During those months, in the Delaware River, Bay, and tributaries thereof, a slot limit of 20”-26” was in effect, again with a two fish creel limit. No harvest was allowed in April and May from the spawning grounds in the Delaware River,

Chesapeake and Delaware Canal, or the Nanticoke River. These regulations do not prohibit catch-and-release fishing on the spawning grounds, but the use of circle hooks is required when using bait.

2. 2012 Recreational Harvest

a. Landings and method of estimation

Delaware obtained recreational harvest estimates from the Marine Recreational Information Program (MRIP), which was augmented to three times the base level by DDFW funding. The length frequency distribution by wave (two month period) was combined with age-length data from the Division's spring electrofishing survey on the spawning grounds, samples of the commercial gill net landings and the DDFW's research trawl survey of Delaware Bay to establish catch at age estimates for the Delaware recreational fishery spring landings. Biological samples from the summer slot season were collected by DDFW staff and each sample, in addition to be measured and weighed, was sexed and had both otoliths and scales collected for aging. Biological samples from the fall recreational landings were collected by a bait-and-tackle shop in Lewes, Delaware. Sex identification, length/weight measurements, and scales were obtained from each striped bass sample. Otoliths were then removed by DDFW staff and each fish was aged using both scale and otoliths. Only scale ages were included in reports for consistency and were included in the catch-at-age matrix employed in the statistical catch-at-age model of the ASMFC Striped Bass Stock Assessment Subcommittee.

b. Catch composition

The estimated total number of striped bass caught recreationally in 2012 was 136,407 (Table 4). The MRIP estimates of total number caught (including live releases) increased from 421 fish in 1990 to a peak of more than 277,727 in 2008. The 2012 estimated total number caught was below the time-series annual mean of 152,113.

The 2012 estimated number harvested was 25,434 fish, a 41% increase from 2011 and the 2012 estimated landed weight was 360,106 lbs. (Table 4), a 49% increase from 2011. The 2012 estimated number released, 110,973 striped bass (Table 4), was below the time-series annual mean of 134,507.

The age and sex of eleven summer slot season striped bass were determined by DDFW.

Ages from scale samples ranged from 3 to 7 and averaged 5.4. All samples were male except for one where sex could not be determined. This undetermined sex fish was also the only fish that was too large for the slot.

The age and length frequency distributions of fall recreational striped bass landings were determined from size and age samples obtained from 63 fish racks kept for DDFW by a bait-and-tackle shop in Lewes, DE.

The ages, determined from scales, of the fall recreational striped bass ranged from 5 to 11, but ages 7 through 9 accounted for 62% of the aged samples (Table 5).

The fall recreational striped bass ranged in total length from 711 mm to 1,143 mm, and the mean length was 889 mm (Table 5).

c. Effort

Delaware did not collect data on recreational fishing trips targeting striped bass.

iii. **Other losses**

Commercial drift gill-netters reported discarding 118 (Table 1) striped bass during 2012, but the discard mortality rate for drift gill-caught striped bass in a Delaware study during 2002 and 2003 was close to zero (Clark and Kahn 2009). Commercial anchor gill-netters reported discarding 251 striped bass during 2012 (Table 1), resulting in an estimated 103 dead discarded striped bass using an anchor net discard mortality rate of 0.41 (Clark and Kahn 2009). Commercial hook and line fishers reported discarding 165 striped bass in 2012 (Table 1), resulting in an estimated 13 dead discarded striped bass, using a hook and release mortality rate of 0.08 (Northeast Fisheries Science Center 2008).

The recreational fishery released an estimated 110,973 striped bass in 2012 (Table 4), resulting in an estimate of 8,878 striped bass dying after release, using the hook and release mortality rate of 0.08 (Northeast Fisheries Science Center 2008).

Several of the large industrial operations (e.g. power plants, refineries, chemical plants) situated along the Delaware River near striped bass spawning grounds use large volumes of Delaware River water for cooling and often kill many young-of-the-year

striped bass during normal operations. The impact of these losses on the striped bass population was not determined.

iv. **Total Harvest and Losses**

The number of striped bass harvested or killed in Delaware during 2012 was 15,854 for all commercial fisheries combined and 34,312 for the recreational fishery. The estimated total weight harvested or killed in Delaware during 2012 was 195,751 lbs. for all commercial fisheries combined and 360,087 lbs. for the recreational fishery.

B. Fishery Independent Monitoring Programs

i. Spawning stock survey

The 2012 spawning stock survey for the Delaware River is attached as appendix A.

III. Planned management programs for this year

No changes are anticipated to Delaware's striped bass regulations or monitoring programs in the current year.

References

Clark, J. H. and D. M. Kahn. 2009. Amount and disposition of striped bass discarded in Delaware's spring striped bass gill-net fishery during 2002 and 2003: effects of regulations and fishing strategies. North American Journal of Fisheries Management 29:576-585.

Northeast Fisheries Science Center. 2008. 46th Northeast Regional Stock Assessment Workshop (46th SAW). 46th SAW assessment summary report. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 08-01; 24 p.

Table 1. Reported commercial striped bass harvest from Delaware, in pounds and number, estimated number discarded and total number caught, by gear type and area fished in 2012. Unspecified Delaware Bay landings were included with Middle Delaware Bay landings.

Pounds Landed

Location	Gill Net			Hook and Line	Combined
	Spring	Fall	Total		
Delaware River	6,860		6,860	*	*
Upper Delaware Bay	80,758	3,566	84,324	*	*
Middle Delaware Bay	51,383	1,253	52,636	1,885	54,521
Lower Delaware Bay	21,554	4,158	25,712	3,955	29,667
Delaware Estuary Total:	**160,555**	**8,977**	**169,532**	**8,326**	**177,858**
Nanticoke River	12,033		12,033		12,033
Producer Area Total:	**172,588**	**8,977**	**181,565**	**8,326**	**189,891**
Atlantic Ocean	*	*	83	1,856	1,939
Indian River and Bay	*	*	1,523	971	2,494
Unspecified Areas					
Other Areas Total:	**1,415**	**191**	**1,606**	**2,827**	**4,433**
Statewide Total:	**174,003**	**9,168**	**183,171**	**11,153**	**194,324**

* Denote values that cannot be shown per Delaware State Code (Title 7 § 903) regarding confidentiality of landings.

Table 1 (con't). Reported commercial striped bass harvest from Delaware, in pounds and number, estimated number discarded and total number caught, by gear type and area fished in 2012. Unspecified Delaware Bay landings were included with Middle Delaware Bay landings.

Number Landed

Location	Gill Net			Hook and Line	Combined
	Spring	Fall	Total		
Delaware River	462		462	*	*
Upper Delaware Bay	7,064	353	7,417	*	*
Middle Delaware Bay	3,947	114	4,061	150	4,211
Lower Delaware Bay	1,610	373	1,983	310	2,293
Delaware Estuary Total:	**13,083**	**840**	**13,923**	**625**	**14,548**
Nanticoke River	821		821		821
Producer Area Total:	**13,904**	**840**	**14,744**	**625**	**15,369**
Atlantic Ocean	*	*	7	154	161
Indian River and Bay	*	*	132	76	208
Unspecified Areas					
Other Areas Total:	**121**	**18**	**139**	**230**	**369**
Statewide Total:	**14,025**	**858**	**14,883**	**855**	**15,738**

* Denote values that cannot be shown per Delaware State Code (Title 7 § 903) regarding confidentiality of landings.

Table 1 (con't). Reported commercial striped bass harvest from Delaware, in pounds and number, estimated

number discarded and total number caught, by gear type and area fished in 2012. Unspecified Delaware Bay landings were included with Middle Delaware Bay landings.

Number Discarded

Location	Drift Gill Net		Anchor Gill Net				
	Spring	Fall	Spring	Fall	Total	Hook and Line	Combined
Delaware River	10				10		10
Upper Delaware Bay			15	90	105	11	116
Middle Delaware Bay	16		94	27	137	51	188
Lower Delaware Bay	49			7	56	30	86
Delaware Estuary Total:	**75**		**109**	**124**	**308**	**92**	**400**
Nanticoke River	43				43		43
Producer Area Total:	**118**		**109**	**124**	**351**	**92**	**443**
Atlantic Ocean			*	*		37	37
Indian River and Bay			*	*	18	36	54
Unspecified Areas							
Other Areas Total:			**4**	**14**	**18**	**73**	**91**
Statewide Total:	**118**		**113**	**138**	**369**	**165**	**534**

* Denote values that cannot be shown per Delaware State Code (Title 7 § 903) regarding confidentiality of landings.

Table 1 (con't). Reported commercial striped bass harvest from Delaware, in pounds and number, estimated number discarded and total number caught, by gear type and area fished in 2012.

Unspecified Delaware Bay landings were included with Middle Delaware Bay landings.

Total Number Caught
(Landings plus discards)

Location	Gill Net			Hook and Line	Combined
	Spring	Fall	Total		
Delaware River	472		472	*	*
Upper Delaware Bay	7,079	443	7,522	*	*
Middle Delaware Bay	4,057	141	4,198	201	4,399
Lower Delaware Bay	1,659	380	2,039	340	2,379
Delaware Estuary Total:	**13,267**	**964**	**14,231**	**717**	**14,948**
Nanticoke River	864		864		864
Producer Area Total:	**14,131**	**964**	**15,095**	**717**	**15,812**
Atlantic Ocean	*	*	7	191	198
Indian River and Bay	*	*	150	112	262
Unspecified Areas					
Other Areas Total:	**125**	**32**	**157**	**303**	**460**
Statewide Total:	**14,256**	**996**	**15,252**	**1,020**	**16,272**

* Denote values that cannot be shown per Delaware State Code (Title 7 § 903) regarding confidentiality of landings.

Table 1 (con't). Reported commercial striped bass harvest from Delaware, in pounds and number, estimated number discarded and total number caught, by gear type and area fished in 2012.

Unspecified Delaware Bay landings were included with Middle Delaware Bay landings.

Total Effort (Trips)

Location	Gill Net			Hook and Line	Combined
	Spring	Fall	Total		
Delaware River	39		39	*	*
Upper Delaware Bay	191	42	233	*	*
Middle Delaware Bay	166	27	193	33	226
Lower Delaware Bay	77	39	116	47	163
Delaware Estuary Total:	**473**	**108**	**581**	**103**	**684**
Nanticoke River	19		19		19
Producer Area Total:	**492**	**108**	**600**	**103**	**703**
Atlantic Ocean	*	*	2	24	26
Indian River and Bay	*	*	9	15	24
Unspecified Areas					
Other Areas Total:	**5**	**6**	**11**	**39**	**50**
Statewide Total:	**497**	**114**	**611**	**142**	**753**

* Denote values that cannot be shown per Delaware State Code (Title 7 § 903) regarding confidentiality of landings.

Table 1 (con't). Reported commercial striped bass harvest from Delaware, in pounds and number, estimated number discarded and total number caught, by gear type and area fished in 2012. Unspecified Delaware Bay landings were included with Middle Delaware Bay landings.

Total Net Yards					
	Gill Net				
Location	**Spring**	**Fall**	**Total**	**Hook and Line**	**Combined**
Delaware River	16,700		16,700		16,700
Upper Delaware Bay	65,412	12,860	78,272		78,272
Middle Delaware Bay	50,530	6,850	57,380		57,380
Lower Delaware Bay	49,414	8,920	58,334		58,334
Delaware Estuary Total:	**182,056**	**28,630**	**210,686**	**0**	**210,686**
Nanticoke River	4,110		4,110		4,110
Producer Area Total:	**186,166**	**28,630**	**214,796**	**0**	**214,796**
Atlantic Ocean	*	*	1,600		1,600
Indian River and Bay	*	*	6,600		6,600
Unspecified Areas					
Other Areas Total:	**5,000**	**3,200**	**8,200**	**0**	**8,200**
Statewide Total:	**191,166**	**31,830**	**222,996**	**0**	**222,996**

* Denote values that cannot be shown per Delaware State Code (Title 7 § 903) regarding confidentiality of landings.

Table 2. Reported gill net fishing effort, landings and catch per unit effort for the 2012 spring and fall gill net fisheries.

SPRING		FALL	
No. of trips[1]	497	No. of trips	114
Net-Yards	191,166	Yard-days	31,830
Total catch	14,256	Total Catch	996
Catch/trip	28.68	Catch/trip	8.74

The number of man-days was based on the number of days when striped bass landings occurred, not necessarily the total number of days of fishing effort.

Table 3. Age distribution and length at age of striped bass sampled from the 2012 spring gill net fishery (n=146).

Age	TL mean (mm)	TL min (mm)	TL max (mm)	Freq. at age	Percent of total sampled
5	692	615	858	10	6.8%
6	703	581	834	26	17.8%
7	753	582	968	35	24.0%
8	795	399	965	34	23.3%
9	856	627	976	22	15.1%
10	876	753	1002	13	8.9%
11	985	939	1015	3	2.1%
12	947	947	947	2	1.4%
13	1055	1055	1055	1	0.7%

Table 4. Delaware recreational striped bass estimates from 1990 through 2012: number caught, number released, number landed, weight landed and number released dead.

Year	Total number caught	PSE	Number Harvested	Number released (B2)	H & L release mortality	Total Losses (number)	Pounds Landed
1990	16,421	22.7	2,009	14,411	1,153	3,162	18,115
1991	41,075	21.5	2,741	38,334	3,067	5,858	25,501
1992	39,332	24.6	2,400	36,932	2,955	5,354	25,677
1993	93,599	23.4	4,055	89,543	7,163	11,219	52,540
1994	108,131	21.6	4,140	103,992	8,319	12,459	63,832
1995	130,725	17.8	15,361	115,363	9,229	24,590	175,347
1996	122,240	12.6	22,867	99,372	7,950	30,817	281,481
1997	149,779	20.1	19,706	130,073	10,406	30,112	232,186
1998	203,774	13.6	18,758	185,016	14,801	33,559	236,926
1999	114,469	18.8	8,772	105,696	8,456	17,228	100,541
2000	191,381	12.0	39,543	151,838	12,147	50,886	346,905
2001	203,872	15.0	41,195	162,677	13,014	54,219	382,498
2002	143,799	9.7	29,149	114,650	9,172	38,689	299,561
2003	194,708	11.5	29,101	169,012	13,521	42,350	303,909
2004	176,652	11.2	23,849	152,803	12,224	36,073	288,650
2005	242,376	13.8	19,977	222,399	17,792	37,769	254,466
2006	256,128	12.9	17,804	238,324	19,065	36,869	190,943
2007	261,168	14.1	10,095	251,073	20,085	30,180	112,071
2008	277,727	12.6	16,994	260,733	20,858	37,852	209,995
2009	174,319	13.1	21,762	152,557	12,205	33,967	313,268
2010	92,420	13.9	14,622	77,799	6,224	20,846	191,355
2011	128,107	18.6	18,023	110,084	8,807	26,830	241,149
2012	136,407	28.7	25,434	110,973	8,878	34,312	360,106

Table 5. Age distribution and length at age of striped bass sampled from the 2012 fall recreational fishery (n=82).

Age	Freq. at age	Mean TL (mm)	Min TL (mm)	Max TL (mm)	Percent of total sampled
5	4	854	711	914	6.3%
6	11	860	813	965	17.5%
7	17	901	800	1143	27.0%
8	9	866	749	1016	14.3%
9	13	890	711	1016	20.6%
10	6	893	762	1067	9.5%
11	3	1024	952	1080	4.8%

Appendix A. *Delaware River Striped Bass Spawning Stock Assessment*

State: Delaware Project: F-47-R-22

Annual Report

Project Type: Research and/or Survey

Project Title: Anadromous Species Investigations

Job I: Striped Bass Research

Activity I: Delaware River Striped Bass Spawning Stock Assessment

Period Covered: February 1, 2012 to January 31, 2013

Delaware Department of Natural Resources and Environmental Control

Division of Fish and Wildlife

Principal Investigator: Matthew T. Fisher, Fisheries Biologist

_____

Director

_____

Date

This project was funded under the Federal Aid in Fisheries Restoration Act of the U.S. Fish and Wildlife Service and completed by the Delaware Division of Fish and Wildlife, 89 Kings Highway, Dover, Delaware 19901.

ABSTRACT

The striped bass *Morone saxatilis* is one of the most economically important fish species along the Atlantic Coast, supporting valuable recreational and commercial fisheries. The Delaware Division of Fish and Wildlife has assessed the Delaware River striped bass spawning stock for population characteristics annually since 1991. On-going objectives of the program include assessing relative abundance, size structure, age and sex composition, and tag return patterns of the spawning stock.

From April 12 to May 23, 2011, 325 sexually mature fish, including 285 males and 40 females, were taken during 12.6 hrs of electrofishing effort, yielding an overall catch rate of 25.8 fish/hr (CPUE) for the randomized sampling program. An additional 392 sexually mature fish were taken during ancillary collections. Water temperatures during the spawning season were warmer than average in mid-April and warmer in late-May and remained optimal for spawning (14-20°C) from April 17 to May 22 which provided for a truncated spawning season than most years. Catch rates, from randomized sampling, in the upper and lower zones of the spawning grounds were 25.8 and 0.0 CPUE, respectively. No effort was directed in the lower zone due to unusually high salinities and the highest catch rate observed at Station 25P "Upper Navy Yard" in the upper zone, which had a CPUE of 70.0. The geometric mean catch rate decreased to 1.9 fish/station for 2012 compared to 3.3 in 2011.

The total length (TL) of fish collected on the spawning grounds during randomized sampling averaged 552 mm and ranged from 288 to 1,173 mm. Males averaged 495 mm and ranged from 288 to 1020 mm, while females averaged 959 mm with lengths ranging from 644 to 1,173mm. The catch rate of fish ≥710 mm TL was 5.4 CPUE, and was 3.1 CPUE for males and 2.3 CPUE for females ≥710 mm. Fish ≥710 mm TL accounted for 21% of the spawning stock overall by number. Females ≥710 mm TL composed 98% of female spawners and 12% of the spawning stock overall by number.

The age of fish collected on the spawning grounds during randomized sampling averaged 5.3 years and ranged from age 2 to age 15. Males averaged 4.3 years and ranged from age 2 to age 13, while females averaged 12.3 years and ranged from age 5 to age 15. Males of the 2009 year class were the most abundant on the spawning grounds and accounted for 37% of male spawners, while the 2000 year class was the most abundant year class of females and accounted for 28% of female spawners.

There were 484 fish tagged in 2012, including those from ancillary collections. By December 31, 2012, forty-two were reported as recaptured. Thirty-eight were caught by recreational anglers, 3 were

caught by commercial fisherman and 1 was caught by researchers. Forty three percent of tag returns came from the Coastal areas, 33% from the Delaware Estuary, and 26% from Chesapeake Bay and tributaries. Forty-two percent were reported harvested.

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INTRODUCTION

The striped bass *Morone saxatilis* is one of the most economically important fish species along the Atlantic Coast, supporting valuable recreational and commercial fisheries. The Delaware Division of Fish and Wildlife (DFW) has assessed the Delaware River striped bass spawning stock for population characteristics annually since 1991. During the development of the program, the efficiency and feasibility of several sampling techniques were evaluated, given the highly industrialized nature of the lower Delaware River. In 1994, boat electrofishing was selected as the most efficient sampling technique to more accurately evaluate changes in striped bass year class abundance on the spawning grounds (Shirey 1995). Although the sampling methodology has remained similar since 1994, adjustments have been made to address problems commonly associated with monitoring the abundance and movement of extremely mobile and migratory aggregations of spawning fish and to adjust for movement of the freshwater zone in years with below average precipitation. Changes included the expansion of sampling into Pennsylvania waters and the use of a multistage lattice survey design implemented in 1996. In addition, several sampling stations have been added and some removed due to low catch rates and shoreline development. Ongoing objectives of the program include assessing the relative abundance, size structure, age and sex composition, and tag return patterns of the Delaware River striped bass spawning stock.

METHODS

Study area and survey design

This assessment was conducted in the lower Delaware River from the Delaware Memorial Bridge at rkm 110 to the mouth of Big Timber Creek, NJ at rkm 152, which encompassed the main spawning grounds in the Delaware River (Figure 1). The spawning grounds were divided into lower and upper zones. The lower zone had twelve sampling stations and extended from rkm 110 at the Delaware Memorial Bridge to the boundary between the states of Delaware and Pennsylvania. The upper zone had thirteen sampling stations and extended from the Commodore Barry Bridge to rkm 152 at Big Timber Creek. The average station length was approximately 1.6 km and ranged from approximately 1.1 (Station 4P “Mobil Oil”) to 2.2 km (Station 2P “Lower Monds Island”). However, the segment within each station sampled varied on any particular day depending on the direction of tidal current and fish abundance. Depth at each station ranged from 0.9 to 9.1 m. In addition to the shoreline stations, sampling was also conducted on Cherry Island Flats, a submerged island in the lower zone, as well as along Little Tinicum and Chester Islands in the upper zone.

Stations within the lower and upper zones of the spawning grounds were grouped into two categories based on average catch rates from the previous three years. Stations with catch rates below average were categorized as "poor" stations, while stations with average or above average catch rates were categorized as "good" stations. On each sampling day, five good stations and two poor stations were randomly selected from a given zone. Each of the upper and lower zones are typically sampled weekly throughout the spawning season, which generally extends from mid-April to late May or early June depending on water temperature. In addition to randomized collections, ancillary collections were made to increase the number of tags released and number of samples obtained for age and growth analysis.

Data collection

Fish were collected using a Smith-Root, Inc. model 18-E boat electrofisher operated using pulsed direct current at 60 pps and 500 volts. Output amperage was kept within a range of 7.0 to 8.5 amps. The standardized sampling time at each station was 720 seconds of pedal time. The boat was operated moving with the tidal current in a serpentine-shaped pattern. Only fish approximately >200 mm total length (TL) were collected. Fish <200 mm TL, which are typically immature and not yet recruited to the spawning population, generally pass through the mesh of dip nets used aboard the electrofishing boat. Captured fish were held in an onboard, flow-through, 280 liter live-well until the station was completed or the live-well was deemed full.

All sexually mature fish were measured to the nearest mm TL. Sex was determined by the expression of milt by palpation of the gonadal region of the abdomen, obvious outward appearance, or presence of eggs. The condition of females was also noted as gravid or spent when apparent. Only sexually mature fish were included in total catch or catch rate calculations.

Scale samples were collected from all fish for subsequent age and growth analysis. Scales were removed from the left side midway between the lateral line and the junction of the two dorsal fins. Scales were cleaned with mild soapy water and pressed on heated acetate slides using a Carver® hydraulic press. Scales were pressed for 2.5 minutes at 94°C using 10,000 lbs of pressure. Scale impressions were read using an EYECOM® model 3000 microfiche reader at 24x magnification. The y-intercept was assumed to be 15 mm TL. Ages were then assigned to the remaining samples utilizing an age-at-length key and also to regenerated scales samples. Resulting assigned aged samples were included in age and growth analysis results.

All fish ≥ 458 mm TL and in good physical condition were tagged with a numbered internal anchor tag as part of the coast-wide tagging program coordinated by the U.S. Fish and Wildlife Service

(U.S. FWS) in Annapolis, MD. This also included any immature fish ≥458 mm TL. Release data was provided to the U.S. FWS at the end of the sampling season; tag return data was obtained from the U.S. FWS at the end of the year.

Data analysis

Relative abundance, expressed as catch per unit effort (fish/hr), was calculated as the number of sexually mature fish collected during randomized collections. Because each station was sampled for a standardized time (720 seconds), rather than distance, effort was defined as hours of pedal time. Catch rates were calculated by date, station, zone, sex, age, size, and year class. The geometric and arithmetic mean catch rate (fish/station) was also calculated and used as a measure of abundance for annual comparison. Since sampling time was standardized, time was not included in the expression of the geometric and arithmetic mean catch rate.

Linear regression analysis was conducted between the DFW spawning stock assessment (1996-2012) and the New Jersey Department of Environmental Protection (NJDEP) juvenile striped bass seine survey (1980-2010) for survey validation purposes. The catch rates by year class of sexually mature fish collected in the DFW spawning stock assessment (y) were plotted as a lagged function against their respective catch rate at age-0 in the NJDEP juvenile seine survey (x) in the lower Delaware River. This analysis was conducted for males, females, and both sexes combined at age-2 to age-15. Results were considered significant at $p < 0.05$.

RESULTS AND DISCUSSION

From April 12 to May 23, 2011, 325 sexually mature fish, including 285 males and 40 females, were taken during 63 randomized collections (12.6 hrs) on the main spawning grounds in the lower Delaware River (Tables 1 and 2). An additional 392 sexually mature striped bass, including 355 males and 37 females, were taken during 31 ancillary collections (5.4 hrs) (Tables 3 and 4). Water temperatures during the spawning season were warmer than average in mid-April and warmer in late-May. Temperatures remained within the optimal spawning range, 14 to 20°C (Fay et al. 1983), from April 17 to May 22 (Figure 2). The lack of a winter snowpack melt in the upper watershed combined with a lack of rainfall in April led to the spring freshet being well below normal flows on the spawning grounds. This affected the sampling regime by causing the salinity to be abnormally high in the lower zone and prevented effective electrofishing sampling. Therefore, all sampling had to be conducted in the upper zone. This situation previously occurred in 2006 and was handled in a similar fashion.

In 2006, two small males with lesions tested positive for mycobacteriosis (Murphy 2007). Lesions were observed on 1% (8 of 717) of fish handled in 2006 and appeared over a brief two-week period during the late spawning season mainly on small males. From 2007-2011 no lesions were observed. However, the late spawning season has not been sampled since 2006. In 2011, noting small dark dots, a sign of healed mycobacteriosis (VIMS personnel, pers. com) was added to the protocols but none were observed. The extent of mycobacteriosis in the Delaware River stock will continue to be monitored.

Relative abundance

A total of 285 sexually mature fish was collected during 12.6 electrofishing hours on the spawning grounds, yielding an overall CPUE of 25.8 for the randomized sampling program (Table 1). The individual catch rates for males and females were 22.6 and 3.2 CPUE, respectively. High catch rates ($\geq$ 25.0 CPUE) were attained on 33% of random sampling days. The highest daily catch (n = 84) was observed on May 3rd in the upper zone.

In the lower zone unusually high salinities prevented effective sampling so all effort was focused on the upper zone (Table 2).

In the upper zone, 325 sexually mature fish were collected during 12.6 randomized electrofishing hours, yielding a catch rate of 25.8 CPUE. The most productive sampling locations in the upper zone were; stations 5P "UPS Terminal", 8P "Upper Tinicum Island", 23P "Upper Navy Yard" and 25P "Lower Navy Yard" which yielded catch rates $\geq$ 25.0 CPUE. Stations 3P "Upper Monds Island", 6P "Chester Island", 18P "Mantua Creek" and 24P "Big Timber Creek" yielded low catch rates $\leq$ 5.0 CPUE. The highest total catch and catch rate occurred at station 25P (n= 126; 70.0 CPUE). This station has been a top producer.

Station 4P "Mobil Oil" yielded high catch rates from 1996 to 2004. However, from 2005 to 2008 CPUE has been low, ranging from 3.6 to 6.9 CPUE. Since 2009 station 4P has shown improvement averaging 11.5 CPUE indicating a moderate increase but still below the overall average of 25.1. Catch rates at station 4P post 2004 indicate that residual oil pollution from the Athos I Oil spill that occurred in November 2004 has caused spawning striped bass to avoid station 4P. Weber et al. (1981) demonstrated that Pacific salmon *Oncorhynchus sp.* migrating upstream during the peak of the spawning run in Chamber Creek, Washington substantially avoided petroleum hydrocarbons. The improved catch rates since 2009 indicate an increasing trend for this station.

The annual catch rates have been expressed in numerous ways since the project inception. The survey adopted the use of a geometric mean in 2001 to mitigate for years with substantially less effort (i.e.

2007) or high variation in catch per station (most years) (Figure 3). Recently, an internal statistical review by D. Kahn has encouraged the use of a stratified arithmetic mean to examine trend. All 3 ways to look at trend are included in Figure 3. The arithmetic mean and stratified arithmetic mean are highly correlated and they result in the same interpretation of trend. To calculate the stratified arithmetic mean educated guesses were made as to what stations were considered 'good' and 'poor' throughout the time series since annual records of this were not kept. Due to this potential introduced bias calculating the stratified arithmetic mean and its associated standard errors only the arithmetic mean and geometric mean will be presented and discussed in the future. The geometric mean catch rate has decreased from 2011 to 2012, 3.3 to 1.9 fish/station respectively. The arithmetic mean also decreased with 2012 having an average year (Figure 3). Despite these decreases the spawning population abundance since 1996 appears to vary without clear trend when using arithmetic mean or geometric mean for analysis.

Size structure

The mean TL of fish collected on the spawning grounds during the randomized sampling program was 552 mm and ranged from 288 to 1,173 mm. In most sampling years previous to 2010 the length frequency distribution indicates a bimodal distribution for the spawning stock, reflective of the notable difference in size between males and females on the spawning grounds. However, since 2010, due to an increase in the proportion of large males (>710 mm) the distribution appears more like a bell curve.

For males, the mean TL on the spawning grounds was 495 mm and ranged from 288 to 1020 mm. The length frequency distribution indicated that the 300 through 500 mm size classes were the most abundant size classes of males on the spawning grounds (Figure 4). This represents a size class shift from recent years when the 400 to 600 mm TL size class was most dominant. This shift seems likely due to the arrival of a strong 2009 year class that is seeing increased representation in the spawning stock as small males.

Male fish 300 to 500 mm TL composed 79% of male spawners and 69% of the spawning stock overall. The catch rate of males ≥ 710 mm, the minimum recreational size limit in Delaware, New Jersey and Pennsylvania waters, was 2.3 CPUE in 2012 (Table 5). Males ≥710 mm composed just 10% of male spawners and only 9% of the spawning stock overall.

The female size distribution is important for management measures, such as size restrictions designed to manipulate female biomass in the spawning stock. The mean TL of females on the spawning grounds was 959 mm with lengths ranging from 644 to 1,173 mm (Table 6). The length frequency distribution indicated that the 900 to 1,000 and 1,100 to 1,200 mm size class was the most abundant size class of females on the spawning grounds. The inclusion of the 1,100 to 1,200 class as most abundant is

the first change in female abundance since 2004. In years prior to 2002, the 800 to 900 mm-size class was the most abundant. The catch rate of females ≥ 710 mm decreased from 4.3 CPUE in 2011 to 3.1 CPUE in 2012. Females ≥ 710 mm composed 98% of spawning females and 12% of the spawning stock overall by number.

The catch rate of females <725 mm TL has been negligible in recent years and was 0.1 CPUE in 2012 (Table 7). Females this size are not typically fully recruited into the spawning stock based on age-at-maturity estimates of other stocks (Berlinsky et al. 1995) and length-at-age data for the Delaware River stock. The maturity schedule of female striped bass will most likely continue to preclude them from participating on the spawning grounds in large numbers at sizes <725 mm. The catch rate of females 725 to 1,000 mm TL, which typically represents females that have spawned at least once and are fully recruited into all fisheries, decreased from 2.8 CPUE in 2011 to 1.8 in 2012. Female striped bass >1,000 mm TL abundance has never been high on the spawning grounds. Females of this size are typically older than age 10, have spawned multiple times, and are fully recruited into all fisheries. The catch rate of female striped bass >1,000 mm TL decreased to 1.3 CPUE in 2012; the second highest of the survey. Catch rates of female striped bass >1,000 mm TL should remain above average as some of the stronger year classes, such as the 1993 and 1995 year classes, continue to be recruited into this size group.

Age and growth

The mean age of fish on the spawning grounds was 5.3 years with fish from age 2 to age 15 represented (Table 8). The 2009 year class accounted for the largest percentage of spawners (37.4%) (Table 9). Three year olds are typically the dominant age class. Additionally, 2009 was a moderately high year class according to NJ DEP seine survey so that year class may remain a dominant year class in the near future.

The mean age of males on the spawning grounds was 4.3 years with males from age 2 to age 13 represented (Table 9). The 2008 through 2010 year classes were the most abundant year classes of males and accounted for nearly 79% of male spawners and 68% of the spawning stock overall.

The mean age of females on the spawning grounds has continued to increase from 8.0 years in 1996 (Shirey and Stetzar 1996) to a new peak of 12.3 years in 2012. In 2012, females from age 5, 7, 9 to 15 were represented. The 1997, 2000 and 2001 year classes were the most abundant year classes of females on the spawning grounds and accounted for 55% of spawning females and 5.3% of the spawning stock overall by number. The mean length-at-age of the 1997, 2000 and 2001 year classes ranged from 924 to 1102 mm TL. The percentage of females in the spawning stock age 8 and older has steadily increased from less than 50% in 1995 (Shirey and Stetzar 1996) to 94% in 2012.

Survey validation

The DFW spawning stock assessment and NJDEP juvenile survey were significantly correlated at multiple ages. There was a significant positive relationship ($p < 0.05$) between the catch rate by year class (sexes combined) of fish collected during the DFW spawning stock assessment when plotted as a lagged function against their respective catch rate at geometric mean age 0 during the NJDEP juvenile survey at age 4, 8, 11, 12, 13 and 14 (Table 10). The strongest relationships were observed at age 8 ($r^2 = 0.58$) and age 11 ($r^2 = 0.60$). When only males were assessed, there was a significant positive relationship ($p < 0.05$) at age 4, 8, 11, 12 and 14 with the strongest relationship observed at age 12 ($r^2 = 0.53$). When only females were assessed, there was a significant positive relationship ($p < 0.05$) at age 11, 12, 14 and 15 with the strongest relationship observed at age 14 ($r^2 = 0.46$).

Many factors complicate survey agreement, particularly with long lags between abundance measures (changes in catchability, mortality, etc.). A potential source of error is accurate age assignment. Validation would likely produce stronger correlations among more year classes if otoliths were used. Scales produce a somewhat reliable growth curve to determine age at maturity especially if younger fish are considered. However, the accuracy of scales is not as good as otoliths so when year classes are assigned and compared to juvenile index this weakness is exposed and produces weak correlations for this validation. The use of otoliths to assign age requires the fish be sacrificed and is inconsistent with the tag and recapture component of the project. The tag and recapture data that is produced is an important component to management of the Delaware stock. For this reason, scales will continue to be used for age and growth but needs to be considered when evaluating this validation technique.

Tagging program - 2012

In 2012, 484 fish, including 407 males and 77 females, were tagged with an abdominal anchor tag as part of the coast-wide tagging program coordinated by the U.S. FWS. By December 31, 2012, 42 of these fish were reported as recaptured, yielding a tag return rate of 8.9%, below the long-term rate which has averaged nearly 10% (Table 11). One additional tag was reported as 'found dead' and for informational purposes was included in the table but not included in recapture calculations. Fish recaptures reported in 2012 were taken in waters off all coastal states from Virginia to Rhode Island except for Connecticut and New Hampshire. Recreational anglers accounted for 91% of recaptures, commercial fisherman 7%, and researchers 2%. The lack of commercial harvest was expected given that most commercial fisheries near and within the Delaware River and Bay, including the Chesapeake Bay and coastal areas along the Delmarva Peninsula, occur in late winter and early spring. Therefore, fish

tagged during the spring spawning stock assessment are typically not exposed to harvest by commercial fisheries during the six to eight months following release.

To better describe the geographic distribution of tag returns, recapture locations were grouped into: Delaware Bay and tributaries, Chesapeake Bay and tributaries, and coastal areas (Table 11). Tag returns from tributaries that drain directly into the Atlantic Ocean, such as Indian River Inlet and Little Egg Inlet, were included in coastal areas.

Delaware Bay and tributaries

Fourteen (33%) of 42 fish tagged and recaptured in 2012 were caught in the Delaware Estuary. Recreational anglers accounted for 93% of tag returns. Recapture locations ranged from Bristol, PA to Port Norris, NJ on the Delaware Bay. Two fish were reported harvested and one was found dead. The mean TL of striped bass recaptured in the Delaware Estuary was 595 mm but total lengths ranged from 418 to 946 mm at the time of tagging. Although three jurisdictions (Delaware, New Jersey, and Pennsylvania) occur in the tidal portion of the Delaware Estuary, the majority of tag returns are typically reported from New Jersey ports or waters (Figure 5), which accounted for 50% of tag returns in 2012. Males typically make up the majority of recaptures and in 2012 all but one recaptures were males. DE DFW in 2009 introduced a summer (July 1 to August 31) slot season with a limit of two fish from 508 to 660 mm. No slot sized fish were reported in Delaware waters during the slot season. Recaptures during the slot season are rare; however, occasional reports just as the two in 2011 indicate some utilization of the summer slot fishery.

Chesapeake Bay and tributaries

Eleven (26%) of 42 fish tagged and recaptured in 2012 were caught in the Chesapeake Bay and tributaries. Recreational anglers accounted for 86% of tag returns and 5 were reported harvested. One of the tag returns was from a charter boat. Commercial fisherman accounted for the remaining 14% of tag returns, one of which was harvested. The mean TL of fish recaptured in the Chesapeake Bay and tributaries was 568 mm but fish ranged from 411 to 1065 mm TL at the time of tagging. The average size of fish harvested in Chesapeake Bay is smaller because the minimum recreational size limit in Chesapeake Bay during most of the season is only 457 mm TL. Most of these fish were males caught from mid-Chesapeake Bay to the Conowingo Dam with one female coming from Cape Charles, VA near the entrance to the bay.

Coastal areas

Eighteen (43%) of 42 fish tagged and reported recaptured in 2012 were caught in coastal areas. Recreational anglers accounted for 94% and commercial fisherman accounted for the remaining 6% of fish recaptured in coastal areas with 10 reported as harvested. Charter boats accounted for one of the

recaptures and it was reported as harvested. Recapture locations ranged from all coastal states from Maryland to Massachusetts, excluding New York and Connecticut. The majority of striped bass recaptured in coastal areas within several months of tagging were caught in areas north of the Delaware Estuary or within a short distance of the mouth of the Delaware Bay. This is indicative of a northerly migration along the Atlantic Coast following the spawning season, which is consistent with tag return patterns observed in previous years (Murphy and Shirey 2005). Most of the fish recaptured in southerly locations (e.g., Indian River Inlet) were caught several months after tagging or in late fall. Striped bass recaptured in coastal areas were larger (mean TL 738) than those recaptured in the Delaware Estuary and Chesapeake Bay and tributaries. The percentage of females (44%) recaptured in coastal areas was also higher than that observed for the Delaware Estuary and Chesapeake Bay and tributaries (8%). Fifty-five percent of fish reported recaptured in coastal areas were harvested and 91% of fish (n=11) >710 mm TL were harvested. The majority of tag returns in coastal areas came from New Jersey (44%).

Tagging program - 1991 to 2011

In addition to the 42 fish tagged and reported recaptured in 2012, there were 25 fish reported recaptured in 2012 that were tagged in the previous years of the survey by DFW on the Delaware River spawning grounds (Table 12). Recreational anglers and commercial fishermen accounted for 84% and 12% of these recaptures, respectively. One recapture (4%) is from an unknown origin with no recapture information. Recapture locations ranged from waters off all coastal states from Virginia to Massachusetts, except Connecticut.

Delaware Bay and tributaries

Six (24%) of 25 fish tagged in previous years and reported recaptured in 2012 were caught in the Delaware Estuary. Two (33%) of these fish were reported harvested and 100% fish >710 mm TL at the time of tagging were reported as harvested. Females accounted for 0% of tag returns. In 2009, Pennsylvania Fish and Boat Commission (PFBC) introduced a spring (April 1 to May 31) slot from 508 to 660 mm limit of two. It is likely that additional effort directed during this new season generated the four reports from PA. The four reports in each year from 2009-2012 were the first reports since 2005. Two fish in the slot range were captured and both released. One fish above the slot length was kept which may be kept if captured above the Calhoun state bridge in Trenton, however, the location is listed as Philadelphia.

Chesapeake Bay and tributaries

Two (8%) of 25 fish tagged in previous years and reported recaptured in 2012 were caught in the Chesapeake Bay and tributaries. Both of these striped bass were reported as harvested and were caught in

the early summer so it is possible they would have participated on the spawning grounds in the Delaware River. The other reported recaptures were caught around the mouth of Susquehanna River, and likely did not participate in the Delaware spawn. Males accounted for 100% of tag returns.

Coastal areas

Fifteen (60%) of 25 fish tagged in previous years and reported recaptured in 2012 were recaptured in coastal areas. Recapture locations ranged from Cape Henry, Virginia to Chatham, Massachusetts. The majority of tag returns in coastal areas came from New Jersey (33%), Massachusetts (20%), New York (20%), and Rhode Island (13%). Approximately 73% of these fish were harvested. Females accounted for 40% of tag returns.

Hudson River and unknown locations

One (4%) of 25 fish tagged in previous years and reported recaptured in 2012 was recaptured in the Hudson River. This fish was recaptured during the spawn on the Hudson spawning grounds indicating it has participated in two spawning populations. Some straying from natal estuary to spawn in another system is known to occur in anadromous fish populations but is rare. One other recapture report is of an unknown location and size.

Recommendations

1. Conduct weekly assessment of the Delaware River striped bass spawning stock during the spring spawning season from mid-April to late May or early June.
2. Evaluate the relative abundance, size structure, and age and sex composition of striped bass on the spawning grounds.
3. Assess survival and mortality, migrational patterns, and trends in exploitation of striped bass tagged on the spawning grounds.

TABLE 1. Daily catch per unit effort (CPUE: fish/hr) of striped bass collected during the spring spawning stock assessment in the lower Delaware River in 2012. Data from randomized sampling program.

Date	Water temp. (°C)	No. collections	No. fish	Effort (hr)	CPUE (fish/hr)
		UPPER ZONE (PA)			
April 12	13.1	7	6	1.4	4.3
April 16	14.0	7	31	1.4	22.1
April 17	15.1	7	27	1.4	19.3
May 3	14.9	7	84	1.4	60.0
May 9	16.4	7	34	1.4	24.3
May 11	16.6	7	35	1.4	25.0
May 16	18.1	7	72	1.4	51.4
May 17	19.0	7	17	1.4	12.1
May 23	20.1	7	19	1.4	13.6
	Upper zone totals	63	325	12.6	25.8
		LOWER ZONE (DE)			
-	-	-	-	-	-
	Lower zone totals	-	-	-	-
	Overall totals	63	325	12.6	25.8

TABLE 2. Catch per unit effort (CPUE: fish/hr) by sampling station of striped bass collected during the spring spawning stock assessment in the lower Delaware River in 2012. Data from randomized sampling program.

Station no.	Station description	No. collections	No. fish	Effort (hr)	CPUE (fish/hr)
		UPPER ZONE (PA)			
1P	Raccoon Creek	2	6	0.4	15.0
2P	Lower Monds Island	8	21	1.6	13.1
3P	Upper Monds Island	3	0	0.5	0.0
4P	Mobil Oil	7	8	1.4	5.7
5P	UPS Terminal	3	28	0.6	46.7
6P	Chester Island	1	0	0.2	0.0
7P	Lower Tinicum Island	10	29	2.1	13.8
8P	Upper Tinicum Island	10	67	2.0	33.5
18P	Mantua Creek	1	0	0.2	0.0
20P	Fort Mifflin	-	-	-	-
23P	Upper Navy Yard	8	40	1.6	25.0
24P	Big Timber Creek	1	0	0.2	0.0
25P	Lower Navy Yard	9	126	1.8	70.0
	Upper zone totals	63	325	12.6	25.8
		LOWER ZONE (DE)			
1	Below Oldmans Creek	-	-	-	-
2	Above Oldmans Point	-	-	-	-
3	Below Oldmans Point	-	-	-	-
4	Upper Cherry Island Flats	-	-	-	-
5	Upper Penns Grove	-	-	-	-
6	Helms Cove	-	-	-	-
7	Lower Cherry Island Flats	-	-	-	-
8	Carneys Point	-	-	-	-
9	Lower Carneys Point	-	-	-	-
D1	Grubb Landing	-	-	-	-
D2	Below Edgemoor	-	-	-	-
D3	Fox Point State Park	-	-	-	-
	Lower zone totals	-	-	-	-
	Overall totals	63	325	12.6	25.8

Table 3. Daily catch per unit effort (CPUE: fish/hr) of striped bass collected during the spring spawning stock assessment in the lower Delaware River in 2012. Data from ancillary collections.

Date	Water temp. (°C)	No. collections	No. fish	Effort (hr)	CPUE (fish/hr)
		UPPER ZONE (PA)			
April 4	12.8	7	4	1.4	2.9
April 11	12.8	7	6	1.4	4.3
April 30	14.4	4	135	0.8	168.8
May 1	14.6	3	126	1.0	123.8
May 3	14.9	1	103	0.5	221.9
May 17	19.0	1	18	0.3	60.0
	Upper zone totals	23	392	5.4	72.8
		LOWER ZONE (DE)			
-	-	-	-	-	-
	Lower zone totals	-	-	-	-
	Overall totals	23	392	5.4	72.8

TABLE 4. Catch per unit effort (CPUE: fish/hr) by sampling station of striped bass collected during the spawning stock assessment in the lower Delaware River in 2012. Data from ancillary collections.

Station no.	Station description	No. collections	No. fish	Effort (hr)	CPUE (fish/hr)
	UPPER ZONE (PA)				
1P	Raccoon Creek	-	-	-	-
2P	Lower Monds Island	2	1	0.4	2.5
3P	Upper Monds Island	1	0	0.2	0.0
4P	Mobil Oil	1	0	0.2	0.0
5P	UPS Terminal	1	1	0.2	5.0
6P	Chester Island	-	-	-	-
7P	Lower Tinicum Island	4	23	0.8	28.8
8P	Upper Tinicum Island	7	200	1.9	104.3
18P	Mantua Creek	-	-	-	-
20P	Fort Mifflin	-	-	-	-
23P	Upper Navy Yard	2	0	0.4	0.0
24P	Big Timber Creek	1	0	0.2	0.0
25P	Lower Navy Yard	4	167	1.1	157.0
	Upper zone totals	23	392	5.4	72.3
	LOWER ZONE (DE)				
1	Below Oldmans Creek	-	-	-	-
2	Above Oldmans Point	-	-	-	-
3	Below Oldmans Point	-	-	-	-
4	Upper Cherry Island Flats	-	-	-	-
5	Upper Penns Grove	-	-	-	-
6	Helms Cove	-	-	-	-
7	Lower Cherry Island Flats	-	-	-	-
8	Carneys Point	-	-	-	-
9	Lower Carneys Point	-	-	-	-
D1	Grubb Landing	-	-	-	-
D2	Below Edgemoore	-	-	-	-
D3	Fox Point State Park	-	-	-	-
	Lower zone totals	-	-	-	-
	Overall totals	23	392	5.4	72.3

TABLE 5. Catch per unit effort (CPUE: fish/hr) of striped bass ≥710 mm total length collected during the spring spawning stock assessment in the lower Delaware River from 1996 to 2012. Data from randomized sampling program.

Year	CPUE (fish/hr) Males ≥710 mm	CPUE (fish/hr) Females ≥710 mm	CPUE (fish/hr) Overall ≥710 mm
1996	0.7	2.7	3.4
1997	0.4	3.5	3.9
1998	2.2	4.3	6.4
1999	1.4	3.0	4.4
2000	1.1	3.4	4.5
2001	2.2	3.5	5.7
2002	1.8	1.9	3.8
2003	2.9	6.6	9.5
2004	2.7	6.4	9.1
2005	1.1	2.9	4.0
2006	1.1	4.5	5.6
2007	2.6	5.9	8.4
2008	2.1	2.2	4.3
2009	0.9	2.8	3.7
2010	3.8	3.8	7.6
2011	5.5	4.3	9.8
2012	2.3	3.1	5.4

TABLE 6. Total length indices (mm) of male and female striped bass collected during the spring spawning stock assessment in the lower Delaware River from 1996 to 2012. Data from randomized sampling program.

	Males			Females		
Year	Average	Minimum	Maximum	Average	Minimum	Maximum
1996	445	225	960	764	460	1065
1997	514	190	835	731	390	1140
1998	537	215	1035	795	530	1155
1999	540	280	1000	796	515	1085
2000	519	220	915	811	525	1050
2001	584	283	1023	883	617	1162
2002	548	207	926	880	628	1180
2003	557	247	1037	852	575	1173
2004	523	285	962	913	659	1134
2005	467	213	939	933	613	1156
2006	473	194	1006	907	561	1235
2007	490	289	921	922	628	1160
2008	531	212	973	903	648	1148
2009	501	171	883	931	577	1128
2010	536	261	946	933	711	1154
2011	558	208	1005	953	652	1178
2012	495	288	1020	959	644	1173

TABLE 7. Catch per unit effort (CPUE: fish/hr) of female striped bass <725, 725-1,000, and >1,000 mm total length collected during the spring spawning stock assessment in the lower Delaware River from 1996 to 2012. Data from randomized sampling program.

Year	CPUE (fish/hr) <725 mm	CPUE (fish/hr) 725-1,000 mm	CPUE (fish/hr) >1,000 mm
1996	1.5	2.9	0.2
1997	2.8	3.2	0.3
1998	2.2	2.8	0.4
1999	2.0	3.0	0.4
2000	0.9	3.2	0.2
2001	0.3	3.0	0.4
2002	0.2	1.6	0.3
2003	0.8	5.7	0.5
2004	0.1	5.1	1.3
2005	0.1	2.2	0.7
2006	0.2	3.9	0.6
2007	0.3	4.9	0.9
2008	0.3	1.6	0.5
2009	0.0	2.0	0.8
2010	0.1	2.6	1.1
2011	0.1	2.8	1.6
2012	0.1	1.8	1.3

TABLE 8. Age composition of striped bass collected during the spring spawning stock assessment in the lower Delaware River in 2012. Data from randomized sampling program. Age could not be determined from some scale specimens (n=18) due to: scale regeneration checks or scale harvest error and are subsequently not included in this table.

Year class	Age	No. fish	Percent	CPUE (fish/hr)
		MALES		
2010	2	49	17.9%	3.9
2009	3	95	34.7%	7.5
2008	4	67	24.5%	5.3
2007	5	9	3.3%	0.7
2006	6	10	3.6%	0.8
2005	7	4	1.5%	0.3
2004	8	19	6.9%	1.5
2003	9	10	3.6%	0.8
2002	10	2	0.7%	0.2
2001	11	2	0.7%	0.2
2000	12	3	1.1%	0.2
1999	13	4	1.5%	0.3
Sub-totals	(ave.) 4.2			
		FEMALES		
2007	5	1	3.0%	0.1
2006	6	0	0.0%	0.0
2005	7	0	0.0%	0.0
2004	8	1	3.0%	0.1
2003	9	0	0.0%	0.0
2002	10	4	12.1%	0.3
2001	11	3	9.1%	0.2
2000	12	11	33.3%	0.9
1999	13	4	12.1%	0.3
1998	14	3	9.1%	0.2
1997	15	6	18.2%	0.5
Sub-totals	(ave.) 12.2			
		OVERALL		
2010	2	49	16.0%	3.9
2009	3	95	30.9%	7.5
2008	4	67	21.8%	5.3
2007	5	10	3.3%	0.8
2006	6	10	3.3%	0.8
2005	7	4	1.3%	0.3
2004	8	20	6.5%	1.6
2003	9	10	3.3%	0.8
2002	10	6	2.0%	0.5
2001	11	5	1.6%	0.4
2000	12	14	4.6%	1.1
1999	13	8	2.6%	0.6
1998	14	3	1.0%	0.2
1997	15	6	2.0%	0.5
Totals	(ave.) 5.1			

TABLE 9. Total length-at-age of striped bass collected during the spring spawning stock assessment in the lower Delaware River in 2012. Data from all collections. Age could not be determined from some scale specimens (n=32) due to: scale regeneration checks or scale harvest error and are subsequently not included in this table.

Year class	Age	No. fish	Percent	Mean TL (mm)	Min (mm)	Max (mm)	SD (mm)
			MALES				
2010	2	100	16.1%	364	208	446	38
2009	3	232	37.4%	430	263	550	63
2008	4	159	25.6%	472	320	584	63
2007	5	26	4.2%	581	551	606	16
2006	6	20	3.2%	598	551	662	31
2005	7	13	2.1%	635	614	669	19
2004	8	35	5.6%	702	616	789	56
2003	9	19	3.1%	731	657	778	36
2002	10	3	0.5%	770	718	872	88
2001	11	3	0.5%	848	807	875	36
2000	12	4	0.6%	856	808	913	43
1999	13	5	0.8%	907	835	1020	71
1998	14	1	0.2%	895	895	895	-
Sub-totals	(ave.) 4.1						
			FEMALES				
2007	5	2	3.1%	610	575	644	49
2006	6	2	3.1%	653	591	714	87
2005	7	0	-	-	-	-	-
2004	8	2	3.1%	793	756	830	52
2003	9	1	1.5%	881	881	881	-
2002	10	4	6.2%	837	816	878	28
2001	11	9	13.8%	940	788	1003	85
2000	12	18	27.7%	924	835	1052	62
1999	13	8	12.3%	983	881	1065	77
1998	14	5	7.7%	1038	841	1158	122
1997	15	9	13.8%	1102	885	1173	88
1996	16	4	6.2%	1135	1104	1171	32
1995	17	0	-	-	-	-	-
1994	18	1	1.5%	1194	1194	1194	-
Sub-totals	(ave.) 12.2						
			OVERALL				
2010	2	100	14.6%	364	208	446	38
2009	3	232	33.9%	430	263	550	63
2008	4	159	23.2%	472	320	584	63
2007	5	28	4.1%	583	551	644	19
2006	6	22	3.2%	603	551	714	39
2005	7	13	1.9%	635	614	669	19
2004	8	37	5.4%	707	616	830	59
2003	9	20	2.9%	739	657	881	48
2002	10	7	1.0%	808	718	878	65
2001	11	12	1.8%	917	788	1003	85
2000	12	22	3.2%	912	808	1052	64
1999	13	13	1.9%	954	835	1065	81
1998	14	6	0.9%	1014	841	1158	124
1997	15	9	1.3%	1102	885	1173	88
1996	16	4	0.6%	1135	1104	1171	32
1995	17	-	0.0%	-	-	-	-
1994	18	1	0.1%	1194	1194	1194	-
Totals	(ave.) 4.8						

TABLE 10. Summary of linear regression analysis between the catch per unit effort by year class of striped bass collected in the Delaware Division of Fish and Wildlife's spawning stock assessment (1996-2012) plotted as a lagged function against their respective geometric mean catch rate at age-0 in the New Jersey Department of Environmental Protection's juvenile seine survey (1980-2010) in the lower Delaware River. Statistically significant relationships were highlighted ($p<0.05$). n=the number of years of data used in the analysis.

		Males		Females		Overall	
Age	n	r^2	p	r^2	p	r^2	p
2	17	0.06	0.35	-	-	0.06	0.35
3	17	0.16	0.11	-	-	0.16	0.11
4	17	0.41	0.01	-	-	0.42	0.00
5	17	0.00	0.86	-	-	0.00	0.82
6	17	0.00	0.88	-	-	0.00	0.86
7	17	0.19	0.08	0.00	0.84	0.17	0.10
8	17	0.46	0.00	0.02	0.61	0.58	0.00
9	17	0.02	0.61	0.05	0.37	0.05	0.39
10	17	0.10	0.22	0.11	0.20	0.13	0.15
11	17	0.44	0.00	0.45	0.00	0.60	0.00
12	17	0.53	0.00	0.38	0.01	0.56	0.00
13	17	0.22	0.06	0.15	0.12	0.27	0.03
14	17	0.22	0.05	0.46	0.00	0.49	0.00
15	17	0.02	0.57	0.25	0.04	0.29	0.02

TABLE 11. Striped bass tagged during the spring spawning stock assessment in the lower Delaware River in 2012 and recaptured (n=42) by December 31, 2012. Note that a fish was 'found dead' and included in the table with a 'D' disposition but not included in the total recaptures.

Date caught	State	Location	Disposition	TL at tagging (mm)	Sex	Age
		DELAWARE BAY AND TRIBUTARIES				
20-Apr-12	NJ	Delaware R., Salem Cove	K	946	F	12
21-Apr-12	DE	Chesapeake and Delaware Canal	K	704	M	9
06-May-12	PA	Delaware R., Philadelphia	R	648	M	8
12-May-12	DE	Delaware R., near Odessa	R	555	M	5
12-May-12	DE	Delaware R., near Smyrna	D	836	M	
14-May-12	PA	Delaware R., Philadelphia	R	550	M	4
20-May-12	PA	Delaware R., Bristol	R	418	M	3
08-Jun-12	PA	Darby Creek trib of Delaware R.	R	588	M	5
12-Oct-12	NJ	Delaware Bay, near Millville	R	691	M	9
27-Oct-12	NJ	Delaware Bay, near Sea Breeze	R	501	M	3
16-Nov-12	NJ	Delaware Bay, near Port Norris	R	480	M	3
23-Nov-12	NJ	Delaware Bay, near Fortescue	R	529	M	4
28-Nov-12	NJ	Delaware Bay, near Cape May	R	433	M	3
07-Dec-12	NJ	Delaware Bay, near Fortescue	R	453	M	3
No. recaptured = 13		Kept/sold =	15%	Mean		Mean
		Released =	85%	595		6.3
		CHESAPEAKE BAY AND TRIBUTARIES				
26-May-12	MD	Ches. Bay	K	534	M	4
11-Jun-12	MD	Ches. Bay, Poplar Island	R	517	M	4
18-Jun-12	MD	Ches. Bay, Love Point	K	652	M	8
21-Jun-12	VA	Ches. Bay, Tangier Island	R	485	M	4
27-Jun-12	MD	Ches. Bay, Annapolis	K	550	M	4
16-Jul-12	MD	Ches. Bay, Poplar Island	R	442	M	3
21-Sep-12	MD	Ches. Bay, Sandy Point	R	411	M	4
04-Nov-12	MD	Ches Bay, Bay Bridge	K	467	M	3
12-Nov-12	MD	Susquehanna R., Perryville	K	476	M	4
22-Nov-12	MD	Elk river and C + C Canal	R	644	M	
09-Dec-12	VA	Ches. Bay, Cape Charles	K	1065	F	13
No. recaptured = 11		Kept/sold =	55%	Mean		Mean
		Released =	45%	568		5.1
		COASTAL AREAS				
07-May-12	NJ	Atlantic Ocean	K	929	F	12
21-May-12	MD	Atlantic Ocean, Assateague Island	K	775	M	8
25-May-12	NJ	Island Beach State Park	K	885	F	12
27-May-12	NJ	Atlantic Ocean, Wildwood Crest	R	530	M	3
28-May-12	DE	Indian River Inlet, Bethany Beach	R	466	M	4
28-May-12	DE	Indian River Inlet, Bethany Beach	R	503	M	4
06-Jun-12	NJ	Barnegat Bay	K	759	M	9
10-Jun-12	MA	Billingsgate Shoal, Cape Cod	R	660	M	7
10-Jun-12	NJ	Atlantic Ocean, Shrewsbury	K	826	F	10
21-Jun-12	NJ	Manasquan Pt. Inlet, Spring Lake	K	1010	F	14
07-Jul-12	MA	Broad Sound, Winthrop	R	801	F	11
07-Jul-12	MD	Ocean City Inlet, Ocean City	R	576	M	5
12-Jul-12	MA	Atlantic Ocean, Chatham	K	841	F	14
22-Jul-12	MA	Cape Cod Bay, Sandwich	K	1005	F	
21-Sep-12	NJ	Atlantic Ocean, Sea Isle	K	760	M	9
21-Sep-12	MD	Ches. Bay, Perryville	R	417	M	4
12-Nov-12	NJ	Great Egg Harbor Inlet	K	965	F	11
01-Dec-12	DE	Atlantic Ocean, Lewes	R	577	M	5
No. recaptured = 18		Kept/sold =	55%	Mean		Mean
		Released =	45%	738		8.4

TABLE 12. Striped bass tagged during the spring spawning stock assessment in the lower Delaware River from 1991 to 2011 and recaptured (n=25) between January 1 and December 31, 2012.

Date tagged	Date caught	State	Location	Disposition	TL at tagging (mm)	Sex	Age
			DELAWARE BAY AND TRIBUTARIES				
20-Apr-11	01-Apr-12	PA	Delaware River, Philadelphia	K	861	M	11
18-May-09	15-Apr-12	PA	Delaware River, Philadelphia	R	512	M	9
19-Apr-10	30-Apr-12	PA	Delaware River, Tinicum	R	477	M	6
18-Apr-11	09-Jul-12	PA	Delaware River	R	528	M	8
20-Apr-11	12-Nov-12	NJ	Delaware Bay, Port Norris	R	483	M	5
17-May-05	21-Nov-12	DE	Delaware Bay, Port Mahon	K	801	M	18
No. recaptured = 6			Kept/sold =	33%	Mean		Mean
			Released =	67%	610		9.5
			CHESAPEAKE BAY AND TRIBUTARIES				
01-Jun-09	10-Jun-12	MD	Chesapeake Bay, Thomas Point	K	525	M	11
06-May-11	14-Jun-12	MD	Chesapeake Bay Rock Hall	K	502	M	6
No. recaptured = 2			Kept/sold =	100%	Mean		Mean
			Released =	0%	515		8.5
			COASTAL AREAS				
03-May-01	26-Jan-12	VA	Atlantic Ocean, Cape Henry	R	819	M	20
02-May-06	12-May-12	NJ	Atlantic Ocean, Cape May Inlet	K	643	M	15
20-May-11	20-May-12	NJ	Atlantic Ocean, Cape May Harbor	K	719	M	9
25-Apr-11	29-May-12	NJ	Atlantic Ocean, Long Branch	R	687	M	9
18-Apr-11	06-Jun-12	RI	Block Island Sound, Point Judith	K	954	F	12
25-Apr-11	09-Jun-12	NJ	Shark River	K	840	F	10
08-May-07	23-Jun-12	DE	Indian River Inlet, Rehoboth Beach	K	480	M	
12-May-09	01-Jul-12	NY	Atlantic Ocean, Montauk	K	1045	F	
25-Apr-11	06-Jul-12	NY	Block Island Sound, Montauk	K	883	M	9
25-Apr-11	18-Jul-12	MA	Ipswich Bay	R	1014	F	15
25-Apr-11	23-Jul-12	MA	Nantucket Sound, Nauset Beach	K	892	M	10
20-Apr-10	29-Jul-12	NJ	Great Channel, Stone Harbor	K	627	M	6
20-Apr-11	08-Aug-12	MA	Atlantic Ocean, Chatham	K	903	F	13
21-May-08	14-Aug-12	RI	Block Island Sound, Block Island	R	964	F	7
25-Apr-11	02-Nov-12	NY	Moriches Inlet	K	694	M	8
No. Recaptured = 15			Kept/Sold=	73%	Mean		Mean
			Released=	27%	811		11.8
			HUDSON RIVER				
24-May-06	29-Apr-12	NY	Beacon, NY	K	415	M	10
			UNKNOWN				
22-Apr-05	20-Mar-12	UN	Unknown	K	1005	F	18

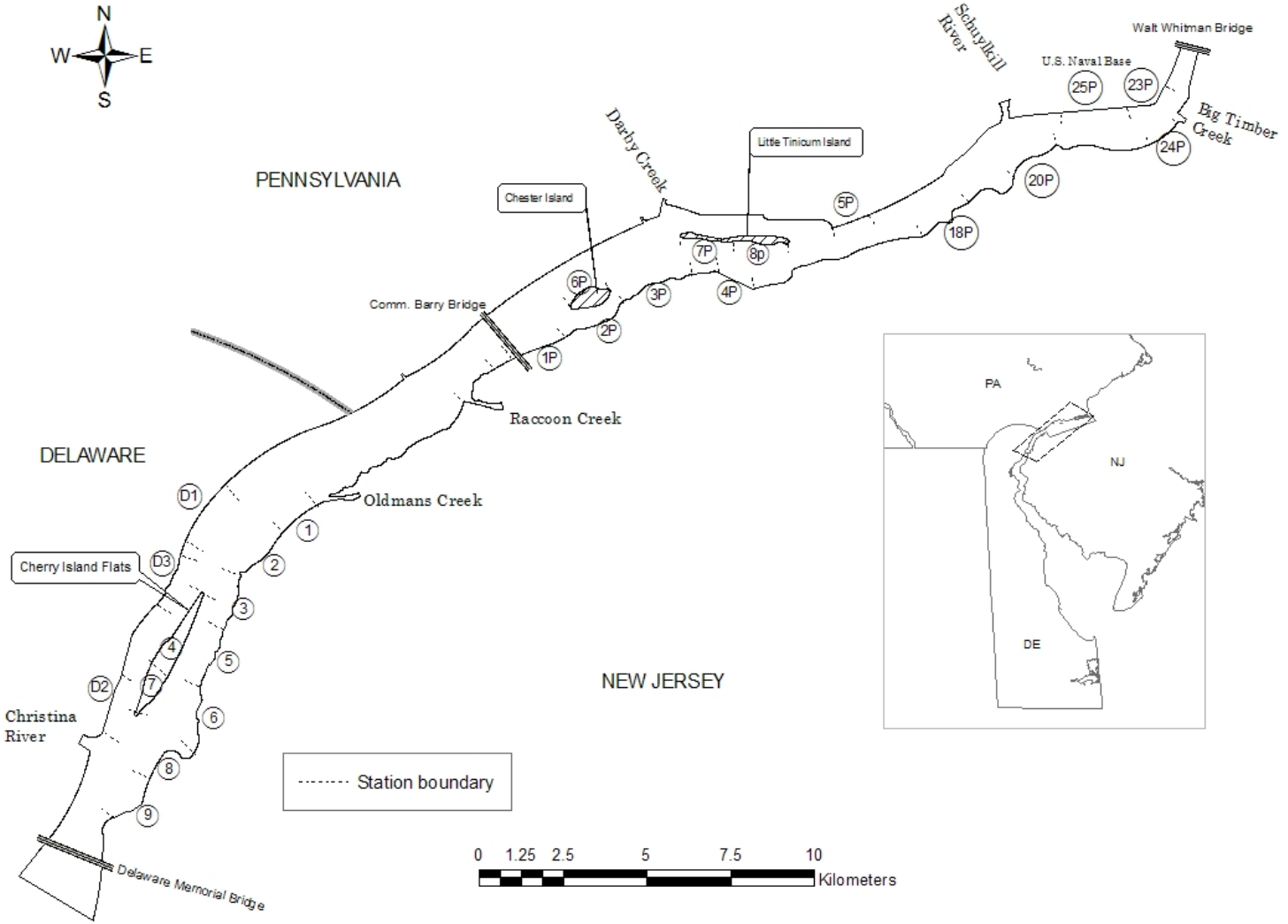


FIGURE 1. Study area and sampling stations used for the striped bass spawning stock assessment in the lower Delaware River.

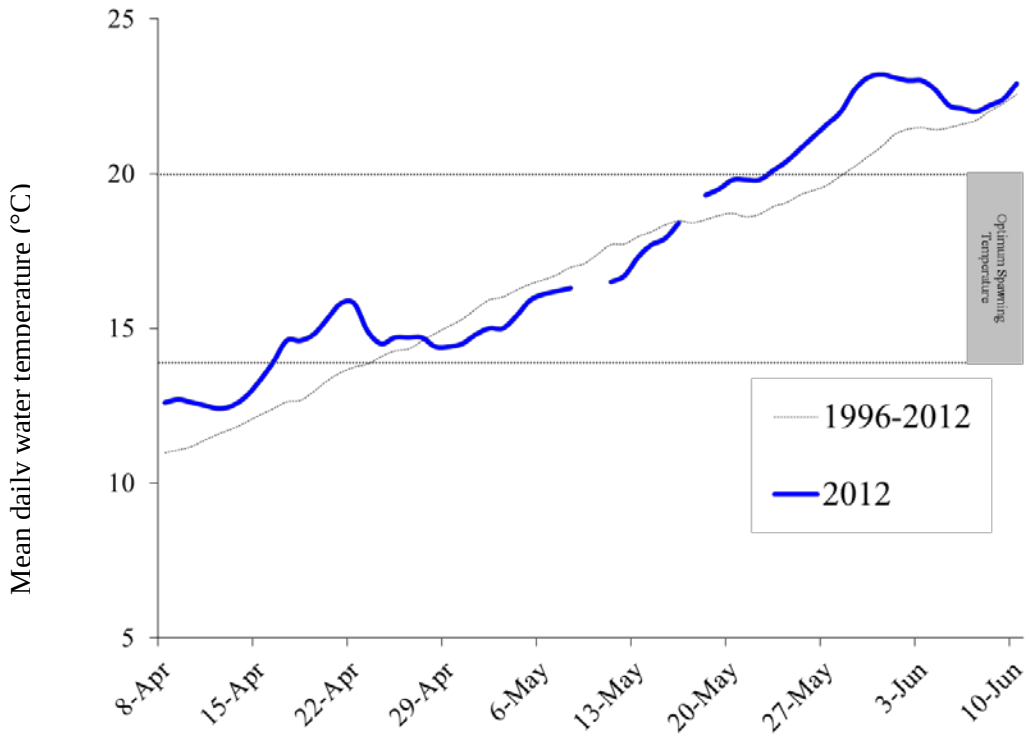
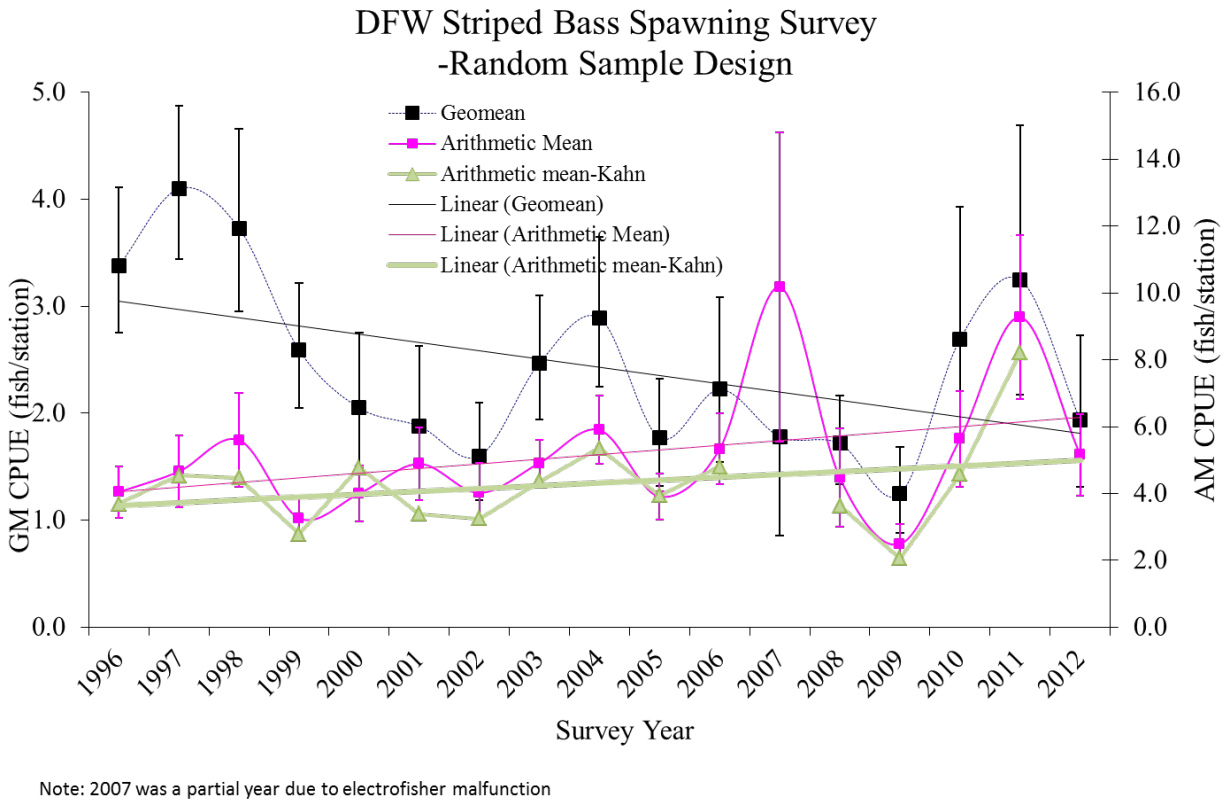


FIGURE 2. Mean daily water temperature of the Delaware River during the striped bass spawning season at Chester, PA in 2012 (U.S. Geological Service Station 01477050). The mean daily water temperature from 1996 to 2012 was shown for comparison.



Note: 2007 was a partial year due to electrofisher malfunction

FIGURE 3. Geometric and arithmetic mean catch per unit effort (CPUE: fish/station) with 95% confidence intervals of striped bass collected during the spring spawning stock assessment in the lower Delaware River from 1996 to 2012. Data from randomized sampling program.

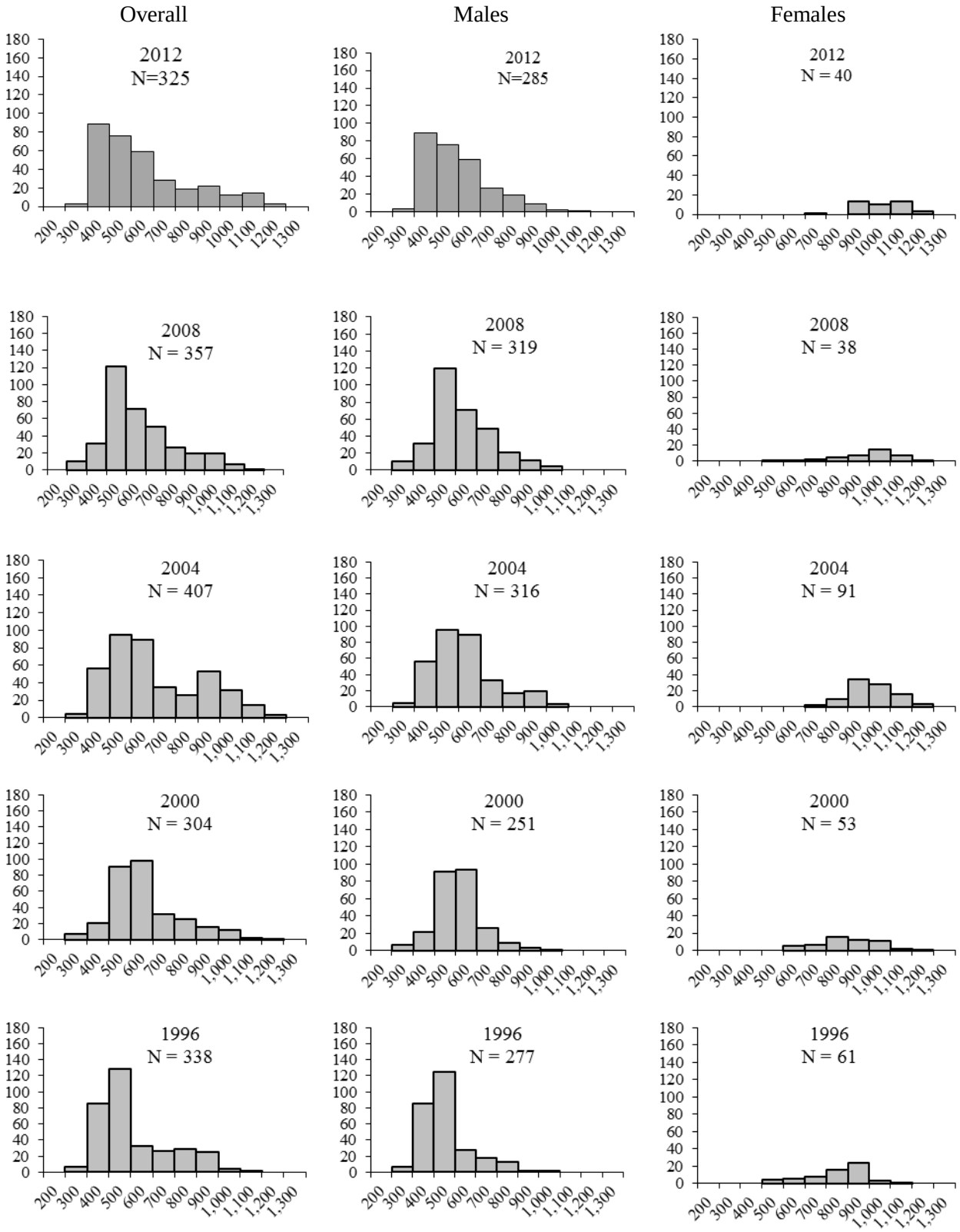


FIGURE 4. Length frequency distribution of striped bass collected during the spring spawning stock assessment in the lower Delaware River 2012 with historical comparisons to 1996, 2000, 2004, and 2008. Data from randomized sampling program.

FIGURE 5. Percentage of tag returns by state for striped bass tagged during the spring spawning stock assessment in the lower Delaware River from 1991 to 2012 (n = 1,660). Recaptures of an unknown state location are not included (n = 34).

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Maryland Striped Bass (*Morone saxatilis*) Compliance Report to the Atlantic States Marine Fisheries Commission

2012

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I. Introduction

Maryland's combined Chesapeake Bay and Atlantic Ocean 2012 striped bass quota was 4.7 million pounds. Maryland's recreational fishing seasons were open for approximately 34 weeks in Chesapeake Bay, and year-round in Atlantic coastal waters. Maryland's recreational landings for 2012 are estimated at 1,060,611 pounds in Chesapeake Bay and 28,688 pounds in the Atlantic Ocean (MRIP). Maryland commercial seasons are managed by a quota system. Commercial seasons were open for 36 weeks in Chesapeake Bay (January-February, June-December), and 24 weeks in the Atlantic Ocean (January-April, November-December). Commercial landings were reported at 1,851,431 pounds in Maryland's Chesapeake Bay and 77,551 pounds on the Atlantic Coast.

II. Request for *de minimis*, where applicable.

N/A

III. Previous calendar year's fishery and management program

A. Fishery Dependent Monitoring Programs

i. Commercial Fishery

(1) Characterization of the commercial fishery

- The 2012 Chesapeake Bay commercial quota was 1,963,873 lbs, unchanged from 2011. However, 5% of the commercial quota was withheld to account for management uncertainty in harvest reporting. The effective commercial quota was 1,865,680 pounds. The Bay quota was further divided among gear types as follows: drift gill net, 802,056 lbs; hook and line, 447,205 lbs; pound net/haul seine, 616,420 lbs. Gear-specific quotas were adjusted throughout the year as progress toward the Bay quota was monitored. State jurisdictional waters on the Atlantic Coast were allotted a quota of 126,396 lbs.
- In Chesapeake Bay each commercial gear type had a specified season, subject to modification as needed to ensure quotas were not exceeded:
    i. The **pound net** fishery was open from June 1 through November 30, Monday-Saturday.
    ii. The **haul seine** fishery was open from June 7 through November 30, Monday-Friday
    iii. The **hook and line** fishery operated from June 7 through November 30, Monday-Thursday only.
    iv. The **drift gill net** fishery was open during the periods January 1 through February 28 and December 3 through 31, Monday-Friday.
- The Atlantic Coast drift gill net/otter trawl fishery was open during the periods January 1 through April 30 and November 1 through December 31, Monday-Friday.
- The commercial striped bass fishery in Chesapeake Bay operated under an 18-36 inch (TL) slot limit. The commercial fishery on the Atlantic Coast operated under a 24 inch (TL) minimum size limit.
- A summary of Maryland's 2012 commercial striped bass regulations is provided in Table 1 and in the accompanying Excel file, MD_SB_Compliance2012.xls (worksheet: State Regulations).

(2) Characterization of directed commercial harvest

(a) Landings and method of estimation

- The Maryland Department of Natural Resources (MD DNR) solicited cooperation from licensed seafood dealers throughout the state to act as check stations. Check stations were responsible for counting and weighing each fisherman's catch and certifying the daily harvest data on the individual fisherman's harvest permit. All commercially harvested striped bass were required to pass through a check station prior to sale. Check stations provided a weekly report detailing daily fishing activities of each checked permittee. Reported landings (pounds) were calculated from these weekly reports. Mean weights were determined from samples taken by MD DNR biologists at commercial check stations. Chesapeake Bay landings in numbers were estimated by dividing reported monthly landings in pounds by monthly mean weights. Atlantic Coast landings in numbers were taken from checkstation reports.
- Commercial landings by gear are presented in Table 2. In Chesapeake Bay 465,644 striped bass weighing 1,851,431 pounds were harvested in 2012 (Gill Net: 190,523 fish, 861,174 lbs.; Pound Net: 141,558 fish, 565,600 lbs; Hook and Line: 133,563 fish, 424,657 lbs). In Atlantic waters 6,873 striped bass weighing 77,551 pounds were harvested.
- The time series of Maryland Chesapeake Bay commercial landings in numbers and pounds is presented in Table 3 and in the accompanying Excel file, MD_SB_Compliance2012.xls (worksheets: Comm lnd # by state, Comm lnd wt by state).

(b) Catch composition

- Landings at striped bass check stations were sampled according to a stratified random design. Strata were defined as high-, medium-, or low-use check stations based on the previous year's reported landings. High-use and medium-use check stations were sampled at a ratio of approximately 3:1, at an intensity of 1 visit per week. Days and check stations were randomly selected each month. At each check station, fish were measured (mm TL) and weighed (kg). Scales were taken from two fish per 10 mm length group and from all fish greater than 700 mm TL.
- Analysis

(i) Age frequency

- The number of age samples for each fishery is presented in Table 4 and in the accompanying Excel file, MD_SB_Compliance2012.xls (worksheets: Comm-Atl gillnet trawl, Comm-Bay gillnet, Comm-Bay hook and line, Comm-Bay pound net).
- Age-length keys (ALK) for each fishery are provided in the accompanying Excel file, MD_SB_Compliance2012.xls (worksheets: Comm-Atl gillnet trawl, Comm-Bay gillnet, Comm-Bay hook and line, Comm-Bay pound net).
- Age expansions of the total landings are provided in Table 5a (numbers of fish) and Table 6a (pounds), and in the accompanying Excel file, MD_SB_Compliance2012.xls (worksheet: Catch-at-age Summary).

- Mean length-at-age with confidence intervals for fish sampled from the hook and line/pound net and drift gill net fisheries are provided in Tables 7 and 8, respectively.
- Mean weight-at-age as calculated by the Compliance Report template provided by the Atlantic States Marine Fisheries Commission (ASMFC) is presented in Table 9 and the accompanying Excel file, MD_SB_Compliance2012.xls (worksheet: Catch-at-age Summary).

(ii) Length frequency

- The number of length samples for each fishery is provided in Table 4. Length frequencies and number of length samples for the commercial fisheries are provided in the accompanying Excel file, MD_SB_Compliance2012.xls (worksheets: Comm-Atl gillnet trawl, Comm-Bay gillnet, Comm-Bay hook and line, Comm-Bay pound net).

(c) Estimation of effort

- Total commercial effort in 2012 was determined from monthly fishing activity reports submitted to the Department by licensed fishermen. Total commercial effort by striped bass permit holders was estimated at 6,658 days (Chesapeake Bay 6,431; Atlantic 227). In Chesapeake Bay, pound net effort was 1,759 days, hook and line effort was 2,368 days, and drift gill net effort was 2,304 days. In the Atlantic Ocean, gill net effort was 165 days and trawl effort was 62 days. Effort was defined as days when striped bass landings were reported by gear type.

(d) CPUE

- Commercial CPUE as fish per day was 80 in 2012, compared to 83 in 2011. CPUE as pounds per day was 290 in 2012, compared to 332 in 2011.

(e) Losses

- Commercial discards are estimated bay wide by the Striped Bass Stock Assessment Subcommittee. No Maryland-specific commercial discard data are included in this report.

ii. Recreational Fishery

(1) Characterization of recreational fishery

- Maryland's 2012 Chesapeake Bay recreational quota was 2,657,102 pounds for resident striped bass, unchanged from 2011.
- The estimate of migratory harvest is reported to ASMFC separately (Appendix 1: Estimate of the 2012 Harvest of Spring Coastal Migrant Striped Bass in Chesapeake Bay. Report to the Striped Bass Technical Committee. Horne, J., 2012). MRIP landings estimates reported here are for migratory and resident fish combined.
- Maryland's 2012 Chesapeake Bay recreational striped bass fishery was divided into three distinct segments:
  - **Susquehanna Flats; Catch and Release** (March 1-May 3), **Catch and Keep** (May 16-May 31, 18-26 inches TL, one fish per person, per day) **seasons**: upstream of a line from Sandy Point to Turkey Point and the Susquehanna River downstream from a line connecting the Susquehanna State Park boat ramp in Lapidum to Twin Rocks to Tomes Wharf in Port

Deposit, and the Northeast River. The Susquehanna River is closed to this fishery. Non-offset circle hooks are required when fishing with baited hooks with a gap larger than 0.5 inches. Eels prohibited.

- **Spring Trophy season**: April 21-May 15; one fish per person, per day; 28 inches (TL) minimum ; fish may be harvested only in the main-stem Bay from Brewerton Channel (Baltimore) to the MD/VA line, excluding all tributaries, bays, creeks, rivers, and sounds except Tangier and Pocomoke Sounds. Eels prohibited.
- **Summer-Fall Recreational/Charter Boat season**: Two fish per person, per day at 18-28 inches (TL) **or** one fish per person, per day, at 18-28 inches (TL) and one fish greater than 28 inches (TL) per person, per day. Eels prohibited before June 1. Boundaries changed according to the following schedule: *May 16- May 31*, fish may be harvested only in the main-stem Bay below Hart-Miller Island (Baltimore) to the MD/VA line, and the lowermost five miles of the Chester, Choptank, and Patuxent Rivers. All other tributaries, bays, creeks, rivers, and sounds closed except Tangier and Pocomoke Sounds. *June 1-December 15*, Bay and all tributaries open.

- Maryland's 2012 Atlantic Coast recreational fishery was open from January 1 through December 31, with a two fish per person, per day creel limit and a 28 inch (TL) minimum size limit.
- A summary of Maryland's 2012 recreational striped bass regulations appears in Table 10 and the accompanying Excel file, MD_SB_Compliance2012.xls (worksheet: State Regulations).

(2) Characterization of directed harvest

(a) Landings and method of estimation

- Estimates of the total catch, harvest, and associated statistics for the recreational/charter boat fishery were taken directly from the NOAA Marine Recreational Information Program (MRIP). Note that the recreational/charter boat harvest reported as being taken in the Potomac River, and landed in Maryland, is included in Maryland's recreational/charter boat harvest estimates.
- All MRIP estimates are from a May 16, 2013 query.
- The MRIP estimate of Maryland's total recreational harvest (Type A+B1) in 2012 is estimated at 201,407 fish (Chesapeake Bay: 199,583; Atlantic: 1,824) or 1,089,300 pounds (Chesapeake Bay: 1,060,611; Atlantic: 28,688) (MRIP). The compliance report template estimates recreational harvest in the same period at 1,261,168 pounds (Chesapeake Bay: 1,224,317; Atlantic: 36,851) using length frequencies from MD DNR and MRIP, and seasonal MD DNR length-weight regression parameters.
- The MRIP estimate of recreational harvest by area and wave (two-month sampling period) is presented in Table 11 (numbers of fish) and Table 12 (pounds).
- The time series of recreational landings is presented in Table 13 and in the accompanying Excel file, MD_SB_Compliance2012.xls (worksheets: MRFSS-MRIP lnd # by state, MRFSS-MRIP lnd wt by state).

(b) Age composition of recreational catch

- Estimates of total catch by wave were taken from MRIP. The summary of the recreational catch-at-age is presented in Tables 5a (numbers of fish) and 6a (pounds). The recreational catch-at-age by area and season is presented in

Table 14. Detailed development of the recreational catch-at-age is presented in the accompanying Excel file, MD_SB_Compliance2012.xls (worksheets: Rec-Harvest Wave 2 CB, Rec-Harvest Wave 3 CB, Rec-Harvest Waves 4-6 CB, Rec-Harvest Atlantic).

(i) Age frequency

- Chesapeake Bay ALKs were developed for three periods and applied to landings to develop catch-at-age by season. ALKs were supplemented as needed with ages from others surveys and/or years. The overall recreational catch-at-age was calculated as the sum.
    - Waves 2 and 3: ALK was developed from pooled spring gill net survey/creel survey data (n=625).
    - Waves 4-6 combined: ALK was developed from June-November commercial check station and pound net survey data (n=335).
- The ALK for the Atlantic Coast was developed from commercial check station data supplemented with spring gill net/creel survey data (n=224).

(ii) Length frequency

- Chesapeake Bay recreational harvest length frequencies (LF) were developed for three periods and applied to landings to develop catch-at-age by season.
    - Wave 2: LF was developed from Volunteer Charter Boat Survey data (n=2,043).
    - Wave 3: LF was developed from Volunteer Charter Boat Survey data (n=2,280).
    - Waves 4-6 combined: LF was developed from MRIP raw intercept data (n=189).
- The Atlantic Coast recreational harvest LF was developed from logbook data submitted voluntarily by charterboat captains and recreational anglers to the NJDEP Division of Fish and Wildlife (n=46; Heather Corbett, personal communication). The LF was developed using data from fish caught and kept on the Atlantic Coast of NJ during May-June to correspond with MRIP's Wave 3 harvest estimate for Maryland.
- Expanded length frequencies (sample length frequency multiplied by the harvest) are presented in the accompanying Excel file, MD_SB_Compliance2012.xls (worksheets: Rec-Harvest Wave 2 CB, Rec-Harvest Wave 3 CB, Rec-Harvest Waves 4-6 CB, Rec-Harvest Atlantic).

(c) Sex ratio of the recreational catch was only available for the 2012 spring trophy fishery. The sampled catch was 75% female when fish of indeterminate sex were excluded (Chesapeake Bay Finfish Investigations, 2011-2012. USFWS Federal Aid Project F-61-R-8. Maryland Department of Natural Resources).

(d) Estimation of effort

- The estimate of targeted striped bass trips for 2012 was obtained from a May 17, 2013 MRIP query. Of the 2.1 million fishing trips taken in Maryland's Chesapeake Bay, approximately 499,000 (23%) targeted striped bass. In Maryland's coastal

waters within 3 miles offshore, 33% of the approximately 24,000 total trips targeted striped bass. Number of trips by area and wave are presented in the accompanying Excel file, MD_SB_Compliance2012.xls (worksheet: Rec Effort).

iii. Other Losses

(1) Estimates of recreational discards were taken directly from MRIP (date of query: May 16, 2013).

(a) Maryland striped bass recreational discards (Type B2) are estimated at 2,136,452 fish in Chesapeake Bay. The discard estimate for coastal waters is zero fish (Table 15 and accompanying Excel file, MD_SB_Compliance2012.xls: worksheet: MRFSS-MRIP disc # by state).

(b) Per the Striped Bass Stock Assessment Subcommittee conference call of March 4, 2013, recreational discard mortality is calculated as 9% of recreational discards (8% was used previously), for a total of 192,281 fish in Chesapeake Bay lost to discard mortality in 2012. Recreational discard mortality-at-age is presented in Tables 5b and 16. Discard mortality-at-age is also presented in the accompanying Excel file, MD_SB_Compliance2012.xls (worksheet: Catch-at-age summary).

(c) The compliance report template estimated 2012 recreational discard mortality weight at 447,906 pounds in Chesapeake Bay. Detailed discard mortality weight-at-age and total weight are presented in Table 6b and the accompanying Excel file, MD_SB_Compliance2012.xls (worksheet: Catch-at-age summary).

(d) Chesapeake Bay discard mortality weight was estimated using LFs developed from the MD Volunteer Charterboat Survey (waves 2 and 3), the MD Striped Bass Volunteer Angler Survey (Waves 4-6), and seasonal MD DNR length-weight regression parameters.

(e) Atlantic discard mortality weight was not estimated because the MRIP estimate for coastal recreational discards is zero.

(f) Age composition – Detailed development of recreational discards and discard mortality by season is presented in the accompanying Excel file, MD_SB_Compliance2012.xls (worksheets: Rec-Discards Wave 2 CB, Rec-Discards Wave 3 CB, Rec-Discards Waves 4-6 CB, Rec-Discards Atl).

(i) Age frequency

- The same ALKs and seasons used for recreational harvest were applied to Chesapeake Bay discards. ALKs were supplemented as needed with ages from others surveys and/or years. ALKs were developed by season and applied to discards to develop discard-at-age by season. These were added to develop overall recreational discards-at-age.
    - Waves 2 and 3 Chesapeake Bay: ALK was developed from pooled spring gill net survey/creel survey data (n=627).
    - Waves 4-6 combined Chesapeake Bay: ALK was developed from June-November commercial check station and pound net monitoring survey data (n=212).

(ii) Length frequencies

- The LF for Wave 2 Chesapeake Bay discards was developed from the Maryland Volunteer Charterboat Survey (n=410).

- The LF for Wave 3 Chesapeake Bay discards was developed from the Maryland Volunteer Charterboat Survey (n=1,041).
- The LF for combined Waves 4-6 Chesapeake Bay discards was developed from the Maryland Striped Bass Volunteer Angler Survey (n=172).

iv. Total Harvest & Losses

- Total harvest and losses (excluding commercial fisheries discards) in Maryland waters are estimated at 866,205 fish and 3,466,188 pounds for 2012.
    - The total number of fish reflects reported commercial landings (472,517 fish; Table 2), the MRIP estimate of recreational harvest (201,407 fish; Table 11), and the MRIP-based recreational discard mortality estimate (192,281 fish; Table 16).
    - The total weight figure reflects reported commercial landings (1,928,982 lbs; Table 2), MRIP weight estimates for recreational harvest (1,089,300 lbs; Table 12), and calculations from the compliance report template for recreational discard mortality (447,906 lbs; Table 6b). Total removals-at-age in numbers of fish and by weight appear in Tables 5 and 6 and in the accompanying Excel file, MD_SB_Compliance2012.xls (worksheet: Catch-at-age summary).
- There are two values for commercial harvest weight presented in this report: the MD DNR reported landings, and the ASMFC Compliance Report template estimate. The two sources are generally corroborative. The MD DNR landings report is 1,928,982 pounds (Table 2). The ASMFC Compliance Report template estimate is 1,887,508 pounds (Table 6a). The template uses length frequencies and seasonal length-weight parameters derived from fisheries dependent surveys. The two sources are in close agreement for Chesapeake Bay commercial harvest (2% difference), Atlantic harvest (4% difference), and total harvest (2% difference).
- There are two estimates of Chesapeake Bay recreational harvest weight presented in this report: the MRIP estimate, and the ASMFC Compliance Report template estimate. The estimates differ by approximately 13%. The 2012 MRIP estimate for Chesapeake Bay is 1,060,611 pounds (Table 13) with a proportional standard error (PSE) of 18%. The ASMFC Compliance Report template estimate for Maryland's Chesapeake Bay is 1,224,317 pounds (Table 6a). The template uses length frequencies and seasonal length-weight parameters derived from fisheries dependent surveys.
- There are two estimates of Atlantic Coast recreational harvest weight presented in this report: the MRIP estimate, and the ASMFC Compliance Report template estimate. The MRIP estimate for the Atlantic Coast is 28,688 pounds with a PSE of 75%. The ASMFC Compliance Report template estimate for Maryland's Atlantic Coast is 36,851 pounds (Table 6a), a difference of 22%. The template uses length frequencies and seasonal length-weight parameters derived from fisheries dependent surveys.
- It should be noted that estimates of recreational harvest calculated by MRIP and the compliance report template include migratory fish harvested in the spring season which are not counted against Maryland's portion of the Chesapeake Bay recreational quota of 2,657,102 pounds. The 2012 migratory harvest is estimated at 16,769 fish and 273,733 pounds. The estimate of migratory harvest is reported to ASMFC separately (Appendix 1: Estimate of the 2012 Harvest of Spring Coastal Migrant Striped Bass Striped Bass in Chesapeake Bay. Report to the Striped Bass Technical Committee. Horne, J., 2012).
- For a measure of Maryland Chesapeake Bay recreational harvest relative to the quota, the weight estimate of 2012 spring migratory harvest (273,733 pounds) must be subtracted from the total harvest estimates above. The resulting estimates are 786,878 pounds

(MRIP-based) or 950,584 pounds (Compliance Report-based). These estimates are under quota by 70% and 64%, respectively.

B. Fishery Independent Monitoring Programs

i. Juvenile Striped Bass Seine Survey

- **Description**: The juvenile striped bass seine survey documents annual year-class success for young-of-the-year (YOY) striped bass and relative abundance of many other fish species in Chesapeake Bay. Annual indices of relative abundance provide an early indicator of future adult stock recruitment and document annual variation and long-term trends in abundance and distribution.
- **Survey Design**: Juvenile indices are derived annually from sampling at 22 fixed stations within Maryland's portion of the Chesapeake Bay. Stations have been sampled continuously since 1954, with changes in some station locations. They are divided among four of the major spawning and nursery areas: seven each in the Potomac River and Head of Bay areas and four each in the Nanticoke and Choptank rivers.
- **Time of Year**: Sampling is monthly, with rounds (sampling excursions) occurring during July, August, and September.
- **Gear Type**: Samples are collected using a 30.5-m x 1.24-m bagless beach seine of untreated 6.4-mm bar mesh.
- **Methods**: One end of the seine was held on shore while the other was fully stretched by hand, perpendicular from the beach, and swept with the current. When depths of 1.6-m or greater were encountered, the offshore end was deployed along this depth contour. Striped bass and selected other species were separated into 0 and 1+ age groupings. All other finfish were identified to species and counted. Replicate seine hauls, a minimum of thirty minutes apart, are taken at each site on each sample round. This produces a total of 132 samples from which Bay-wide means are calculated.
- **Results**:
    - **Age 0 Index**: The geometric mean (GM) has been adopted by the ASMFC Striped Bass Technical Committee as the preferred index of YOY striped bass relative abundance to model stock status. The GM is calculated from the $\log_e(x+1)$ transformation, where x is an individual seine haul catch. A time series of the juvenile indices with 95% confidence intervals is presented in Figure 1, and the accompanying Excel file, MD_SB_Compliance2012.xls (worksheet: YOY Index). The 2012 value of 0.49 was less than the time-series average of 4.25 and the lowest in the time-series.
    - **Age 1 Index**: Age 1 indices were developed from the Maryland Juvenile Striped Bass Seine Survey data. Size ranges were used to determine catch of age 1 fish from records prior to 1991. Since 1991, striped bass have been separated into 0, 1 and 2+ age groups in the recorded data. The GM is calculated from the $\log_e(x+1)$ transformation, where x is an individual seine haul catch. Age 1 indices with 95% confidence intervals are presented in Figure 2, and the accompanying Excel file, MD_SB_Compliance2012.xls (worksheet: Age 1 Index). The 2012 value of 0.35 was greater than the time series average of 0.25.

ii. Spring Spawning Stock Survey

- **Description**: Since 1985, the spawning stock survey has characterized the status of the spawning stock in Maryland's portion of the Chesapeake Bay, and produces estimates of relative abundance-at-age used in the coast-wide stock assessment.

- **Survey Design**: Sampling is conducted according to a stratified random design. Experimental drift gill nets are used to sample striped bass in the Upper Bay and Potomac River spawning areas. One site within each spawning area (strata) is selected randomly each day.
- **Time of Year**: The survey is conducted annually from late-March through mid-May, up to six days per week as weather permits.
- **Gear Type**: Panels of experimental drift gill nets were constructed of multifilament nylon twine in the following sizes: 3.00, 3.75, 4.5, 5.25, 6.00, 6.50, 7.00, 8.00, 9.00, and 10.00 inch stretch-mesh. Each panel was 150 feet long and approximately 10 feet deep. Panels were tied together with spaces of approximately 10 feet between each mesh size.
- **Methods**: Experimental drift gill nets were deployed up to twice each day in a randomly selected survey site at slack tide. The time that each net was deployed was recorded. All fish were removed from the nets as they were pulled into the boat by hand. Striped bass were measured (mm TL), sexed by expression of gonadal products, and tagged with internal anchor tags as time permitted. Scale samples were taken from a sub-sample of male fish, all males over 700 mm TL, and all females for age determination.
- **Results**:
    - **Relative Abundance at age**: Selectivity-corrected CPUEs were developed as fish per 1000 square yards of net per hour. A skew-normal model and bootstrap analysis enabled the development of CIs. Age-length keys used in the model were developed as sex-specific keys. The time series of CPUE estimates is presented in Table 17 and the accompanying Excel file, MD_SB_Compliance2012.xls (worksheet: Spring CPUE @ Age). The 2012 composite value of 265 was less than the time series average of 487.
    - **Sex Ratio at Age**: Sex ratio-at-age of fish sampled during the spring survey is presented in Table 18 and the accompanying Excel file, MD_SB_Compliance2012.xls (worksheet: Spring Sex Ratio).
    - **Mean Length at Age**: Length at age was determined by reading a sub-sample of scales taken during the spring surveys in the Upper Bay and Potomac River. Previous statistical analysis showed no difference in mean length-at-age between areas but significant difference (α=0.05) between sexes. Therefore, mean length-at-age is presented separately for females and males (Tables 19 and 20).

iii. Spring Tagging

- **Description**: During the spring spawning stock survey, striped bass are tagged with USFWS internal anchor tags and released as part of the Cooperative Coastal Striped Bass Tagging Program. The information generated from this effort is used to evaluate stock dynamics of Atlantic Coast striped bass stocks.
- **Results**:
    - In 2012, a total of 682 fish were tagged and released during the spring spawning stock survey (453 in the Upper Bay, and 229 on the Potomac River; Figure 3).

IV. Planned management programs for the current calendar year 2013

A. Maryland Striped Bass Seasons for 2013.

Striped bass regulations and monitoring programs for 2013 will be similar to 2012.

i. Commercial

- **Pound net**: June 1-November 30 (Monday-Saturday); 18-36 inch TL slot limit.

- **Haul seine**: June 7-November 30 (Monday-Friday); 18-36 inch TL slot limit.
- **Hook and line**: June 10-November 30 (Monday-Thursday); 18-36 inch TL slot limit.
- **Drift gill net**: January 1-February 28, December 1-31 (Monday-Friday); 18-36 inch TL slot limit.
- **Atlantic Trawl/Gill net**: January 1-April 30, November 1-December 31 (Monday-Friday); 24 inch TL minimum size

ii. Recreational

- **Susquehanna Flats; Catch and Release** (March 1-May 3), **Catch and Keep** (May 16-31, 18-26 inch TL, one fish per person, per day) **seasons**: upstream of a line from Sandy Point to Turkey Point and downstream from a line connecting Lapidum boat ramp to Twin Rocks to Tomes Wharf in Port Deposit; and the Northeast River. The Susquehanna River is closed to this fishery. Non-offset circle hooks are required when fishing with baited hooks with a gap larger than 0.5 inches. Eels prohibited.
- **Spring Trophy season (Bay)**: April 20-May 15; one fish per person, per day; 28 inch (TL) minimum size limit; fish may be harvested only in the main-stem Bay from Brewerton Channel (Baltimore) to the MD/VA line, All other tributaries, bays, creeks, rivers, and sounds closed except Tangier and Pocomoke sounds. Eels prohibited.
- **Summer-Fall Recreational/Charter Boat season (Bay)**: Two fish per person, per day at 18-28 inches (TL) **or** one fish per person, per day, at 18-28 inches (TL) and one fish greater than 28 inches (TL) per person, per day. Eels prohibited before June 1. Boundaries change according to the following schedule: *May 16- May 31*, fish may be harvested only in the main-stem Bay below Hart-Miller Island (Baltimore) to the MD/VA line, and the lowermost five miles of the Chester, Choptank, and Patuxent Rivers. All other tributaries, bays, creeks, rivers, and sounds closed except Tangier and Pocomoke Sounds. *June 1-December 15*, Bay and all tributaries open.
- **Atlantic Coast Recreational season**: January 1 through December 31, with a two fish per person, per day creel limit and a 28 inch (TL) minimum size limit. EEZ beyond Maryland waters (3 miles offshore) is closed.

B. Maryland Striped Bass Quotas for 2013

i. Atlantic Commercial Quota: 126,396 pounds
ii. Chesapeake Bay Commercial Quota: 1,688,966 pounds
iii. Chesapeake Bay Recreational Quota: 2,285,072 pounds

C. Monitoring programs to be performed

i. Conduct spring Trophy Season Creel Survey and Volunteer Charterboat Survey:
- Survey will estimate CPUE and characterize the legal catch and by-catch of the spring trophy season fishery in terms of age, size, and sex.

ii. Conduct Spring Spawning Stock Survey on the Potomac River and Upper Chesapeake Bay spawning grounds:
- Survey will characterize the spawning stock of representative and important Maryland Chesapeake Bay systems in terms of age, size, sex, and relative abundance.

iii. Conduct tagging of striped bass captured on spawning grounds as a participant in the Cooperative Coastal Striped Bass Tagging Program.

iv. Sample commercial check stations:
- Survey will characterize the harvest of the Chesapeake Bay and Atlantic commercial fisheries in terms of age, size, sex, and relative abundance. MD DNR will also monitor

the striped bass harvest to ensure compliance with harvest quotas and provide harvest and catch-at-age as required by ASMFC.

v. Conduct Juvenile Striped Bass Seine Survey in Maryland's portion of the Chesapeake Bay.
- Survey will determine the relative abundance of juvenile striped bass in four major spawning areas.

vi. Conduct Commercial Pound Net Survey in Maryland's portion of the Chesapeake Bay.
- Survey will characterize length and age of the pound net catch.

vii. Conduct internet-based Striped Bass Volunteer Angler Survey:
- Survey will characterize length distribution of recreational harvest and discards.

D. Changes from the previous year:

i. Quota Reduction
- Maryland's 2013 Chesapeake Bay quota was reduced by 14% from 2012 in response to decreased estimates of overall stock abundance.

ii. Commercial Quota Withholding
- The 2013 Chesapeake Bay commercial quota was further reduced by 2.5% to account for management uncertainty in harvest reporting. The effective 2013 commercial quota is 1,646,742 pounds.

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Table 3. Time series of Maryland Chesapeake Bay commercial striped bass reported landings in numbers and pounds.

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Table 5a. Summary of 2012 Maryland striped bass commercial and recreational removals-at-age (harvest) in numbers of fish.

Table 5b. Summary of 2012 Maryland striped bass commercial and recreational removals-at-age (discard mortality) in numbers of fish.

Table 6a. Summary of 2012 Maryland striped bass commercial and recreational removals-at-age (harvest) in pounds of fish.

Table 6b. Summary of 2012 Maryland striped bass commercial and recreational removals-at-age (discard mortality) in pounds of fish.

Table 7. Mean length-at-age of striped bass samples aged from commercial pound net/hook and line fisheries and pound net surveys in Maryland's Chesapeake Bay, June through November 2012.

Table 8. Mean length-at-age of striped bass samples aged from commercial drift gill net fisheries in Maryland Chesapeake Bay, December 2011 through February 2012.

Table 9. Summary of 2012 mean weight-at-age in kilograms for Maryland striped bass Atlantic and Chesapeake Bay commercial fisheries as calculated by the ASMFC compliance report template.

Table 10. Maryland 2012 striped bass recreational regulations.

Table 11. Maryland 2012 striped bass recreational harvest (Type A+B1) by area and MRIP wave in numbers of fish.

Table 12. Maryland 2012 striped bass recreational harvest (Type A+B1) by area and MRIP wave in pounds.

Table 13. Time series of Maryland Chesapeake Bay recreational striped bass landings, in numbers and pounds (MRFSS 1982-2003; MRIP 2004-present; Type A+B1, inland waters).

Table 14. Catch-at-age (in numbers of fish) for the 2012 Maryland striped bass recreational harvest by MRIP wave in Chesapeake Bay (CB) and on the Atlantic Coast.

Table 15. Time series of Maryland recreational discards of striped bass in numbers of fish (MRFSS 1982-2003, MRIP 2004-present).

Table 16. Maryland 2012 recreational striped bass discard mortality at age by MRIP wave in Chesapeake Bay (CB) and the Atlantic Ocean (Atl).

Table 17. Time series of relative abundance at age, corrected for selectivity, from Chesapeake Bay striped bass spring spawning stock survey. Includes Potomac, Upper Bay, and Choptank River (1985-1994, 1996), sexes combined. Units are number of fish per 1000 square yards of gill net per hour.

Table 18. Sex ratio-at-age of fish sampled on the Potomac River and Upper Bay, spring 2012.

Table 19. Mean length-at-age (mm TL) statistics for female striped bass collected in the Potomac River and Upper Bay, spring 2012.

Table 20. Mean length-at-age (mm TL) statistics for male striped bass collected in the Potomac River and Upper Bay, spring 2012.

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Figure 1. Maryland juvenile striped bass survey geometric mean (GM) catch per haul of YOY striped bass with 95% confidence intervals (+/- 2 SE) and Target Period Average (TPA).

Figure 2. Maryland juvenile striped bass survey geometric mean (GM) catch per haul of age-1 striped bass with 95% confidence intervals (+/- 2 SE).

Figure 3. Length frequency of striped bass measured and tagged during the spawning stock survey in the Upper Bay and Potomac River, spring 2012.

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Appendix 1. Estimate of the 2012 Harvest of Spring Coastal Migrant Striped Bass Striped Bass in Chesapeake Bay. Report to the Striped Bass Technical Committee. Horne, J., 2012.

Table 1. Maryland 2012 striped bass commercial regulations.

Season	Bay: pound net (June 1-Nov 30, Mon-Sat)
Annual quota (lbs)	616,420
Trip/Season/Gear Limit	1,600 lbs/day/licensee with multiple allocations; 4 nets/licensee
Minimum Size	18-36 inch TL slot
Reporting requirement	Daily check station reports and monthly harvest report
# of participants	100
Season	Bay: haul seine (June 7-Nov 30, Mon-Fri)
Annual quota (lbs)	Included in pound net quota
Trip/Season/Gear Limit	750 lbs/license/day; 1,100 lbs/license/net/season
Minimum Size	18-36 inch TL slot
Reporting requirement	Daily check station reports and monthly harvest report
# of participants	3
Season	Bay: hook and line (June 7-Nov 30, Mon-Thu)
Annual quota (lbs)	447,205
Trip/Season/Gear Limit	500 lbs/license/day; 1500 lbs/license/week; max 4 people/boat; 2 crew/licensee
Minimum Size	18-36 inch TL slot
Reporting requirement	Daily check station reports and monthly harvest report
# of participants	147
Season	Bay: drift gill net (Jan 1-Feb 28, Dec 3-31, Mon-Fri)
Annual quota (lbs)	802,056
Trip/Season/Gear Limit	300 lbs/licensee/day, max 4 licenses/boat
Minimum Size	18-36 inch TL slot
Reporting requirement	Daily check station reports and monthly harvest report
# of participants	621 dual registered as gill net/hook and line
Season	Atlantic: drift gill net/otter trawl (Jan 1-Apr 30, Nov 1-Dec 31, Mon-Fri)
Annual quota (lbs)	126,396
Trip/Season/Gear Limit	1,600 pounds/license/season
Minimum Size	24 inch TL min
Reporting requirement	Daily check station reports and monthly harvest report
# of participants	55

Table 2. Maryland 2012 commercial striped bass harvest by gear type and area, based on MD DNR reported landings.

Area	Gear	Number of Fish	Pounds
Chesapeake Bay	Pound net*	141,558	565,600
	Hook and line*	133,563	424,657
	Gill net*	190,523	861,174
Bay Total		**465,644**	**1,851,431**
Atlantic Ocean	Trawl/gill net	6,873	77,551
MD Total		**472,517**	**1,928,982**

* Number of fish was calculated by dividing pounds reported by monthly mean weights measured during biological surveys.

Table 3. Time series of Maryland Chesapeake Bay commercial striped bass landings in numbers and pounds.

Year	Numbers*	Pounds
1991	31,880	191,066
1992	119,286	552,451
1993	211,089	916,764
1994	208,914	884,970
1995	280,051	856,568
1996	415,272	1,523,293
1997	656,416	2,030,061
1998	780,893	2,368,393
1999	650,022	2,377,393
2000	627,777	2,411,554
2001	538,808	1,774,758
2002	296,635	1,852,634
2003	587,438	1,813,676
2004	461,064	1,899,539
2005	563,859	2,008,687
2006	645,078	2,116,257
2007	586,934	2,240,585
2008	580,651	2,208,018
2009	605,576	2,267,293
2010	595,015	2,104,487
2011	488,897	1,955,072
2012	465,644	1,851,431

* Number of fish was calculated by dividing pounds reported by monthly mean weights measured during biological surveys.

Table 4. Summary of 2012 Maryland commercial striped bass fisheries sampling.

Fishery	Length Frequency Sample Size	# Age Samples in Age Length Key
Chesapeake Bay Pound Net /Haul Seine	788	198
Chesapeake Bay Hook and Line	1,988	198
Chesapeake Bay Gill net	3,800	122
Atlantic Gill Net/Trawl	629	210

Table 5a. Summary of 2012 Maryland striped bass commercial and recreational removals-at-age (harvest) in numbers of fish.

Fishery:	**Catch at age (numbers of fish)**						
	0	**1**	**2**	**3**	**4**	**5**	**6**
Comm Atl Gill net, Trawl					15	495	565
Comm CB Gill net				2,567	21,760	88,643	45,074
Comm CB Hook and Line			4,748	24,046	22,434	45,284	24,077
Comm CB Pound Net			2,216	22,635	21,871	47,581	28,373
Rec Wave 2 CB						2	122
Rec Wave 3 CB				372	4,023	8,295	6,951
Rec Waves 4-6 CB		714	4,045	26,112	17,130	41,238	23,959
Rec Atlantic							8
Harvest Total		**714**	**11,008**	**75,733**	**87,233**	**231,539**	**129,128**

Fishery:	**Catch at age (numbers of fish)**							
	7	**8**	**9**	**10**	**11**	**12**	**13+**	**Total**
Comm Atl Gill net, Trawl	982	1,213	2,501	559	350	114	79	6,873
Comm CB Gill net	26,650	2,404	3,241	50	134			190,523
Comm CB Hook and Line	10,570	1,371	940	59		34		133,563
Comm CB Pound Net	14,837	2,090	1,496	172	180	108		141,558
Rec Wave 2 CB	283	1,921	4,466	1,729	2,237	767	1,178	12,705
Rec Wave 3 CB	6,033	7,188	10,691	2,930	3,377	810	1,306	51,976
Rec Waves 4-6 CB	13,639	2,724	2,576	714	1,392	232	428	134,902
Rec Atlantic	71	169	396	206	182	265	528	1,824
Harvest Total	**73,065**	**19,079**	**26,306**	**6,418**	**7,852**	**2,330**	**3,519**	**673,924**

Table 5b. Summary of 2012 Maryland striped bass commercial and recreational removals-at-age (discard mortality) in numbers of fish.

Fishery:	**Catch at age (numbers of fish)**						
	0	**1**	**2**	**3**	**4**	**5**	**6**
Rec Discard Mort Wave 2 CB		44	282	1,521	453	1,020	1,892
Rec Discard Mort Wave 3 CB		50	1,275	9,057	3,695	2,162	3,174
Rec Discard Mort Waves 4-6 CB		54,677	47,583	28,736	7,883	4,407	1,612
Rec Discard Mort Atlantic							
Rec Discard Mort Total		**54,772**	**49,140**	**39,315**	**12,030**	**7,589**	**6,678**
GRAND TOTAL (Removals)		**55,486**	**60,148**	**115,047**	**99,264**	**239,128**	**135,807**

Fishery:	**Catch at age (numbers of fish)**							
	7	**8**	**9**	**10**	**11**	**12**	**13+**	**Total**
Rec Discard Mort Wave 2 CB	2,953	2,276	3,566	1,138	1,586	496	861	18,090
Rec Discard Mort Wave 3 CB	4,347	1,526	877	36	31	11	43	26,283
Rec Discard Mort Waves 4-6 CB	1,827	322			123	246	491	147,908
Rec Discard Mort Atlantic								
Rec Discard Mort Total	**9,128**	**4,124**	**4,443**	**1,174**	**1,740**	**752**	**1,395**	**192,281**
GRAND TOTAL (Removals)	**82,193**	**23,203**	**30,749**	**7,592**	**9,592**	**3,082**	**4,914**	**866,205**

Table 6a. Summary of 2012 Maryland striped bass commercial and recreational removals-at-age (harvest) in pounds of fish*.

Fishery:	**Total Weight at age (lb)**						
	0	**1**	**2**	**3**	**4**	**5**	**6**
Comm Atl Gill net, Trawl					76	3,197	3,901
Comm CB Gill net				7,500	70,010	366,724	213,053
Comm CB Hook and Line			9,674	64,021	60,045	155,203	87,900
Comm CB Pound Net			4,272	62,144	58,985	171,961	106,850
Rec Wave 2 CB						14	1,232
Rec Wave 3 CB				804	11,072	28,562	33,383
Rec Waves 4-6 CB		101	8,128	63,766	44,507	145,869	92,508
Rec Atlantic							64
Harvest Total		**101**	**22,074**	**198,234**	**244,696**	**871,531**	**538,893**

Fishery:	**Total Weight at age (lb)**							
	7	**8**	**9**	**10**	**11**	**12**	**13+**	**Total**
Comm Atl Gill net, Trawl	8,609	12,715	28,467	7,557	6,003	2,189	1,798	74,513
Comm CB Gill net	147,990	21,734	26,228	1,001	2,303			856,542
Comm CB Hook and Line	49,522	9,924	6,963	619		310		444,181
Comm CB Pound Net	71,501	17,405	12,386	2,291	3,425	1,051		512,272
Rec Wave 2 CB	3,059	24,540	66,271	29,222	40,615	16,571	27,625	209,150
Rec Wave 3 CB	39,186	77,427	139,440	45,912	57,385	17,112	30,239	480,523
Rec Waves 4-6 CB	72,252	22,007	26,757	11,833	27,863	6,128	12,924	534,643
Rec Atlantic	732	2,217	5,571	3,665	3,297	6,455	14,850	36,851
Harvest Total	**392,851**	**187,970**	**312,084**	**102,099**	**140,890**	**49,816**	**87,437**	**3,148,676**

* Pounds presented here are calculated by the Compliance Report template supplied by ASMFC using length-weight regression parameters. They differ slightly from commercial pounds reported by MDDNR and weight estimates produced by MRIP.

Table 6b. Summary of 2012 Maryland striped bass commercial and recreational removals-at-age (discard mortality) in pounds of fish*.

Fishery:	**Total Weight at age (lb)**						
	0	**1**	**2**	**3**	**4**	**5**	**6**
Rec Discard Mort Wave 2 CB		17	280	2,116	881	4,598	10,558
Rec Discard Mort Wave 3 CB		20	1,233	13,965	6,858	8,615	16,450
Rec Discard Mort Waves 4-6 CB		18,259	36,048	39,484	13,654	18,079	6,407
Rec Discard Mort Atlantic							
Rec Discard Mort Total		**18,296**	**37,561**	**55,565**	**21,393**	**31,292**	**33,415**
GRAND TOTAL (Removals)		**18,397**	**59,635**	**253,799**	**266,089**	**902,823**	**572,308**

Fishery:	**Total Weight at age (lb)**							
	7	**8**	**9**	**10**	**11**	**12**	**13+**	**Total**
Rec Discard Mort Wave 2 CB	18,861	22,921	48,423	19,208	29,016	10,813	20,120	187,813
Rec Discard Mort Wave 3 CB	26,014	10,526	6,505	488	508	240	1,172	92,594
Rec Discard Mort Waves 4-6 CB	8,886	2,295			3,484	6,968	13,936	167,498
Rec Discard Mort Atlantic								
Rec Discard Mort Total	**53,761**	**35,742**	**54,928**	**19,695**	**33,008**	**18,022**	**35,228**	**447,906**
GRAND TOTAL (Removals)	**446,612**	**223,712**	**367,012**	**121,794**	**173,899**	**67,838**	**122,665**	**3,596,582**

* Pounds presented here are calculated by the Compliance Report template supplied by ASMFC using length-weight regression parameters. They differ slightly from commercial pounds reported by MDDNR and weight estimates produced by MRIP.

Table 7. Mean length-at-age of striped bass samples aged from commercial pound net/hook and line fisheries and pound net surveys in Maryland's Chesapeake Bay, June through November 2012.

Year Class	Age	n	Mean Length (mm TL)	Standard Deviation	Lower CI (95%)	Upper CI (95%)
2011	1	19	249	45	227	271
2010	2	18	368	58	339	397
2009	3	26	446	68	419	474
2008	4	13	511	75	466	557
2007	5	37	614	77	588	640
2006	6	23	644	81	609	679
2005	7	27	686	69	659	713
2004	8	15	755	69	716	793
2003	9	14	768	57	735	800
2002	10	3	799	46	685	912
2001	11	2	901	26	672	1130
2000	12	1	744	-	-	-

Table 8. Mean length-at-age of striped bass samples aged from commercial drift gill net fisheries in Maryland Chesapeake Bay, December 2011 through February 2012.

Year Class	Age*	n	Mean Length (mm TL)	Standard Deviation	Lower CI (95%)	Upper CI (95%)
2009	3	3	463	22	408	518
2008	4	11	482	23	466	497
2007	5	22	555	54	531	579
2006	6	12	603	58	566	640
2005	7	25	688	64	662	715
2004	8	22	741	34	726	757
2003	9	18	760	67	727	794
2001	11	1	891	-	-	-

* Age was calculated by subtracting year-class from the year in which the fishery ended, i.e. 2012.

Table 9. Summary of 2012 mean weight-at-age in kilograms for Maryland striped bass Atlantic and Chesapeake Bay commercial fisheries as calculated by the ASMFC compliance report template.

Fishery:	**Mean weight at age (kg)**							
	2	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Comm Atl Gillnet, Trawl	-	-	2.38	2.93	3.13	3.98	4.75	5.16
Comm CB Gillnet	-	1.33	1.46	1.88	2.14	2.52	4.10	3.67
Comm CB Hook and Line	0.92	1.21	1.21	1.55	1.66	2.13	3.28	3.36
Comm CB Pound Net	0.87	1.25	1.22	1.64	1.71	2.19	3.78	3.76

Fishery:	**Mean weight at age (kg)**						
	10	**11**	**12**	**13**	**14**	**15**	**16**
Comm Atl Gillnet, Trawl	6.14	7.77	8.68	9.49	12.43	9.67	12.43
Comm CB Gillnet	9.05	7.81	-	-	-	-	-
Comm CB Hook and Line	4.78	-	4.18	-	-	-	-
Comm CB Pound Net	6.04	8.65	4.42	-	-	-	-

Table 10. Maryland 2012 striped bass recreational regulations.

Season	Susquehanna Flats Catch and Release (Mar 1-May 3)
Bag Limit	N/A
Minimum Size	N/A
Special Conditions	No eels; no stinger hooks; max 6 lines when trolling; circle hooks required if baited hook has gap greater than 0.5 inches
License	Yes
Season	Susquehanna Flats Catch and Keep (Mar 16-May 31)
Bag Limit	1 fish/person/day
Minimum Size	18-26 inches TL
Special Conditions	No eels; no stinger hooks; max 6 lines when trolling; circle hooks required if baited hook has gap greater than 0.5 inches
License	Yes
Season	Bay: Spring Trophy (April 21-May 15)
Bag Limit	1 fish/person/day
Minimum Size	28 inches TL
Special Conditions	Main-stem Bay from Baltimore to MD/VA line, tribs closed
License	Yes
Season	Bay: Spring/Early Summer (May 16-31)
Bag/Size Limit	2 fish/person/day @18-28 inches TL **OR**
	1 fish/person/day @18-28 inches and 1 fish/person/day @ 28+ inches TL
Special Conditions	main-stem Bay from Baltimore to MD/VA line, tribs closed except the lower 5 mile (approx) of the Chester, Choptank, and Patuxent rivers
License	Yes
Season	Bay: Summer/Fall Rec/Charter (June 1-Dec 15)
Bag/Size Limit	2 fish/person/day @18-28 inches TL **OR**
	1 fish/person/day @18-28 inches and 1 fish/person/day @ 28+ inches TL
Special Conditions	Bay and tribs open
License	Yes
Season	Atlantic Coast (Jan 1-Dec 31)
Bag Limit	2 fish/person/day
Minimum Size	28 inches TL
Special Conditions	Closed beyond MD waters, 3 miles from shore (EEZ)
License	Yes

Table 11. Maryland 2012 striped bass recreational harvest (Type A+B1) by area and MRIP wave in numbers of fish (source: MRIP query May 16, 2013).

Wave	Chesapeake Bay	Atlantic Coast (<= 3 mi)	Total
1 (Jan-Feb)	0	0	0
2 (Mar-Apr)	12,705	0	12,705
3 (May-June)	51,976	1,824	53,800
4 (July-Aug)	50,090	0	50,090
5 (Sept-Oct)	67,783	0	67,783
6 (Nov-Dec)	17,029	0	17,029
Total	**199,583**	**1,824**	**201,407**

*Note: values may not sum due to rounding

Table 12. Maryland 2012 striped bass recreational harvest (Type A+B1) by area and MRIP wave in pounds (source: MRIP query May 16, 2013).

Wave	Chesapeake Bay	Atlantic Coast (<= 3 mi)	Total
1 (Jan-Feb)	0	0	0
2 (Mar-Apr)	180,694	0	180,694
3 (May-June)	386,045	28,688	414,733
4 (July-Aug)	181,171	0	181,171
5 (Sept-Oct)	217,291	0	217,291
6 (Nov-Dec)	95,411	0	95,411
Total	**1,060,611**	**28,688**	**1,089,300**

*Note: values may not sum due to rounding

Table 13. Time series of Maryland Chesapeake Bay recreational striped bass landings, in numbers and pounds (MRFSS 1982-2003; MRIP 2004-present; Type A+B1, inland waters).

Year	Numbers	Pounds
1982	984	
1983	31,746	149,351
1984	16,789	44,262
1985	2,965	8,825
1986	14,077	3,104
1987	4,025	40,818
1988	133	1,058
1989		
1990	736	12,967
1991	77,873	456,954
1992	99,354	613,174
1993	104,682	794,853
1994	199,378	1,096,409
1995	355,237	2,057,450
1996	337,415	1,560,389
1997	334,068	1,962,947
1998	391,824	1,908,344
1999	263,191	1,137,940
2000	506,462	2,100,854
2001	382,557	2,072,943
2002	282,429	1,423,515
2003	530,488	2,975,437
2004	363,983	2,313,359
2005	531,412	4,578,687
2006	668,798	3,866,227
2007	765,169	3,504,041
2008	415,403	2,728,048
2009	498,614	4,234,461
2010	452,439	2,583,008
2011	444,915	2,637,719
2012	199,583	1,060,611

Table 14. Catch-at-age (in numbers of fish) for the 2012 Maryland striped bass recreational harvest by MRIP wave in Chesapeake Bay (CB) and on Atlantic Coast.

Catch at Age (numbers of fish)						
Age	**Wave 2 CB**	**Wave 3 CB**	**Waves 4-6 CB**	**CB Total**	**Atlantic**	**MD Total**
0	0	0	0	**0**	0	**0**
1	0	0	714	**714**	0	**714**
2	0	0	4,045	**4,045**	0	**4,045**
3	0	372	26,112	**26,484**	0	**26,484**
4	0	4,023	17,130	**21,154**	0	**21,154**
5	2	8,295	41,238	**49,535**	0	**49,535**
6	122	6,951	23,959	**31,032**	8	**31,040**
7	283	6,033	13,639	**19,954**	71	**20,025**
8	1,921	7,188	2,724	**11,832**	169	**12,001**
9	4,466	10,691	2,576	**17,733**	396	**18,128**
10	1,729	2,930	714	**5,373**	206	**5,579**
11	2,237	3,377	1,392	**7,006**	182	**7,189**
12	767	810	232	**1,809**	265	**2,074**
13	287	391	0	**678**	130	**808**
14	523	585	143	**1,250**	53	**1,303**
15	235	232	143	**610**	192	**803**
16	108	92	143	**342**	119	**461**
17	11	7	0	**17**	13	**31**
18	10	0	0	**10**	0	**10**
19	4	0	0	**4**	0	**4**
20	0	0	0	**0**	0	**0**
21	0	0	0	**0**	20	**20**
Total	**12,705**	**51,976**	**134,902**	**199,583**	**1,824**	**201,407**

*Note: values may not sum due to rounding

Table 15. Time series of Maryland recreational discards of striped bass in numbers of fish (MRFSS 1982-2003, MRIP 2004-present).

Year	Numbers of Fish
1982	30,376
1983	213,487
1984	104,095
1985	147,103
1986	390,063
1987	118,395
1988	132,250
1989	114,269
1990	420,084
1991	1,036,011
1992	749,959
1993	1,556,848
1994	2,785,392
1995	2,401,277
1996	2,545,238
1997	4,019,987
1998	2,641,680
1999	2,387,615
2000	3,244,731
2001	2,890,054
2002	2,928,589
2003	4,580,161
2004	3,479,634
2005	3,855,552
2006	3,711,342
2007	3,064,928
2008	1,338,728
2009	1,423,332
2010	1,508,647
2011	1,127,511
2012	2,136,452

Table 16. Maryland 2012 recreational striped bass discard mortality at age by MRIP wave in Chesapeake Bay (CB) and the Atlantic Ocean.

Discard Mortality at Age (numbers of fish)						
Age	**Wave 2 CB**	**Wave 3 CB**	**Waves 4-6 CB**	**CB Total**	**Atlantic**	**MD Total**
0	0	0	0	**0**	0	**0**
1	44	50	54,677	**54,772**	0	**54,772**
2	282	1,275	47,583	**49,140**	0	**49,140**
3	1,521	9,057	28,736	**39,315**	0	**39,315**
4	453	3,695	7,883	**12,030**	0	**12,030**
5	1,020	2,162	4,407	**7,589**	0	**7,589**
6	1,892	3,174	1,612	**6,678**	0	**6,678**
7	2,953	4,347	1,827	**9,128**	0	**9,128**
8	2,276	1,526	322	**4,124**	0	**4,124**
9	3,566	877	0	**4,443**	0	**4,443**
10	1,138	36	0	**1,174**	0	**1,174**
11	1,586	31	123	**1,740**	0	**1,740**
12	496	11	246	**752**	0	**752**
13	200	7	123	**330**	0	**330**
14	391	14	184	**589**	0	**589**
15	155	8	184	**347**	0	**347**
16	72	8	0	**79**	0	**79**
17	15	0	0	**15**	0	**15**
18	15	6	0	**21**	0	**21**
19	15	0	0	**15**	0	**15**
Total	**18,090**	**26,283**	**147,908**	**192,281**	**0**	**192,281**

*Note: values may not sum due to rounding

Table 17. Time series of relative abundance at age, corrected for selectivity, from Chesapeake Bay striped bass spring spawning stock survey. Includes Potomac, Upper Bay and Choptank River (1985-1994, 1996), sexes combined. Units are number of fish per 1000 square yards of gill net per hour.

	AGE															
YEAR	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15+**	**TOTAL**
1985	0	140.5	305.5	31.9	4.8	1.3	2.2	0.0	0.4	0.1	0.0	0.4	0.3	0.0	0.7	**488**
1986	0	230.2	261.1	497.6	4.0	5.3	2.0	2.9	2.8	0.0	0.0	0.0	0.0	0.0	0.9	**1,007**
1987	0	142.2	258.0	115.1	176.1	17.9	2.2	2.6	0.2	0.0	0.0	0.0	0.0	0.3	0.3	**715**
1988	0	40.8	77.6	71.3	57.0	74.6	1.3	0.0	0.0	4.3	0.0	0.0	0.0	0.0	0.3	**327**
1989	0	33.1	154.7	80.5	45.5	48.8	32.9	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	**396**
1990	0	78.1	158.1	120.4	48.3	34.3	32.0	29.8	0.9	0.1	0.1	0.5	0.7	0.1	0.2	**504**
1991	0	73.4	191.1	62.2	47.1	26.7	26.1	19.2	10.7	0.4	1.5	0.0	0.6	0.6	1.1	**461**
1992	0.1	27.4	221.1	153.5	58.6	69.9	42.9	29.1	13.7	7.0	3.3	0.0	1.0	1.2	0.2	**629**
1993	0	41.0	132.0	187.2	88.2	51.0	51.9	37.1	22.6	7.4	3.1	0.8	1.4	1.4	0.1	**625**
1994	0	26.8	103.5	98.0	117.9	59.5	34.0	42.9	17.6	8.6	3.1	1.3	0.3	0.0	0.0	**513**
1995	0	50.0	117.2	67.3	60.9	51.8	40.2	25.1	19.8	11.6	9.7	3.5	4.7	0.0	0.0	**462**
1996	0	4.0	368.3	102.2	34.7	69.5	64.4	42.3	35.4	16.7	15.2	4.7	1.6	0.0	0.0	**759**
1997	0	36.8	44.8	140.3	46.5	20.9	18.9	22.1	26.6	11.4	9.9	3.3	1.2	0.6	0.0	**383**
1998	0	36.1	142.8	32.7	149.3	32.3	13.2	18.5	17.3	15.0	9.1	9.9	1.7	0.4	0.3	**479**
1999	0	8.6	172.4	78.9	58.6	36.7	11.7	7.0	11.5	5.2	4.8	2.8	1.1	2.1	0.1	**402**
2000	0	14.4	55.9	104.1	48.0	57.7	25.0	13.8	8.3	8.3	7.0	7.4	1.5	2.5	0.5	**354**
2001	0	4.9	39.1	60.3	53.2	23.1	29.1	33.3	11.6	12.1	9.3	6.1	3.5	1.2	0.4	**287**
2002	0	84.6	40.8	39.7	85.8	42.7	35.0	33.1	23.5	8.4	5.8	3.6	5.2	1.2	0.4	**410**
2003	0	15.7	111.5	53.4	35.4	68.4	51.6	27.6	26.7	29.1	14.7	7.2	6.1	2.5	0.3	**450**
2004	0	28.8	193.2	121.2	42.4	34.6	44.4	47.3	30.1	23.1	23.1	6.7	4.2	3.7	2.6	**605**
2005	0	66.0	103.6	73.5	96.6	24.3	25.9	21.7	27.5	20.4	17.5	11.3	3.0	1.0	3.8	**496**
2006	0	7.5	257.9	40.1	47.6	29.2	14.8	12.7	18.4	21.6	13.1	11.0	9.3	2.7	6.1	**492**
2007	0	7.9	22.5	76.0	14.9	15.3	13.5	7.4	9.0	10.0	16.0	8.0	3.0	5.4	5.3	**214**
2008	0	3.3	86.0	108.4	112.3	16.9	23.0	19.7	11.3	12.0	10.1	14.0	13.4	3.3	3.6	**437**
2009	0	40.1	42.1	153.0	51.6	138.2	21.1	22.7	31.2	9.0	15.8	12.1	23.4	4.8	4.8	**570**
2010	0	7.5	149.7	50.4	65	50.5	54.9	6.7	13.9	10.2	4.0	5.1	5.9	9.9	19.4	**453**
2011	0	23.0	73.3	123.7	45.4	57.3	38	44.9	10.1	9.1	7.9	7.8	4.0	4.3	9.5	**458**
2012	0	15.2	52.0	23.2	23.7	17.8	23.1	22.6	25.0	7.4	16.5	13.6	4.4	6.7	13.4	**265**
AVERAGE	**0**	**46.0**	**140.6**	**102.4**	**61.4**	**42.0**	**27.7**	**21.1**	**15.2**	**9.6**	**7.9**	**5.0**	**3.6**	**2.0**	**2.7**	**495**

Table 18. Sex ratio-at-age of fish sampled on the Potomac River and Upper Bay, spring 2012.

Age	% Male	% Female
1	0	0
2	100	0
3	100	0
4	98	2
5	94	6
6	65	35
7	78	22
8	81	19
9	60	40
10	48	52
11	63	37
12	52	48
13	31	69
14	63	37
15+	3	97
TOTAL	**78**	**22**

Table 19. Mean length-at-age (mm TL) statistics for female striped bass collected in the Potomac River and Upper Bay, late March-May 2012.

Year-class	Age	Area	n	Mean	LCL	UCL	SD	SE
2008	4	POTOMAC	1	468	-	-	-	-
		UPPER	0	-	-	-	-	-
		COMBINED	1	468	-	-	-	-
2007	5	POTOMAC	0	-	-	-	-	-
		UPPER	1	544	-	-	-	-
		COMBINED	1	544	-	-	-	-
2006	6	POTOMAC	4	647	527	767	75	38
		UPPER	3	655	510	801	59	34
		COMBINED	7	651	592	709	63	24
2005	7	POTOMAC	2	697	290	1104	45	32
		UPPER	6	657	620	695	36	14
		COMBINED	8	667	635	700	39	14
2004	8	POTOMAC	0	-	-	-	-	-
		UPPER	6	794	711	876	79	32
		COMBINED	6	794	711	876	79	32
2003	9	POTOMAC	5	908	861	955	38	17
		UPPER	32	866	838	895	80	14
		COMBINED	37	872	847	898	76	13
2002	10	POTOMAC	4	928	854	1002	47	23
		UPPER	18	939	917	961	44	10
		COMBINED	22	937	918	957	44	9
2001	11	POTOMAC	8	964	919	1008	53	19
		UPPER	12	966	941	990	38	11
		COMBINED	20	965	945	985	43	10
2000	12	POTOMAC	4	1031	960	1102	45	22
		UPPER	13	1031	999	1062	53	15
		COMBINED	17	1031	1005	1056	50	12
1999	13	POTOMAC	0	-	-	-	-	-
		UPPER	9	1040	1002	1079	50	17
		COMBINED	9	1040	1002	1079	50	17
1998	14	POTOMAC	3	1081	830	1331	101	58
		UPPER	7	1039	1001	1078	41	16
		COMBINED	10	1052	1008	1096	62	19
1997	15	POTOMAC	2	1090	931	1248	18	13
		UPPER	4	1078	945	1211	83	42
		COMBINED	6	1082	1013	1150	65	27
1996	16	POTOMAC	4	1080	988	1172	58	29
		UPPER	3	1119	981	1257	56	32
		COMBINED	7	1097	1045	1148	56	21
1995	17	POTOMAC	1	1197	-	-	-	-
		UPPER	0	-	-	-	-	-
		COMBINED	1	1197	-	-	-	-
1994	18	POTOMAC	0	-	-	-	-	-
		UPPER	2	1158	695	1622	52	37
		COMBINED	2	1158	695	1622	52	37
1993	19	POTOMAC	0	-	-	-	-	-
		UPPER	1	1196	-	-	-	-
		COMBINED	1	1196	-	-	-	-

Table 20. Mean length-at-age (mm TL) statistics for male striped bass collected in the Potomac River and Upper Bay, late March-May 2012.

Year-class	Age	Area	n	Mean	LCL	UCL	SD	SE
2010	2	POTOMAC	9	326	301	350	32	11
		UPPER	2	320	244	396	8	6
		COMBINED	11	325	305	344	28	9
2009	3	POTOMAC	16	400	379	420	39	10
		UPPER	15	376	353	398	40	10
		COMBINED	31	388	373	403	41	7
2008	4	POTOMAC	4	463	336	590	80	40
		UPPER	13	446	403	489	71	20
		COMBINED	17	450	414	486	71	17
2007	5	POTOMAC	13	535	510	561	43	12
		UPPER	9	536	489	582	61	20
		COMBINED	22	536	514	558	50	11
2006	6	POTOMAC	10	572	537	607	49	15
		UPPER	8	641	568	714	87	31
		COMBINED	18	603	565	640	75	18
2005	7	POTOMAC	9	618	597	638	27	9
		UPPER	27	646	618	674	70	14
		COMBINED	36	639	617	660	63	11
2004	8	POTOMAC	4	672	544	800	81	40
		UPPER	43	748	729	772	79	12
		COMBINED	47	742	718	767	81	12
2003	9	POTOMAC	7	824	791	857	36	14
		UPPER	43	777	754	800	74	11
		COMBINED	50	784	763	804	71	10
2002	10	POTOMAC	3	855	781	929	30	17
		UPPER	8	850	790	910	72	25
		COMBINED	11	851	810	893	61	19
2001	11	POTOMAC	4	839	776	901	39	20
		UPPER	11	917	861	974	84	25
		COMBINED	15	896	851	942	82	21
2000	12	POTOMAC	3	974	862	1086	45	26
		UPPER	5	984	897	1072	70	31
		COMBINED	8	981	932	1029	59	21
1999	13	POTOMAC	2	992	782	1201	23	17
		UPPER	1	1042	-	-	-	-
		COMBINED	3	1008	925	1092	34	19
1998	14	POTOMAC	1	1138	-	-	-	-
		UPPER	9	991	950	1032	54	18
		COMBINED	10	1006	957	1055	69	22
1997	15	POTOMAC	0	-	-	-	-	-
		UPPER	1	1043	-	-	-	-
		COMBINED	1	1043	-	-	-	-

Figure 1. Maryland juvenile striped bass survey geometric mean (GM) catch per haul of YOY striped bass with 95% confidence intervals (+/- 2 SE) and Target Period Average (TPA).

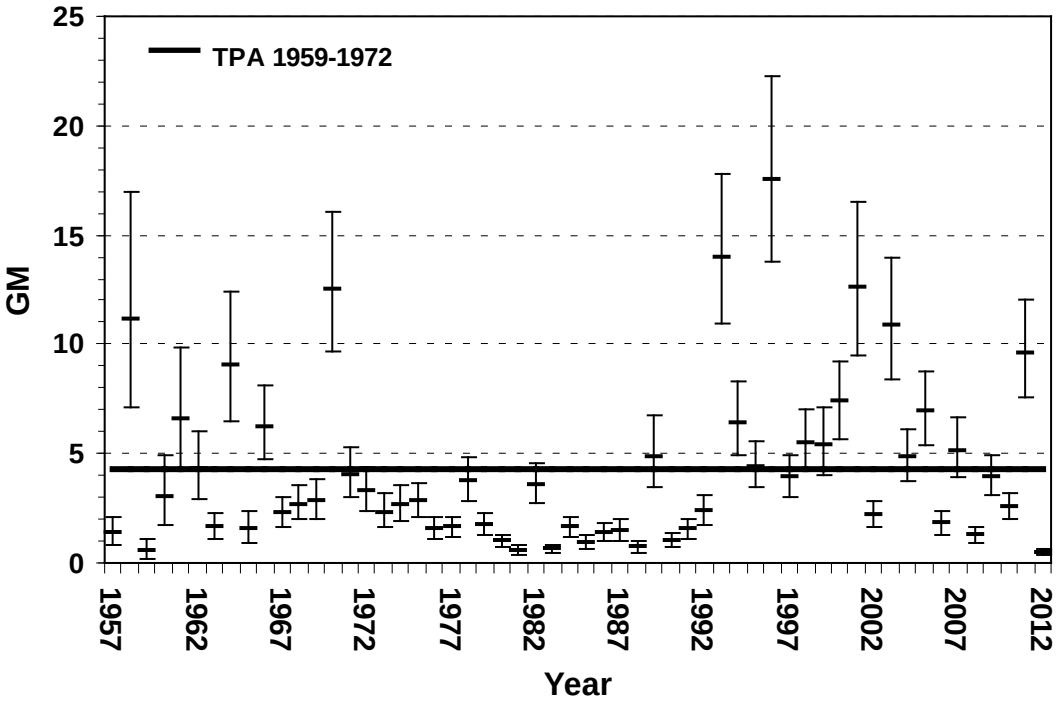


Figure 2. Maryland juvenile striped bass survey geometric mean (GM) catch per haul of age-1 striped bass with 95% confidence intervals (+/- 2 SE).

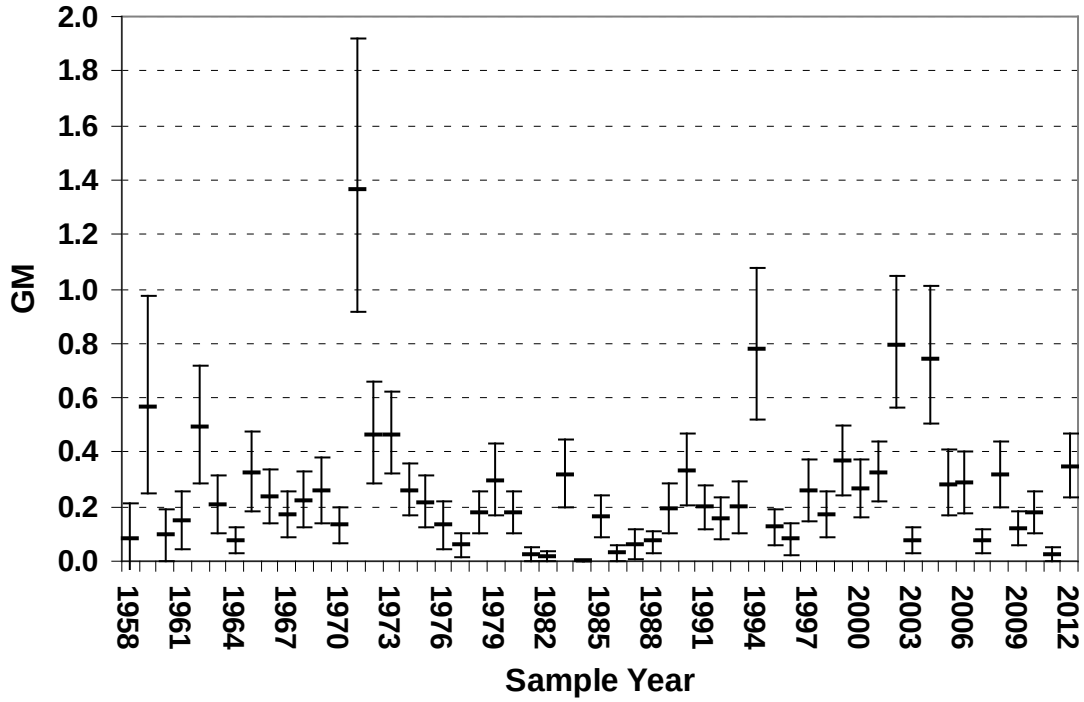
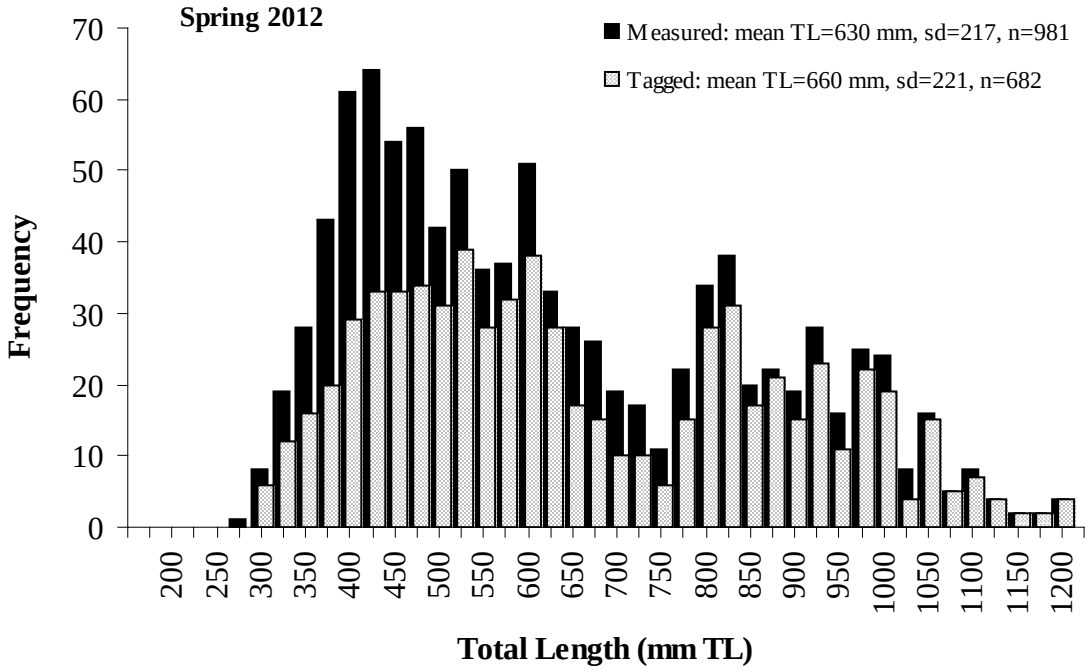


Figure 3. Length frequency of striped bass measured and tagged during the spawning stock survey in the Upper Bay and Potomac River, spring 2012.



Appendix 1.

Estimate of the 2012 Harvest of Spring Coastal Migrant Striped Bass in Chesapeake Bay

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October 24, 2012

This report presents the calculation of the 2012 Maryland spring harvest of coastal migrant striped bass in Chesapeake Bay. The method used to estimate the spring trophy season harvest in Maryland was presented in detail in Jones (2003), Barker and Sharov (2004), and Sharov et al. (2005). Results of the 2012 calculations are summarized in Table 1. The specific steps used in the calculation are as follows:

Estimation of harvest.

- Maryland charter boat logbook reports provided the census values of daily charter boat harvest in numbers of fish (Table 1).
- NOAA Marine Recreational Information Program (MRIP) survey provided estimates of harvest for Maryland private/rental boats for Waves 2 and 3 (Table 1).
- VMRC provided the preliminary estimate of Virginia migratory striped bass harvest.

Harvest apportioned by time.

- The migrant harvest season overlaps parts of both Wave 2 and 3 of the MRIP survey. Length distribution of the harvest is known to change over this time period, so total harvest was apportioned into 2-week intervals between April 21 and June 15.
- All Wave 2 landings occurred in the last 2 weeks of the wave.
- 2-week interval proportions for Wave 3 landings were developed as the proportions of the harvest registered in the Maryland charter boat logbook reports (Table 1).
- Total Maryland striped bass harvest per interval was calculated as charter boat harvest + private/rental harvest (Table 1).

Harvest apportioned by length.

- Data from the MD DNR Charter Boat Volunteer Survey were used to develop the length frequency distribution of the Maryland charter boat catch for each 2-week interval (Table 2). Data from the Charter Boat Volunteer Survey were also used to develop the length frequency distribution for the Maryland private angler catch due to small samples of fish reported in the Volunteer Angler Survey.
- Harvest in each interval was distributed by the length frequency distribution for each 2-week interval.
- The number of migrants harvested in Maryland during the spring trophy season was determined by applying length-specific migration probabilities. These probabilities were derived from the estimate of the number of striped bass tagged on the spawning grounds in Maryland that migrate to the Atlantic coast before December of the first year at large (Dorazio et al. 1994). The result was a migrant and resident harvest estimate for each 2-week interval, distributed among interval-specific length groups (Table 3).
- The total 2012 Maryland spring harvest of coastal migrant striped bass in Chesapeake Bay was calculated as the sum of migrants over all length groups and 2-week intervals from both sectors (charter and private).
- The preliminary estimate of the migrant harvest for Virginia's portion of Chesapeake Bay was provided by VMRC, based on mandatory reporting by recreational anglers and charter boat captains.

Results and Discussion

The estimate of the 2012 Chesapeake Bay spring migrant harvest is 16,846 fish, a 52% decrease compared to 2011 and below the 2006-2012 average (Table 4). The Maryland portion of the Chesapeake Bay migrant harvest is 16,769 migrants (Table 1). The Maryland charter boat migrant harvest is 7,454 fish. The Maryland private boat migrant harvest is 9,315 fish. The VMRC preliminary estimate of the spring 2012 migrant harvest in Virginia is 77 fish. Spring migrant harvest by length group is similar in each year from 2008 to 2012 (Figure 1).

The decrease in migratory striped bass harvest relative to 2011 occurred in both the charter and private sector. The MRIP estimate of waves 2 and 3 private boat trips in 2012 was higher than 2011, but the waves 2 and 3 harvest estimate decreased, indicating a decrease in private angler success (Figure 2 and 3). The MD DNR Creel Survey also documented a similar decrease in angler success (Figure 4). The MRIP estimates of charter boat trips and harvest decreased compared to previous years (Figure 2 and 3). MD DNR charter boat logbooks documented a decrease in 2012 charter trips (2,653 trips) compared to 2011 (3,552 trips) of approximately 25%.

References

Barker, L. S., A. Sharov. 2004. Estimate of the 2004 Harvest and 2005 Quota for Spring Coastal Migrant Striped Bass in Chesapeake Bay.

Dorazio, R. M., K. A. Hattala, C. B. McCollough and J. E. Skjeveland. 1994. Tag recovery estimates of migration of striped bass from spawning areas of Chesapeake Bay. Transactions of the American Fisheries Society 123: 150-163.

Jones, P. 2003. Estimates of the harvest of coastal migrant striped bass in Chesapeake Bay in the spring of 2003. Report to the ASMFC Striped Bass Technical Committee, November 2003.

Sharov, A., L. S. Barker, and L. Warner. 2005. Estimate of the 2005 Harvest and 2006 Quota for Spring Coastal Migrant Striped Bass in Chesapeake Bay. Maryland Department of Natural Resources, Annapolis MD.

Table 1. 2012 Chesapeake Bay spring striped bass migrant harvest, distributed among 2-week intervals, based on data from Maryland charter boat log book reports, MRIP Maryland recreational harvest estimate and VMRC reported migrant harvest.* Shaded time intervals outside of the April 21st to June 15th season are shown to demonstrate partitioning of the total harvest.

	Interval	Charter Harvest (% by interval)[1]	MD Charter Harvest[1]	MD Private Harvest[2]	MD Total Harvest	MD Charter Migrants	MD Private Migrants	MD Total Migrants	VA Migrants[3]	Bay Total Migrants
Wave 2	Apr 1-20	0	0	0	0	0	0	0		
	Apr 21-30	100	5,800	5,209	11,009	4,367	3,922	8,288		
Wave 3	May 1-15	18	3,562	6,216	9,778	2,335	4,075	6,410		
	May 16-31	28	5,500	9,669	15,169	610	1,073	1,683		
	June 1-15	25	4,978	8,633	13,611	142	246	388		
	June 16-30	29	5,867	10,014	15,881					
	Wave 3 total	*100*	*19,907*	*34,531*	*54,438*					
Season total			19,840	29,726	49,566	7,454	9,315	**16,769**	**77**	**16,846**

* – Numbers may not sum due to rounding
1 – Data from MD DNR charter logbooks (9/18/12)
2 – Data from MRIP (retrieved from NOAA NMFS website 9/18/12)
3 – Data from VMRC (Joe Grist, VMRC, Pers. Comm. 9/18/12)

Table 2. Length distribution of the 2012 Maryland striped bass spring season harvest as voluntarily reported by charter boat captains, by 2-week intervals between April 21 and June 15. Shaded areas represent no-take size groups.

Length Group	April 21-30	May 1-15	May 16-31	June 1-15	Total
17	0	0	2	0	2
18	0	0	43	65	108
19	0	0	53	103	156
20	0	0	64	94	158
21	0	0	66	80	146
22	0	0	44	70	114
23	0	0	55	47	102
24	0	0	70	53	123
25	0	0	44	33	77
26	0	0	55	29	84
27	0	0	40	17	57
28	27	31	18	11	87
29	56	57	15	7	135
30	79	64	18	6	167
31	94	79	15	3	191
32	165	99	16	3	283
33	168	104	11	2	285
34	226	120	15	1	362
35	260	89	12	0	361
36	271	108	7	2	388
37	205	59	3	0	267
38	194	65	2	0	261
39	127	30	0	0	157
40	62	22	1	0	85
41	41	6	0	0	47
42	23	7	0	0	30
43	14	5	0	0	19
44	12	0	0	0	12
45	2	4	0	0	6
46	1	0	0	0	1
47	3	0	0	0	3
48	3	1	0	0	4
49	0	0	0	0	0
50	0	0	0	0	0
51	0	0	0	0	0
52	0	0	0	0	0
53	0	0	0	0	0
54	0	0	0	0	0
55	0	0	0	0	0
56	0	0	0	0	0
n	**2,033**	**950**	**669**	**626**	**4,278**

Table 3. 2012 Maryland spring striped bass migrant harvest, distributed among 1 inch length groups (length as total length).*

Length Group	Apr 21-30			May 1-15		
	Charter	Private	Total	Charter	Private	Total
17	0	0	0	0	0	0
18	0	0	0	0	0	0
19	0	0	0	0	0	0
20	0	0	0	0	0	0
21	0	0	0	0	0	0
22	0	0	0	0	0	0
23	0	0	0	0	0	0
24	0	0	0	0	0	0
25	0	0	0	0	0	0
26	0	0	0	0	0	0
27	0	0	0	0	0	0
28	10	9	19	15	26	41
29	31	28	59	41	72	113
30	63	57	120	67	117	184
31	104	93	197	115	200	315
32	238	214	452	188	328	516
33	299	269	568	244	425	669
34	471	423	893	328	573	902
35	604	543	1,147	272	474	746
36	678	609	1,287	355	620	975
37	538	484	1,022	204	355	559
38	526	472	998	231	404	635
39	351	315	666	109	190	299
40	173	156	329	81	141	222
41	116	104	219	22	39	61
42	65	58	124	26	45	71
43	40	36	75	19	33	51
44	34	31	65	0	0	0
45	6	5	11	15	26	41
46	3	3	5	0	0	0
47	9	8	16	0	0	0
48	9	8	16	4	7	10
49	0	0	0	0	0	0
50	0	0	0	0	0	0
51	0	0	0	0	0	0
52	0	0	0	0	0	0
53	0	0	0	0	0	0
54	0	0	0	0	0	0
55	0	0	0	0	0	0
56	0	0	0	0	0	0
n	**4,367**	**3,922**	**8,288**	**2,335**	**4,075**	**6,410**

*Note: numbers may not sum due to rounding.

Table 3. 2012 Maryland spring striped bass migrant harvest, distributed among 1 inch length groups (length as total length).* Continued.

Length Group	May 16-31			June 1-15		
	Charter	Private	Total	Charter	Private	Total
17	0	0	0	0	0	0
18	0	0	0	0	0	0
19	0	0	0	0	0	0
20	2	3	4	2	4	6
21	3	5	7	3	5	9
22	3	5	8	4	8	12
23	6	10	16	5	8	13
24	12	21	33	9	15	24
25	12	21	33	9	15	24
26	24	42	66	12	21	33
27	27	48	75	11	19	31
28	19	33	52	11	19	31
29	24	42	66	11	19	29
30	41	73	114	13	23	36
31	48	84	132	9	16	25
32	67	117	184	12	21	33
33	56	99	156	10	17	27
34	90	158	248	6	10	16
35	80	141	222	0	0	0
36	50	89	139	14	24	38
37	23	40	63	0	0	0
38	16	27	43	0	0	0
39	0	0	0	0	0	0
40	8	14	22	0	0	0
41	0	0	0	0	0	0
42	0	0	0	0	0	0
43	0	0	0	0	0	0
44	0	0	0	0	0	0
45	0	0	0	0	0	0
46	0	0	0	0	0	0
47	0	0	0	0	0	0
48	0	0	0	0	0	0
49	0	0	0	0	0	0
50	0	0	0	0	0	0
51	0	0	0	0	0	0
52	0	0	0	0	0	0
53	0	0	0	0	0	0
54	0	0	0	0	0	0
55	0	0	0	0	0	0
56	0	0	0	0	0	0
n	**610**	**1,073**	**1,683**	**142**	**246**	**388**

*****Note: numbers may not sum due to rounding.

Table 4. Harvest of migrant striped bass in the spring fishery from 1992-2012 (Individual estimates not available for all sectors prior to 2006). Average was only calculated for 2006-2012 due to techniques used to calculate migrant harvest.

Year	MD Charter Migrant Harvest	MD Private Migrant Harvest	VA Migrant Harvest	Total Migrant Harvest
1992				1,013
1993				2,719
1994				3,672
1995				42,634
1996				11,613
1997				21,222
1998				10,021
1999				17,051
2000				26,748
2001				25,728
2002				14,839
2003	43,248		242	43,900
2004	31,218		186	31,404
2005	64,345		1,319	65,664
2006	15,570	47,878	4,323	67,771
2007	9,359	26,229	740	36,328
2008	13,106	22,785	275	36,166
2009	12,740	77,799	243	90,782
2010	12,504	7,261	82	19,847
2011	12,566	22,616	145	35,327
2012	7,454	9,315	77	16,846
Avg (2006-12)	**11,900**	**30,555**	**841**	**43,295**

Figure 1. Comparison of Maryland's 2008 through 2012 spring striped bass migrant harvests, apportioned by length.

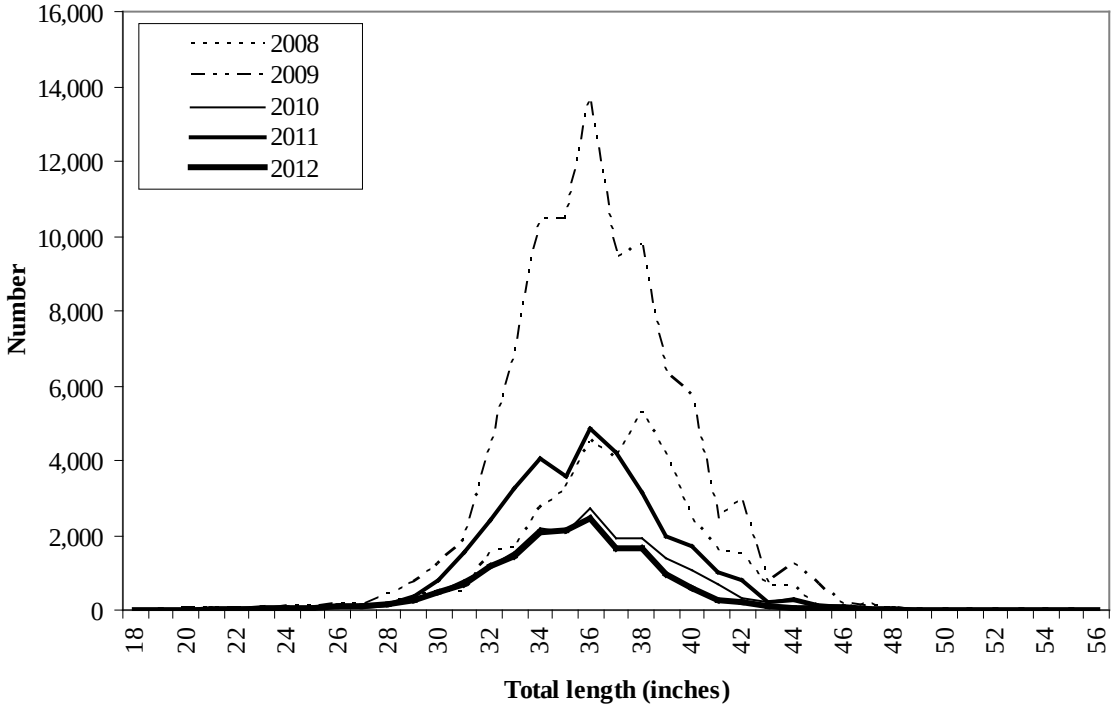


Figure 2. Total number of trips in Maryland's portion of Chesapeake Bay, Waves 2 and 3, from 1992 to 2012 for for-hire and private/rental boats according to MRFSS/MRIP data.

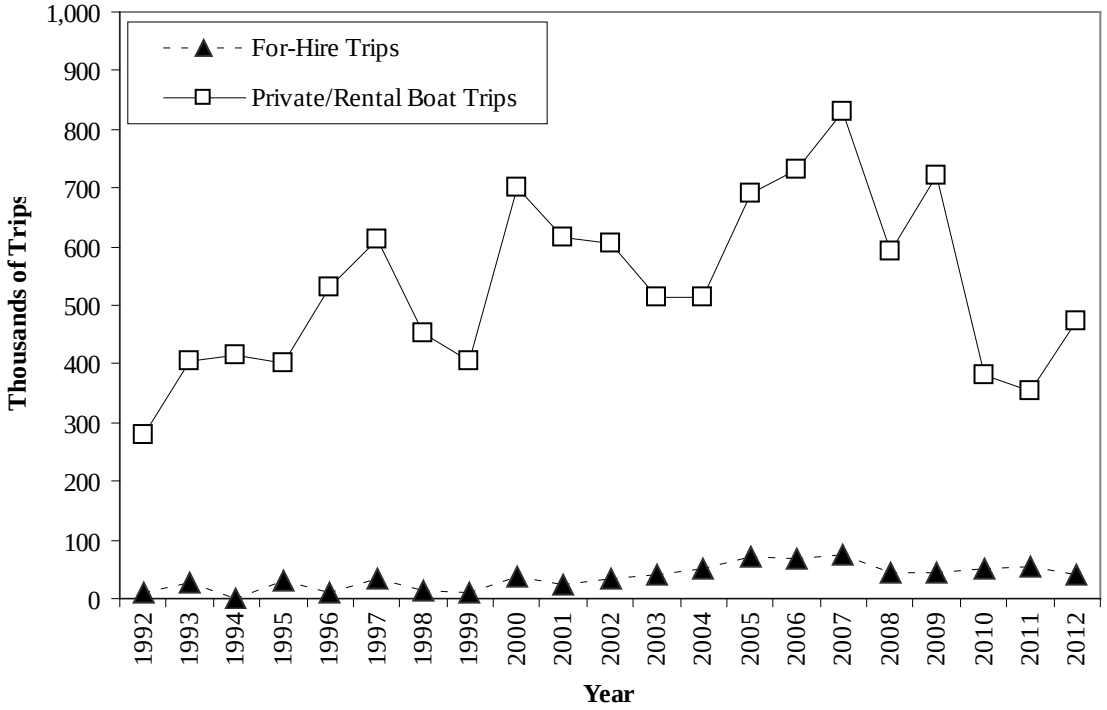


Figure 3. Harvest of striped bass in Maryland's portion of Chesapeake Bay, Waves 2 and 3, from 1992 to 2012 for for-hire and private/rental boats according to MRFSS/MRIP data. Data includes migrant and resident striped bass.

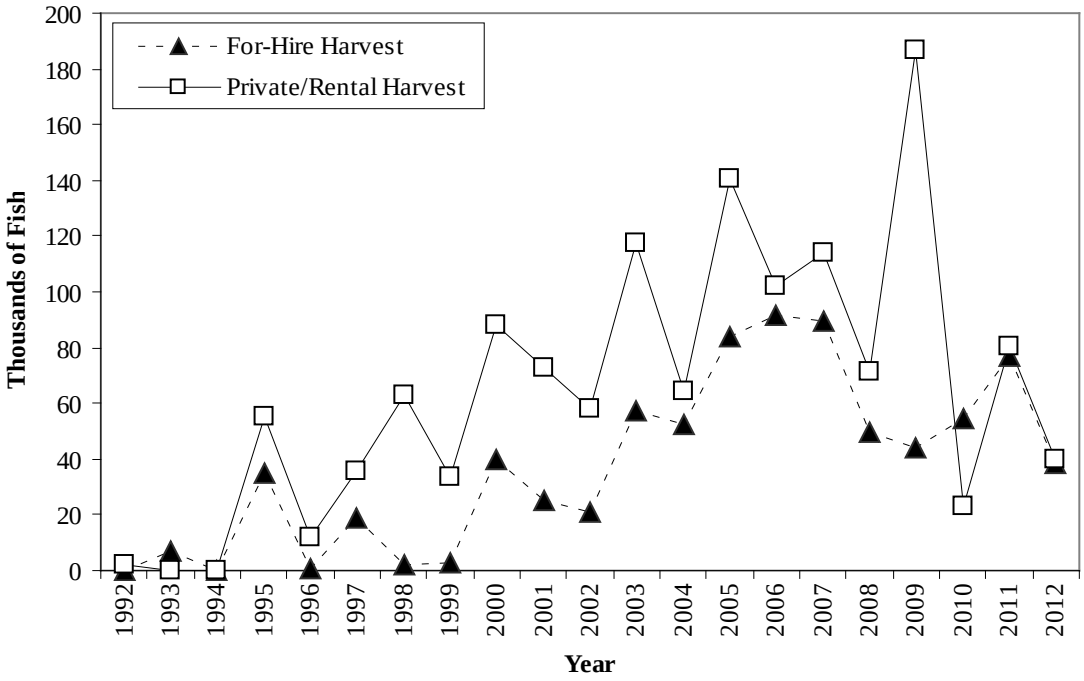
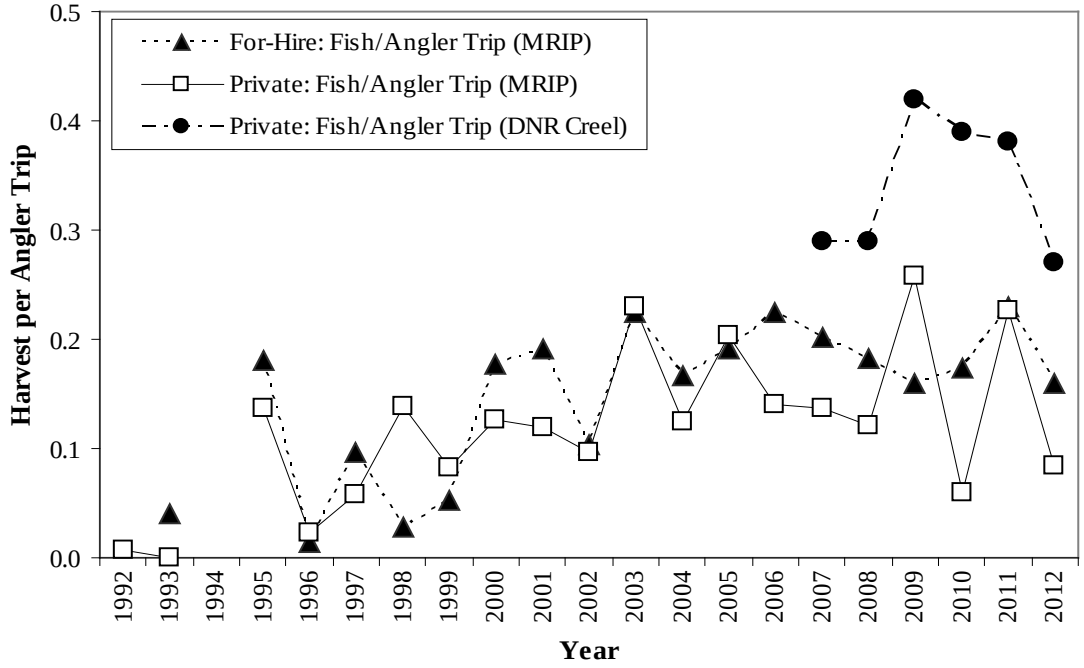


Figure 4. Harvest per angler trip of striped bass in Maryland's portion of Chesapeake Bay, Waves 2 and 3, from 1992 to 2012 for for-hire and private/rental boats according to the MRFSS/MRIP data and private boats from the DNR Creel Survey (2007-2012). Data includes migrant and resident striped bass.



Fisheries Research Branch

I. Introduction

The ASMFC's efforts in enhancing the fishery stocks of this species along the Atlantic Coast have proven successful. The Fisheries and Wildlife Division of the District of Columbia has always supported the actions of the commission and followed all Amendments to the Interstate Fishery Management Plan for Atlantic striped bass. The striped bass population in District waters can be observed all year, but is most abundant from March through June during the spawning migration. Efforts to monitor the striped bass population include a monthly electrofishing survey and seasonal seining surveys. Additional electrofishing is conducted each spring in an effort to tag migrating striped bass.

II. Request for de minimis, where applicable.

Not applicable.

III. Previous calendar year's fishery and management program.

A. Fishery Dependant Monitoring Programs

i. Commercial Fishery

There is no commercial fishery in the District of Columbia.

ii. Recreational Fishery

(1.) Characterization of Recreational Fishery

- The recreational regulations for the 2012 fishing season for striped bass were as follows: Hook and Line fishing season was open from May 16th through December 31st with anglers permitted a creel of two fish per day, measuring at least 18" of which only one may exceed 28". The 2012 fishing regulations are displayed in Table 7 along with previous regulations.

(2.) Characterization of directed harvest

(a) Landings and method of estimation:

- The Fisheries Research Branch currently has no method of accumulating recreational catch data for the directed harvest of striped bass.

(b) Catch Composition

- The directed recreational fishery for striped bass consists primarily of shoreline anglers with a small number of boat based anglers. The prime period for the directed harvest in the District of Columbia is during May and June, with a smaller directed harvest from September through mid-November. In the past the District's overall recreational fishery had

been characterized by a random stratified angler creel survey during the months of May through November. The survey was suspended during the 2006 season due to a lack of personnel and has not been conducted since then.

(c) Estimation of effort (where available)
- No data is available for this section

iii. Other Losses (Poaching, Hook & Release Mortality, Bycatch, etc.)
- No data is available for this section

iv. Total Harvest & Losses
- No data is available for this section

B. Fishery Independent Monitoring Programs

- As part of the annual biological survey of the fishery resources of the District of Columbia, efforts were made to collect striped bass to determine relative abundance of adults and juveniles. Both life stages were collected during our electrofishing and seining surveys for abundance estimates, and juveniles collected during our seining surveys were used to calculate the YOY indices. The electrofishing survey was conducted monthly at eight sites, between the months of March and November, and four alternate electrofishing sites were sampled in May, July, September and November in the Potomac and Anacostia Rivers. The seining survey was conducted twice monthly at six sites from June to October. Specimens collected during these surveys were measured and weighed, then released. These surveys will continue in 2013.

i. Results

(1) Juvenile indices

- YOY indices calculated for striped bass during our standard seining surveys are presented in Table 1. Table 2 presents the arithmetic and geometric means of YOY indices broken down by river for the years 1992 through 2012. Table 3 presents the YOY and adult catch, by month, for our electrofishing and seining surveys. Table 4 presents a comparison of the geometric YOY indices for the District versus the Maryland indices for several river systems and the bay.

(2) Spawning stock assessment

- Due to the short period of time, large spawning adults are in the District, we electrofish the Potomac in the spring in an attempt to document the abundance and size of visiting spawning fish. In 2012 we had 7 special tagging outings between March 15th and April 26th.

(a) Length frequency

- Figure 1 shows a length frequency of all striped bass collected from all surveys in 2012. An average length form scale aged striped bass is displayed in Figure 2.

(b) Age frequency

- Figures 1 and 2 present the length at age frequency data for striped bass captured in 2012. Figure 1 includes all 163 striped bass sampled in 2012.

(c) Sex

- In 2012 we did not determine the sex of any of the striped bass sampled.

(3) Stock characterization

(a) Length frequency

- The striped bass stock in the District is primarily characterized through our seining and electrofishing surveys which were conducted monthly, from March through November, during 2012. These surveys provide us with the data needed to produce our young-of-year indices as well as our relative abundance estimates.

(b) Age frequency

- As noted above, Figures 1 and 2 presents our age data for 2012.

(c) Sex

- Not Available.

(d) Catch per unit effort

- Our standard monthly electrofishing survey provides us with monthly relative abundance data. This data, for the years 2000 through 2012 is presented in Table 5. This data is based on the average catch over two, 10 minute shocking runs at each site sampled.

(4) Tagging

(a) Number of fish tagged

- The Fisheries Research Branch tags striped bass throughout the year during our surveys. In 2012 we tagged 34 fish with US Fish and Wildlife Service tags. All data was submitted to FWS.

(5) Research Removals

- DC Fisheries recorded no research removals in 2012.

IV. Planned management programs for the current calendar year.

A. Summarize regulations which will be in effect.

- The Fisheries Research Branch will continue to mirror the striped bass regulations that are presented by neighboring jurisdictions (PRFC). The regulations for 2013 are as follows: Open Hook and Line season for striped bass from May 16th through December 31st. A creel limit of two fish a day with an 18" minimum size and only one striped bass over 28".

B. Summarize monitoring programs that will be performed.

- Seining surveys and electrofishing surveys will continue in 2013 as a means of monitoring YOY populations and reproductive success in the waters of the District of Columbia. Special electrofishing events targeting large migratory striped bass will also continue with the purpose of tagging harvestable fish that are found only briefly in this jurisdiction.

C. Highlight any changes from the previous year.

- The seining survey was modified in 2010 from a once a month sampling event over a nine month span, to a bimonthly event that focused on the time when YOY may actually be observed in District waters. The survey began in June and was performed bimonthly through October. The number of sampling events remained the same, but the effort was concentrated on the time of year when YOY were actually present.

Table 1
Young-of-Year Index for Striped Bass
(Seining)
(2012)

DATES	Site						YOY Totals
	A1	A2	P1	P2	P3	P4	
6/12/2012	2	0	0	0	0	0	2
6/28/2012	13	5	0	2	5	0	25
7/10/2012	4	6	0	5	0	1	16
7/26/2012	12	2	0	1	0	2	17
8/9/2012	0	0	0	0	0	0	0
8/23/2012	2	1	0	0	0	0	3
9/7/2012	0	1	0	1	0	0	2
9/24/2012	0	0	0	0	0	0	0
10/10/2012	0	0	0	0	0	0	0
YOY Totals	**33**	**15**	**0**	**9**	**5**	**3**	**65**
Index[1]	**3.67**	**1.67**	**0.00**	**1.00**	**0.56**	**0.33**	**1.20**
Index[2]	**6.60**	**3.00**	**0.00**	**2.25**	**5.00**	**1.50**	**3.82**

Total YOY collected= 65
YOY Index[1] (with all sites combined) = 1.20
YOY Index[2] (with only those sites where YOY were actually collected) = 3.82
Anacostia YOY Index[2] = 4.80
Potomac YOY Index[2] = 2.43

Table 2
Arithmetic and Geometric Means of YOY Striped Bass
From the Potomac and Anacostia Rivers in the District of Columbia
(Seining Survey 1992-2012)

Years	YOY Index'		Geometric Mean
	Potomac	Anacostia	
1992	1	2	1.41
1993	5.8	60.4	18.72
1994	9.5	4	6.16
1995	1.33	16.67	4.71
1996	1.5	5.75	2.94
1997	22.86	12.8	17.11
1998	3.33	9.25	5.55
1999	16.25	6.6	10.36
2000	0.25	6	2.45
2001	3	42	11.22
2002	0	9	3
2003	1.89	4.5	2.92
2004	1.86	17.5	5.7
2005	3.4	6.67	4.76
2006	4	15	7.75
2007	1.5	2.5	1.94
2008	0	1	1
2009	1.1	13.7	3.88
2010	4.42	6.67	5.43
2011	20	8.17	12.78
2012	2.43	4.80	3.42
Average	**5.02**	**12.14**	**6.09**

YOY Index[2] = Calculated from only those sites where YOY were actually collected

Table 3
Young of the Year and Adults Captured by
Seining and Electrofishing - (2012)

Months	Seining			Electrofishing			Total
	YOY	Adults	Total	YOY	Adults	Total	Seining & Electrofishing
Mar	*	*	*	0	0	0	**0**
Apr	*	*	*	0	0	0	**0**
May	*	*	*	0	9	9	**9**
Jun	27	0	27	0	14	14	**41**
Jul	33	0	33	0	6	6	**39**
Aug	3	0	3	0	4	4	**7**
Sep	2	0	2	0	1	1	**3**
Oct	*	*	*	0	3	3	**3**
Nov	*	*	*	0	0	0	**0**
Dec	*	*	*	*	*	*	*****
TOTAL	**65**	**0**	**65**	**0**	**37**	**37**	**102**

(*) – No sample taken

Table 4
Maryland striped bass juvenile Indices (1992-2012)
Geometric mean of catch-per-haul
Compared with that of District of Columbia

Year	Head of Bay	Potomac River	Choptank River	Nanticoke River	Bay-wide	D.C.
1992	0.87	6	2.07	1.72	2.34	**1.41**
1993	15	15.96	27.87	4.9	13.97	**18.72**
1994	12.88	2.01	7.71	9.06	6.4	**6.16**
1995	2.85	4.47	9.96	3.76	4.41	**4.71**
1996	14.92	13.45	33.29	18.8	17.46	**2.94**
1997	6.15	3.67	3.95	1.74	3.91	**17.11**
1998	4.32	4.42	21.1	2.74	5.5	**5.55**
1999	1.91	5.84	20.01	5.52	5.34	**10.36**
2000	8.84	3.52	12.53	10.86	7.42	**2.45**
2001	7.15	5.01	86.71	20.31	12.57	**11.22**
2002	1.35	3.95	0.38	4.89	2.2	**3**
2003	11.89	12.81	20.56	3.25	10.83	**2.92**
2004	4.17	2.36	9.52	9.65	4.85	**5.7**
2005	8.48	7.92	16.81	1.07	6.91	**4.76**
2006	0.95	2.42	2.81	1.65	1.78	**7.75**
2007	8.21	2.2	7.87	5.41	5.12	**1.94**
2008	2.33	1.4	0.34	0.73	1.26	**1**
2009	2.85	3.75	6.61	4.18	3.92	**3.88**
2010	2.9	2.17	2.23	2.96	2.54	**5.43**
2011	5.79	7.18	26.14	12.99	9.57	**12.78**
2012	0.44	0.95	0.08	0.37	0.49	**3.42**
Average	**5.92**	**5.31**	**15.17**	**6.03**	**6.13**	**6.49**

Table 5
Electrofishing Relative Abundance of Striped Bass
2000 – 2012

Lower Anacostia River (A1E)													
Month	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Feb	NST	NST	NST	NST	NST	NST	NST	NST	NST	NST	NST	NST	NST
March	6.5	-	4	1	NST	-	-	-	-	0	1	0	0
April	22	NST	3	7	NST	6	1.5	-	1	3	8	1	0
May	4	0.5	8	1.5	2.5	4.5	3.5	5.5	1.5	0	2	0	0
June	1	5	-	3.5	1	0.5	0.5	-	4.5	0.5	0	1	0
July	3	0.5	-	0.5	0.5	2	2	2	-	0	0.5	1	0
Aug	1.5	2.5	1.5	0.5	1.5	1.5	0.5	-	2	0.5	0	0	0
Sep	1	0.5	2	-	-	4.5	-	-	0.5	0	0	0	0
Oct	3	-	1	0.5	1.5	1	NST	0.5	8	0.5	0.5	1.5	0
Nov	3.5	28	1	10	13	9	3	1	0.5	0.5	0	0	1
Dec	NST	9.5	NST	16.5	NST	NST	1.5	NST	NST	NST	NST	NST	NST
Year Avg	5.06	5.17	2.28	4.1	2.86	3.22	1.39	1	2	0.56	1.33	0.50	0.11

Upper Anacostia (A2E)													
Month	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Feb	NST	NST	NST	NST	NST	NST	NST	NST	NST	NST	NST	NST	NST
March	-	-	-	-	NST	-	-	-	-	0	0	0	0
April	-	NST	0.5	-	NST	1	0.5	0.5	-	0.5	1	0.5	0
May	-	1.5	0.5	0.5	-	-	-	0.5	2.5	2	0	1	0
June	0.5	-	-	1	2	-	-	0.5	-	0	0	0	0
July	1	0.5	1	-	0.5	-	-	-	-	0	0	0	0
Aug	-	-	-	-	-	0.5	-	-	0.5	0	0	0	0
Sep	-	-	-	-	0.5	-	-	-	-	0	0	0	0
Oct	-	0.5	-	-	1	-	NST	-	0.5	0	0.5	0	0
Nov	0.5	1	-	0.5	1	-	-	0.5	-	0	0	0	0
Dec	NST	0.5	NST	-	NST	NST	NST	NST	NST	NST	NST	NST	NST
Year Avg	0.22	0.44	0.22	0.2	0.71	0.17	0.06	0.22	0.39	0.28	0.17	0.17	0

NST = No Sample Taken

Table 5
Electrofishing Relative Abundance of Striped Bass
2000 – 2012

Washington Channel (W1E)													
Month	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Feb	NST	NST	NST	NST	NST	NST	NST	NST	NST	NST	NST	NST	NST
March	7	-	2.5	-	NST	28	3.5	-	1	0	0	0	0
April	39	NST	4.5	17.5	NST	2	6	-	0.5	15	8	11.5	5.5
May	6	3.5	4	9.5	0.5	6	6	0.5	3	4.5	11	1.5	0.5
June	22.5	18.5	3.5	0.5	1.5	0.5	1.5	-	-	1.5	0	0.5	0
July	9	21.5	6.5	21	-	10	4.5	2.5	-	1.5	2.5	0	0
Aug	4.5	3	3.5	4	37.5	9	0.5	-	3.5	0.5	0	0.5	0
Sep	3.5	4.5	24	2	18.5	10	1	-	-	0	0	0	0
Oct	28.5	8.5	4.5	2	5	3.5	NST	-	0.5	0	1	0	0
Nov	20	28.5	12	8	38	3.5	12.5	-	6.5	0.5	0.5	3.5	6
Dec	NST	16.5	NST	9.5	NST	NST	13.5	NST	NST	NST	NST	NST	NST
Year Avg	15.56	11.61	10.72	7.4	14.43	8.83	5.44	0.33	1.67	2.61	2.56	1.94	1.33

Lower Potomac River (P1E)													
Month	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Feb	NST	NST	NST	NST	NST	NST	NST	NST	NST	NST	NST	NST	NST
March	1.5	0.5	-	-	NST	1.5	1.5	-	-	0	0	0.5	0
April	18	NST	10	14.5	NST	3.5	5.5	-	1	0	1	3	0
May	18	4	3	3.5	12	3	NST	-	3	2	4.5	0.5	3.5
June	15.5	3	1.5	6	3	0.5	0.5	-	-	0	0	1.5	1
July	3	2	1.5	2	-	-	-	0.5	-	1	0	0	0
Aug	3.5	11	8	4	1.5	-	-	-	0.5	0	0.5	0	0.5
Sep	15.5	6	4.5	1	0.5	-	-	0.5	-	0	0	0	0
Oct	26.5	6	7.5	1.5	-	-	NST	-	-	1	0	0.5	3.5
Nov	22.5	12	11	3.5	-	1	1.5	1	-	0	0	0.5	2.5
Dec	NST	2	NST	-	NST	NST	-	NST	NST	NST	NST	NST	NST
Year Avg	13.78	5.17	5.22	3.6	2.43	1.06	1.13	0.22	0.5	0.44	0.67	0.72	1.22

NST = No Sample Taken

Table 5
Electrofishing Relative Abundance of Striped Bass
2000 – 2012

Middle Potomac River – National Airport (P2E)													
Month	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Feb	NST	NST	NST	NST	NST	NST	NST	NST	NST	NST	NST	NST	NST
March	12	-	3	4.5	NST	0.5	1	-	-	0.5	0	0	0
April	28	NST	12	3	NST	-	-	-	0.5	0	0	0	0
May	41.5	8	2.5	1	0.5	0.5	-	-	0.5	0	0	0.5	0.5
June	3.5	2	19.5	11	3	0.5	8.5	-	-	0	0	0	0
July	11.5	1	5.5	0.5	-	0.5	-	1	-	0.5	0	0	0
Aug	17	2.5	0.5	0.5	6	4	-	0.5	-	0	0	0	0
Sep	3.5	0.5	8	1	-	1	0.5	-	-	0.5	0	0	0
Oct	2.5	3	-	0.5	-	0.5	NST	-	1	0	0	0	0
Nov	10.5	25.5	16.5	0.5	-	2.5	0.5	4.5	1.5	0	0	0	0
Dec	NST	58	NST	-	NST	NST	0.5	NST	NST	NST	NST	NST	NST
Year Avg	14.44	11.17	7.5	2.25	1.36	1.11	1.22	0.67	0.39	0.17	0.00	0.06	0.06

Middle Potomac River – Roosevelt Island (P3E)													
Month	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Feb	NST	NST	NST	NST	NST	NST	NST	NST	NST	NST	NST	NST	NST
March	2	0.5	-	1	NST	1	2	-	0.5	0	0	0	0
April	10	NST	12.5	3	NST	4.5	7	0.5	-	0	1	1.5	0.5
May	23.5	8	11.5	4.5	7	2	1	5	6	1.5	2.5	0.5	1.5
June	9	9.5	6	6.5	5	2	-	-	0.5	1.5	0.5	0.5	2.5
July	18	10	6.5	5.5	2	0.5	2	6	7.5	6	3	0	2.5
Aug	11.5	17	14	10	2	1	1.5	4.5	12.5	5	0.5	1	6
Sep	1\NST	5.5	28	6.5	2.5	6.5	10.5	1	13.5	9	2.5	0	6
Oct	1\NST	3.5	19.5	3.5	1	4.5	NST	6	23.5	9.5	0	4.5	4
Nov	27	19.5	19	11.5	3	6	2.5	18.5	21	9.5	4.5	3	11.5
Dec	NST	26.5	NST	7.5	NST	NST	11.5	NST	NST	NST	NST	NST	NST
Year Avg	12.63	11.11	13	5.95	3.21	3.11	4.22	5.19	9.44	4.67	1.61	1.22	3.83

NST = No Sample Taken

Table 5
Electrofishing Relative Abundance of Striped Bass
2000 – 2012

Lower Rock Creek (P3AE)													
Month	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Feb	NST	NST	NST	NST	NST	NST	NST	NST	NST	NST	NST	NST	NST
March	3.5	0.5	0	1.5	NST	2	4.5	-	-	0.5	0	0	0
April	21.5	NST	9	5	NST	8.5	3	-	-	0	0	0.5	0
May	18.5	3.5	18.5	8.5	1	2	2.5	1.5	1.5	1.5	1.5	1	0
June	2.5	3	4	1	4	4.5	-	-	-	0	1	0	1
July	-	-	2.5	0.5	1	2	-	1	-	0	0	1	0.5
Aug	0.5	1	1.5	0.5	1.5	0.5	1	-	-	0.5	0	0	0.5
Sep	-	0.5	2.5	-	0.5	2	-	0.5	0.5	0	0.5	0.5	0
Oct	3.5	0.5	3	-	1.5	2.5	NST	-	1	2	0	0.5	0
Nov	2.5	6	7	5	14.5	1.5	3.5	4.5	1.5	1	0	0.5	0
Dec	NST	8	NST	-	NST	NST	4	NST	NST	NST	NST	NST	NST
Year Avg	5.83	2.56	5.33	2.2	3.43	2.83	2.06	0.83	0.5	0.61	0.33	0.44	0.22

Upper Potomac River (P4E)													
Month	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Feb	NST	NST	NST	NST	NST	NST	NST	NST	NST	NST	NST	NST	NST
March	0.5	-	-	10.5	NST	-	-	-	-	1	0	0	0
April	10.5	NST	2	1	NST	1.5	-	-	0.5	0.5	0.5	0.5	0
May	4	4.5	2	2.5	3	0.5	0.5	0.5	1	0.5	0	1.5	0.5
June	-	2	1	1.5	4	-	-	-	-	0	0	0	0.5
July	-	0.5	-	1	0.5	-	-	-	-	0	0	0	0
Aug	-	3	0.5	2.5	-	-	-	-	-	0	0	0	3
Sep	-	2	3.5	0.5	0.5	0.5	-	0.5	0.5	0	0	0	0
Oct	7	1	2	0.5	-	0.5	NST	2	1	0	1	0	0.5
Nov	3	11	6.5	-	2	0.5	1	1	1.5	0.5	3	1.5	0
Dec	NST	5	NST	0.5	NST	NST	-	NST	NST	NST	NST	NST	NST
Year Avg	2.78	3.22	1.94	2.05	1.43	0.39	0.17	0.44	0.5	0.28	0.50	0.39	0.5
Overall	**8.79**	**6.31**	**5.78**	**3.47**	**3.73**	**2.59**	**1.96**	**0.99**	**1.92**	**1.20**	**0.90**	**0.68**	**0.91**

NST = No Sample Taken

Table 6
District of Columbia Recreational Fishery Regulations for Striped Bass

YEAR	SIZE LIMIT		DAILY CREEL LIMIT	SEASONAL QUOTA	OPEN SEASON
March 1987 to August 4, 1989	24"		2 Fish	NONE	No restriction
August 1989 to 1991	**MORATORIUM** (IN LINE WITH OTHER ATLANTIC STATES)				
1992	**MIN**	18"	2 fish	NONE	Oct 5 - Nov 16
	MAX	36"			
1993	**MIN**	18"	1 Fish	NONE	Jun 7 - Nov 30
	MAX	36"			
1994	**MIN**	18"	1 fish	NONE	Jun 5 - Nov 19
	MAX	36"			
1995	**MIN**	18"	1 Fish	NONE	Jun 5 - Jul 31 (August closed)
	MAX	36"			
1996	**MIN**	18"	1 Fish	NONE	Jun 3 - Jul 31 (August closed)
	MAX	36"			
1997	**MIN**	18"	1 Fish	NONE	June 3 - Jul 31 (August closed)
	MAX	36"			
1998	**MIN**	18"	1 Fish	NONE	June 3-Jul 31 (August closed)
	MAX	36"			
1999	**MIN**	18"	1 Fish	NONE	June 1-Jul 31 (August closed)
	MAX	36"			
2000	**MIN**	18"	1 Fish	NONE	June 4-Jul 31 (August closed)
	MAX	36"			
2001	**MIN**	18"	1 Fish	NONE	June 4-Jul 31 (August closed)
	MAX	36"			
2002	**MIN**	18"	2 Fish	NONE	May 4 - July 31 (August closed) Sept. 1-Nov. 17
	MAX	36"			
2003-2007	**MIN**	18"	2 Fish	NONE	May 1 – Nov. 19
2008-2012	**MIN**	18"	2 Fish (only one may exceed 28")	NONE	May 16 –Dec. 31

NOTE:
1. Violation of a size limit will not be tolerated.
2. The starting and ending dates of the open season are inclusive.
3. The method of fishing is only hook and line.
4. The recreational catch will not be offered for sale.
5. A D.C. Fishing License is required.
6. These rules are consistent with Atlantic States Marine Fisheries Commission's Management Guidelines.

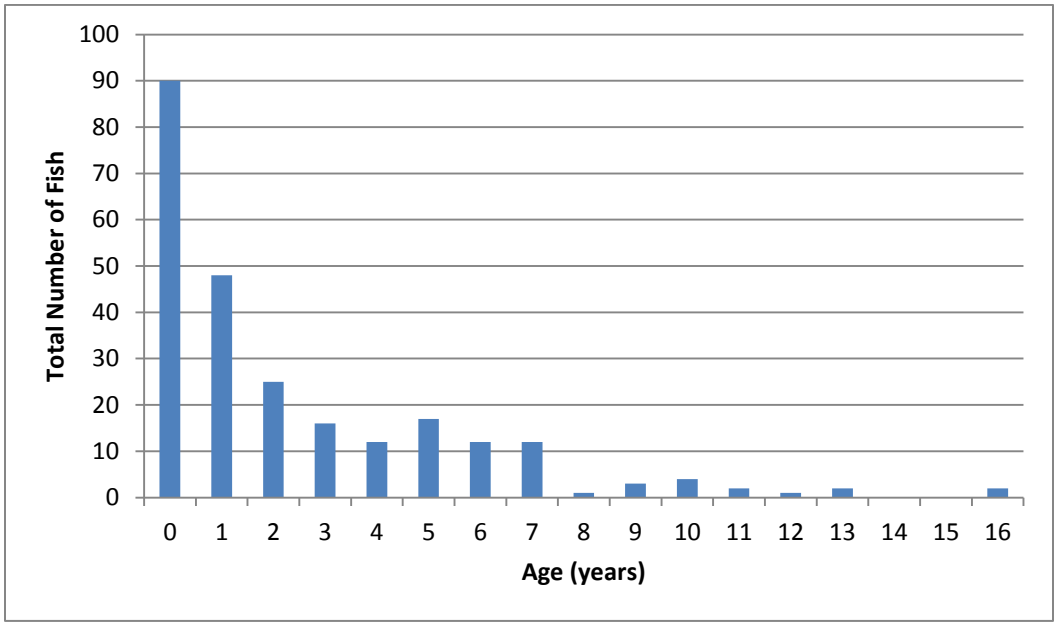


Figure 1 - Length frequency of all striped bass collected in District waters, 2012.

Figure 2 – Average length at age for striped bass from scale age readings, 2012.

MARYLAND - VIRGINIA
"Potomac River Compact of 1958"
Potomac River Fisheries Commission
222 Taylor Street
P.O. BOX 9
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TELEPHONE: (804) 224-7148 · (800) 266-3904 · FAX: (804) 224-2712

Atlantic Striped Bass
2012 Annual State Report
June 1, 2013

I. Introduction

The 2012 Potomac River striped bass fishery operated under the Maryland (DNR)/ Virginia (MRC)/Potomac River Fisheries Commission (PRFC) joint Chesapeake Bay target cap. PRFC's share of the total bay-wide target cap was 1,343,812 pounds, which was then divided among the various user groups of the fishery. The commercial fisheries were further sub-divided by gear type. There were no substantive changes in the regulations from the previous year.

II. Request for *de minimis*, where applicable - N/A

III. Previous calendar year's fishery and management program

A. Fishery Dependent Monitoring Program

i. Commercial fishery

(1) Characterization of fishery

Commercial fisheries in the Potomac continued to operate under the individual fish tagging system and mandatory daily harvest reporting requirements as used in previous years. The commercial fish tagging system requires each striped bass harvested be individually tagged prior to landing. A fixed number of tags – based on the estimated size of fish available, the number of fishermen, and the target cap for each gear type's fishery – were issued to each fisherman prior to the opening of a gear specific season. The commercial gear types used in the Potomac to harvest striped bass include gill net, pound net, commercial hook and line, haul seine, fyke net, fish trot line and fish pot. Each fisherman is required to file detailed daily harvest reports for each gear type used. The different gear types had various seasons from January 1 through March 25, and again between June 1 and December 31. The minimum size limit for all commercial fisheries was 18 inches, with a 36-inch maximum size limit between January 1 and March 25 for all gears.

(2) Characterization of directed harvest

(a) Landings and method of estimation

Striped bass landings in 2012 totaled 733,789 pounds. The estimate is from the PRFC's mandatory commercial daily harvest reporting system. Table 1 includes information on the mean sizes and effort data. Table 2 provides harvest data by month, area, gear and market categories. Figure 1 illustrates the annual commercial harvest.

(b) Catch composition
Samples purchased from fish houses were transported to VIMS where age, length, weight and sex of each fish were obtained. A total of 514 fish, weighing approximately 3,133 pounds were examined. The data shows ten year classes represented in the 2012 fishery and the assessment reveals that about 25 percent were female. Other details of the sampling can be seen in Table 3.

(c) Estimation of effort
Gill net effort is expressed as "yards" of gill net fished, and the commercial hook and line effort is expressed as "hours" fished. The pound net fishery effort is expressed as "net days", which is one pound net fished one time. The term "gear days" is used to express the effort for the miscellaneous gear types. Effort data by gear type is found in Table 1.

ii. Recreational Fishery

(1) Characterization of fishery
The recreational fishery is capped as part of the MD/VA/PRFC Chesapeake Bay target cap. It is further regulated by daily creel limits and fixed season lengths. The recreational season opened the third Saturday of April with a limited 25-day spring season which was further restricted by a minimum size limit of 28" and a single fish creel limit. In addition, only the lower half of the river was open during this spring season. The traditional summer/fall season opened May 16 and ran through December 31 with an 18-inch minimum size limit and a 2-fish creel limit with only one over 28 inches.

The charter boat fishery is capped as part of the MD/VA/PRFC Chesapeake Bay target cap. It is further regulated by daily creel limits and fixed season lengths. The charter boat season opened the third Saturday of April with a limited 25-day spring season which was further restricted by a minimum size limit of 28" and a single fish creel limit. In addition, only the lower half of the river was open during this spring season. The traditional summer/fall season opened May 16 and ran through December 31 with an 18-inch minimum size limit and a 2-fish creel limit with only one over 28 inches.

(2) Characterization of directed harvest
(a) Landings and method of estimation
The PRFC no longer requires the permit system and we buy 'adds-on' to the MRFSS telephone interviews. The estimated landed numbers are included within the MD and VA combined MRFSS estimate for the Chesapeake Bay and its tributaries.

(b) Catch composition
The catch composition data is included within the MD and VA combined MRFSS estimate for the Chesapeake Bay and its tributaries.

(c) Estimation of effort
The estimation of the effort data is included within the MD and VA combined MRFSS estimate for the Chesapeake Bay and its tributaries.

iii. Other losses

(1) Estimate and method of estimation

No Potomac River specific poaching information for striped bass is available; therefore we use the ASMFC mandated fifteen percent of the harvest, or 13,592 fish weighing 110,068 pounds. The mandatory commercial harvest catch reporting system includes information on fish discards. We estimate no losses in discards in the pound net fishery, and no losses of small fish in the gill net fishery. We use the eight percent ASMFC mandated hook and release mortality to calculate the by-catch losses for that segment of the fishery, and an eight percent released mortality for the miscellaneous gear. For 2012 we estimate a loss of 453 fish weighing 3,886 pounds (Table 4).

For the recreational fishery, the number of released fish, and therefore the hook and release mortality estimate must be obtained from the MD and VA combined MRFSS estimate for the Chesapeake Bay and its tributaries.

All charter boat captains operating in the Potomac River must be licensed by PRFC. License list are provided to NMFS so that all PRFC charter boats are monitored through the NMFS “For-Hire” survey. The estimated harvest and losses are included within the Maryland and Virginia Chesapeake Bay and its tributaries data (all Potomac River harvested fish are landed in either MD or VA).

(2) Estimate of composition

Based on the discard information supplied through the commercial mandatory harvest reporting system, 51 percent of the by-catch released were listed as “too small” (i.e. under 18 inches), one percent as “too large” (i.e. over 36 inches), fourteen percent as “no market”, and 34 percent were reported as released during the closed season. No information on size or age of the other discards is available.

The estimated recreational catch composition must be obtained from the MD and VA combined MRFSS estimate for the Chesapeake Bay and its tributaries. No specific age or length frequency data for the charter boat fishery exist.

iv. Total Harvest and Losses

This summary is found in Table 4.

B. Fishery Independent Monitoring Programs

The fishery independent monitoring programs (JI, SSB and Tagging) in the Potomac are performed and reported by Maryland Department of Natural Resources. The 2012 Geometric Mean Index for YOY striped bass in the Potomac River is presented in Figure 2. The 2012 value decreased significantly from the 2011 value. Refer to the MD DNR website for additional information about the juvenile abundance survey: www.dnr.state.md.us/fisheries/juvindex/index.html .

IV. Planned management programs for the current calendar year

A. Summarize regulations that will be in effect

Effective January 1, 2011 – all pound nets in the Potomac River must have at least six PRFC approved fish cull panels properly installed in each pound net to help release undersize fish. These fish cull panels were being used by some pound netters on a voluntary basis prior to 2011. Otherwise, same as listed in harvest and losses for the commercial fishery, charter boat fishery and the recreational fishery.

B. Summarize monitoring programs that will be performed

We will continue sampling the harvest for length, weight, sex and age; and will continue mandatory daily harvest reporting for commercial fisheries.

C. Highlight any changes from the previous year

No substantive regulatory changes.

V. Tables and Figures

List of Tables

Table 1 Commercial Data by Gear Type
Table 2 Commercial Data by Month, Area, Gear and Size
Table 3 Age, Sex, Length, and Weight Data
Table 4 Summary of Harvest and Losses
Table 5 Commercial Harvest by Gear Type (1964 – 2012)

List of Figures

Figure 1 Annual Commercial Harvest
Figure 2 Striped Bass YOY

TABLE 1

Commercial Data by Gear Type
Potomac River - 2012

	Number	Pounds	Mean Per Fish Pounds	Effort Data (Units)
Commercial				
Gill Net	60,492	531,251	8.78	3,728,540 (yds)
Pound Net	24,467	153,970	6.29	1,188 (net days)
Hook and Line	4,975	44,071	8.86	6,028 (hrs.)
Miscellaneous	682	4,497	6.59	283 (gear days)
Sub-Total	90,616	733,789		

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TABLE 2

Commercial Data by Month, Area, Gear and Size
Potomac River – 2012

By Month	Jan.	Feb.	March	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Pounds	72,964	163,879	235,143	29,441	1,649	1,636	2,690	11,251	78,089	137,047	733,789
%	9.94	22.33	32.04	4.01	0.22	0.22	0.37	1.53	10.64	18.68	100
Numbers	10,012	16,567	23,924	4,558	447	423	698	2,278	12,108	19,601	90,616

By Area	Upper	Upper Middle	Lower Middle	Lower	Total
Pounds	1,629	119,396	134,731	478,033	733,789
%	0.22	16.27	18.36	65.15	100

By Gear	Gill Net	Pound Net	Hook and Line	Miscellaneous	Total
Pounds	531,251	153,970	44,071	4,497	733,789
%	72.40	20.98	6.01	0.61	100

By Size	Mixed	18”– 6 lbs	6 lbs & up	Total
Pounds	458,149	50,531	225,109	733,789

Table 3

Striped Bass Age, Length, and Weight
Potomac River - 2012

Year Class	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**Total**
Age	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	
Males											
Number	0	1	3	3	7	20	56	119	150	25	384
% by Year class	0.00%	0.26%	0.78%	0.78%	1.82%	5.21%	14.58%	30.99%	39.06%	6.51%	
Av.Total Length (in)	0.00	31.48	32.80	31.16	28.88	26.72	25.51	24.14	22.56	20.35	
Av. Weight (lbs)	0.00	13.02	13.50	12.04	10.30	8.18	7.30	6.19	4.98	2.97	
Females											
Number	1	3	4	3	2	2	14	39	36	26	130
% by Year class	2.94%	2.31%	3.08%	2.31%	1.54%	1.54%	10.77%	30.00%	27.69%	20.00%	
Av.Total Length (in)	35.88	36.45	35.43	34.91	32.12	30.36	26.61	24.99	22.86	20.31	
Av. Weight (lbs)	18.35	18.04	16.19	17.03	13.12	11.47	7.55	6.48	4.92	2.68	
Sexes Combined											
Number	1	4	7	6	9	22	70	158	186	51	514
% by Year class	0.19%	0.78%	1.36%	1.17%	1.75%	4.28%	13.62%	30.74%	36.19%	9.92%	
Av Total Length (in)	35.88	35.21	34.30	33.03	29.60	27.05	25.73	24.35	22.62	20.33	
Av. Weight (lbs)	18.35	16.78	15.03	14.53	10.93	8.48	7.35	6.26	4.97	2.82	

TABLE 4

Summary of 2012 Harvest and Losses

	Number	Pounds	Mean Per Fish Pounds	Effort Data (Units)
Commercial				
Gill Net	60,492	531,251	8.78	3,728,540 (yds)
Pound Net	24,467	153,970	6.29	1,188 (net days)
Hook and Line	4,975	44,071	8.86	6,028 (hrs.)
Miscellaneous	682	4,497	6.59	283 (gear days)
Sub-Total	90,616	733,789		
Charter**	*See "For-Hire" Survey*			
Recreational***	*See MRFSS*			
ASMFC Mandated Adjustments				
Poaching (15% of Harvest)	13,592	110,068	8.10	
Hook & Release (8 %)	398	3,526	8.86	
Misc. Catch & Release (8 %)	55	360	6.54	
Total	104,661	847,743		

* 2012 Harvest caps – PRFC is part of MD/VA/PRFC Bay wide cap.
** 2012 Harvest caps – Charter Boats are monitored through the NMFS "For-Hire" survey and estimated harvest and losses are included within the Maryland Virginia Chesapeake Bay and its tributaries data (all Potomac River harvested fish are landed in either MD or VA).
******* Recreational fisheries are monitored through the NMFS-MRFSS and estimated harvest and losses are included within the Maryland and Virginia combined MRFSS estimate for the Chesapeake Bay and its tributaries (all Potomac River harvested fish are landed in either MD or VA).

TABLE 5

Potomac River Commercial Harvest (lbs) for **STRIPED BASS** by gear type

YEAR	HAUL SEINE	POUND NET	FYKE NET	GILL NET	H & L	MISC.	LBS LANDED IN MARYLAND	LBS LANDED IN VIRGINIA	TOTAL
1964	-	-	-	-	-	1,174,752	372,295	802,457	1,174,752
1965	-	-	-	-	-	1,530,365	491,095	1,039,270	1,530,365
1966	-	-	-	-	-	1,231,205	361,900	869,305	1,231,205
1967	-	-	-	-	-	1,342,033	545,278	796,755	1,342,033
1968	-	-	-	-	-	1,155,227	368,110	787,117	1,155,227
1969	-	-	-	-	-	979,645	453,937	525,708	979,645
1970	-	-	-	-	-	830,483	373,010	457,473	830,483
1971	-	-	-	-	-	691,013	287,702	403,311	691,013
1972	-	-	-	-	-	689,136	229,278	459,858	689,136
1973	-	-	-	-	-	1,175,333	349,840	825,493	1,175,333
1974	-	-	-	-	-	1,547,821	623,116	924,705	1,547,821
1975	-	-	-	-	-	849,166	456,101	393,065	849,166
1976	2,450	18,964	91	699,741	-	13,104	382,448	351,902	734,350
1977	1,393	18,683	44	606,747	-	8,293	185,898	449,262	635,160
1978	18	13,674	63	406,949	-	5,386	156,916	269,174	426,090
1979	8	11,187	-	309,497	-	543	90,332	230,903	321,235
1980	4,662	22,549	298	499,293	-	24,474	218,269	333,007	551,276
1981	89	8,175	-	458,348	-	-	135,203	331,409	466,612
1982	36	1,685	49	133,923	-	360	39,070	96,983	136,053
1983	-	9,333	91	150,972	3,849	-	64,995	99,250	164,245
1984	440	251,471	-	494,577	36,652	-	292,889	490,251	783,140
1985	-	114,819	-	88,431	18,946	-	41,523	180,673	222,196
1986	-	5,320	-	5,773	18,277	-	7,737	21,633	29,370
1987	-	24,415	-	30,184	3,346	-	6,633	51,312	57,945
1988	-	52,088	-	55,955	7,163	45	11,380	103,871	115,251
1989*	-	-	-	-	-	-	-	-	-
1990	1,207	30,755	170	111,051	25,877	-	95,744	73,316	169,060
1991	-	28,829	-	179,644	8,282	-	125,332	91,423	216,755
1992	-	28,137	-	92,462	6,799	-	64,114	63,284	127,398
1993	-	43,967	-	91,395	7,380	-	63,563	79,179	142,742
1994	-	34,783	-	104,579	10,529	-	65,193	84,698	149,891

* A moratorium was in effect in 1989

TABLE 5 continued

Potomac River Commercial Harvest (lbs) for **STRIPED BASS** by gear type

							LBS LANDED IN		
YEAR	HAUL SEINE	POUND NET	FYKE NET	GILL NET	H & L	MISC.	MARYLAND	VIRGINIA	TOTAL
1995	-	40,018	-	149,663	8,797	-	88,838	109,640	198,478
1996	1,850	48,846	664	284,815	10,365	294	159,402	187,432	346,834
1997	4,446	134,754	2,230	573,014	15,432	1,238	299,995	431,119	731,114
1998	7,185	162,921	1,300	542,798	10,866	1,109	334,349	391,830	726,179
1999	5,623	189,092	1,450	439,093	16,812	1,196	278,646	374,620	653,266
2000	4,110	122,551	2,522	521,216	14,451	1,151	287,828	378,173	666,001
2001	5,460	123,759	2,730	503,693	22,152	882	271,034	387,642	658,676
2002	5,303	140,462	2,728	342,348	27,683	2,524	220,076	300,972	521,048
2003	3,309	141,080	3,245	507,351	20,771	818	364,103	312,471	676,574
2004	8,068	112,414	3,706	622,954	23,484	1,707	406,180	366,153	772,333
2005	5,134	120,460	3,893	381,797	20,228	1,944	243,786	289,670	533,456
2006	5,765	133,959	3,713	493,007	35,674	1,390	324,628	348,880	673,508
2007	6,966	141,835	2,702	412,986	33,408	1,364	291,362	307,899	599,261
2008	6,491	146,146	2,269	415,964	41,596	1,326	327,961	285,831	613,792
2009	3,982	167,711	2,087	501,833	50,785	799	387,291	339,906	727,197
2010	4,019	160,915	2,239	484,545	30,846	676	314,280	368,960	683,240
2011	4,575	152,268	1,731	502,325	32,165	1,087	336,477	357,674	694,151
2012	2,225	153,970	459	531,251	44,071	1,813	357,453	376,336	733,789

Figure 1

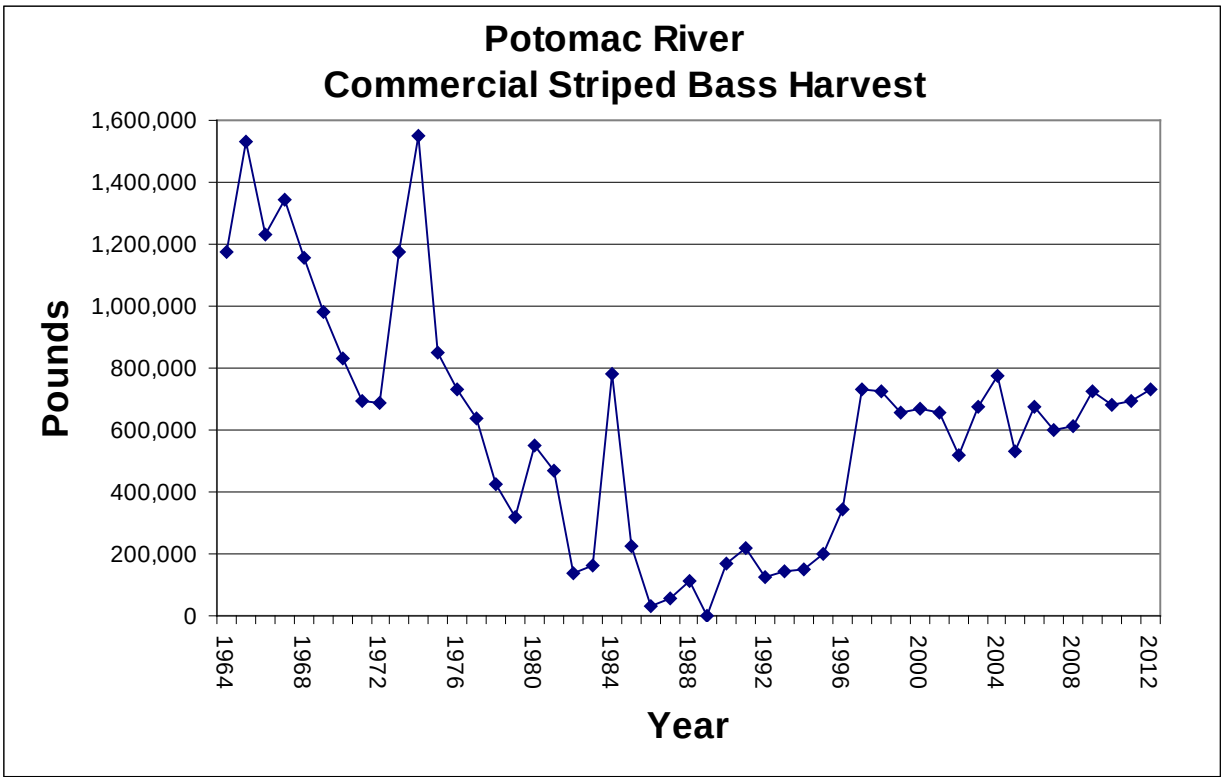
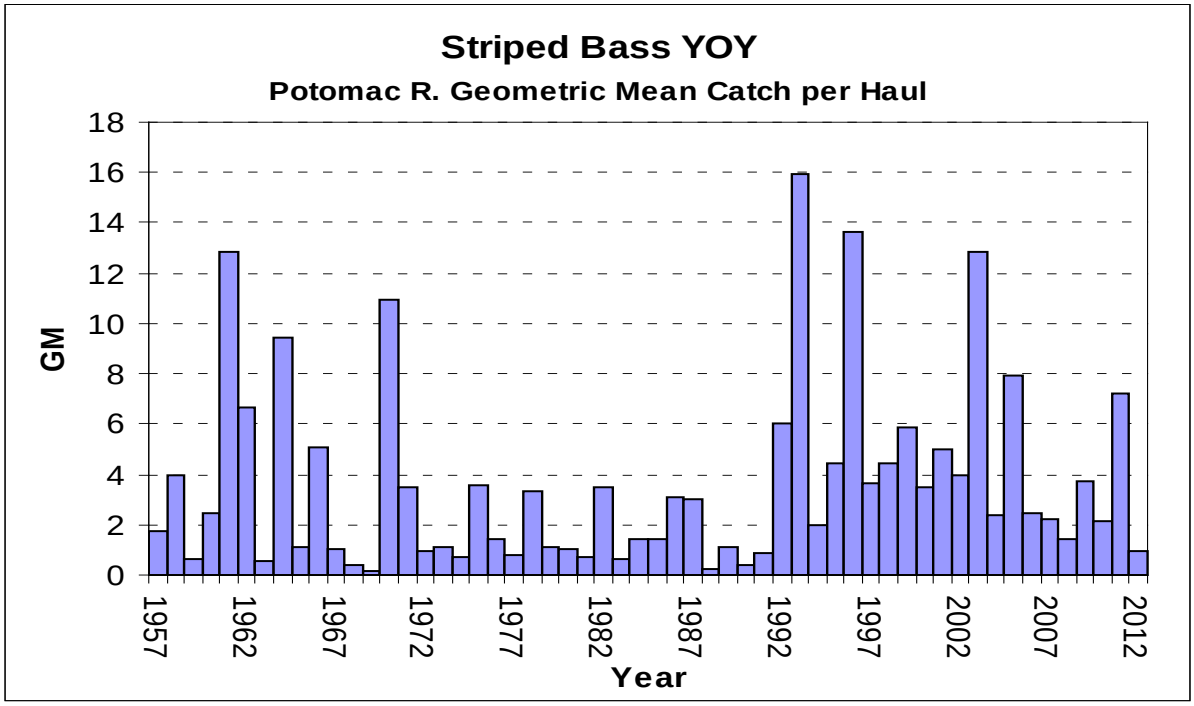


Figure 2



COMMONWEALTH of VIRGINIA

Marine Resources Commission

2600 Washington Avenue
Third Floor
Newport News, Virginia 23607

Douglas W. Domenech
Secretary of Natural Resources

Jack G. Travelstead
Commissioner

June 15, 2013

MEMORANDUM

TO: Michael Waine, Striped Bass Fisheries Management Plan Coordinator
Atlantic States Marine Fisheries Commission

FROM: Allison Watts, Fisheries Management Division
Virginia Marine Resources Commission

SUBJECT: Virginia's 2012 Compliance Report for Striped Bass

I. Introduction

The following report describes the 2012 Virginia striped bass fisheries and includes results from fishery-dependent and fishery-independent monitoring programs. Sources for fishery-dependent data include the Virginia Marine Resources Commission (VMRC) and the Old Dominion University Center for Quantitative Fisheries Ecology. The Virginia Institute of Marine Science (VIMS) provided the striped bass fishery-independent data. This report also documents Virginia's compliance with the requirements of Amendment 6 (2003) of the Atlantic States Marine Fisheries Commission (ASMFC) Interstate Fisheries Management Plan for Striped Bass (1981).

From 1990 until 2002, VMRC was authorized by the ASMFC to manage the Coastal Area and Chesapeake Area harvests of striped bass under a single statewide quota. In May 2002, the Virginia Marine Resources Commission was required by the ASMFC to establish separate quotas for the Chesapeake Area and Coastal Area commercial fisheries. The VMRC implemented this two-quota system in 2003, wherein both area-specific commercial striped bass fisheries are managed by an individual transferable quota system (ITQ) that allows for permanent or temporary intra-annual transfer of shares (pounds) of the respective fisheries quota. Chapter 4 VAC 20-252-10 et seq., "Pertaining to the Taking

of Striped Bass", is attached to this report as an appendix to this report, containing specific management measures for these two commercial quotas. Appendix I pertains to the regulation established for the 2012 striped bass fishery, and Appendix II pertains to the 2013 striped bass fishery.

The Coastal Area commercial fishery quota was 184,853 pounds in 2012, and has remained unchanged since 2003. The 2012 Chesapeake Area commercial and recreational fishery quotas were 1,430,361 pounds each, as in 2011. Recreational seasons, size limits and possession limits that were in place are detailed below.

All data tables that pertain to the derivation of catch-at-age and weight-at-age matrices are contained in the attached main file: VA_2012_SB Annual Report Workbook.xlsx. The VA_Dependent_2012.zip file contains the support files for the catch-at-age summary table, and VA_Independent_2012 zip file contains the research results associated with 2012 Virginia monitoring programs.

II. A request for *de minimis* is not applicable.

III. Previous calendar year's fishery and management program

A. Harvest and Losses

i. Commercial Fishery

(1) Characterization of fishery (seasons, cap, gears, regulations)

All restrictions and conservation measures that pertained to the 2012 Virginia striped bass fisheries are detailed in Chapter 4 VAC 20-252-10 et seq. (Appendix I). The 2012 commercial season for both the Chesapeake Area (mainstem Chesapeake Bay, its tributaries and Potomac River tributaries of Virginia) and Coastal Area began February 1, 2012 and ended December 31, 2012. The Chesapeake Area quota was 1,430,361 pounds, and the 2012 harvest was 1,339,152 pounds. The Coastal Area quota was 184,853 pounds, and the 2012 harvest was 170,788 pounds. The total (Chesapeake Area and Coastal Area combined) commercial harvest was 1,509,940 pounds.

Both area quotas are managed by an Individual Transferable Quota (ITQ) system. From 1998 through 2006, the ITQ share was based on numbers of striped bass that correspond to an average gear-specific weight, for most of those years. Since 2007, the individual shares of quota are allocated in pounds of fish. Chapter 4 VAC 20-252-10 et seq. (Appendix I) provides all requirements and restrictions associated with the weight-based ITQ systems. Permits are required to harvest striped bass, under each ITQ system, and the ITQ systems allow permitted fishermen to use any legal gear type to harvest their individual quotas (pounds of fish). Limited entry and mandatory fish-tagging programs established in 1992 were continued in 2012. No licensed registered commercial fisherman shall hold more than 2.0% of the total annual Chesapeake Area commercial striped bass harvest quota or more than 11% of the total annual Coastal Area commercial striped bass harvest quota.

The minimum commercial size limit was 18 inches in the Chesapeake Area and 28 inches in the Coastal Area (Virginia portion of the Federal Territorial Sea). A maximum size limit of 28 inches and complementary gill net mesh size restrictions were in effect for the Chesapeake Area from March 26 through June 15, 2012.

(2) Characterization of directed harvest

(a) Landings and method of estimation

All permitted fishermen were required to report daily striped bass harvests on a monthly basis to the VMRC. All buyers of striped bass taken from Virginia tidal waters were required to submit written reports of daily purchases and sales for each commercial fishing season to the VMRC, no later than the 5th of the following month. In addition, during the month of December, permitted buyers were required to call the Marine Resources Commission interactive voice recording system on a daily basis to report their striped bass purchases (Subsection 130 H. of Chapter 4 VAC 20-252-10 et seq.; Appendix I).

(b) Catch composition

All harvest and biological data files, age length keys and regression files that contain the raw data used to construct the catch composition are included in this report, as part of the VA_Dependent_2012.zip file. Length, weight and sex data were collected using a stratified (season, area, gear) random approach, whereas age samples were collected to provide representative samples by size (inch) intervals.

(i) Age frequency

Of the 803 striped bass aged using scales by the Old Dominion University Age and Growth Laboratory, all were sampled from commercial fisheries, with the exception of one fish donated from the recreational fishery. From Chesapeake Area fisheries, 301 commercial samples were aged from spring fisheries and 251 samples were aged from fall fisheries. From Coastal Area commercial fisheries, 189 samples were aged from spring fisheries and 61 striped bass were aged from fall fisheries. The single sample from the recreational fishery was obtained from the coastal area in the spring.

Of the 803 scale ages, the Old Dominion University Age and Growth Laboratory also processed and read 267 paired otolith-scale samples collected by the VMRC (ages ranged from 2 to 26 years).

Commercial catch-at-age matrices are according to a seasonal basis. The recreational catch-at-age (harvest and discard removals) is according to a statewide basis.

A statewide all-season age-length key was used to calculate a statewide recreational catch-at-age and weight-at-age, and the length-weight parameters used for the recreational fishery spreadsheet were from the Bay gill net spring regression.

To characterize the commercial catch-at-age and weight-at-age, Chesapeake Area age-length keys were constructed from seasonal (January through June and July through December) length and age data, based on combinations of fish harvested from either gill net + hook-and-line gear, or pound net + haul seine + other minor gear. Coastal Area age-length keys were also according to season, with gill net the major contributing gear type, along with a few commercial hook-and-line harvested striped bass. The single recreationally-harvested fish was used in formation of the statewide and fall Coastal Area age-length keys.

All length-weight equations used in this report are included in the attached file named 2012_VA_lengthweight_regressions.xlsx and are listed in Table 1. The recreationally-caught fish was excluded from this process. Catch-at-age files can be found in VA_2012_SB Annual Report Workbook.xlsx.

Harvests (pounds) from minor gear types that were not sampled for biological data were included with the best-fit major gear type to account for the entire harvest, according to area and season, in developing the catch-at-age formats. The attached file 2012_VA_commercial_harvest.xlsx provides the harvest by gear types, which comprised area- or season-specific catch-at-age.

The majority of striped bass biological samples from Chesapeake Area commercial harvests were taken from gill nets, and all Coastal Area sampled fish were from gill net harvests.

(ii) Length frequency

Biological samples from the commercial harvest were collected at buyers' places of business or directly from pound net fishermen. A total of 2,194 (343 Coastal Area and 1,851 Chesapeake Area) striped bass was measured for length and weight data (Table 1). Gill net harvests accounted for 70.3% (1,302 of 1,851 fish) of the total lengths from the Chesapeake fishery and 100% (343 fish) of the Coastal fishery samples of length. These data were utilized in age-length keys, along with the commercial samples. Expanded length frequency data can be found in the attached worksheets contained in the VA_2012_SB Annual Report Workbook.xlsx file.

(iii) Sex composition

The VMRC Biological Sampling Program obtains sex information in two ways: as part of the stratified random (gear, area, time) approach and from fish that are purchased for otolith-scale ageing. The sex composition is

more representative than in previous recent years but still biased from collection of partial fishermen harvests. For this reason, sex data for 2012 are not considered representative of the harvest. From Chesapeake Area striped bass fisheries, the program collected 229 males and 309 females. From Coastal Area fisheries, the sex sample consisted of 37 males and 204 females.

(c) Estimation of effort

At the start of the 2012 season, a total of 410 commercial harvesters were permitted to fish for striped bass in the Chesapeake, and 21 harvesters were permitted for harvest of striped bass from the Coastal Area. Since both fisheries are managed by an ITQ system that allows transfers, the number of permitted fishermen changes throughout the season. Each harvester reports effort data for each harvest day. Additional effort or CPUE information is available to the ASMFC, if needed, but total pounds and trips by gear for 2012 are included in Table 2.

(3) Characterization of other losses (poaching, bycatch, etc.)

(d) Estimate and method of estimation

The available data to estimate illegal harvest and by-catch mortality from commercial fisheries are limited. The Virginia Marine Police confiscated 621 pounds in 2012, compared to 1,281 pounds in 2011 and 1,476 pounds in 2010. A copy of the intensive law enforcement efforts can be found in the annual ASMFC Striped Bass Enforcement Report. Using a traditional average weight (4.7 pounds), the 2012 confiscations amounted to 132 striped bass.

It is assumed that most striped bass caught in trap nets can be released alive and do not pose a by-catch mortality problem. Gill net fishing is widespread in Virginia and is associated with by-catch mortality, especially in anchored gill net operations. In 2012, most striped bass were caught by gill nets (88.5% of the total Chesapeake Area harvest of 1,339,152 pounds). Of Coastal Area harvests, gill nets accounted for 99.9% of the 2012 harvest. Since 2007, the Virginia commercial striped bass fisheries have been managed by an individual weight-based quota, whereby each permitted fisherman is allocated a share of the quota in pounds. This enables fishermen to pick and choose fishing and market opportunities and is expected to lessen by-catch by gill nets considerably, as compared to a less-controlled fishery.

Hook-and-release mortality applies to both the recreational fishery and the commercial hook-and-line fishery. However, there are no estimates of released striped bass from the commercial hook-and-line fishery. The ASMFC has recently specified a 9% hook-and-release mortality rate for recreational fisheries. According to MRIP, 101,628 striped bass were released alive (B2s) in the 2012 Virginia recreational fisheries (see VA_2012_SB Annual Report Workbook.xlsx). The estimated hook-and-release mortality (discard losses) is 9,146 striped bass.

(e) Estimate of composition (length and/or age)

Length and age compositions of striped bass lost to poaching or as by-catch are not available.

ii. Recreational Fishery

(1) Characterization of fishery (seasons, cap, gears, regulations)

The 2012 recreational fishing seasons, possession limits, and minimum and maximum possession size limits for Virginia waters are listed in the attached Excel file: VA_2012_SB Annual Report Workbook.xlsx. Chapter 4 VAC 20-252-10 et seq. (Appendix I), in effect at the start of 2012, is attached to this report. Virginia recreational anglers are allowed a trophy season, as part of a Chesapeake Bay-wide cap. In 2012 Virginia's recreational quota was 1,430,361 pounds for the Chesapeake Bay and its tributaries and Virginia's tributaries of the Potomac River (Chesapeake Area).

(2) Characterization of directed harvest

(a) Landings and method of estimation

This was the first year that the Marine Recreational Fisheries Statistics Survey (MRFSS) was replaced entirely by the Marine Recreational Information Program (MRIP). MRIP estimates of Virginia recreational striped bass landings and catch are available from 2004 through 2012. Recreational regulations in effect and estimated landings (weight and number) for the statewide fishery are listed in the attached Excel file: VA_2012_SB Annual Report Workbook.xlsx. Virginia statewide (Chesapeake Area and Coast fisheries, combined) recreational length-weight parameters were based on lengths and corresponding weights from the samples of commercial and recreational striped bass. When the MRIP estimate of reported landings was used (70,028 fish), the resulting length-weight parameters resulted in a spreadsheet-calculated weight-at-age (1,688,304 pounds) that was 25.8% greater than the reported MRIP amount (1,342,088 pounds). This has been a recurring problem for Virginia and some other states. In addition, the MRIP reported landings produce an average weight of 19.2 pounds per fish, which is much higher than expected and is suspect. In 2011, the average weight according to MRIP was 9.5 pounds. The average weight according to MRFSS in 2011 was 5.6 pounds, which is in line with past years and more reflective of Virginia's recreational fishery. It is also unusual that the all ocean landings (Type A+B1 fish) in 2012 were 194 fish, compared to 62,994 fish in 2008, 2,340 fish (2009), 11,201 fish (2010), and 25,358 fish (2011).

The VMRC trophy striped bass reporting program was initiated in 1995. A total of 46 trophy striped bass was reported for 2012 from Virginia waters, with the majority (34 of 46 fish) reported from the Chesapeake Area. Of the total, 18 reported trophy striped bass were from permitted charter trips and 28 fish were reported to the Virginia Saltwater Fisherman's Journal. The size of harvested fish ranged from 32.5 inches to 40 inches from charter boat reports,

and from 32 inches to 44 inches from individual reporting anglers. All fish were reported as kept (not released). A reporting rate of 44% was applied, based on the results of a 1990 through 1992 licensing and reporting program. Using this expansion, the estimate of the trophy harvest is 105 fish (or 1,568 pounds, using average weight of 15 pounds) in 2012.

(b) Catch composition

(i) Age frequency

The statewide age-length key consists of 802 commercial length-age combinations and 1 fish donated by a recreational harvester. This age-length key was applied to the distribution of lengths from the MRIP intercepts, to form the statewide recreational fishery catch-at-age and weight-at-age (see VA_2012_SB Annual Report Workbook.xlsx). Fork lengths from MRIP were converted to total lengths, using a regression equation based on fish measured for length and weight from all areas (see attached file: 2012_VA_fork_ total.xlsx).

(ii) Length frequency

Expanded length frequency distributions can be found in the attached file: VA_2012_Annual Report Workbook.xlsx.

(iii) Sex (if available)

The single recreationally-donated fish was a female.

(c) Estimation of effort

According to MRIP, the number of total general (all-species) trips in Virginia was estimated at 2,517,758 trips in 2012, compared to 2,898,696 in 2011.

(3) Characterization of other losses (poaching, hook and release mortality, etc.)

Hook and release mortality of released recreational fish is assumed to be 9%, according to a recent revision of this estimate by the ASMFC Striped Bass Technical Committee (formerly assumed to be 8%).

iii. Other losses

All known striped bass losses to harvest and monitoring programs are detailed in Table 3.

iv. Total Harvest & Losses

All known striped bass losses to harvest and monitoring programs are detailed in Table 3.

B. Fishery Independent Monitoring Programs

Tables 7 and 8 of Amendment 6 stipulate that Virginia is responsible for conducting a juvenile striped bass abundance survey in the Chesapeake Bay tributaries and spawning stock biomass surveys in the Rappahannock and James rivers.

i. Results (Complete reports, not included as attachments, are available by request)

(1) Juvenile indices

Results from VIMS survey of juvenile striped bass relative abundance in the Virginia portion of Chesapeake Bay (and its tributaries) is included in the VA_2012_SB Annual Report Workbook.xlsx file.

(a) A time series of indices of abundance and associated standard errors of means is included in the VA_2012_SB Annual Report Workbook.xlsx file. The 2012 striped bass juvenile abundance index is 2.68 and is the lowest of the time series (1982 through 2012).

(b) The standard error of the mean is 0.0617.

(2) Spawning stock assessment

Files associated with the VIMS monitoring studies in the Rappahannock and James rivers are included in the VA_Independent_2012.zip file. Data from monitoring of Rappahannock pound nets and gill nets extend from 1991 through 2012, and data from monitoring of James River gill nets extend from 1994 through 2012.

(a) Mean size (length, weight) data of striped bass sampled by VIMS during spring monitoring studies in the Rappahannock and James rivers in 2012 is included in the attached file: VIMS_SSB_1991_2012.xlsx.

(b) A time series of sex ratios, at age, from the VIMS spring monitoring program in the Rappahannock and James rivers is in the attached file: VIMS_sex_ratio_1991_2012.xlsx.

(c) A time series of catch per unit of effort data from VIMS spring monitoring programs in the Rappahannock and James rivers is in the attached file: VIMS_CPUE_summary_1991_2012.xlsx.

(3) Stock Characterization: Not available. Seasonal monitoring and tagging programs may not adequately characterize the stock.

(4) Tagging

(a) In 2012, 2,981 striped bass were tagged from the Rappahannock River as part of the Bay-wide project to enumerate fishing mortality on the stock (for time series of releases, see attached file: VIMS_tag_releases_2012.xlsx).

(5) Research Removals

Throughout the course of monitoring activities in 2012, and including by-catch losses from the American shad staked gill net studies, VIMS removed 825 striped bass (5,087 pounds; see attached file: VIMS_SB_WtandN_Sacrificed_2012.xlsx).

IV. Planned management programs for the current calendar year

A. Summarize regulations that will be in effect.

A copy of current (2013) Chapter 4 VAC 20-252-10 et seq., "Pertaining to the Taking of Striped Bass," is attached (Appendix II).

B. Summarize monitoring programs that will be performed.

Spawning stock assessment, mark and recapture and estimation of juvenile striped bass abundance programs, as described in this report for 2012, will continue in 2013.

C. Highlight any changes from the previous year.

In 2013, the commercial and recreational striped bass quotas were established as 1,230,110 pounds each (compared to 1,430,361 pounds in 2012).

Additional changes that are in effect for the 2013 fishing year and future years, unless amended, are described as follows:

The commercial season opening date was changed from February 1 to January 16. The commercial season closing date remains as December 31. Commercial striped bass quota shares may not be transferred in any quantity less than 500 pounds (compared to 200 pounds in 2012). Transfers of commercial striped bass quota will be prohibited from October 1 through November 30, and December 16 through January 31. Temporary transfers of commercial striped bass quota will be permitted between December 1 and December 16.

Table 1. Length-weight parameters from samples of the 2012 Virginia striped bass commercial fisheries.

Area	Season	Gear	Number of length-weight samples	Length-weight parameters: y-intercept	slope
Coastal	Spring	Gill net	241	-6.89132	2.74483
	Fall	Gill net	102	-8.29819	3.12149
Chesapeake	Spring	Gill net	865	-7.23595	2.85863
		Hook and line	30		
		Pound net	93	-6.55143	2.58713
	Fall	Gill net	437	-8.49996	3.18431
		Hook and line	114		
		Pound net	312	-8.22113	3.11082

Table 2. Harvest and effort by gear type for the Virginia Coastal and Chesapeake Areas striped bass fisheries in 2012.

Area	Gear name	Harvest (pounds)	Effort (trips)
Coastal	Anchored gill net	126,286	197
	Drift gill net	44,470	66
	Hand line	32	1
	Total:	170,788	264
Chesapeake	Anchor gill net	1,110,113	3,184
	Drift gill net	9,335	41
	Staked gill net	66,032	305
	Hand line	83,113	507
	Pound net	62,440	544
	Other*	8,119	146
	Total:	1,339,152	4,727

*Other: fyke net, haul seine, pots and traps, trot line

Table 3. Summary of striped bass losses in Virginia in 2012.

	Average

Fishery	Type	Number of fish	Pounds of fish	weight of fish
Commercial	Legal harvest	111,426	1,509,940	13.5
	Illegal harvest (confiscations)	132	621	4.7
Recreational	Legal landings (MRIP)	70,028	1,342,088	19.2
	Trophy	105	1,568	14.9
	Hook and release mortality (9% of Type B2s)**	9,146	37,498	4.1
Fishery-independent	VIMS monitoring	825	5,087	6.2
	Total Losses	191,662	2,896,802	15.1

** Average weight of dead discards in 2011 applied to 9% of MRIP estimated discards (9,146 fish) produces 37,498 pounds

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CHAPTER 4 VAC 20-252-10 ET SEQ., "PERTAINING TO THE TAKING OF STRIPED BASS" (IN EFFECT IN 2012)

Appendix I.

VIRGINIA MARINE RESOURCES COMMISSION

PERTAINING TO THE TAKING OF STRIPED BASS

CHAPTER 4VAC20-252-10 ET SEQ.

PREAMBLE

This chapter establishes a limited commercial and recreational fishery for striped bass in Virginia. The provisions of this chapter are intended to comply with all Federal and interstate requirements for fishing for striped bass. This chapter also authorizes the aquaculture of striped bass and hybrid striped bass and sets forth the conditions required for their culture.

This chapter is promulgated pursuant to the authority contained in §§ 28.2-201 and 28.2-204.1 of the Code of Virginia. This chapter amends and re-adopts, as amended, previous Chapter 4VAC20-252-10 et seq. which was promulgated November 24, 2009 and made effective on January 1, 2010. The effective date of this chapter, as amended, is February 1, 2011.

4VAC20-252-10. Purpose.

The purpose of this chapter is to provide for the continued sustained yield from the recovered striped bass stocks in Virginia and to limit the growth of the number of commercial participants in this fishery. The provisions pertaining to aquaculture serve to prevent the escape of cultured hybrid striped bass into the natural environment and to minimize the impact of cultured fish in the market place on the enforcement of other provisions of this chapter.

This regulation is not intended to create any property right in anyone, and the commission reserves the right to change this regulation at any time it deems it necessary because of biological conditions and to change the regulation in all other respects at any time it deems it necessary to carry out its statutory mission.

4VAC20-252-20. Definitions.

The following words and terms when used in this chapter shall have the following meaning unless the context clearly indicates otherwise:

"Chesapeake area" means the area that includes the Chesapeake Bay and its tributaries and the Potomac River tributaries.

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"Chesapeake Bay and its tributaries" means all tidal waters of the Chesapeake Bay and its tributaries within Virginia, westward of the shoreward boundary of the Territorial Sea, excluding the coastal area and the Potomac River tributaries as defined by this section.

"Coastal area" means the area that includes Virginia's portion of the Territorial Sea, plus all of the creeks, bays, inlets, and tributaries on the seaside of Accomack County, Northampton County (including areas east of the causeway from Fisherman Island to the mainland), and the City of Virginia Beach (including federal areas and state parks, fronting on the Atlantic Ocean and east and south of the point where the shoreward boundary of the Territorial Sea joins the mainland at Cape Henry).

"Commission" means the Marine Resources Commission.

"Commercial fishing" or "fishing commercially" or "commercial fishery" means fishing by any person where the catch is for sale, barter, trade, or any commercial purpose, or is intended for sale, barter, trade, or any commercial purpose.

"Potomac River tributaries" means all the tributaries of the Potomac River that are within Virginia's jurisdiction beginning with, and including, Flag Pond thence upstream to the District of Columbia boundary.

"Recreational fishing" or "fishing recreationally" or "recreational fishery" means fishing by any person, whether licensed or exempted from l licensing, where the catch is not for sale, barter, trade, or any commercial purpose, or is not intended for sale, barter, trade, or any commercial purpose.

"Share" means a percentage of the striped bass commercial harvest quota.

"Spawning reaches" means sections within the spawning rivers as follows:

1. James River from a line connecting Dancing Point and New Sunken Meadow Creek upstream to a line connecting City Point and Packs Point.

2. Pamunkey River from the Route 33 Bridge at West Point upstream to a line connecting Liberty Hall and the opposite shore.

3. Mattaponi River from the Route 33 Bridge at West Point upstream to the Route 360 bridge at Aylett.

4. Rappahannock River from the Route 360 Bridge at Tappahannock upstream to the Route 1 Falmouth Bridge.

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"Striped bass" means any fish of the species *Morone saxatilis*, including any hybrid of the species *Morone saxatilis*.

4VAC20-252-30. General prohibitions and requirements.

A. It shall be unlawful for any person to possess any striped bass taken from the tidal waters of Virginia, including Virginia's portion of the Territorial Sea, except in accord with the provisions of Title 28.2 of the Code of Virginia and in accord with the provisions of this chapter.

B. It shall be unlawful for any person to possess any striped bass taken from the tidal waters of Virginia, including Virginia's portion of the Territorial Sea, during a time, from an area, and with a gear type when there is no open season set forth in this chapter for such time, area, and gear type.

C. Except for those persons permitted in accordance with 4VAC20-252-170, it shall be unlawful for any person to possess any striped bass less than 18 inches total length at any time.

D. It shall be unlawful for any person to possess any striped bass that measures less than the minimum size or more than the maximum size applicable to the open season when fishing occurs, except as described in 4VAC20-252-115.

E. Total length measurement of striped bass shall be in a straight line from tip of nose to tip of tail.

F. It shall be unlawful for any person while aboard any boat or vessel or while fishing from shore or pier to alter any striped bass or to possess any altered striped bass such that its total length cannot be determined.

G. It shall be unlawful for any person to spear or gaff, or attempt to spear or gaff any striped bass at any time.

H. It shall be unlawful for any person to use a commercial hook and line within 300 feet of any bridge, bridge-tunnel, jetty, or pier during Thanksgiving Day and the following day or during any open recreational striped bass season in the Chesapeake Bay and its tributaries, except during the period midnight Sunday through 6 a.m. Friday.

I. Unless specified differently in other regulations, it shall be unlawful to place, set, or fish any gill net within 300 feet of any bridge, bridge-tunnel, jetty, or pier during any open recreational striped bass season in the Chesapeake Bay and its tributaries, except during the period midnight Sunday through midnight Wednesday.

J. During the period April 1 through May 31, inclusive, it shall be unlawful for any person to set or fish any anchored gill net or staked gill net, for any purpose, within the spawning reaches of the James, Pamunkey, Mattaponi, and Rappahannock Rivers. Drift or float gill nets may be set and fished within the spawning reaches of these rivers during this period, provided that the person setting and fishing the net remains with the net during the time it is fishing and all striped bass that are caught shall be returned to the water immediately.

K. Holding any permit issued by the commission to fish for striped bass, recreationally or commercially, shall authorize any commission personnel or their designees to inspect, measure, weigh, or take biological samples from any striped bass in possession of the permit holder.

L. Nothing in this chapter shall preclude any person, who is legally eligible to fish, from possessing any striped bass tagged with a Virginia Institute of Marine Science (VIMS) fluorescent green tag. Possession of these VIMS-tagged striped bass shall not count towards the personal recreational possession limit, and permitted commercial striped bass individual transferable quota (ITQ) holders shall not be required to apply a tamper evident, numbered tag provided by the commission, in order to possess any striped bass tagged with a VIMS-inscribed green fluorescent tag. It shall be unlawful for any person to retain any of these VIMS-tagged striped bass for a period of time that is longer than necessary to provide the VIMS-tagged striped bass to a VIMS representative. Under no circumstance shall any VIMS-tagged striped bass be stored for future use or sale or delivered to any person who is not a VIMS representative.

4VAC20-252-40. Severability.

Any provision of this chapter that is held invalid by a court of competent jurisdiction shall not affect the validity of other provisions of this chapter which can be given effect without the invalid provision.

4VAC20-252-50. Concerning recreational fishing: general.

A. It shall be unlawful for any person fishing recreationally to take or to catch striped bass with any gear other than hook and line, rod and reel, or hand line.

B. It shall be unlawful for any person fishing recreationally to possess any striped bass while fishing in an area where or at a time when there is no open recreational striped bass season, except as described in 4VAC20-252-115. Striped bass caught contrary to this provision shall be returned to the water immediately.

C. It shall be unlawful for any person fishing recreationally to possess land and retain any striped bass in excess of the possession limit applicable for the area and season being fished

within the 24-hour period of 12 a.m. through 11:59 p.m. Striped bass taken in excess of the possession limit shall be returned to the water immediately.

When fishing from a boat or vessel where the entire catch is held in a common hold or container, the possession limit shall be for the boat or vessel and shall be equal to the number of persons on board legally eligible to fish multiplied by the applicable personal possession limit. The captain or operator of the boat or vessel shall be responsible for any boat or vessel possession limit.

D. It shall be unlawful to combine possession limits when there is more than one area or season open at the same time.

E. It shall be unlawful for any person while actively fishing pursuant to a recreational fishery to possess any striped bass that are smaller than the minimum size limit or larger than the maximum size limit for the area and season then open and being fished, except as described in 4VAC20-252-115. Any striped bass caught that does not meet the applicable size limit shall be returned to the water immediately.

F. It shall be unlawful for any person to sell, offer for sale, trade or barter any striped bass taken by hook and line, rod and reel, or hand line provided, however, this provision shall not apply to persons possessing a commercial hook-and-line license and a striped bass permit and meeting the other requirements of this chapter.

G. It shall be unlawful for any person fishing recreationally to transfer any striped bass to another person, while on the water or while fishing from a pier or shore.

H. It shall be unlawful for the captain of any charter boat or charter vessel to take hook-and-line, rod-and-reel, or hand line fishermen for hire unless the captain has obtained a permit from the commission and is the holder of a Coast Guard charter license.

I. Charter boat captains shall report to the commission, on forms provided by the commission, all daily quantities of striped bass caught and harvested, and daily fishing hours for themselves or their customers, respectively. The written report shall be forwarded to the commission no later than 15 days following the last day of any open season. In addition, charter boat captains engaging in the Bay and Coastal Spring Trophy-size Striped Bass Recreational Fishery and the Potomac River Tributaries Spring Striped Bass Recreational Fishery shall provide the report required by 4VAC20-252-60 and 4VAC20-252-70, respectively. Failure to provide these reports is a violation of this chapter.

4VAC20-252-55. Recreational harvest quota.

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The total allowable level of all recreational harvest of striped bass for all open seasons and for all legal gear shall be 1,430,361 pounds of whole fish. At such time as the total recreational harvest of striped bass is projected to reach 1,430,361 pounds, and announced as such, it shall be unlawful for any person to land or possess striped bass caught for recreational purposes.

4VAC20-252-60. Bay and Coastal Spring Trophy-size Striped Bass Recreational Fisheries.

A. The open season for the Bay Spring Trophy-size Striped Bass Recreational Fishery shall be May 1 through June 15, inclusive; however, the season may be adjusted as set forth in subsection G of this section.

B. The area open for the Bay Spring Trophy-size fishery shall be the Chesapeake Bay and its tributaries, except the spawning reaches of the James, Pamunkey, Mattaponi, and Rappahannock Rivers.

C. The open season for the Coastal Spring Trophy-size Striped Bass Recreational Fishery shall be May 1 through May 15, inclusive; however, the season may be adjusted as set forth in subsection G of this section.

D. The area open for the Coastal Spring Trophy-size Striped Bass Recreational Fishery is the coastal area as described in 4VAC20-252-20.

E. The minimum size limit for the fisheries described in this section shall be 32 inches total length.

F. The possession limit for the fisheries described in this section shall be one fish per person.

G. The Bay and Coastal Spring Trophy-size fisheries, combined with the fishery defined by 4VAC20-252-70, shall have a target take of 30,000 total fish coming from both the Virginia and Maryland portions of the Chesapeake Bay and any tributaries of the Chesapeake Bay and the Potomac River, and includes the area under the jurisdiction of the Potomac River Fisheries Commission. The season for this fishery shall be closed when it is determined that this total target has been reached.

H. Persons engaging in the Bay and Coastal fisheries shall report the retention of any striped bass to the commission. Filing the report shall be the responsibility of the person retaining the striped bass or, in the case of any charter boat or vessel, the captain of the charter boat or vessel. These reports are due 15 days after the close of this fishery and shall be on forms provided by the commission. There will be separate forms for persons and for charter boats or vessels.

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4VAC20-252-70. Potomac River tributaries spring trophy-size striped bass recreational fishery.

A. The open season for the Potomac River tributaries spring striped bass recreational fishery shall correspond to the open season as established by the Potomac River Fisheries Commission for the mainstem Potomac River spring fishery.

B. The area open for this fishery shall be those tributaries of the Potomac River that are within Virginia's jurisdiction beginning with, and including, Flag Pond thence upstream to the Route 301 bridge.

C. The minimum size limit for this fishery shall correspond to the minimum size limit as established by the Potomac River Fisheries Commission for the mainstem Potomac River spring trophy-size fishery.

D. The possession limit for this fishery shall be one fish per person.

E. This fishery, combined with the fishery defined by 4VAC20-252-60, shall have a target take of 30,000 total fish coming from both the Virginia and Maryland portions of the Chesapeake Bay and any tributaries of the Chesapeake Bay and Potomac River, and includes the area under the jurisdiction of the Potomac River Fisheries Commission. The season for this fishery shall be closed when it is determined that this total target has been reached.

F. Persons engaging in this fishery shall report the retention of any striped bass to the commission. Filing the report shall be the responsibility of the person retaining the striped bass, or, in the case of any charter boat or vessel, the captain of the charter boat or vessel. These reports are due 15 days after the close of this fishery and shall be on forms provided by the commission. There will be separate forms for persons and for charter boats or vessels.

4VAC20-252-80. Bay Spring/Summer Striped Bass Recreational Fishery.

A. The open season for the Bay Spring/Summer Striped Bass Recreational Fishery shall be May 16 through June 15 inclusive.

B. The area open for this fishery shall be the Chesapeake Bay and its tributaries.

C. The minimum size limit for this fishery shall be 18 inches total length, and the maximum size limit for this fishery shall be 28 inches total length, except as provided in subsection E of this section.

D. The possession limit for this fishery shall be two fish per person.

E. The possession limit described in subsection D of this section may consist of one trophy-size striped bass 32 inches or greater, which is subject to the provisions of subsections A, B, E, F, G and H of 4VAC20-252-60.

4VAC20-252-85. [Repealed]

4VAC20-252-90. Bay fall striped bass recreational fishery.

A. The open season for the bay fall striped bass recreational fishery shall be October 4 through December 31, inclusive.

B. The area open for this fishery shall be the Chesapeake Bay and its tributaries.

C. The minimum size limit for this fishery shall be 18 inches total length.

D. The maximum size limit for this fishery shall be 28 inches total length, except as provided in subsection F of this section.

E. The possession limit for this fishery shall be two fish per person.

F. The possession limits described in subsection E of this section may consist of only one striped bass 34 inches or greater.

4VAC20-252-100. Potomac River tributaries summer/fall striped bass recreational fishery.

A. The open season for the Potomac River tributaries summer/fall striped bass fishery shall correspond to the open summer/fall season as established by the Potomac River Fisheries Commission for the mainstem Potomac River.

B. The area open for this fishery shall be the Potomac River tributaries.

C. The minimum size limit for this fishery shall be 18 inches total length.

D. The maximum size limit for this fishery shall be 28 inches total length, except as provided in subsection F of this section.

E. The possession limit for this fishery shall be two fish per person.

F. The possession limits described in subsection E of this section may consist of only one striped bass 34 inches or greater.

APPENDIX I.
CHAPTER 4 VAC 20-252-10 ET SEQ., "PERTAINING TO THE TAKING OF STRIPED BASS" (IN EFFECT IN 2012)

4VAC20-252-110. Coastal striped bass recreational fishery.

A. The open seasons for the coastal striped bass recreational fishery shall be January 1 through March 31 and May 16 through December 31, inclusive.

B. The area open for this fishery shall be the coastal area as defined in this chapter.

C. The minimum size limit for this fishery shall be 28 inches total length.

D. The possession limit for this fishery shall be two fish per person.

4VAC20-252-115. Exemptions from size limits and closed fishing seasons for recreational striped bass fishing tournaments.

A. The commissioner or his designee may grant exemptions for any recreational fishing tournament from size and season limitations described in 4VAC20-252-80, 4VAC-20-252-90, 4VAC20-252-100 and 4VAC20-252-110 provided that the tournament meets all of the following conditions:

1. The tournament operates for a limited duration, with a maximum of three consecutive days.

2. The tournament format provides for the live release of all fish and significant penalties for entrants bringing in or weighing in dead striped bass.

3. The tournament director submits a written proposal to the commissioner detailing the measures the tournament will use to ensure the survivability of fish entered in the tournament, to include capture, handling and storage of fish by tournament entrants on the water during the competition, by tournament officials at the weigh-in, by tournament officials when transporting and returning the fish to the water, and any penalties that will apply to entrants bringing in or weighing dead fish. Such proposal must be submitted no later than 120 days prior to the tournament, and the proposal must be determined by the commissioner to adequately address potential mortality issues.

4. Tournament officials must agree to provide any or all fish entered in the tournament to the Marine Resources Commission, or to any designee of the Marine Resources Commission, upon written request, and tournament officials agree to allow Marine Resources Commission staff access to all tournament areas during the event for the purposes of observation and assessment, upon request.

B. Any determination by the commissioner or his designee that approval of any requested recreational striped bass tournament could jeopardize the status of the striped bass stock or prove to be an issue of compliance with the interstate fishery management plan will result in disapproval of that request.

4VAC20-252-120. Concerning commercial fishing: general.

A. It shall be unlawful for any person to engage in the commercial fishery for striped bass without first having the necessary commercial fisherman's registration license and appropriate gear license as required by Title 28.2 of the Code of Virginia, and the special permit to fish for striped bass established in 4VAC20-252-130, except as provided in subsection G of 4VAC20-252-160.

B. It shall be unlawful for any person fishing commercially to possess any striped bass taken outside any open commercial season or area, or with gear inapplicable to the season and area, as specified in 4VAC20-252-140. Any striped bass caught contrary to this provision shall be returned to the water immediately.

C. It shall be unlawful for any person while actively fishing pursuant to a commercial fishery to possess any striped bass that is less than the minimum size limit applicable for the area and season then open and being fished. Any striped bass caught that does not meet the applicable minimum size limit shall be returned to the water immediately.

D. All striped bass in the possession of any person for the purpose of sale must be identified with a tamper-evident sealed tag that has been approved and issued by the appropriate authority in the jurisdiction of capture. Whole striped bass shall have tags attached directly to the fish. Processed or filleted striped bass must be accompanied by the tags removed from the fish when processed. Any person who possesses any amount of striped bass in excess of the maximum number allowed for a licensed recreational fisherman as described in 4VAC20-252-60 through 4VAC20-252-110, inclusive, shall be considered as possessing all striped bass for the purpose of sale. When any person possesses striped bass in excess of the maximum number allowed a licensed recreational fisherman, all striped bass of said person shall be tagged, and the possession of any untagged striped bass shall be prima facie evidence of a violation of this chapter and subject to the provisions of 4VAC20-252-160 H and I and 4VAC20-252-230.

E. When the striped bass are in the possession of any person, other than the original harvester, for the purpose of resale, the striped bass shall be accompanied by a bill of sale which shall include the name of the seller, the permit or license number of the seller if such permit or license is required in the jurisdiction of harvest, the date of sale, the pounds of striped bass in

possession, the location of catch and the gear type used to harvest the striped bass. If the striped bass product for sale is fillets, the bill of sale shall also specify the number of fillets.

4VAC20-252-130. Entry limits, permits, and reports.

A. There is established a special permit for engaging in either the Chesapeake area commercial fishery for striped bass or the coastal area commercial fishery for striped bass, and it shall be unlawful for any person to engage in either commercial fishery for striped bass without first having obtained the permit from the commission and meeting the following conditions:

1. The person shall be a licensed registered commercial fisherman.

2. The person shall have reported all prior fishing activity in accordance with 4VAC20-610 and shall not be under any sanction by the Marine Resources Commission for noncompliance with the regulation.

B. Permits for the commercial harvest of striped bass in the Chesapeake area or coastal area shall be issued to any registered commercial fishermen holding striped bass quota shares issued under the provisions of 4VAC20-252-150 and 4VAC20-252-160.

C. Permits shall be in the possession of the permittee while catching, harvesting, selling or possessing striped bass. Failure to have the appropriate permit in possession shall be a violation of this chapter.

D. It shall be unlawful for any person, business, or corporation, except for licensed restaurants, to purchase from the harvester any quantity of striped bass greater than 10 pounds in total weight taken from Virginia's tidal waters for the purpose of resale without first obtaining a striped bass buyer's permit from the commission, except as described in subsection E of this section. Such permit shall be completed in full by the permittee and kept in possession of the permittee while selling or possessing striped bass. Failure to have the appropriate permit in possession shall be a violation of this chapter.

E. Restaurants shall not be required to obtain a striped bass buyer's permit from the commission but shall be required to certify and maintain a record of any striped bass purchased from any harvester for a period of not less than one year.

F. All permitted commercial harvesters of striped bass shall report to the commission in accordance with 4VAC20-610. In addition to the reporting requirements of 4VAC20-610, all permitted commercial harvesters of striped bass shall record and report daily striped bass harvest by specifying the number of tags used on striped bass harvested for each day in either the Chesapeake area or coastal area and reporting the daily total whole weight of striped bass

harvested in either the Chesapeake area or coastal area. Daily striped bass tag use on harvested striped bass and daily total whole weight of harvested striped bass from either the Chesapeake area or coastal area, within any month, shall be recorded on forms provided by the commission and shall accompany the monthly catch report submitted no later than the fifth day of the following month.

G. Any permitted commercial harvester of striped bass who self markets his striped bass to a restaurant, individual, or out-of-state market shall be required to prepare a receipt describing each sale greater than 10 pounds in total weight. Each receipt shall be a record and report of the date of transaction, name and signature of buyer, address and phone number of buyer, number and total weight of striped bass sold, and name and signature of harvester. Copies of each receipt shall be forwarded to the commission in accordance with 4VAC20-610.

H. Any buyer permitted to purchase striped bass harvested from Virginia tidal waters shall provide written reports to the commission of daily purchases and harvest information on forms provided by the Marine Resources Commission. Such information shall include the date of the purchase, buyer's and harvester's striped bass permit numbers, and harvester's Commercial Fisherman Registration License number. In addition, for each different purchase of striped bass harvested from Virginia waters, the buyer shall record the gear type, water area fished, city or county of landing, weight of whole fish, and number and type of tags (Chesapeake area or coastal area) that applies to that harvest. These reports shall be completed in full and submitted monthly to the Marine Resources Commission no later than the fifth day of the following month. In addition, during the month of December, each permitted buyer shall call the Marine Resources Commission interactive voice recording system on a daily basis to report his name and permit number, date, pounds of Chesapeake area striped bass purchased and pounds of coastal area striped bass purchased.

I. Failure of any person permitted to harvest, buy, or sell striped bass, to submit the required written report for any fishing day shall constitute a violation of this chapter.

4VAC20-252-135. Gill net mesh size and tending restrictions: exemptions.

A. Any registered commercial fisherman who is permitted to harvest striped bass from the coastal area in accordance with 4VAC20-252-130 C and sets or fishes any gill net in the coastal area shall be exempt from the maximum gill net mesh size requirements during November and December as described in 4VAC20-430-65 A and B.

B. Any registered commercial fisherman who is permitted to harvest striped bass from the coastal area in accordance with 4VAC20-252-130 C and sets or fishes any gill net seven inches

or greater in stretched mesh in the coastal area shall be exempt from the tending requirements described in 4VAC20-430-65 E and F during the months of November and December.

C. Any registered commercial fisherman who is permitted to harvest striped bass from the coastal area in accordance with 4VAC20-252-130 C shall display an optic yellow flag issued by the commission while fishing for striped bass in the coastal area and while transiting the coastal area before and after a striped bass fishing trip. This flag shall be prominently displayed on the starboard side of the vessel.

4VAC20-252-140. Commercial seasons, areas, and size limits.

Except as may be adjusted pursuant to 4VAC20-252-150, the open commercial striped bass fishing seasons, areas, and applicable size limits shall be as follows:

1. In the Chesapeake area, the open commercial season shall be from February 1 through December 31, inclusive. The minimum size limit shall be 18 inches total length during the periods of February 1 through December 31. The maximum size limit shall be 28 inches from March 26 through June 15.

2. In the coastal area, the open commercial season shall be February 1 through December 31, inclusive, and the minimum size limit shall be 28 inches total length.

4VAC20-252-150. Individual commercial harvest quota.

A. The commercial harvest quota for the Chesapeake area shall be determined annually by the Marine Resources Commission. The total allowable level of all commercial harvest of striped bass from the Chesapeake Bay and its tributaries and the Potomac River tributaries of Virginia for all open seasons and for all legal gear shall be 1,430,361 pounds of whole fish. At such time as the total commercial harvest of striped bass from the Chesapeake area is projected to reach 1,430,361 pounds, and announced as such, it shall be unlawful for any person to land or possess striped bass caught for commercial purposes from the Chesapeake area.

B. The commercial harvest quota for the coastal area of Virginia shall be determined annually by the Marine Resources Commission. The total allowable level of all commercial harvest of striped bass from the coastal area for all open seasons and for all legal gear shall be 184,853 pounds of whole fish. At such time as the total commercial harvest of striped bass from the coastal area is projected to reach 184,853 pounds, and announced as such, it shall be unlawful for any person to land or possess striped bass caught for commercial purposes from the coastal area.

C. For the purposes of assigning an individual's tags for commercial harvests in the Chesapeake area as described in 4VAC20-252-160, the individual commercial harvest quota of striped bass in pounds shall be converted to an estimate in numbers of fish per individual harvest quota based on the average weight of striped bass harvested by the permitted individual during the previous fishing year. The number of striped bass tags issued to each individual will equal the estimated number of fish to be landed by that individual harvest quota, plus a number of striped bass tags equal to 10% of the total allotment determined for each individual.

D. For the purposes of assigning an individual's tags for commercial harvests in the coastal area of Virginia as described in 4VAC20-252-160, the individual commercial harvest quota of striped bass in pounds shall be converted to a quota in numbers of fish per individual commercial harvest quota, based on the estimate of the average weight of striped bass harvested by the permitted individual during the previous fishing year. The number of striped bass tags issued to each individual will equal the estimated number of fish to be landed by that individual harvest quota, plus a number of striped bass tags equal to 10% of the total allotment determined for each individual.

4VAC20-252-155. Individual transferable shares monitoring and penalties.

A. Any initial overage by any person of an individual commercial harvest quota during any calendar year shall be considered a first offense, with penalties prescribed according to the severity of the overage as described in subdivisions 1 through 5 of this subsection.

1. Any overages that are less than 76 pounds shall result in a warning being issued.

2. Any overages that range from 76 to 250 pounds shall result in a one year deduction of that overage from that individual commercial harvest quota during the following calendar year.

3. Any overages that range from 251 to 475 pounds shall result in a one year deduction of two times that overage from that individual commercial harvest quota during the following calendar year.

4. Any overages that range from 476 to 725 pounds shall result in that overage being permanently deducted from that individual commercial harvest quota and a one year suspension of that individual from the commercial fishery for striped bass.

5. Any overages that are greater than 725 pounds shall result in the revocation of that individual striped bass permit, and that person shall not be eligible to apply for a like permit for a period of two years from the date of revocation.

B. Any second overage by any person of an individual commercial harvest quota within five years of a previous offense shall result in penalties prescribed according to the severity of the overage as described in subdivisions 1 through 4 of this subsection.

1. Any overages that are less than 76 pounds shall result in a one year deduction of the overage from that individual commercial harvest quota during the following calendar year.

2. Any overages that range from 76 to 250 pounds shall result in a one year deduction of two times the overage from that individual commercial harvest quota during the following calendar year.

3. Any overages that range from 251 to 475 pounds shall result in the overage being permanently deducted from the individual commercial harvest quota and a one year suspension of that individual from the commercial fishery for striped bass.

4. Any overages that are greater than 475 pounds shall result in the revocation of that individual striped bass permit, and that individual shall not be eligible to apply for a like permit for a period of two years from the date of revocation.

C. Any third overage by any person of an individual commercial harvest quota within five years of two previous offenses shall result in penalties prescribed according to the severity of the overage as described in subdivisions 1 through 3 of this subsection.

1. Any overages that are less than 76 pounds shall result in a one year deduction of two times the overage from that individual commercial harvest quota during the following calendar year.

2. Any overages that range from 76 to 250 pounds shall result in the overage being permanently deducted from that individual commercial harvest quota and a one year suspension of the individual from the commercial fishery for striped bass.

3. Any overages that are greater than 250 pounds shall result in the revocation of that individual striped bass permit, and that person shall not be eligible to apply for a like permit for a period of two years from the date of revocation.

D. Any fourth overage by any person of an individual commercial harvest quota within five years of three previous offenses shall result in penalties prescribed according to the severity of the overage as described in subdivisions 1 and 2 of this subsection.

1. Any overages that are less than 76 pounds shall result in the overage being permanently deducted from that individual commercial harvest quota and a one year suspension of the individual from the commercial fishery for striped bass.

2. Any overages that are greater than 75 pounds shall result in the revocation of that individual striped bass permit, and that individual shall not be eligible to apply for a like permit for a period of two years from the date of revocation.

4VAC20-252-160. Individual transferable shares; tagging.

A. For each person permitted under the provisions of 4VAC20-252-130 to harvest striped bass commercially, a weight quota shall be issued to permitted fishermen in amounts equal to the percentage share of the Chesapeake area and coastal area striped bass harvest quota they hold. Tags issued for Chesapeake area harvest quota shall only be used for striped bass harvests in the Chesapeake area, and tags issued for the coastal area harvest quota shall only be used for striped bass harvests in the coastal area.

B. It shall be unlawful for any person or any person aboard any vessel to possess striped bass tags, as described in this subsection, except as described in subsection C of this section. Unlawful striped bass tags shall be confiscated and impounded by the commission and returned to the issuing agency.

1. Chesapeake area tags in the coastal area.

2. Tags issued for previous years for either the Chesapeake area or coastal area.

3. Potomac River Fisheries Commission striped bass tags in Virginia waters, excluding the Virginia tributaries of the Potomac River.

4. Maryland striped bass tags in Virginia waters.

5. Tags from any other jurisdiction in Virginia waters.

C. It shall be lawful for any person or any person onboard a vessel to possess Maryland or Potomac River Fisheries Commission current year striped bass tags in the Great Wicomico River and those Virginia waters north and west of a line beginning at Fleeton Point; thence extending to the southern most point of Tangier Island, and thence to a point due north on the Virginia–Maryland state boundary. Unlawful striped bass tags shall be confiscated and impounded by the commission and returned to the issuing agency.

D. Shares of the commercial striped bass quota held by any permitted fisherman may be transferred to any other person who is a licensed registered commercial fisherman; such transfer

shall allow the transferee to harvest striped bass in a quantity equal to the share transferred. Any transfer of striped bass commercial shares shall be limited by the following conditions.

1. Commercial striped bass shares shall not be transferred in any quantity less than 200 pounds, and transfers shall be prohibited during the period of December 1 through February 1.

2. No licensed registered commercial fisherman shall hold more than 2.0% of the total annual Chesapeake area commercial striped bass harvest quota or more than 11% of the total annual coastal area commercial striped bass harvest quota.

3. No transfer of striped bass commercial harvest quota shall be authorized by the commission unless transferor and transferee provide up-to-date records of all commercial landings of striped bass and striped bass tag use to the commission prior to such transfer.

4. No transfer of striped bass commercial harvest quota shall be authorized unless such transfer is documented on a form provided by the Marine Resources Commission, notarized by a lawful Notary Public, and approved by the commissioner.

E. Transfers of Chesapeake area or coastal area striped bass commercial quota from one person to another may be permanent or temporary. Transferred quota from the Chesapeake area striped bass commercial quota shall only be used by the transferee for striped bass harvested from the Chesapeake area, and transferred quota from the coastal area striped bass commercial quota shall only be used by the transferee for striped bass harvested from the coastal area. Permanent transfers of commercial quota shall grant to the transferee that transferred percentage of the quota for future years, and the transferor loses that same transferred percentage of the quota in future years. Temporary transfers of individual striped bass commercial harvest quota shall allow the transferee to harvest only that transferred percentage of the quota during the year in which the transfer is approved. Transferors are solely responsible for any overage of the transferred percentage of the quota by the transferee. Thereafter, any percentage of the transferred striped bass commercial quota, less any overage incurred by the transferee, reverts back to the transferor.

F. The commission will issue striped bass tags to permitted striped bass commercial fishermen as follows: those fishermen permitted only for Chesapeake area or coastal area harvests of striped bass will receive their allotment of tags prior to the start of the fishing season. Any permitted fisherman, eligible for both Chesapeake area and coastal area tags, shall receive only one type of area-specific tag allotment, of his choosing, prior to the start of the fishing season, and his other type of area-specific tags will be distributed when it has been determined from the commission's mandatory harvest reporting program that the fisherman has used all of his first allotment of tags and has not exceeded his individual harvest quota. The commissioner may authorize the distribution of the second allotment of area-specific tags to a fisherman

eligible for both Chesapeake area and Coastal area tags prior to that fisherman's complete use of his first allotment of tags, provided that fisherman surrenders any remaining tags of his first allotment of tags.

G. Striped bass tags are valid only for use by the permittee to whom the tags were allotted. The permittee shall be on board the boat or vessel when striped bass are harvested and tags are applied. Nothing in this subsection shall prevent a permitted commercial hook-and-line fisherman from using three crew members who are not registered commercial fishermen to assist in the harvest of his allotment of striped bass.

H. At the place of capture, and before leaving that place of capture, tags shall be passed through the mouth of the fish and one gill opening, and interlocking ends of the tag shall then be connected such that the tag may only be removed by breaking. Failure to comply with these provisions shall be a violation of this chapter.

I. It shall be unlawful to bring to shore any commercially caught striped bass that has not been tagged at the place of capture by the fisherman with a tamper evident, numbered tag provided by the commission. It shall be unlawful to possess striped bass in a quantity greater than the number of tags in possession. If a permittee violates this section, the entire amount of untagged striped bass, as well as the number of tags equal to the amount of striped bass in his possession, shall be confiscated. Any confiscated striped bass shall be considered as a removal from that permittee’s harvest quota. Any confiscated striped bass tags shall be impounded by the commission. Upon confiscation, the marine police officer shall inventory the confiscated striped bass and may redistribute the catch by one or a combination of the following methods:

1. The marine police officer shall secure a minimum of two bids for purchase of the confiscated striped bass from approved and licensed seafood buyers. The confiscated fish will be sold to the highest bidder, and all funds derived from such sale shall be deposited to the Commonwealth pending court resolution of the charge of violating the possession limits established in this chapter. All of the collected funds and confiscated tags will be returned to the accused upon a finding of innocence or forfeited to the Commonwealth upon a finding of guilt.

2. The marine police officer shall provide the confiscated striped bass to commission staff for biological sampling of the catch. Upon receipt of confiscated striped bass, commission staff will secure a minimum of two estimates of value per pound for striped bass from approved and licensed seafood buyers. The confiscated tags and the estimated value of confiscated striped bass provided for biological sampling will be reimbursed to the accused upon a finding of innocence or retained by the commission upon a finding of guilt.

J. Altering or attempting to alter any tag for the purpose of reuse shall constitute a violation of this chapter.

K. Prior to receiving any commercial season's allotment of striped bass tags, a permitted commercial harvester shall be required to have returned all unused tags from the previous commercial season to the commission within 30 days of harvesting their individual harvest quota, or by the second Thursday in January, whichever comes first. Any unused tags that cannot be turned in to the commission shall be accounted for by the harvester submitting an affidavit to the commission that explains the disposition of the unused tags that are not able to be turned into the commission. Each individual shall be required to pay a processing fee of $25, plus $0.13 per tag, for any unused tags that are not turned in to the commission.

L. Any individual with remaining unused striped bass commercial quota in the current year requesting additional commercial season striped bass tags shall provide up-to-date records of landings and account for all previously issued tags prior to receiving an additional allotment of tags. The harvester shall submit an affidavit to the commission that explains the disposition of the tags that are not accounted for and shall be required to pay a processing fee of $25, plus $0.13 per tag, for such tags to the commission.

M. For the commercial fishing season, one type of tag shall be distributed to Chesapeake area permittees and one type of tag shall be distributed to coastal area permittees. For the Chesapeake area, the tag shall only be used on striped bass 18 inches or greater. For the coastal area, the tag shall only be used on striped bass 28 inches or greater. The possession of any improperly tagged striped bass by any permitted striped bass fisherman shall be a violation of this chapter.

4VAC20-252-170. Aquaculture of striped bass; permit required.

A. It shall be unlawful for any person to operate a striped bass aquaculture facility without first obtaining a permit from the commission. Such permit shall authorize and define the limits of activities concerning the purchase, possession, sale, giving, receiving, and transportation of striped bass or hybrid striped bass in accordance with the other rules contained in this chapter.

B. The application for a striped bass aquaculture facility shall state the name and address of the applicant, the type and location of the facility, type of water supply, location of nearest tidal waters or tributaries to tidal water, and an estimate of production capacity. All aquaculture permits shall expire on December 31 of the year of issue and are not transferable. Permits shall be automatically renewed by the commission provided no structural changes in the facility have been made, the facility has been adequately maintained, and the permittee has complied with all of the provisions of this chapter.

C. The original of each permit shall be maintained and prominently displayed at the aquaculture facility described therein. A copy of such permit may be used as evidence of authorization to transport striped bass or hybrid striped bass or to sell the fish away from the permitted facility under the conditions imposed in 4VAC20-252-210.

4VAC20-252-180. Water supply; outfall; prevention of entry and escapement.

A. A striped bass or hybrid striped bass aquaculture facility may consist of one or more ponds, artificial impoundments, closed recirculating systems or a combination of the above.

B. No pond or impoundment used for striped bass or hybrid striped bass aquaculture may be constructed or situated on a natural water course that originates beyond the boundaries of private land upon which the pond or impoundment is located.

C. There shall be no direct and unscreened discharge from any facility to any natural watercourse. Except as provided in subsection D of this section, outfall from any pond or impoundment shall be processed according to one of the following systems:

1. The outfall shall pass over a dry ground percolation system in which ground absorption of the water is sufficient to prevent the formation of a watercourse which is capable of reaching any natural watercourse. The outfall shall pass through a screened filter box prior to entering the percolation area.

2. The outfall shall pass through a chlorination process and retention pond for dechlorination. The outfall shall pass through a filter box prior to entering the chlorination system.

3. Such facilities must also comply with regulations of the State Water Control Board.

D. If the outfall from an aquaculture facility does not conform to the systems described in subdivision C 1 or C 2 of this section, then all of the following conditions shall be required:

1. The aquaculture of striped bass or hybrid striped bass shall be restricted to the use of cage culture. Such cages shall be constructed of a vinyl coated wire or high density polyethylene mesh material sufficient in size to retain the fish, and all cages must be securely anchored to prevent capsizing. Covers shall be required on all cages.

2. The outfall from the pond or impoundment shall pass through a screened filter box. Such filter box shall be constructed of a mesh material sufficient in size to retain the fish and shall be maintained free of debris and in workable condition at all times.

3. The outfall from the screened filter box shall pass into a containment basin lined and filled with quarry rock or other suitable material to prevent the escapement of the fish from the basin.

E. Those facilities utilizing embankment ponds shall maintain sufficient freeboard above the spillway to prevent overflow.

4VAC20-252-190. Acquisition of fish, fingerlings, fry, and eggs.

Striped bass or hybrid striped bass fingerlings, fry, or eggs, may be obtained only from state permitted fish dealers and must be certified by the seller as having a disease free status. Each purchase or acquisition of striped bass or hybrid striped bass must be accompanied by a receipt or other written evidence showing the date, source, species, quantity of the acquisition and its destination. Such receipt must be in the possession of the permittee prior to transportation of such fish, fingerlings, fry, or eggs to the permitted facility. All such receipts shall be retained as part of the permittee's records. The harvesting of striped bass from the tidal waters of Virginia for the purpose of artificially spawning in a permitted aquaculture facility shall comply with all of the provisions of this chapter and state law including minimum size limits, maximum size limits, and closed harvesting seasons and areas.

4VAC20-252-200. Inspection of facilities; diseased fish.

A. Inspections. Agents of the commission and the Department of Game and Inland Fisheries are authorized to make periodic inspection of the facilities and the stock of each operation permitted under this section. Every person engaged in the business of striped bass aquaculture shall allow such inspection at any reasonable time.

B. Diseased fish. No person permitted under this chapter shall maintain in the permitted facility any fish which shows evidence of any contagious disease listed in the most current list by the United States Fish and Wildlife Service as "certifiable diseases," except for the period required for application of standard treatment procedures or for approved disposition.

C. Disposition. No person permitted under this chapter shall sell or otherwise transfer possession of any striped bass or hybrid striped bass which shows evidence of a "certifiable disease" to any person, except that such transfer may be made to a fish pathologist for examination and diagnosis.

4VAC20-252-210. Sale, records, importation, release.

A. All striped bass or hybrid striped bass except fingerlings, fry, and eggs, which are the product of an aquaculture facility permitted under this section shall be packaged with a printed

label bearing the name, address, and permit number of the aquaculture facility. When so packaged and labeled such fish may be transported and sold at retail or at wholesale for commercial distribution through normal channels of trade until reaching the ultimate consumer. Every such sale must be accompanied by a receipt showing the date of sale, the name, address and permit number of the aquaculture facility, the numbers and species of fish sold, and the name of the purchaser. Each subsequent resale must be accompanied by a receipt clearly identifying the seller by name and address, showing the number and species of the fish sold, the date sold, the permit number of the aquaculture facility and, if the sale is to other than the ultimate consumer, the name and address of the purchaser. The purchaser in possession of such fish must exhibit the receipt on demand of any law enforcement officer. A duplicate copy of each such receipt must be retained for one year by the seller as part of the records of each transaction.

B. Each permitted aquaculture facility operator shall maintain a chronological file of the receipts or copies thereof showing the dates and sources of acquisitions of striped bass or hybrid striped bass and quantities thereof, and a chronological file of copies of receipts of his sales required under subsection A of this section. Such records shall be segregated as to each permit year, shall be made available for inspection by any authorized agent of the commission or Department of Game and Inland Fisheries, and shall be retained for at least one year following the close of the permit year to which they pertain.

C. Striped bass or hybrid striped bass which are the product of an approved and state permitted aquaculture facility in another state may be imported into Virginia for the consumer market. Such fish shall be packaged and labeled in accordance with the provisions contained in subsection A of this section. Any sale of such fish also shall be accompanied by receipts as described in subsection A of this section.

D. Release of live fish. Under no circumstance shall striped bass which are the product of an aquaculture facility located within or outside the Commonwealth of Virginia be placed into the waters of the Commonwealth without first having notified the commission and having received written permission from the Commissioner of Marine Resources.

4VAC20-252-220. Penalty.

As set forth in §28.2-903 of the Code of Virginia, any person violating any provision of this chapter shall be guilty of a Class 3 misdemeanor, and a second or subsequent violation of any provision of this chapter committed by the same person within 12 months of a prior violation is a Class 1 misdemeanor.

4VAC20-252-230. Sanctions.

APPENDIX I.
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A. Any person failing to submit any report required by this chapter shall be denied a striped bass permit for the following year.

B. It shall be unlawful for any person with a pending violation of this chapter or found guilty of violating any provision of this chapter to receive or transfer striped bass commercial harvest quota as described in 4VAC20-252-160.

C. It shall be unlawful for any person with a pending violation of this chapter or found guilty of violating any provision of this chapter to receive additional tag distributions as described in 4VAC20-252-160.

D. Any person found guilty of violating any provision of this chapter may have his permit or license revoked at any time upon review by the commission as provided for in §28.2-232 of the Code of Virginia. If the commission revokes any person's permit for an aquaculture facility, then that person shall not be eligible to apply for a like permit for a period of two years from the date of revocation.

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APPENDIX II.
CHAPTER 4 VAC 20-252-10 ET SEQ., "PERTAINING TO THE TAKING OF STRIPED BASS" (IN EFFECT IN 2013)

Appendix II.

VIRGINIA MARINE RESOURCES COMMISSION

PERTAINING TO THE TAKING OF STRIPED BASS

CHAPTER 4VAC20-252-10 ET SEQ.

PREAMBLE

This chapter establishes a limited commercial and recreational fishery for striped bass in Virginia. The provisions of this chapter are intended to comply with all Federal and interstate requirements for fishing for striped bass. This chapter also authorizes the aquaculture of striped bass and hybrid striped bass and sets forth the conditions required for their culture.

This chapter is promulgated pursuant to the authority contained in §§ 28.2-201 and 28.2-204.1 of the Code of Virginia. This chapter amends and re-adopts, as amended, previous Chapter 4VAC20-252-10 et seq. which was promulgated August 28, 2012 and made effective on September 1, 2012. The effective date of this chapter, as amended, is January 1, 2013.

4VAC20-252-10. Purpose.

The purpose of this chapter is to provide for the continued sustained yield from the recovered striped bass stocks in Virginia and to limit the growth of the number of commercial participants in this fishery. The provisions pertaining to aquaculture serve to prevent the escape of cultured hybrid striped bass into the natural environment and to minimize the impact of cultured fish in the market place on the enforcement of other provisions of this chapter.

This regulation is not intended to create any property right in anyone, and the commission reserves the right to change this regulation at any time it deems it necessary because of biological conditions and to change the regulation in all other respects at any time it deems it necessary to carry out its statutory mission.

4VAC20-252-20. Definitions.

The following words and terms when used in this chapter shall have the following meaning unless the context clearly indicates otherwise:

"Chesapeake area" means the area that includes the Chesapeake Bay and its tributaries and the Potomac River tributaries.

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"Chesapeake Bay and its tributaries" means all tidal waters of the Chesapeake Bay and its tributaries within Virginia, westward of the shoreward boundary of the Territorial Sea, excluding the coastal area and the Potomac River tributaries as defined by this section.

"Coastal area" means the area that includes Virginia's portion of the Territorial Sea, plus all of the creeks, bays, inlets, and tributaries on the seaside of Accomack County, Northampton County (including areas east of the causeway from Fisherman Island to the mainland), and the City of Virginia Beach (including federal areas and state parks, fronting on the Atlantic Ocean and east and south of the point where the shoreward boundary of the Territorial Sea joins the mainland at Cape Henry).

"Commission" means the Marine Resources Commission.

"Commercial fishing" or "fishing commercially" or "commercial fishery" means fishing by any person where the catch is for sale, barter, trade, or any commercial purpose, or is intended for sale, barter, trade, or any commercial purpose.

"Potomac River tributaries" means all the tributaries of the Potomac River that are within Virginia's jurisdiction beginning with, and including, Flag Pond thence upstream to the District of Columbia boundary.

"Recreational fishing" or "fishing recreationally" or "recreational fishery" means fishing by any person, whether licensed or exempted from l licensing, where the catch is not for sale, barter, trade, or any commercial purpose, or is not intended for sale, barter, trade, or any commercial purpose.

"Share" means a percentage of the striped bass commercial harvest quota.

"Spawning reaches" means sections within the spawning rivers as follows:

1. James River from a line connecting Dancing Point and New Sunken Meadow Creek upstream to a line connecting City Point and Packs Point.

2. Pamunkey River from the Route 33 Bridge at West Point upstream to a line connecting Liberty Hall and the opposite shore.

3. Mattaponi River from the Route 33 Bridge at West Point upstream to the Route 360 bridge at Aylett.

4. Rappahannock River from the Route 360 Bridge at Tappahannock upstream to the Route 1 Falmouth Bridge.

“Spear” or “spearing” means to fish while the person is fully submerged under the water’s surface with a mechanically aided device designed to accelerate a barbed spear.

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"Striped bass" means any fish of the species *Morone saxatilis*, including any hybrid of the species *Morone saxatilis*.

4VAC20-252-30. General prohibitions and requirements.

A. It shall be unlawful for any person to possess any striped bass taken from the tidal waters of Virginia, including Virginia's portion of the Territorial Sea, except in accord with the provisions of Title 28.2 of the Code of Virginia and in accord with the provisions of this chapter.

B. It shall be unlawful for any person to possess any striped bass taken from the tidal waters of Virginia, including Virginia's portion of the Territorial Sea, during a time, from an area, and with a gear type when there is no open season set forth in this chapter for such time, area, and gear type.

C. Except for those persons permitted in accordance with 4VAC20-252-170, it shall be unlawful for any person to possess any striped bass less than 18 inches total length at any time.

D. It shall be unlawful for any person to possess any striped bass that measures less than the minimum size or more than the maximum size applicable to the open season when fishing occurs, except as described in 4VAC20-252-115.

E. Total length measurement of striped bass shall be in a straight line from tip of nose to tip of tail.

F. It shall be unlawful for any person while aboard any boat or vessel or while fishing from shore or pier to alter any striped bass or to possess any altered striped bass such that its total length cannot be determined.

G. It shall be unlawful for any person to gaff or attempt to gaff any striped bass at any time.

H. It shall be unlawful for any person to use a commercial hook and line within 300 feet of any bridge, bridge-tunnel, jetty, or pier during Thanksgiving Day and the following day or during any open recreational striped bass season in the Chesapeake Bay and its tributaries, except during the period midnight Sunday through 6 a.m. Friday.

I. Unless specified differently in other regulations, it shall be unlawful to place, set, or fish any gill net within 300 feet of any bridge, bridge-tunnel, jetty, or pier during any open recreational striped bass season in the Chesapeake Bay and its tributaries, except during the period midnight Sunday through midnight Wednesday.

J. During the period April 1 through May 31, inclusive, it shall be unlawful for any person to set or fish any anchored gill net or staked gill net, for any purpose, within the spawning reaches of the James, Pamunkey, Mattaponi, and Rappahannock Rivers. Drift or float gill nets may be set and fished within the spawning reaches of these rivers during this period, provided that the

person setting and fishing the net remains with the net during the time it is fishing and all striped bass that are caught shall be returned to the water immediately.

K. Holding any permit issued by the commission to fish for striped bass, recreationally or commercially, shall authorize any commission personnel or their designees to inspect, measure, weigh, or take biological samples from any striped bass in possession of the permit holder.

L. Nothing in this chapter shall preclude any person, who is legally eligible to fish, from possessing any striped bass tagged with a Virginia Institute of Marine Science (VIMS) fluorescent green tag. Possession of these VIMS-tagged striped bass shall not count towards the personal recreational possession limit, and permitted commercial striped bass individual transferable quota (ITQ) holders shall not be required to apply a tamper evident, numbered tag provided by the commission, in order to possess any striped bass tagged with a VIMS-inscribed green fluorescent tag. It shall be unlawful for any person to retain any of these VIMS-tagged striped bass for a period of time that is longer than necessary to provide the VIMS-tagged striped bass to a VIMS representative. Under no circumstance shall any VIMS-tagged striped bass be stored for future use or sale or delivered to any person who is not a VIMS representative.

4VAC20-252-40. Severability.

Any provision of this chapter that is held invalid by a court of competent jurisdiction shall not affect the validity of other provisions of this chapter which can be given effect without the invalid provision.

4VAC20-252-50. Concerning recreational fishing: general.

A. It shall be unlawful for any person fishing recreationally to take, catch, or attempt to take or catch any striped bass by any gear or method other than hook and line, rod and reel, hand line, or spearing.

B. It shall be unlawful for any person fishing recreationally to possess any striped bass while fishing in an area where or at a time when there is no open recreational striped bass season, except as described in 4VAC20-252-115. Striped bass caught contrary to this provision shall be returned to the water immediately.

C. It shall be unlawful for any person fishing recreationally to possess land and retain any striped bass in excess of the possession limit applicable for the area and season being fished within the 24-hour period of 12 a.m. through 11:59 p.m. Striped bass taken in excess of the possession limit shall be returned to the water immediately.

When fishing from a boat or vessel where the entire catch is held in a common hold or container, the possession limit shall be for the boat or vessel and shall be equal to the number of persons on board legally eligible to fish multiplied by the applicable personal possession limit.

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The captain or operator of the boat or vessel shall be responsible for any boat or vessel possession limit.

D. It shall be unlawful to combine possession limits when there is more than one area or season open at the same time.

E. It shall be unlawful for any person while actively fishing pursuant to a recreational fishery to possess any striped bass that are smaller than the minimum size limit or larger than the maximum size limit for the area and season then open and being fished, except as described in 4VAC20-252-115. Any striped bass caught that does not meet the applicable size limit shall be returned to the water immediately.

F. It shall be unlawful for any person to sell, offer for sale, trade or barter any striped bass taken by hook and line, rod and reel, hand line, or spearing provided, however, this provision shall not apply to persons possessing a commercial hook-and-line license and a striped bass permit and meeting the other requirements of this chapter.

G. It shall be unlawful for any person fishing recreationally to transfer any striped bass to another person, while on the water or while fishing from a pier or shore.

H. It shall be unlawful for the captain of any charter boat or charter vessel to take hook-and-line, rod-and-reel, hand line, or spear fishermen for hire unless the captain has obtained a permit from the commission and is the holder of a Coast Guard charter license.

I. Charter boat captains shall report to the commission, on forms provided by the commission, all daily quantities of striped bass caught and harvested, and daily fishing hours for themselves or their customers, respectively. The written report shall be forwarded to the commission no later than 15 days following the last day of any open season. In addition, charter boat captains engaging in the Bay and Coastal Spring Trophy-size Striped Bass Recreational Fishery and the Potomac River Tributaries Spring Striped Bass Recreational Fishery shall provide the report required by 4VAC20-252-60 and 4VAC20-252-70, respectively. Failure to provide these reports is a violation of this chapter.

4VAC20-252-55. Recreational harvest quota.

The total allowable level of all recreational harvest of striped bass for all open seasons and for all legal gear shall be 1,230,110 pounds of whole fish. At such time as the total recreational harvest of striped bass is projected to reach 1,230,110 pounds, and announced as such, it shall be unlawful for any person to land or possess striped bass caught for recreational purposes.

4VAC20-252-60. Bay and Coastal Spring Trophy-size Striped Bass Recreational Fisheries.

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A. The open season for the Bay Spring Trophy-size Striped Bass Recreational Fishery shall be May 1 through June 15, inclusive; however, the season may be adjusted as set forth in subsection G of this section.

B. The area open for the Bay Spring Trophy-size fishery shall be the Chesapeake Bay and its tributaries, except the spawning reaches of the James, Pamunkey, Mattaponi, and Rappahannock Rivers.

C. The open season for the Coastal Spring Trophy-size Striped Bass Recreational Fishery shall be May 1 through May 15, inclusive; however, the season may be adjusted as set forth in subsection G of this section.

D. The area open for the Coastal Spring Trophy-size Striped Bass Recreational Fishery is the coastal area as described in 4VAC20-252-20.

E. The minimum size limit for the fisheries described in this section shall be 32 inches total length.

F. The possession limit for the fisheries described in this section shall be one fish per person.

G. The Bay and Coastal Spring Trophy-size fisheries, combined with the fishery defined by 4VAC20-252-70, shall have a target take of 30,000 total fish coming from both the Virginia and Maryland portions of the Chesapeake Bay and any tributaries of the Chesapeake Bay and the Potomac River, and includes the area under the jurisdiction of the Potomac River Fisheries Commission. The season for this fishery shall be closed when it is determined that this total target has been reached.

H. Persons engaging in the Bay and Coastal fisheries shall report the retention of any striped bass to the commission. Filing the report shall be the responsibility of the person retaining the striped bass or, in the case of any charter boat or vessel, the captain of the charter boat or vessel. These reports are due 15 days after the close of this fishery and shall be on forms provided by the commission. There will be separate forms for persons and for charter boats or vessels.

4VAC20-252-70. Potomac River tributaries spring trophy-size striped bass recreational fishery.

A. The open season for the Potomac River tributaries spring striped bass recreational fishery shall correspond to the open season as established by the Potomac River Fisheries Commission for the mainstem Potomac River spring fishery.

B. The area open for this fishery shall be those tributaries of the Potomac River that are within Virginia's jurisdiction beginning with, and including, Flag Pond thence upstream to the Route 301 bridge.

C. The minimum size limit for this fishery shall correspond to the minimum size limit as established by the Potomac River Fisheries Commission for the mainstem Potomac River spring trophy-size fishery.

D. The possession limit for this fishery shall be one fish per person.

E. This fishery, combined with the fishery defined by 4VAC20-252-60, shall have a target take of 30,000 total fish coming from both the Virginia and Maryland portions of the Chesapeake Bay and any tributaries of the Chesapeake Bay and Potomac River, and includes the area under the jurisdiction of the Potomac River Fisheries Commission. The season for this fishery shall be closed when it is determined that this total target has been reached.

F. Persons engaging in this fishery shall report the retention of any striped bass to the commission. Filing the report shall be the responsibility of the person retaining the striped bass, or, in the case of any charter boat or vessel, the captain of the charter boat or vessel. These reports are due 15 days after the close of this fishery and shall be on forms provided by the commission. There will be separate forms for persons and for charter boats or vessels.

4VAC20-252-80. Bay Spring/Summer Striped Bass Recreational Fishery.

A. The open season for the Bay Spring/Summer Striped Bass Recreational Fishery shall be May 16 through June 15 inclusive.

B. The area open for this fishery shall be the Chesapeake Bay and its tributaries.

C. The minimum size limit for this fishery shall be 18 inches total length, and the maximum size limit for this fishery shall be 28 inches total length, except as provided in subsection E of this section.

D. The possession limit for this fishery shall be two fish per person.

E. The possession limit described in subsection D of this section may consist of one trophy-size striped bass 32 inches or greater, which is subject to the provisions of subsections A, B, E, F, G and H of 4VAC20-252-60.

4VAC20-252-85. [Repealed]

4VAC20-252-90. Bay fall striped bass recreational fishery.

A. The open season for the bay fall striped bass recreational fishery shall be October 4 through December 31, inclusive.

B. The area open for this fishery shall be the Chesapeake Bay and its tributaries.

C. The minimum size limit for this fishery shall be 18 inches total length.

D. The maximum size limit for this fishery shall be 28 inches total length; however, the maximum size limit shall only apply to one fish of the possession limit.

E. The possession limit for this fishery shall be two fish per person.

4VAC20-252-100. Potomac River tributaries summer/fall striped bass recreational fishery.

A. The open season for the Potomac River tributaries summer/fall striped bass fishery shall correspond to the open summer/fall season as established by the Potomac River Fisheries Commission for the mainstem Potomac River.

B. The area open for this fishery shall be the Potomac River tributaries.

C. The minimum size limit for this fishery shall be 18 inches total length.

D. The maximum size limit for this fishery shall be 28 inches total length; however, the maximum size limit shall only apply to one fish of the possession limit.

E. The possession limit for this fishery shall be two fish per person.

4VAC20-252-110. Coastal striped bass recreational fishery.

A. The open seasons for the coastal striped bass recreational fishery shall be January 1 through March 31 and May 16 through December 31, inclusive.

B. The area open for this fishery shall be the coastal area as defined in this chapter.

C. The minimum size limit for this fishery shall be 28 inches total length.

D. The possession limit for this fishery shall be two fish per person.

4VAC20-252-115. Exemptions from size limits and closed fishing seasons for recreational striped bass fishing tournaments.

A. The commissioner or his designee may grant exemptions for any recreational fishing tournament from size and season limitations described in 4VAC20-252-80, 4VAC-20-252-90, 4VAC20-252-100 and 4VAC20-252-110 provided that the tournament meets all of the following conditions:

1. The tournament operates for a limited duration, with a maximum of three consecutive days.

2. The tournament format provides for the live release of all fish and significant penalties for entrants bringing in or weighing in dead striped bass.

3. The tournament director submits a written proposal to the commissioner detailing the measures the tournament will use to ensure the survivability of fish entered in the tournament, to include capture, handling and storage of fish by tournament entrants on the water during the competition, by tournament officials at the weigh-in, by tournament officials when transporting and returning the fish to the water, and any penalties that will apply to entrants bringing in or weighing dead fish. Such proposal must be submitted no later than 120 days prior to the tournament, and the proposal must be determined by the commissioner to adequately address potential mortality issues.

4. Tournament officials must agree to provide any or all fish entered in the tournament to the Marine Resources Commission, or to any designee of the Marine Resources Commission, upon written request, and tournament officials agree to allow Marine Resources Commission staff access to all tournament areas during the event for the purposes of observation and assessment, upon request.

B. Any determination by the commissioner or his designee that approval of any requested recreational striped bass tournament could jeopardize the status of the striped bass stock or prove to be an issue of compliance with the interstate fishery management plan will result in disapproval of that request.

4VAC20-252-120. Concerning commercial fishing: general.

A. It shall be unlawful for any person to engage in the commercial fishery for striped bass without first having the necessary commercial fisherman's registration license and appropriate gear license as required by Title 28.2 of the Code of Virginia, and the special permit to fish for striped bass established in 4VAC20-252-130, except as provided in subsection G of 4VAC20-252-160.

B. It shall be unlawful for any person fishing commercially to possess any striped bass taken outside any open commercial season or area, or with gear inapplicable to the season and area, as specified in 4VAC20-252-140. Any striped bass caught contrary to this provision shall be returned to the water immediately.

C. It shall be unlawful for any person while actively fishing pursuant to a commercial fishery to possess any striped bass that is less than the minimum size limit applicable for the area and season then open and being fished. Any striped bass caught that does not meet the applicable minimum size limit shall be returned to the water immediately.

D. All striped bass in the possession of any person for the purpose of sale must be identified with a tamper-evident sealed tag that has been approved and issued by the appropriate authority in the jurisdiction of capture. Whole striped bass shall have tags attached directly to the fish. Processed or filleted striped bass must be accompanied by the tags removed from the fish when processed. Any person who possesses any amount of striped bass in excess of the maximum number allowed for a licensed recreational fisherman as described in 4VAC20-252-60 through 4VAC20-252-110, inclusive, shall be considered as possessing all striped bass for the purpose of sale. When any person possesses striped bass in excess of the maximum number allowed a licensed recreational fisherman, all striped bass of said person shall be tagged, and the possession of any untagged striped bass shall be prima facie evidence of a violation of this chapter and subject to the provisions of 4VAC20-252-160 H and I and 4VAC20-252-230.

E. When the striped bass are in the possession of any person, other than the original harvester, for the purpose of resale, the striped bass shall be accompanied by a bill of sale which shall include the name of the seller, the permit or license number of the seller if such permit or license is required in the jurisdiction of harvest, the date of sale, the pounds of striped bass in possession, the location of catch and the gear type used to harvest the striped bass. If the striped bass product for sale is fillets, the bill of sale shall also specify the number of fillets.

4VAC20-252-130. Entry limits, permits, and reports.

A. There is established a special permit for engaging in either the Chesapeake area commercial fishery for striped bass or the coastal area commercial fishery for striped bass, and it shall be unlawful for any person to engage in either commercial fishery for striped bass without first having obtained the permit from the commission and meeting the following conditions:

1. The person shall be a licensed registered commercial fisherman.

2. The person shall have reported all prior fishing activity in accordance with 4VAC20-610 and shall not be under any sanction by the Marine Resources Commission for noncompliance with the regulation.

B. Permits for the commercial harvest of striped bass in the Chesapeake area or coastal area shall be issued to any registered commercial fishermen holding striped bass quota shares issued under the provisions of 4VAC20-252-150 and 4VAC20-252-160.

C. Permits shall be in the possession of the permittee while catching, harvesting, selling or possessing striped bass. Failure to have the appropriate permit in possession shall be a violation of this chapter.

D. It shall be unlawful for any person, business, or corporation, except for licensed restaurants, to purchase from the harvester any quantity of striped bass greater than 10 pounds in

total weight taken from Virginia's tidal waters for the purpose of resale without first obtaining a striped bass buyer's permit from the commission, except as described in subsection E of this section. Such permit shall be completed in full by the permittee and kept in possession of the permittee while selling or possessing striped bass. Failure to have the appropriate permit in possession shall be a violation of this chapter.

E. Restaurants shall not be required to obtain a striped bass buyer's permit from the commission but shall be required to certify and maintain a record of any striped bass purchased from any harvester for a period of not less than one year.

F. All permitted commercial harvesters of striped bass shall report to the commission in accordance with 4VAC20-610. In addition to the reporting requirements of 4VAC20-610, all permitted commercial harvesters of striped bass shall record and report daily striped bass harvest by specifying the number of tags used on striped bass harvested for each day in either the Chesapeake area or coastal area and reporting the daily total whole weight of striped bass harvested in either the Chesapeake area or coastal area. Daily striped bass tag use on harvested striped bass and daily total whole weight of harvested striped bass from either the Chesapeake area or coastal area, within any month, shall be recorded on forms provided by the commission and shall accompany the monthly catch report submitted no later than the fifth day of the following month.

G. Any permitted commercial harvester of striped bass who self markets his striped bass to a restaurant, individual, or out-of-state market shall be required to prepare a receipt describing each sale greater than 10 pounds in total weight. Each receipt shall be a record and report of the date of transaction, name and signature of buyer, address and phone number of buyer, number and total weight of striped bass sold, and name and signature of harvester. Copies of each receipt shall be forwarded to the commission in accordance with 4VAC20-610.

H. Any buyer permitted to purchase striped bass harvested from Virginia tidal waters shall provide written reports to the commission of daily purchases and harvest information on forms provided by the Marine Resources Commission. Such information shall include the date of the purchase, buyer's and harvester's striped bass permit numbers, and harvester's Commercial Fisherman Registration License number. In addition, for each different purchase of striped bass harvested from Virginia waters, the buyer shall record the gear type, water area fished, city or county of landing, weight of whole fish, and number and type of tags (Chesapeake area or coastal area) that applies to that harvest. These reports shall be completed in full and submitted monthly to the Marine Resources Commission no later than the fifth day of the following month. In addition, during the month of December, each permitted buyer shall call the Marine Resources Commission interactive voice recording system on a daily basis to report his name and permit number, date, pounds of Chesapeake area striped bass purchased and pounds of coastal area striped bass purchased.

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I. Failure of any person permitted to harvest, buy, or sell striped bass, to submit the required written report for any fishing day shall constitute a violation of this chapter.

4VAC20-252-135. Gill net mesh size and tending restrictions: exemptions.

A. Any registered commercial fisherman who is permitted to harvest striped bass from the coastal area in accordance with 4VAC20-252-130 C and sets or fishes any gill net in the coastal area shall be exempt from the maximum gill net mesh size requirements during November and December as described in 4VAC20-430-65 A and B.

B. Any registered commercial fisherman who is permitted to harvest striped bass from the coastal area in accordance with 4VAC20-252-130 C and sets or fishes any gill net seven inches or greater in stretched mesh in the coastal area shall be exempt from the tending requirements described in 4VAC20-430-65 E and F during the months of November and December.

C. Any registered commercial fisherman who is permitted to harvest striped bass from the coastal area in accordance with 4VAC20-252-130 C shall display an optic yellow flag issued by the commission while fishing for striped bass in the coastal area and while transiting the coastal area before and after a striped bass fishing trip. This flag shall be prominently displayed on the starboard side of the vessel.

4VAC20-252-140. Commercial seasons, areas, and size limits.

Except as may be adjusted pursuant to 4VAC20-252-150, the open commercial striped bass fishing seasons, areas, and applicable size limits shall be as follows:

1. In the Chesapeake area, the open commercial season shall be from January 16 through December 31, inclusive. The minimum size limit shall be 18 inches total length during the periods of January 16 through December 31. The maximum size limit shall be 28 inches from March 26 through June 15.

2. In the coastal area, the open commercial season shall be January 16 through December 31, inclusive, and the minimum size limit shall be 28 inches total length.

4VAC20-252-150. Individual commercial harvest quota.

A. The commercial harvest quota for the Chesapeake area shall be determined annually by the Marine Resources Commission. The total allowable level of all commercial harvest of striped bass from the Chesapeake Bay and its tributaries and the Potomac River tributaries of Virginia for all open seasons and for all legal gear shall be 1,230,110 pounds of whole fish. At such time as the total commercial harvest of striped bass from the Chesapeake area is projected to reach 1,230,110 pounds, and announced as such, it shall be unlawful for any person to land or possess striped bass caught for commercial purposes from the Chesapeake area.

B. The commercial harvest quota for the coastal area of Virginia shall be determined annually by the Marine Resources Commission. The total allowable level of all commercial harvest of striped bass from the coastal area for all open seasons and for all legal gear shall be 184,853 pounds of whole fish. At such time as the total commercial harvest of striped bass from the coastal area is projected to reach 184,853 pounds, and announced as such, it shall be unlawful for any person to land or possess striped bass caught for commercial purposes from the coastal area.

C. For the purposes of assigning an individual's tags for commercial harvests in the Chesapeake area as described in 4VAC20-252-160, the individual commercial harvest quota of striped bass in pounds shall be converted to an estimate in numbers of fish per individual harvest quota based on the average weight of striped bass harvested by the permitted individual during the previous fishing year. The number of striped bass tags issued to each individual will equal the estimated number of fish to be landed by that individual harvest quota, plus a number of striped bass tags equal to 10% of the total allotment determined for each individual.

D. For the purposes of assigning an individual's tags for commercial harvests in the coastal area of Virginia as described in 4VAC20-252-160, the individual commercial harvest quota of striped bass in pounds shall be converted to a quota in numbers of fish per individual commercial harvest quota, based on the estimate of the average weight of striped bass harvested by the permitted individual during the previous fishing year. The number of striped bass tags issued to each individual will equal the estimated number of fish to be landed by that individual harvest quota, plus a number of striped bass tags equal to 10% of the total allotment determined for each individual.

4VAC20-252-155. Individual transferable shares monitoring and penalties.

A. Any initial overage by any person of an individual commercial harvest quota during any calendar year shall be considered a first offense, with penalties prescribed according to the severity of the overage as described in subdivisions 1 through 5 of this subsection.

1. Any overages that are less than 76 pounds shall result in a warning being issued.

2. Any overages that range from 76 to 250 pounds shall result in a one year deduction of that overage from that individual commercial harvest quota during the following calendar year.

3. Any overages that range from 251 to 475 pounds shall result in a one year deduction of two times that overage from that individual commercial harvest quota during the following calendar year.

4. Any overages that range from 476 to 725 pounds shall result in that overage being permanently deducted from that individual commercial harvest quota and a one year suspension of that individual from the commercial fishery for striped bass.

5. Any overages that are greater than 725 pounds shall result in the revocation of that individual striped bass permit, and that person shall not be eligible to apply for a like permit for a period of two years from the date of revocation.

B. Any second overage by any person of an individual commercial harvest quota within five years of a previous offense shall result in penalties prescribed according to the severity of the overage as described in subdivisions 1 through 4 of this subsection.

1. Any overages that are less than 76 pounds shall result in a one year deduction of the overage from that individual commercial harvest quota during the following calendar year.

2. Any overages that range from 76 to 250 pounds shall result in a one year deduction of two times the overage from that individual commercial harvest quota during the following calendar year.

3. Any overages that range from 251 to 475 pounds shall result in the overage being permanently deducted from the individual commercial harvest quota and a one year suspension of that individual from the commercial fishery for striped bass.

4. Any overages that are greater than 475 pounds shall result in the revocation of that individual striped bass permit, and that individual shall not be eligible to apply for a like permit for a period of two years from the date of revocation.

C. Any third overage by any person of an individual commercial harvest quota within five years of two previous offenses shall result in penalties prescribed according to the severity of the overage as described in subdivisions 1 through 3 of this subsection.

1. Any overages that are less than 76 pounds shall result in a one year deduction of two times the overage from that individual commercial harvest quota during the following calendar year.

2. Any overages that range from 76 to 250 pounds shall result in the overage being permanently deducted from that individual commercial harvest quota and a one year suspension of the individual from the commercial fishery for striped bass.

3. Any overages that are greater than 250 pounds shall result in the revocation of that individual striped bass permit, and that person shall not be eligible to apply for a like permit for a period of two years from the date of revocation.

D. Any fourth overage by any person of an individual commercial harvest quota within five years of three previous offenses shall result in penalties prescribed according to the severity of the overage as described in subdivisions 1 and 2 of this subsection.

1. Any overages that are less than 76 pounds shall result in the overage being permanently deducted from that individual commercial harvest quota and a one year suspension of the individual from the commercial fishery for striped bass.

2. Any overages that are greater than 75 pounds shall result in the revocation of that individual striped bass permit, and that individual shall not be eligible to apply for a like permit for a period of two years from the date of revocation.

4VAC20-252-160. Individual transferable shares; tagging.

A. For each person permitted under the provisions of 4VAC20-252-130 to harvest striped bass commercially, a weight quota shall be issued to permitted fishermen in amounts equal to the percentage share of the Chesapeake area and coastal area striped bass harvest quota they hold. Tags issued for Chesapeake area harvest quota shall only be used for striped bass harvests in the Chesapeake area, and tags issued for the coastal area harvest quota shall only be used for striped bass harvests in the coastal area.

B. It shall be unlawful for any person or any person aboard any vessel to possess striped bass tags, as described in this subsection, except as described in subsection C of this section. Unlawful striped bass tags shall be confiscated and impounded by the commission and returned to the issuing agency.

6. Chesapeake area tags in the coastal area.

7. Tags issued for previous years for either the Chesapeake area or coastal area.

8. Potomac River Fisheries Commission striped bass tags in Virginia waters, excluding the Virginia tributaries of the Potomac River.

9. Maryland striped bass tags in Virginia waters.

10. Tags from any other jurisdiction in Virginia waters.

C. It shall be lawful for any person or any person onboard a vessel to possess Maryland or Potomac River Fisheries Commission current year striped bass tags in the Great Wicomico River and those Virginia waters north and west of a line beginning at Fleeton Point; thence extending to the southern most point of Tangier Island, and thence to a point due north on the Virginia–

Maryland state boundary. Unlawful striped bass tags shall be confiscated and impounded by the commission and returned to the issuing agency.

D. Shares of the commercial striped bass quota held by any permitted fisherman may be transferred to any other person who is a licensed registered commercial fisherman; such transfer shall allow the transferee to harvest striped bass in a quantity equal to the share transferred. Any transfer of striped bass commercial shares shall be limited by the following conditions:

1. Commercial striped bass shares shall not be transferred in any quantity less than 500 pounds, or 100% of unused permanent shares, in any year, from February 1 through September 30, and transfers shall be prohibited during the period of October 1 through November 30 and December 16 through January 31.

2. Temporary transfer of commercial striped bass shares in any quantity greater than 200 pounds shall be permitted between December 1 and December 16.

3. No licensed registered commercial fisherman shall hold more than 2.0% of the total annual Chesapeake area commercial striped bass harvest quota or more than 11% of the total annual coastal area commercial striped bass harvest quota.

4. No transfer of striped bass commercial harvest quota shall be authorized by the commission unless transferor and transferee provide up-to-date records of all commercial landings of striped bass and striped bass tag use to the commission prior to such transfer.

5. No transfer of striped bass commercial harvest quota shall be authorized unless such transfer is documented on a form provided by the Marine Resources Commission, notarized by a lawful Notary Public, and approved by the commissioner.

E. Transfers of Chesapeake area or coastal area striped bass commercial quota from one person to another may be permanent or temporary. Transferred quota from the Chesapeake area striped bass commercial quota shall only be used by the transferee for striped bass harvested from the Chesapeake area, and transferred quota from the coastal area striped bass commercial quota shall only be used by the transferee for striped bass harvested from the coastal area. Permanent transfers of commercial quota shall grant to the transferee that transferred percentage of the quota for future years, and the transferor loses that same transferred percentage of the quota in future years. Temporary transfers of individual striped bass commercial harvest quota shall allow the transferee to harvest only that transferred percentage of the quota during the year in which the transfer is approved. Transferors are solely responsible for any overage of the transferred percentage of the quota by the transferee. Thereafter, any percentage of the transferred striped bass commercial quota, less any overage incurred by the transferee, reverts back to the transferor.

APPENDIX II.
CHAPTER 4 VAC 20-252-10 ET SEQ., "PERTAINING TO THE TAKING OF STRIPED BASS" (IN EFFECT IN 2013)

F. The commission will issue striped bass tags to permitted striped bass commercial fishermen as follows: those fishermen permitted only for Chesapeake area or coastal area harvests of striped bass will receive their allotment of tags prior to the start of the fishing season. Any permitted fisherman, eligible for both Chesapeake area and coastal area tags, shall receive only one type of area-specific tag allotment, of his choosing, prior to the start of the fishing season, and his other type of area-specific tags will be distributed when it has been determined from the commission's mandatory harvest reporting program that the fisherman has used all of his first allotment of tags and has not exceeded his individual harvest quota. The commissioner may authorize the distribution of the second allotment of area-specific tags to a fisherman eligible for both Chesapeake area and Coastal area tags prior to that fisherman's complete use of his first allotment of tags, provided that fisherman surrenders any remaining tags of his first allotment of tags.

G. Striped bass tags are valid only for use by the permittee to whom the tags were allotted. The permittee shall be on board the boat or vessel when striped bass are harvested and tags are applied. Nothing in this subsection shall prevent a permitted commercial hook-and-line fisherman from using three crew members who are not registered commercial fishermen to assist in the harvest of his allotment of striped bass.

H. At the place of capture, and before leaving that place of capture, tags shall be passed through the mouth of the fish and one gill opening, and interlocking ends of the tag shall then be connected such that the tag may only be removed by breaking. Failure to comply with these provisions shall be a violation of this chapter.

I. It shall be unlawful to bring to shore any commercially caught striped bass that has not been tagged at the place of capture by the fisherman with a tamper evident, numbered tag provided by the commission. It shall be unlawful to possess striped bass in a quantity greater than the number of tags in possession. If a permittee violates this section, the entire amount of untagged striped bass, as well as the number of tags equal to the amount of striped bass in his possession, shall be confiscated. Any confiscated striped bass shall be considered as a removal from that permittee’s harvest quota. Any confiscated striped bass tags shall be impounded by the commission. Upon confiscation, the marine police officer shall inventory the confiscated striped bass and may redistribute the catch by one or a combination of the following methods:

2. The marine police officer shall secure a minimum of two bids for purchase of the confiscated striped bass from approved and licensed seafood buyers. The confiscated fish will be sold to the highest bidder, and all funds derived from such sale shall be deposited to the Commonwealth pending court resolution of the charge of violating the possession limits established in this chapter. All of the collected funds and confiscated tags will be returned to the accused upon a finding of innocence or forfeited to the Commonwealth upon a finding of guilt.

2. The marine police officer shall provide the confiscated striped bass to commission staff for biological sampling of the catch. Upon receipt of confiscated striped bass, commission staff will secure a minimum of two estimates of value per pound for striped bass from approved and licensed seafood buyers. The confiscated tags and the estimated value of confiscated striped bass provided for biological sampling will be reimbursed to the accused upon a finding of innocence or retained by the commission upon a finding of guilt.

J. Altering or attempting to alter any tag for the purpose of reuse shall constitute a violation of this chapter.

K. Prior to receiving any commercial season's allotment of striped bass tags, a permitted commercial harvester shall be required to have returned all unused tags from the previous commercial season to the commission within 30 days of harvesting their individual harvest quota, or by the second Thursday in January, whichever comes first. Any unused tags that cannot be turned in to the commission shall be accounted for by the harvester submitting an affidavit to the commission that explains the disposition of the unused tags that are not able to be turned into the commission. Each individual shall be required to pay a processing fee of $25, plus $0.13 per tag, for any unused tags that are not turned in to the commission.

L. Any individual with remaining unused striped bass commercial quota in the current year requesting additional commercial season striped bass tags shall provide up-to-date records of landings and account for all previously issued tags prior to receiving an additional allotment of tags. The harvester shall submit an affidavit to the commission that explains the disposition of the tags that are not accounted for and shall be required to pay a processing fee of $25, plus $0.13 per tag, for such tags to the commission.

M. For the commercial fishing season, one type of tag shall be distributed to Chesapeake area permittees and one type of tag shall be distributed to coastal area permittees. For the Chesapeake area, the tag shall only be used on striped bass 18 inches or greater. For the coastal area, the tag shall only be used on striped bass 28 inches or greater. The possession of any improperly tagged striped bass by any permitted striped bass fisherman shall be a violation of this chapter.

4VAC20-252-170. Aquaculture of striped bass; permit required.

A. It shall be unlawful for any person to operate a striped bass aquaculture facility without first obtaining a permit from the commission. Such permit shall authorize and define the limits of activities concerning the purchase, possession, sale, giving, receiving, and transportation of striped bass or hybrid striped bass in accordance with the other rules contained in this chapter.

B. The application for a striped bass aquaculture facility shall state the name and address of the applicant, the type and location of the facility, type of water supply, location of nearest tidal waters or tributaries to tidal water, and an estimate of production capacity. All aquaculture

permits shall expire on December 31 of the year of issue and are not transferable. Permits shall be automatically renewed by the commission provided no structural changes in the facility have been made, the facility has been adequately maintained, and the permittee has complied with all of the provisions of this chapter.

C. The original of each permit shall be maintained and prominently displayed at the aquaculture facility described therein. A copy of such permit may be used as evidence of authorization to transport striped bass or hybrid striped bass or to sell the fish away from the permitted facility under the conditions imposed in 4VAC20-252-210.

4VAC20-252-180. Water supply; outfall; prevention of entry and escapement.

A. A striped bass or hybrid striped bass aquaculture facility may consist of one or more ponds, artificial impoundments, closed recirculating systems or a combination of the above.

B. No pond or impoundment used for striped bass or hybrid striped bass aquaculture may be constructed or situated on a natural water course that originates beyond the boundaries of private land upon which the pond or impoundment is located.

C. There shall be no direct and unscreened discharge from any facility to any natural watercourse. Except as provided in subsection D of this section, outfall from any pond or impoundment shall be processed according to one of the following systems:

1. The outfall shall pass over a dry ground percolation system in which ground absorption of the water is sufficient to prevent the formation of a watercourse which is capable of reaching any natural watercourse. The outfall shall pass through a screened filter box prior to entering the percolation area.

2. The outfall shall pass through a chlorination process and retention pond for dechlorination. The outfall shall pass through a filter box prior to entering the chlorination system.

3. Such facilities must also comply with regulations of the State Water Control Board.

D. If the outfall from an aquaculture facility does not conform to the systems described in subdivision C 1 or C 2 of this section, then all of the following conditions shall be required:

1. The aquaculture of striped bass or hybrid striped bass shall be restricted to the use of cage culture. Such cages shall be constructed of a vinyl coated wire or high density polyethylene mesh material sufficient in size to retain the fish, and all cages must be securely anchored to prevent capsizing. Covers shall be required on all cages.

2. The outfall from the pond or impoundment shall pass through a screened filter box. Such filter box shall be constructed of a mesh material sufficient in size to retain the fish and shall be maintained free of debris and in workable condition at all times.

3. The outfall from the screened filter box shall pass into a containment basin lined and filled with quarry rock or other suitable material to prevent the escapement of the fish from the basin.

E. Those facilities utilizing embankment ponds shall maintain sufficient freeboard above the spillway to prevent overflow.

4VAC20-252-190. Acquisition of fish, fingerlings, fry, and eggs.

Striped bass or hybrid striped bass fingerlings, fry, or eggs, may be obtained only from state permitted fish dealers and must be certified by the seller as having a disease free status. Each purchase or acquisition of striped bass or hybrid striped bass must be accompanied by a receipt or other written evidence showing the date, source, species, quantity of the acquisition and its destination. Such receipt must be in the possession of the permittee prior to transportation of such fish, fingerlings, fry, or eggs to the permitted facility. All such receipts shall be retained as part of the permittee's records. The harvesting of striped bass from the tidal waters of Virginia for the purpose of artificially spawning in a permitted aquaculture facility shall comply with all of the provisions of this chapter and state law including minimum size limits, maximum size limits, and closed harvesting seasons and areas.

4VAC20-252-200. Inspection of facilities; diseased fish.

A. Inspections. Agents of the commission and the Department of Game and Inland Fisheries are authorized to make periodic inspection of the facilities and the stock of each operation permitted under this section. Every person engaged in the business of striped bass aquaculture shall allow such inspection at any reasonable time.

B. Diseased fish. No person permitted under this chapter shall maintain in the permitted facility any fish which shows evidence of any contagious disease listed in the most current list by the United States Fish and Wildlife Service as "certifiable diseases," except for the period required for application of standard treatment procedures or for approved disposition.

C. Disposition. No person permitted under this chapter shall sell or otherwise transfer possession of any striped bass or hybrid striped bass which shows evidence of a "certifiable disease" to any person, except that such transfer may be made to a fish pathologist for examination and diagnosis.

4VAC20-252-210. Sale, records, importation, release.

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A. All striped bass or hybrid striped bass except fingerlings, fry, and eggs, which are the product of an aquaculture facility permitted under this section shall be packaged with a printed label bearing the name, address, and permit number of the aquaculture facility. When so packaged and labeled such fish may be transported and sold at retail or at wholesale for commercial distribution through normal channels of trade until reaching the ultimate consumer. Every such sale must be accompanied by a receipt showing the date of sale, the name, address and permit number of the aquaculture facility, the numbers and species of fish sold, and the name of the purchaser. Each subsequent resale must be accompanied by a receipt clearly identifying the seller by name and address, showing the number and species of the fish sold, the date sold, the permit number of the aquaculture facility and, if the sale is to other than the ultimate consumer, the name and address of the purchaser. The purchaser in possession of such fish must exhibit the receipt on demand of any law enforcement officer. A duplicate copy of each such receipt must be retained for one year by the seller as part of the records of each transaction.

B. Each permitted aquaculture facility operator shall maintain a chronological file of the receipts or copies thereof showing the dates and sources of acquisitions of striped bass or hybrid striped bass and quantities thereof, and a chronological file of copies of receipts of his sales required under subsection A of this section. Such records shall be segregated as to each permit year, shall be made available for inspection by any authorized agent of the commission or Department of Game and Inland Fisheries, and shall be retained for at least one year following the close of the permit year to which they pertain.

C. Striped bass or hybrid striped bass which are the product of an approved and state permitted aquaculture facility in another state may be imported into Virginia for the consumer market. Such fish shall be packaged and labeled in accordance with the provisions contained in subsection A of this section. Any sale of such fish also shall be accompanied by receipts as described in subsection A of this section.

D. Release of live fish. Under no circumstance shall striped bass which are the product of an aquaculture facility located within or outside the Commonwealth of Virginia be placed into the waters of the Commonwealth without first having notified the commission and having received written permission from the Commissioner of Marine Resources.

4VAC20-252-220. Penalty.

As set forth in §28.2-903 of the Code of Virginia, any person violating any provision of this chapter shall be guilty of a Class 3 misdemeanor, and a second or subsequent violation of any provision of this chapter committed by the same person within 12 months of a prior violation is a Class 1 misdemeanor.

4VAC20-252-230. Sanctions.

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B. Any person failing to submit any report required by this chapter shall be denied a striped bass permit for the following year.

B. It shall be unlawful for any person with a pending violation of this chapter or found guilty of violating any provision of this chapter to receive or transfer striped bass commercial harvest quota as described in 4VAC20-252-160.

C. It shall be unlawful for any person with a pending violation of this chapter or found guilty of violating any provision of this chapter to receive additional tag distributions as described in 4VAC20-252-160.

D. Any person found guilty of violating any provision of this chapter may have his permit or license revoked at any time upon review by the commission as provided for in §28.2-232 of the Code of Virginia. If the commission revokes any person's permit for an aquaculture facility, then that person shall not be eligible to apply for a like permit for a period of two years from the date of revocation.

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Review of North Carolina's Striped Bass Fisheries and Monitoring Programs in 2012

Report to the
Atlantic States Marine Fisheries Commission
Striped Bass Technical Committee

North Carolina Department of Environment and Natural Resources

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I. Introduction

North Carolina's Atlantic Ocean commercial striped bass quota for 2012 was 480,480 pounds (lbs), while the commercial quota in the Albemarle Sound Management Area (ASMA) was 275,000 lbs. The Atlantic Ocean recreational season was open year round with a 28 inch total length (TL) minimum size limit and a two fish daily creel limit. The ASMA recreational fishery had a quota of 137,500 pounds and was open October 1 through April 30 with an 18 inch TL minimum size limit and a three fish daily creel limit. The Roanoke River Management Area (RRMA) recreational fishery had a quota of 137,500 pounds and was open March 1 through April 30 with an 18 inch TL minimum size limit, a 22-27 inch no possession slot limit, and a two fish daily creel limit with only one of those fish being greater than 27 inches TL.

During 2012 the commercial fisheries harvested 293 striped bass that weighed 6,226 pounds in the Atlantic Ocean and 27,299 fish that weighed 115,940 pounds in the ASMA. The recreational fisheries harvested zero fish in the Atlantic Ocean, 22,345 fish that weighed 71,456 pounds in the ASMA, and 28,847 fish that weighed 88,271 pounds in the RRMA.

Total losses for 2012 including all discard mortality and research removals were 102,236 fish that weighed 331,282 pounds.

II. Request for *de minimis*

Not applicable.

III. Previous calendar year's fishery and management program

A. Fishery Dependent Monitoring Programs

i. Commercial Fishery

(1) Characterization of the commercial fishery

North Carolina has two distinct commercial fisheries that harvest on two distinct stocks. The Atlantic Ocean commercial harvest is comprised of fish predominately from the Atlantic Migratory stock, while the Albemarle Sound Management Area (ASMA) commercial harvest is comprised of fish predominately from the Albemarle Sound/Roanoke River (A/R) stock.

There are often dozens of Proclamations associated with the opening/closing of seasons, changing of daily trip limits, closing of areas to gill netting, mesh size restrictions, summer mandatory gill net attendance, etc. All the regulations are aimed at keeping harvest below the TAC and reducing striped bass discards to the minimum amount possible. Proclamations can be found on the North Carolina Division of Marine Fisheries (NCDMF) website at http://portal.ncdenr.org/web/mf/proclamations or will be sent upon request. A list of all proclomations affecting 2012 striped bass fisheries is provided in Appendix A1. The regulations for the 2012 RRMA fishery are in **III.A.ii.(1)RRMA Recreational Fishery**.

Atlantic Ocean Commercial Fishery

The Atlantic Ocean commercial fishery has operated under a 480,480 pound total allowable catch (TAC) since the 2002/2003 fishing season. The TAC is harvested during a quota season which runs from December 1 through November 30, but for stock assessment purposes only landings for the 2012 calendar year are reported in the accompanying Excel File, SB Annual Report Workbook 2013 NC.xlsx. Season opening and closing dates and daily trip limits may be adjusted to remain below the 480,480 pound TAC. If water temperatures are cold enough, Atlantic Migratory striped bass are present in NC's territorial seas from November through March, so the fishery is prosecuted during these months.

The beach seine fishery was open for 138 days with a 28 inch (TL) minimum size limit and a 50 or 150 fish per permit holder trip limit. The TAC allocation to this gear was 160,160 lbs.

The gill net fishery was open for 43 days with a 28 inch (TL) minimum size limit and a 10, 15, or 20 fish per permit holder trip limit. The TAC allocation to this gear was 160,160 lbs.

The trawl fishery was open for 92 days with a 28 inch (TL) minimum size limit and a 50 or 100 fish per permit holder trip limit. The TAC allocation to this gear was 160,160 lbs.

ASMA Commercial Fishery

The ASMA commercial fishery has operated under a 275,000 lb TAC since 2003. The fishery has a spring season which can operate from January 1 through April 30 and a fall season which can operate from October 1 through December 31. Season opening and closing dates and daily trip limits may be adjusted to remain below the 275,000 pound TAC and to reduce discards. Striped bass were not to exceed 50% of the total poundage of the entire finfish landings, a provision implemented to reduce directed effort towards striped bass yet allow other fisheries to harvest striped bass encountered as bycatch. The primary harvest gear is anchored gill nets during the spring American shad (*Alosa sappidissima)* fishery, but landings also occur from flounder gill nets, pound nets, fyke nets, and small mesh gill nets.

The spring season was open from January 1 through April 30, with an 18 inch (TL) minimum size limit and a 10 or 15 fish daily trip limit depending on the other fisheries operating in the ASMA at the time.

The fall season was open from October 1 through December 31, with an 18 inch (TL) minimum size limit and a 10 fish daily trip limit.

(2) Characterization of commercial harvest

(a) Landings and method of estimation

Atlantic Ocean Commercial Fishery

In order to participate in the Atlantic Ocean commercial striped bass fishery, individuals holding a NC Standard Commercial Fishing License (SCFL) had to first obtain a permit declaring which gear type they would be using for the fishing season. Once a gear is declared, the permit holder must use that gear for the next three fishing seasons. Dealers could not possess, buy, sell, or offer for sale, striped bass taken from the Atlantic Ocean without first obtaining a current Atlantic Ocean Commercial Dealer Striped Bass Permit from the NCDMF. Dealer permits were issued only to individuals holding a valid North Carolina finfish dealer's license. Dealers were required to affix either a NCDMF issued striped bass tag or similar tag issued by the state of origin for imported striped bass, through the mouth and gill cover. Dealers were required to report daily landings (numbers of tags used and pounds landed) by noon of the following day to the NCDMF Elizabeth City office to determine closing of the season to remain below the TAC.

During the 2012 calendar year 293 fish that weighed 6,226 lbs were harvested (Table 1). The time series for North Carolina's Atlantic Ocean commercial landings are reported in the accompanying Excel File, SB Annual Report Workbook 2013 NC.xlsx. The coastal migratory stock never came down below the Virginia/North Carolina border, eliminating any potential harvest.

ASMA Commercial Fishery

In order to harvest striped bass commercially individuals must hold a NC SCFL. Dealers could not possess, buy, sell or offer for sale, striped bass taken from the ASMA without first obtaining a valid ASMA Dealer's Striped Bass Permit. No dealer could pack or sell striped bass without having affixed either a NCDMF ASMA striped bass tag or a

similar tag issued by the state of origin for imported striped bass. Dealers were required to report daily landings (numbers of tags used and pounds landed) by noon of the following day to the NCDMF Elizabeth City office to determine closing of the season to remain below the TAC.

The 2012 spring ASMA commercial fishery harvested 25,276 fish that weighed 105,109 lbs (Table 2).

The 2012 fall ASMA commercial fishery harvested 2,023 fish that weighed 10,831 lbs (Table 3).

(b) Catch composition

Atlantic Ocean Commercial Fishery

Landings were sampled from each gear, either at the fish house as the catch was unloaded, or in situ during the beach seine fishery. There was a target of 600 samples for the season, with samples distributed among gear types based on daily quota monitoring reports by gear. Fish were measured to the nearest mm for fork length (FL) and TL and weighed to the nearest 0.1 kg. Sex was determined using the Sykes (1957) method and scales were obtained from between the dorsal fins for each sample. Numbers of fish per year class were assigned using the following formula:

$$YC_N = L_T \times WTSYC_{S\%} / WTSYC_{SAVG}$$

Where YC_N is the number of individuals per year class, L_T is total landings, $WTSYC_{S\%}$ is the sample percent weight per sex, per year class, and $WTSYC_{SAVG}$ is the sample average weight per individual, per sex, per year class.

ASMA Commercial Fishery

There was a target of 600 samples for the spring season and 300 for the fall season. Landings were sampled weekly at fish houses throughout the ASMA with sampling effort distributed accordingly based on daily quota monitoring reports. All other methods were the same as detailed in III.A.i.(2)(b) Catch composition Atlantic Ocean Commercial Fishery.

(i) Age frequency

There were 21 samples (length, weight, sex, scales) obtained from the Atlantic Ocean commercial harvest (Table 4). The length weight equation (y-intercept = -7.36155; slope = 2.86784) is provided in the accompanying Excel file Annual Report Workbook 2013 NC.xlsx.

There were 632 samples (length, weight, sex, scales) obtained from the ASMA commercial fishery (Table 4). A length weight equation was not generated because removals from the ASMA are not included in the ASMFC coastwide Atlantic migratory stock assessment. Age expansion (catch at age) is provided in Tables 1 – 3. Mean length and weight at age is provided in Tables 5 – 7.

(ii) Length frequency

Length frequency for the Atlantic Ocean sample is provided in Figure 1 and in the accompanying Excel file Annual Report Workbook 2013 NC.xlsx.

Length frequencies for the ASMA spring and fall samples are provided in Figures 2 and 3 and in Table 4.

(iii) Sex

Expanded sex ratios are provided in Tables 1 – 3. Sex ratios were Male:Female 1.00:2.49 for the Atlantic Ocean and Male;Female 1.00:1.17 for the ASMA.

(c) Estimation of effort

Effort and catch cannot be used to estimate overall CPUE by participant, because a trip with zero striped bass catch will not be included in data collected by the NCDMF TTP. In addition, while the Atlantic Ocean is a directed fishery, the ASMA is a bycatch fishery that includes daily trip limits. Furthermore, transfers at sea or at the dock can occur to other permitted SCFL holders. The intent of this is to allow fisherman that catch over their daily landing limit to transfer these fish to other permit holders to reduce regulatory discards.

ii. Recreational Fishery

(1) Characterization of the recreational fishery

North Carolina has three distinct recreational fisheries that harvest on two distinct stocks. The Atlantic Ocean recreational harvest is comprised of fish predominately from the Atlantic Migratory stock, while the ASMA and Roanoke River Management Area (RRMA) recreational harvest is comprised of fish predominately from the A/R stock. A list of Proclamations is provided in Appendix A1.

Atlantic Ocean Recreational Fishery

North Carolina maintained a 28 in TL minimum size limit with a two fish per person per day creel limit for 2012. The season remained open throughout 2012.

Starting in 2005 and continued annually since, a program was initiated in NC in which anglers were required to report all Atlantic Ocean harvested striped bass from the NC/VA line, south to Ocracoke Inlet, for the months of May through October (Waves 3 – 5). Termed the "catch card survey" the reporting procedure requires that any striped bass harvested recreationally in the designated area must have a landing tag affixed to the fish before it is removed from the vessel. Anglers that harvested striped bass from fishing piers reported their catch at the pier house before leaving the pier. Surf fishermen reported their catch to the nearest reporting station. Reporting stations were established throughout Dare, Currituck, and Hyde counties. Atlantic Ocean striped bass released alive were not required to be reported. The purpose of the program was to obtain more accurate data on striped bass harvested from the Atlantic Ocean during waves 3 – 5.

ASMA Recreational Fishery

The ASMA recreational catch is limited by an annual harvest allocation and regulated by size restrictions, creel limits, and seasonal closures. The 2012 harvest allocation of 137,500 lbs was divided between a spring season (January – April) and a fall season (October – December). The 2012 spring and fall seasons operated under a three fish per person per day creel limit. An 18 in TL minimum size limit was in effect for both seasons. Both seasons were open seven days a week.

Striped bass were also harvested using the NCDMF issued Recreational Commercial Gear License (RCGL), which allowed an individual to fish limited amounts of various commercial gears for recreational purposes. RCGL holders were constrained by the same regulations in effect for recreational fishermen and were prohibited from selling their catch. Due to funding cuts there was no harvest estimate for these license holders in 2012. Harvest estimates from 2002 through 2007 averaged ~ 2,000 lbs.

RRMA Recreational Fishery

The recreational fishery in the RRMA is regulated through a limited open harvest season, daily possession limits and size limits. For the 2011 season, by rule, the harvest season opened on 1 March and closed on 30 April. The daily possession limit was two fish, the minimum length limit was 18 inches (TL) and a protective slot size limit was in effect that prohibited possession of striped bass between 22 and 27 inches (TL). In addition, only one striped bass greater than 27 inches could be retained in the creel limit. Since 1997, anglers have been required to use only single, barbless hooks in zone 1 from 1 April through 30 June to reduce catch and release mortality.

(2) Characterization of directed harvest

(a) *Landings and method of estimation*

Atlantic Ocean Recreational Fishery

The Marine Recreational Fishery Statistics Survey (MRFSS), now known as the Marine Recreational Information Program (MRIP) has been conducted annually by the National Marine Fisheries Service (NMFS) in North Carolina since 1979. The survey consists of telephone and on-site angler interviews. The telephone interviews were used to collect data on number of trips, fishing locations, and when the trips were made. Information on actual catch (species, number, weight (0.01 kg), FL, and TL) was collected through on-site angler interviews. The data from both types of interviews were combined to produce estimates of total numbers and pounds of striped bass harvested, and total numbers of striped bass released from North Carolina's territorial seas.

All harvest, release, and length frequency data is obtained from MRIP. Harvest data (Type A + B1) and released alive data (Type B2) were queried By Wave, All Modes, All Ocean. Only information from Waves 1, 2, and 6 were used due to the high PSE often associated with Waves 3, 4, and 5 estimates.

During 2012 the Atlantic Ocean recreational fishery harvested zero fish. The coastal migratory stock never came down below the Virginia/North Carolina border, eliminating any potential harvest. The time series for North Carolina's Atlantic Ocean recreational landings are reported in the accompanying Excel File, SB Annual Report Workbook 2013 NC.xlsx.

There was 1 striped bass that weighed 14 pounds reported as harvested through the catch card survey. Total length was 35 inches. The fish was harvested June 5, 2012.

ASMA Recreational Fishery

Catch and effort data were collected through on-site interviews at boat ramps during allowed harvest days for each of four ASMA sampling zones. Statistics were calculated through a non-uniform probability access-point creel survey (Pollock et al. 1994). Site probabilities were set in proportion to the likely use of a site according to time of day, day of week, and season. Probabilities for this survey were assigned based on seasonal striped bass fishing pressure observed during past surveys, in addition to anecdotal information of fishing activity for the current year. Probabilities can be adjusted during the survey period according to angler counts to provide more accurate estimates. Morning and afternoon periods were assigned unequal probabilities of conducting interviews, with each period representing half a fishing day. These values varied among sites within zones due to differing fishing pressure. A fishing day was defined as 1.5 hours after sunrise until 1.0 hour after sunset.

Striped bass sampled during the surveys were measured for TL (mm) and weighed to the nearest 0.1 kg. No scales were collected for ageing purposes. Estimations of age composition were based on an age-length key derived from commercial harvest samples.

During 2012 the ASMA recreational fishery harvested 22,345 fish that weighed 71,456 lbs (Table 8). Spring harvest was 62,028 lbs and fall harvest was 9,428 lbs.

RRMA Recreational Fishery

North Carolina Wildlife Resources Commission (NCWRC) personnel used a non-uniform probability stratified access-point creel survey design (Pollock, et al. 1994) to estimate recreational fishing effort, harvest, and numbers of striped bass caught and released from the RRMA for the period 1 March through 30 April 2012.

The survey was stratified by area (zone), time (period), and kind of day (weekdays and weekend days). The upper zone (1) includes the river segment from Roanoke Rapids Lake dam downstream to the U.S. Highway 258 bridge near Scotland Neck. The lower zone (2) extends from U.S. Highway 258 bridge downstream to Albemarle Sound. Because past experience has shown differential catch rates through progression of the open harvest season, the survey was stratified into 2-week sample periods. Within periods, fishing effort and catch is also known to vary as a function of day type so samples and estimates were further stratified by kind of day. Selection of access points where interviews occurred was based upon probability of use data generated from prior creel surveys on the Roanoke River. Probability of fishing activity for time of day (0.4 for AM and 0.6 for PM during periods one and two, and equal probabilities during all other periods) was estimated based upon prior experience with the Roanoke River striped bass fishery.

During 2012 the RRMA recreational fishery harvested 28,847 fish that weighed 88,271 lbs (Table 9).

(b) Catch composition

(i) Age frequency

The age frequency for North Carolina's Atlantic Ocean recreational harvest is generated by the ASMFC striped bass stock assessment sub-committee using other state's age length information. Year class composition for the ASMA and RRMA recreational harvests are presented in Tables 8 and 9 respectively.

(ii) Length frequency

Not applicable because no recreational harvest was reported for the Atlantic Ocean.

There were 1,057 length samples collected from the ASMA recreational catch (Figures 4 and 5) and 688 length samples collected from the RRMA recreational catch (Figure 6). Length-weight parameters were not calculated for the ASMA and RRMA recreational sample as that harvest is not used in the Atlantic Migratory stock assessment.

(iii) Sex

Sex information is not collected from the Atlantic Ocean or ASMA recreational catches. Sex ratio from the RRMA recreational catch sample was Male:Female 1.00:0.44. Sex expansion to the total RRMA harvest is presented in Table 9.

(c) Estimation of effort

There were 15,508 angler trips targeting striped bass in the Atlantic Ocean. In the ASMA there were 14,490 vessel trips (102,787 angler hours) for striped bass, and in the RRMA there were 26,648 angler trips (119,917 angler hours) for striped bass (Table 10).

iii. Other Losses (poaching, hook & release mortality, bycatch, etc.)

The available data to estimate losses from poaching is limited. In 2012 Marine Patrol confiscated 59 lbs of striped bass.

Hook and release mortality in the Atlantic Ocean fishery is calculated by applying 9% release mortality to all estimated releases. Hook and release mortality in the ASMA and RRMA is calculated by applying 6.4% release mortality (Nelson 1998) to all releases. The MRFSS estimated 1,615 fish released alive in the Atlantic Ocean during 2012, resulting in 145 additional losses, although the PSEs were over 90%. There were an estimated 5,631 dead discards equaling 16,877 lbs in the ASMA and RRMA recreational fisheries in 2012.

Bycatch losses for the ASMA commercial gill net fisheries were estimated by determining four things: 1) total gill net trips by gill net category (categories are small mesh net trips, flounder net trips, and shad net trips), 2) average yards of gill net set per trip, 3) striped bass catch rates, and 4) striped bass at net mortality rates (no estimates of delayed mortality are available).

The number of striped bass discard losses at age was estimated from the IGNS data. Numbers of discards by mesh size (large vs. other/small) were proportioned into year classes based on the composition of year classes in the 3.0 and 3.5 ISM and the 5.5 ISM nets respectively from the IGNS. The numbers were then converted into pounds based on the mean weight at age for a particular year class.

For any given category, once the number of trips, yards per trip, striped bass catch rates (# striped bass per yard of gill net), and striped bass at net mortality rates were determined; striped bass bycatch losses were calculated using the following formula:

$$B^{L} = [\, T^{\#} \times Y^{\#} \times B^{stb} \times \mathrm{M} \,] - H$$

where B^{L} = bycatch losses, $T^{\#}$ = total number of gill net trips, $Y^{\#}$ = yards per trip, B^{stb} = bycatch of striped bass per yard of gill net, M = discard mortality, and H = harvest.

Bycatch losses for the ASMA commercial gill net fisheries were estimated at 15,910 fish (27,543 lbs), and were attributed predominately to the small mesh gill net fishery (Table 11). The majority of the discards were undersize occurring in the small mesh fisheries and from the 2010 and 2008 year classes.

iv. Total Harvest & Losses

Total harvest and losses are summarized in Table 12.

B. Fishery Independent Monitoring Programs

North Carolina is required through Amendment 6 to the ASMFC Interstate FMP for Atlantic Striped Bass to conduct a juvenile abundance survey in the Albemarle Sound and a spawning stock survey in the Albemarle Sound and Roanoke River for the A/R stock. Results from the required independent monitoring programs are detailed in the text, however

spreadsheets of length frequency, age length keys, etc are not provided as the results are not used in the coastwide Atlantic migratory striped bass stock assessment.

i. Results

(1) Juvenile Abundance Survey: The NCDMF juvenile abundance survey has 7 fixed stations in western Albemarle Sound, the primary nursery area for A/R juvenile striped bass. Stations are sampled bi weekly from mid July through October for a total of 56 samples. Tow times are 15 minutes using a semi-balloon trawl with an 18 ft head rope, constructed of 1½ in stretched mesh webbing in the body and ½ inch stretched mesh webbing in the cod end. The results from the survey comprise the A/R JAI. Catch per unit effort is calculated as the arithmetic mean of number of striped bass per tow for comparison to the long-term data series.

A total of 168 YOY striped bass was collected in 56 trawls, for a JAI of 3.0, below the long-term average of 8.5 (Table 13: Figure 7). Striped bass were collected during each sampling week, and there were 22 tows with zero catch. Total length ranged from 45 to 154 mm and the mean TL increased an average of 4.0 mm per week, from 58 mm on 16 July to 154 mm on 22 October (Table 14).

(2) Spawning stock assessments and stock characterization: North Carolina annually conducts two spawning stock surveys on the A/R stock. One survey is conducted by the NCDMF using gill net and the other is conducted by the NCWRC using electrofishing gear.

North Carolina also participates in an annual cooperative effort to tag and assess the age composition of the Atlantic migratory stock over wintering off southern VA and/or northern NC. The survey has been conducted annually since the winter of 1988. This survey is conducted through joint efforts of the National Marine Fisheries service (NMFS), Maryland Department of Natural Resources (MDNR), US Fish and Wildlife Service (USFWS), and NCDMF, utilizing National Oceanic and Atmospheric Administration (NOAA) vessels and trawl gear. The majority of the striped bass captured were measured and tagged with USFWS internal anchor tags. Scales for ageing and TL mm were obtained from a representative portion of the oceanic migratory striped bass captured during the survey. Scales were processed as described in earlier sections. All readable scales collected from the COOP Survey were aged. However, due to funding cuts, the survey platform changed and used charter boats in the Atlantic Ocean striped bass fishery to catch striped bass by hook and line for tagging purposes.

Independent Gill Net Survey: The stratified-random multiple-mesh Independent Gill Net Survey (IGNS) began in 1990 to monitor the striped bass resident and overwintering fall/winter population in the Albemarle and Croatan Sounds and the A/R striped bass spring spawning population. The 12 different mesh sizes used allow capture of fish age one and older. Only results from the spring spawning survey which is concentrated around the mouth of the Roanoke River are reported here. An in-depth methodology is available by request.

A total of 1,175 striped bass were collected in 1,008 units of effort for a CPUE of 1.17, above the long-term average of 0.82 (Table 15). Year class composition, age expansion, and sex ratio are provided in Table 16. The length frequency graph is provided in Figure 8.

DEVIATIONS: None.

- Electrofishing Survey: NCWRC personnel sampled striped bass weekly from 5 April through 18 May with a boat-mounted electrofishing unit (Smith-Root 7.5 GPP; 1

netter and 1 boat operator) during daylight hours in the vicinity of Gaston (rm 135) and Weldon (rm 129), the historical spawning area for Roanoke River striped bass. Relative abundance of striped bass for each sample was indexed by catch-per unit-effort (CPUE) and expressed as number of fish captured per hour (fish/h). Overall pooled CPUE (Σ fish collected/Σ hours of electrofishing effort) for all 2012 sample sites and daily pooled CPUE were calculated.

Weekly electrofishing sampling in the Roanoke River between 9 April and 2 May yielded 2,652 striped bass. Forty-two of striped bass were collected from separate broodstock sampling sites and were removed from relative abundance calculations. Sex ratio was Male:Female 3.93:1.00 Overall relative abundance of striped bass for 2012 was 151.2 fish/h (Tables 17 and 18; Figure 9). Year class composition, mean length, and mean weight at age are presented in Table 19. The length frequency is presented in Figure 10.

North Carolina Cooperative Winter Tagging Cruise: During the 2012 North Carolina Cooperative Winter Tagging, six striped bass were collected using hook and line. Scale samples and total length were taken from all fish, they were tagged and released. The 1994-2006 year classes were represented in the sample. Fish ranged from 635 to 1,171 inches (Table 20).

(3) Tagging: The NCDMF has tagged striped bass since 1980. Currently tags are manufactured by Floy (FM-84) with a tube length of 90 mm and anchor disc dimensions of 5 mm x 15 mm. Tags were inserted in the abdominal cavity on the left side posterior to the pectoral fin.

During the 2011/2012 fall/winter IGNS, 2012 spring spawning stock IGNS, and the 2012 electrofishing spawning stock survey, 215, 206, and 2,652 striped bass were tagged respectively. A complete tagging report is available upon request.

(4) Research Removals: There were 1,219 striped bass that weighed 1,660 lbs sacrificed for research purposes in 2012 (Table 12). Unless spoiled, all sacrificed striped bass from the IGNS were donated to the local food bank.

IV. Planned management programs for the current calendar year.

A. Summarize regulations that will be in effect.

Regulations for the 2013 season will remain unchanged.

B. Summarize monitoring programs that will be performed.

The NCDMF and NCWRC will perform the same monitoring programs as outlined in Amendment 6: Catch composition of the commercial and recreational fisheries, juvenile abundance surveys, spawning stock surveys, and tagging programs.

C. Highlight any changes from the previous year.

None.

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Year Class	Male			Female			Totals		
	N	LBS	% Comp (N)	N	LBS	% Comp (N)	N	LBS	% Comp (N)
2004				14	220	4.8	14	220	4.8
2003	56	955	19.1	83	1,408	28.3	139	2,363	47.4
2002	14	257	4.8	28	612	9.6	42	869	14.3
2001				56	1,384	19.1	56	1,384	19.1
2000	14	392	4.8				14	392	4.8
1999				14	459	4.8	14	459	4.8
1997				14	539	4.8	14	539	4.8
Totals	84	1,604	28.7	209	4,622	71.3	293	6,226	100.0

Note. Table may not add due to rounding.

Table 2. Estimated number of striped bass by year class and sex harvested during the spring commercial harvest, Albemarle Sound Management Area, NC 2012. Percent composition is by number.

Year-class	Male			Female			Totals		
	N	LBS	% Comp (N)	N	LBS	% Comp (N)	N	LBS	% Comp (N)
2009	90	207	0.4				90	207	0.4
2008	2,868	7,834	11.3	3,047	8,313	12.1	5,916	16,147	23.4
2007	2,913	10,248	11.5	2,734	9,861	10.8	5,647	20,109	22.3
2006	3,316	13,436	13.1	3,540	14,877	14.0	6,857	28,313	27.1
2005	2,106	10,642	8.3	3,316	17,224	13.1	5,423	27,866	21.5
2004	314	2,255	1.2	717	4,175	2.8	1,031	6,430	4.1
2003	45	850	0.2	90	1,433	0.4	134	2,282	0.5
2002				134	2,766	0.5	134	2,766	0.5
2000				45	988	0.2	45	988	0.2
Totals	11,652	45,471	46.1	13,624	59,638	53.9	25,276	105,109	100.0

Note. Table may not add due to rounding.

Table 3. Estimated number of striped bass by year class and sex harvested during the fall commercial harvest, Albemarle Sound Management Area, NC 2012. Percent composition is by number.

	Male			Female			Totals		
Year Class	N	LBS	% Comp (N)	N	LBS	% Comp (N)	N	LBS	% Comp (N)
2009	116	301	5.71	29	73	1.43	144	374	7.14
2008	578	2,086	28.57	231	915	11.43	809	3,001	40.00
2007	260	1,095	12.86	173	852	8.57	433	1,948	21.43
2006	58	257	2.86	58	336	2.86	116	594	5.71
2005	144	935	7.14	260	2,145	12.86	405	3,080	20.00
2004	116	1,835	5.71			0.00	116	1,835	5.71
Totals	1,271	6,509	62.86	751	4,322	37.14	2,023	10,831	100.00

Note. Table may not add due to rounding.

Table 4. Summary of 2012 North Carolina commercial striped bass sampling from the Atlantic Ocean and Albemarle Sound Management Area.

Fishery	Length Frequency Sample Size	# Age Samples in Age Length Key
Atlantic Ocean Gill Net	21	21
ASMA Gill Net	411	159
ASMA Pound Net	221	115

Table 5. Year class composition, total length (mm) and weight (kg) data for striped bass sampled from the Atlantic Ocean commercial harvest, NC 2012 calendar year. Length and weight data are for aged fish only. Standard deviations are listed in parentheses.

		Total Length (mm)			Weight (kg)		
Year Class	N Aged	Mean	Min	Max	Mean	Min	Max
2004	1	886			7.2		
2003	10	908 (23)	869	944	7.7 (0.7)	6.8	9
2002	3	951 (47)	900	992	9.5 (1.0)	8.4	10.4
2001	4	1,025 (50)	978	1,070	11.3 (0.9)	10.8	12.6
2000	1	1,040			12.8		
1999	1	1,105			15		
1997	1	1,200			17.6		
Totals	21						

Table 6. Year class composition, total length (mm) and weight (kg) data for striped bass sampled from the Albemarle Sound Management Area spring commercial harvest, NC 2012. Length and weight data are for aged fish only. Standard deviations are listed in parentheses.

		Total Length (mm)			Weight (kg)		
Year Class	N Aged	Mean	Min	Max	Mean	Min	Max
Male							
2009	3	465 (6)	462	472	1.05 (0.20)	0.91	1.19
2008	29	484 (20)	457	534	1.21 (0.23)	0.94	1.93
2007	15	530 (20)	486	560	1.60 (0.25)	1.06	1.94
2006	25	563 (63)	502	826	1.91 (0.64)	1.24	4.31
2005	25	602 (42)	550	705	2.50 (0.54)	1.76	3.90
2004	6	657 (97)	582	842	3.39 (1.42	2.18	6.00
2003	1	898			8.60		
Female							
2008	30	496 (21)	462	546	1.24 (0.27)	0.90	1.87
2007	19	531 (32)	474	609	1.64 (0.37)	0.91	2.59
2006	21	571 (41)	515	656	2.00 (0.57)	1.20	3.28
2005	25	616 (55)	548	764	2.49 (0.86)	1.50	5.40
2004	10	646 (45)	587	727	2.85 (0.61)	2.12	4.11
2003	2	897 (20)	883	911	7.25 (0.64)	6.80	7.70
2002	2	949 (1)	948	949	9.90 (0.14)	9.80	10.00
2000	1	953			10.00		
Totals	214						

Table 7. Year class composition, total length (mm) and weight (kg) data for striped bass sampled from the Albemarle Sound Management Area fall commercial harvest, NC 2012. Length and weight data are for aged fish only. Standard deviations are listed in parentheses.

		Total Length (mm)			Weight (kg)		
Year Class	N Aged	Mean	Min	Max	Mean	Min	Max
Male							
2009	4	490 (32)	462	525	1.18 (0.34)	0.85	1.50
2008	20	535 (42)	490	662	1.64 (0.44)	1.17	2.65
2007	9	564 (15)	545	582	1.91 (0.41)	1.41	2.45
2006	2	591 (16)	580	602	2.02 (0.68)	1.54	2.50
2005	5	662 (58)	580	726	2.94 (0.80)	1.78	4.00
2004	4	866 (83)	820	990	7.20 (1.06)	6.2	8.50
Female							
2009	1	470			1.15		
2008	8	547 (14)	523	568	1.80 (0.26)	1.24	2.05
2007	6	593 (25)	574	641	2.23 (0.47)	1.64	3.00
2006	2	623 (74)	570	675	2.64 (0.79)	2.08	3.20
2005	9	704 (63)	615	794	3.74 (1.38)	1.66	6.25
Totals	70						

Table 8. Estimated number of striped bass harvested during the 2012 Albemarle Sound Management Area spring and fall recreational fishery.

Year class	Percent contribution	N
Spring		
2009	2.3	448
2008	52.7	10,405
2007	21.2	4,177
2006	16.8	3317
2005	6.1	1199
2004	0.9	169
2003	0.1	28
Total	100.0	19,743
Fall		
2009	57.9	1,507
2008	22.8	592
2007	9.1	236
2006	4.8	125
2005	1.1	29
2004	1.1	28
2003	3.3	85
Total	100.0	2,602

Table 9. Estimated number of striped bass harvested during the 2012 Roanoke River Management Area recreational fishery. N represents the actual number of striped bass measured in the creel survey.

Sex and Year Class	Age	N	Percent Composition	Estimated Number in Recreational Harvest
Males				
2009	3	99	20.8%	4,175
2008	4	280	58.9%	11,809
2007	5	80	16.8%	3,374
2006	6	8	1.7%	337
2005	7	8	1.7%	337
Total		475	100.0%	20,033
Females				
2009	3	31	14.8%	1,307
2008	4	175	83.7%	7,380
2007	5	0	0.0%	0
2006	6	0	0.0%	0
2005	7	2	1.0%	84
2004	8	1	0.5%	42
Total		209	100.0%	8,814

Table 10. Estimated recreational effort for striped bass in North Carolina, 2012.

Fishery	Trips	Angler hours
Atlantic Ocean	15,508	N/A
Albemarle Sound Management Area spring	10,207	70,446
Albemarle Sound Management Area fall	4,283	32,341
Roanoke River Management Area		119,917
Totals		

Table 11. Estimated discard mortality attributed to the Albemarle Sound Management Area commercial gill net fisheries in 2012.

Fishery	Year Class	N	Percent (N)	Pounds	Percent (lbs)
Flounder					
	2007	161	1.01	543	1.97
	2006	513	3.23	2,174	7.89
	2005	450	2.83	2,174	7.89
Total		1,125	7.07	4,891	17.76
Shad					
Total		0	0.00	0	0.00
Small/other					
	2010	6,760	42.49	4,769	17.31
	2009	4,006	25.18	7,153	25.97
	2008	3,666	23.04	9,538	34.63
	2007	353	2.22	1,192	4.33
Total		14,785	92.93	22,652	82.24
Grand Total		15,910	100.00	27,543	100.00

Table 12. Total striped bass losses for North Carolina (Atlantic Ocean, Albemarle Sound Management Area, and Roanoke River Management Area), in 2012.

Fishery	Area	N	LBS
Commercial			
	ASMA		
	harvest	27,299	115,940
	bycatch mortality	15,910	27,543
	Atlantic Ocean		
	harvest 2012 cal year	293	6,226
	bycatch mortality	no	estimate
Recreational			
	ASMA		
	harvest	22,345	71,456
	discard mortality	1,598	3,164
	RRMA		
	harvest	28,847	88,271
	discard mortality	4,033	13,713
	Atlantic Ocean		
	harvest 2012 cal year	0	0
	discard mortality	145	2,610
Research			
	ASMA		
	Independent Gill Net Survey	1,177	1,257
	RRMA	121	644
Confiscations			
		not available	59
Aquaculture			
	ASMA	0	0
	RRMA	0	0
Broodstock			
	ASMA	0	0
	RRMA	59	399
RCGL			
	ASMA	no	estimate
TOTALS		**101,827**	**331,282**

Table 13. Juvenile Abundance Index (JAI) for A/R striped bass young-of-year trawl sampling in western Albemarle Sound NC 1955-2012.

Year	Western Sound Trawls
1955	3.3
1956	19.1
1957	5.7
1958	0.2
1959	23.9
1960	5.9
1961	10.3
1962	7.9
1963	4.8
1964	3.1
1965	10.1
1966	3.5
1967	23.4
1968	6.6
1969	3.0
1970	12.5
1971	2.9
1972	2.5
1973	2.0
1974	5.5
1975	10.8
1976	10.5
1977	3.6
1978	0.6
1979	0.6
1980	0.5
1981	0.1
1982	3.8
1983	0.8
1984	0.4
1985	1.2
1986	0.1
1987	0.1
1988	4.1
1989	4.3
1990	1.4
1991	0.9
1992	2.6
1993	44.5
1994	38.2
1995	9.9
1996	31.5
1997	5.4
1998	7.0
1999	0.8
2000	58.8
2001	3.3
2002	7.3
2003	0.3
2004	1.7
2005	34.6
2006	3.0
2007	7.2
2008	6.6
2009	0.4
2010	8.9
2011	15.1
2012	3.0
Mean	8.4

Table 14. Number, mean TL (mm), and range TL (mm) of striped bass young-of-year collected during bi-weekly trawls in western Albemarle Sound, NC, 2012.

2012	Date								
Calendar Week	29	31	33	35	37	39	41	43	
Station	16 Jul	30 Jul	13 Aug	27 Aug	10 Sept	24 Sept	8 Oct	22 Oct	Totals
Brickhouse (149)	7	4	3	1	2	6	4	2	29
Nixons Beach (137)	3	0	0	0	2	0	1	7	13
Georges Beach (150)	4	1	0	0	0	0	0	0	5
Batemans Beach (151)	0	2	0	0	0	6	0	1	9
Albemarle Beach (152)	6	0	1	0	0	2	2	1	12
Black Walnut Point (139)	0	2	0	2	29	10	23	19	85
Cape Colony (153)	0	0	0	0	0	1	10	4	15
Totals	20	9	4	3	33	25	40	34	168
Mean TL mm	58	70	75	89	85	94	94	115	85
Range TL mm	48-70	45-76	58-81	62-86	79-123	73-130	86-135	88-154	41-130
CPUE	2.9	1.3	0.6	0.4	4.7	3.6	5.7	4.9	3.0

Table 15. Catch per unit effort (CPUE) from the spring spawning stock Independent Gill Net Survey, conducted in the western Albemarle Sound, NC, 1990-2012.

Spring Segment	Effort	N	CPUE
1991	1,964	2,084	1.06
1992	2,330	1,091	0.47
1993	2,230	614	0.28
1994	2,032	413	0.20
1995	1,950	1,989	1.02
1996	1,883	1,227	0.65
1997	1,925	1,707	0.89
1998	1,909	1,961	1.03
1999	1,991	2,302	1.16
2000	2,011	1,829	0.91
2001	1,867	1,789	0.96
2002	1,850	1,623	0.88
2003	2,166	884	0.41
2004	1,948	1,886	0.97
2005	1,964	1,451	0.74
2006	1,934	1,906	0.99
2007	1,923	973	0.51
2008	1,801	2,417	1.34
2009	1,559	1,204	0.77
2010	1,362	1,415	1.04
2011	1,447	1,721	1.19
2012	1,008	1,175	1.17
	1,866	1,530	0.82

Table 16. Year class composition, total length (mm), and weight (kg) data taken from a subsample of striped bass collected during the spring Independent Gill Net Survey conducted in the western Albemarle Sound, NC, 2012. Length and weight data are for aged fish only. Standard deviations are listed in parentheses.

					Total Length (mm)			Weight (kg)		
Year class	N Aged	N Expanded	N Total	% Comp	Mean (SD)	Min	Max	Mean (SD)	Min	Max
Male										
2010	52	262	314	26.8	318 (27)	265	385	0.32 (0.08)		
2009	10	0	10	0.9	439 (19)	411	466	0.84 (0.16)		
2008	33	1	34	2.9	487 (29)	447	593	1.17 (0.23)		
2007	7	1	8	0.7	528 (20)	505	570	1.58 (0.26)		
2006	3	0	3	0.3	578 (19)	566	600	2.14 (0.13)		
2005	4	1	5	0.4	585 (25)	560	610	2.15 (0.53)		
Female										
2010	60	437	497	42.4	317 (28)	262	378	0.32 (0.09)		
2009	13	0	13	1.1	435 (11)	412	452	0.78 (0.10)		
2008	32	2	34	2.9	492 (21)	452	528	1.19 (0.22)		
2007	10	0	10	0.9	530 (38)	461	578	1.49 (0.47)		
2006	4	0	4	0.3	545 (36)	512	595	1.69 (0.24)		
2005	5	1	6	0.5	591 (8)	577	597	2.23 (0.27)		
2004	1	0	1	0.1	630			2.90		
Unknown										
2010	14	187	201	17.2	291 (53)	215	392	0.09		
2009	3	1	4	0.3	426 (8)	420	435			
2008	10	9	19	1.6	512 (23)	475	547			
2007	5	1	6	0.5	531 (21)	504	562			
2005	1	1	2	0.2	576					
Totals	267	904	1,171	100.0						

Note: Table may not add due to rounding

Table 17. Daily pooled CPUE (daily catch/daily effort) of striped bass collected by electrofishing on the Roanoke River spawning grounds during 2012. A total of eight sites were sampled during each sampling date. Mean daily discharge from the US Geological Survey gauging station at Roanoke Rapids, NC and mean daily water temperature from field collections are also provided.

Date	Effort (h)	Catch	Pooled CPUE	Discharge (cfs)	Water Temp (^{o}C)
9 April	2.27	152	67.0	8,260	15.8
16 April	2.33	330	141.9	6,560	18.0
19 April	2.21	465	210.7	6,650	17.7
23 April	2.22	322	145.3	6,130	16.9
1 May	2.22	327	147.6	5,390	18.6
8 May	2.22	554	249.2	5,240	21.1
15 May	2.19	421	192.7	5,310	21.4
22 May	1.90	80	42.2	6,360	19.0

Table 18. Year class composition and relative abundance (CPUE; fish/h) of striped bass collected by electrofishing on the Roanoke River spawning grounds, 2011.

		Percent Composition			CPUE (fish/h)		
Year Class	Age	Male	Female	Overall	Male	Female	Overall
2010	2	19.1	3.0	22.1	28.9	4.5	33.4
2009	3	16.9	0.6	17.5	25.5	1.0	26.5
2008	4	28.4	6.7	35.0	42.9	10.1	53.0
2007	5	8.6	1.7	10.3	13.0	2.6	15.6
2006	6	3.4	3.2	6.6	5.1	4.9	10.0
2005	7	3.0	1.1	4.0	4.5	1.6	6.1
2004	8	0.2	0.3	0.5	0.3	0.5	0.7
2003	9	0.1	0.3	0.3	0.1	0.4	0.5
2002	10	0.0	0.3	0.3	0.1	0.4	0.5
2001	11	0.1	0.4	0.5	0.1	0.6	0.7
2000	12		0.5	0.5		0.8	0.8
1999	13	0.04	0.5	0.5	0.1	0.7	0.7
1998	14		0.6	0.6		0.9	0.9
1997	15	0.04	0.6	0.6	0.1	0.9	0.9
1996	16		0.3	0.3		0.5	0.5
1995	17		0.2	0.2		0.3	0.3
Totals		79.7	20.3	100.0	120.5	30.6	151.2

Table 19. Age composition, mean total length (mm), and mean weight (kg) of striped bass collected by electrofishing on the Roanoke River spawning grounds, 2011. Mean lengths and weights were calculated from the ageing subsample. Standard deviations are in parentheses.

					Total Length (mm)			Weight (kg)		
Year Class	N Aged	N Expanded	N Total	% Comp	Mean	Min	Max	Mean	Min	Max
Male										
2010	76	430	506	23.9	319 (23.7)	259	409	0.4 (0.1)	0.2	0.7
2009	43	405	448	21.2	464 (23.5)	362	500	0.9 (0.2)	0.5	1.4
2008	42	710	752	35.6	498 (28.8)	400	595	1.3 (0.3)	0.7	2.2
2007	26	202	228	10.8	533 (37.0)	392	670	2.1 (0.5)	1.1	3.1
2006	19	70	89	4.2	577 (19.8)	480	651	2.1 (0.3)	1.4	2.8
2005	25	54	79	3.7	593(46.4)	518	750	2.8 (0.9)	1.8	5.8
2004	4	1	5	0.2	752 (108.4)	633	859	5.9 (2.1)	2.7	8.1
2003	2	0	2	0.1	908	905	910	8.4 (0.2)	8.2	8.5
2002	1	0	1	0.05	862			7.2		
2001	2	0	2	0.09	925 (159.1)	820	1025	10.0 (3.0)	7.0	13.0
2000	0	0	0	0.0						
1999	1	0	1	0.05	1,062			13.5		
1998	0	0	0	0.0						
1997	1	0	1	0.05	1,137			15.0		
Totals	242	1,872	2,114	100.0						
Female										
2010	42	37	79	14.7	325 (15.4)	277	384	0.3 (0.1)	0.2	0.5
2009	7	10	17	3.2	480 (24.6)	432	500	1.1 (0.2)	0.8	1.5
2008	54	123	177	33.0	525 (29.0)	464	617	1.5 (0.3)	1.0	2.7
2007	18	28	46	8.6	595 (25.7)	445	670	2.4 (0.4)	1.7	3.2
2006	37	49	86	16.0	607 (33.5)	456	690	2.6 (0.5)	1.9	3.6
2005	21	7	28	5.2	685 (59.7)	603	902	3.8 (1.6)	2.3	10.2
2004	7	1	8	1.5	784 (82.8)	663	894	5.9 (1.9)	3.2	8.8
2003	6	1	7	1.3	833 (60.3)	743	903	6.7 (1.5)	4.5	8.5
2002	7	0	7	1.3	951 (106.9)	742	1035	10.7 (2.9)	5.3	13.4
2001	11	0	11	2.0	1,001 (46.6)	930	1074	12.4 (2.4)	9.6	17.2
2000	14	0	14	2.6	1,030 (57.5)	939	1121	14.1 (2.2)	10.6	18.5
1999	11	1	12	2.2	1,075 (48.3)	1012	1138	16.6 (2.3)	13.2	20.5
1998	14	2	16	3.0	1,098 (39.8)	1048	1190	17.7 (2.4)	14.5	23.0
1997	14	1	15	2.8	1,105 (47.7)	1020	1197	17.1 (2.0)	13.6	20.5
1996	9	0	9	1.7	1,137 (28.0)	1080	1181	20.0 (1.5)	17.4	23.0
1995	5	0	5	0.9	1,092 (71.6)	1002	1196	19.2 (3.8)	13.5	24.0
Totals										

Note. Table may not add due to rounding.

Table 20. Year class composition and length of striped bass collected offshore North Carolina and Virginia during the striped bass Cooperative Winter Tagging Survey, 2012.

Year Class	Total length (mm)
2006	635
2004	830
2003	896
2002	907
2000	989
1994	1,171

Figure 1. Length frequency of striped bass sampled from the 2012 calendar year Atlantic Ocean commercial harvest.

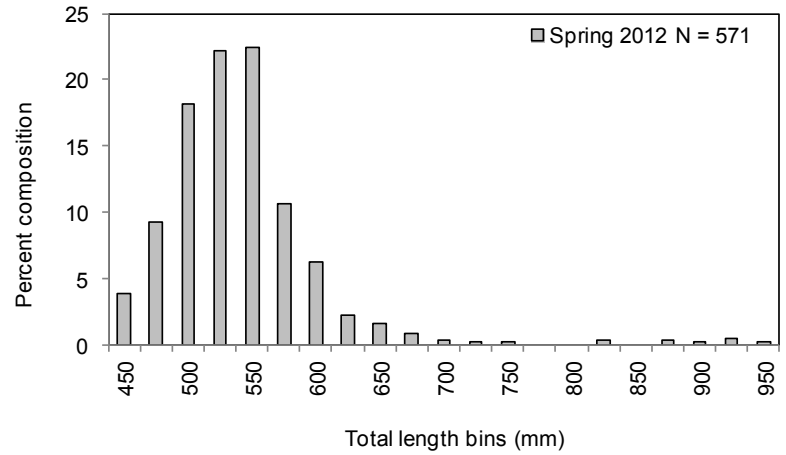


Figure 2. Length frequency of striped bass sampled from the Albemarle Sound Management Area spring 2012 commercial harvest.

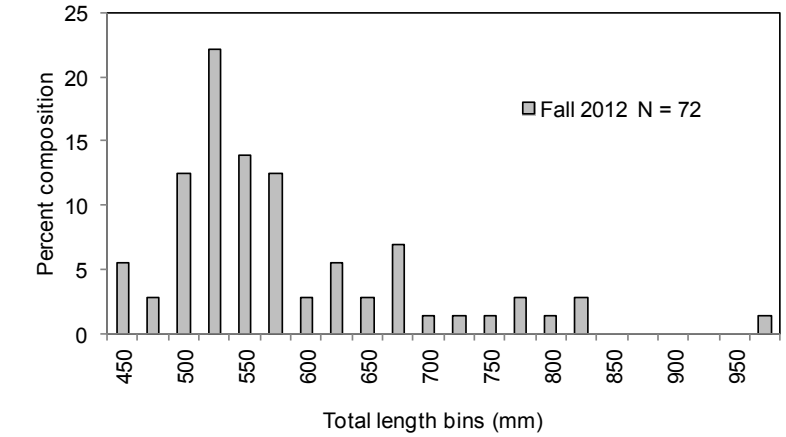


Figure 3. Length frequency of striped bass sampled from the Albemarle Sound Management Area fall 2012 commercial harvest.

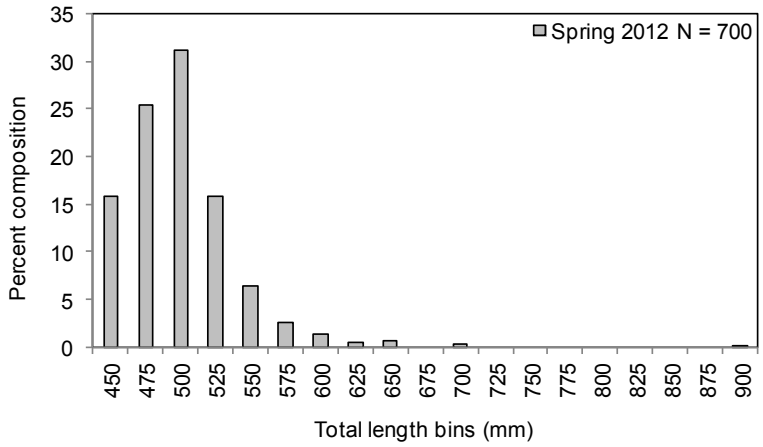


Figure 4. Length frequency of striped bass sampled from the Albemarle Sound Management Area spring 2012 recreational harvest.

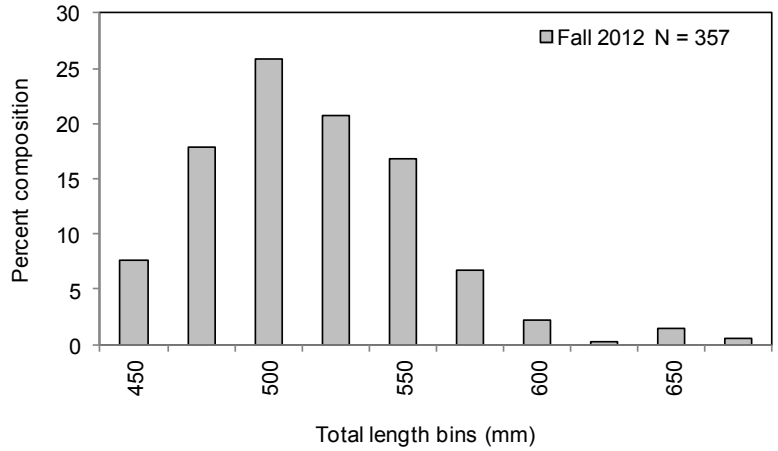


Figure 5. Length frequency of striped bass sampled from the Albemarle Sound Management Area fall 2012 recreational harvest.

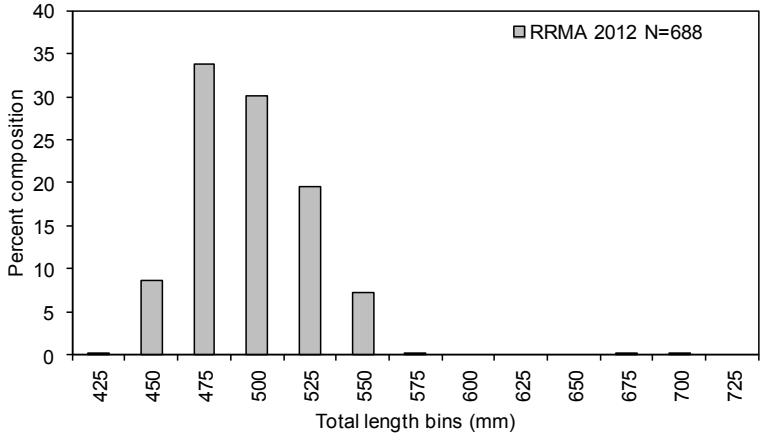


Figure 6. Length frequency of striped bass sampled from the Roanoke River Management Area 2012 recreational harvest. Note the no harvest slot limit of 22-27 inches TL.

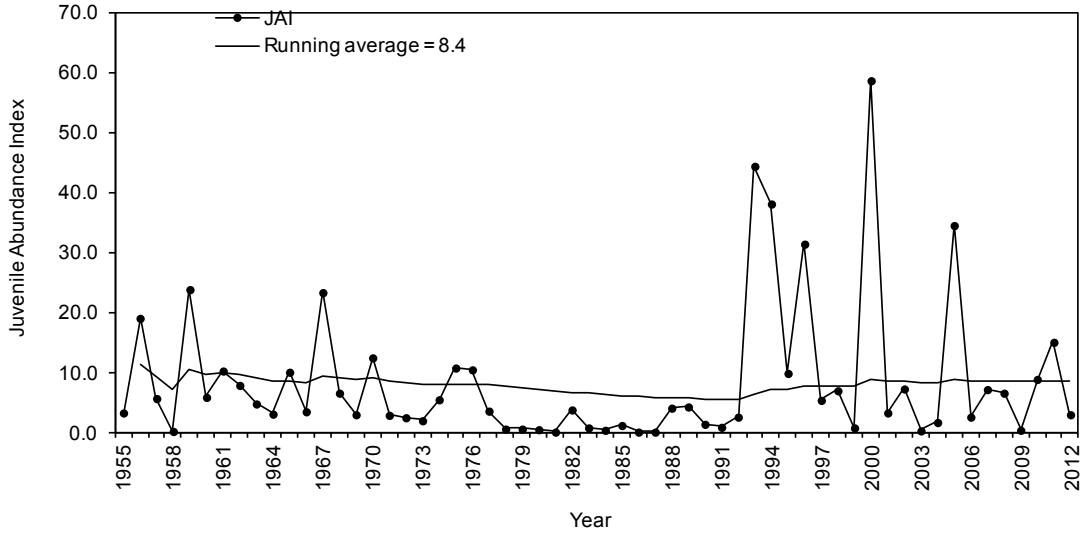


Figure 7. Juvenile Abundance Index (JAI) for A/R striped bass young-of-year trawl sampling in western Albemarle Sound NC 1955-2012.

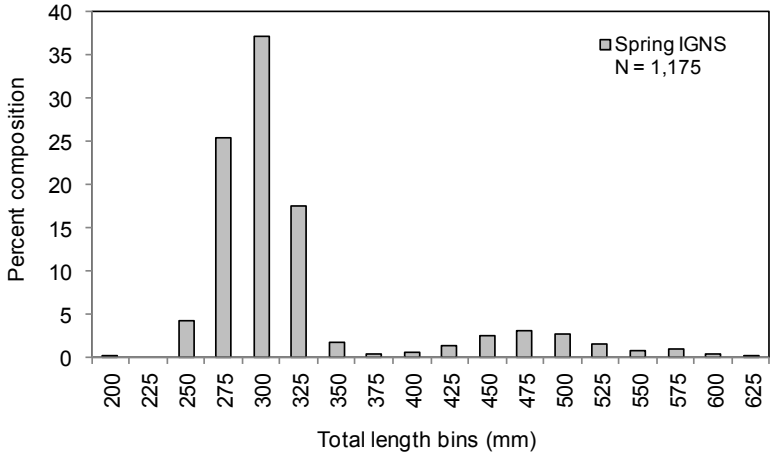


Figure 8. Length frequency of striped bass collected in the NCDMF spring A/R striped bass spawning stock independent gill net survey, western Albemarle Sound, NC, 2012.

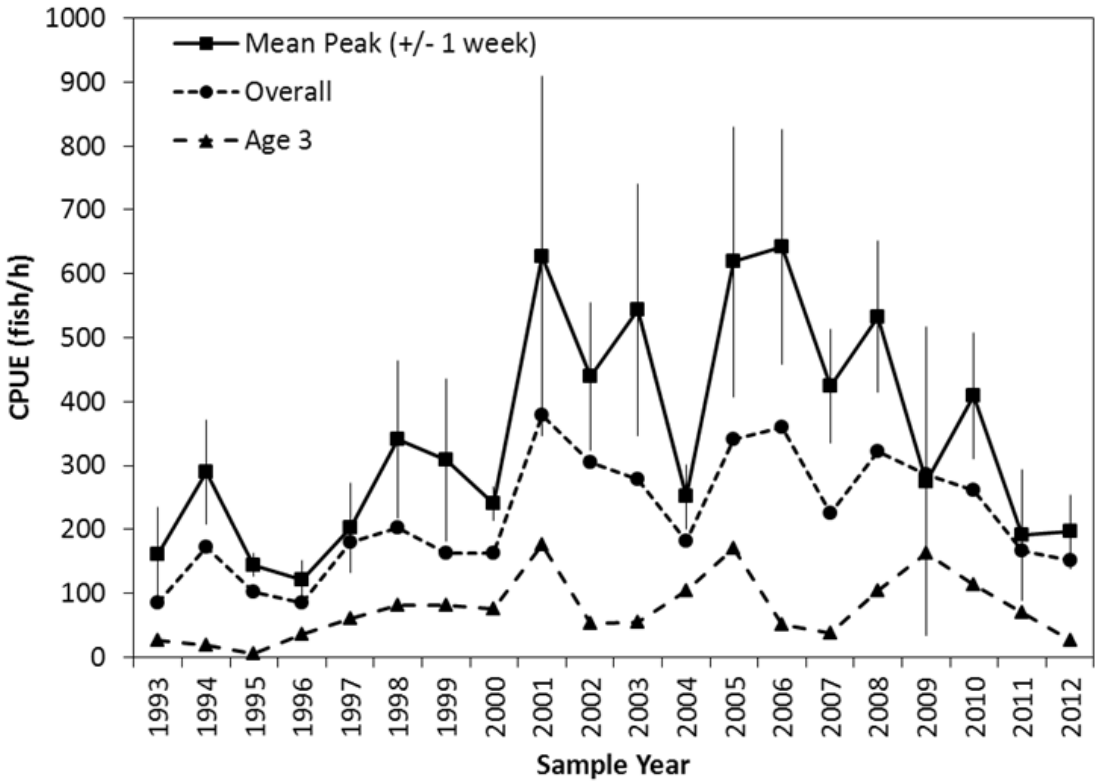


Figure 9. Relative abundance (CPUE; fish/h) of Roanoke River Striped Bass collected by electrofishing during spawning stock surveys at Weldon, NC, 1993–2012. Mean peak CPUE is the average of the peak sample week CPUE and the samples one week before and after the peak for each sample year. Overall CPUE is the sum of fish collected/total electrofishing effort for each sample year, and Age 3 CPUE is the sum of age 3 Striped Bass collected/total electrofishing effort for each sample year. Error bars represent 95% confidence intervals for mean peak CPUE.

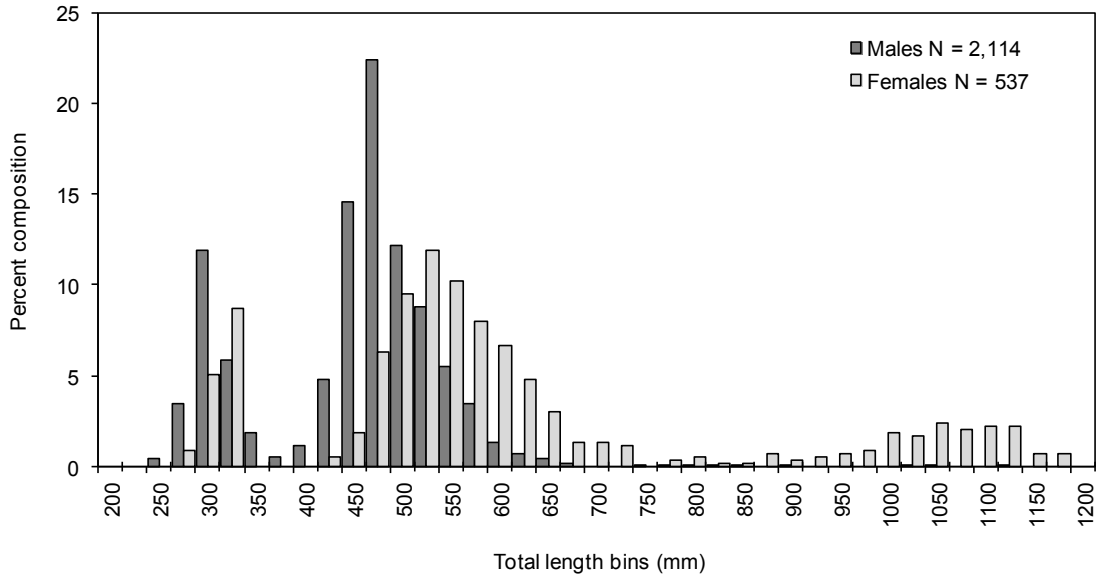


Figure 10. Length frequency histograms for striped bass collected from the Roanoke River, spring 2012. Male and female plots each sum separately to 100.

APPENDIX A1. Proclamations affecting striped bass recreational and commercial fisheries in the Atlantic Ocean and ASMA in NC in 2011. Proclamations can be found at http://portal.ncdenr.org/web/mf/proclamations

ATLANTIC OCEAN GILL NET

Proclamation #	Open Date	Quota	Close Date	Days Open
FF-90-11	01/01/2012	50 fish	Feb 14, 2012	43 days

ATLANTIC OCEAN BEACH SEINE

Proclamation #	Open Date	Quota	Close Date	Days Open
FF-78-2011	12/01/2011	150 fish	Until quota reached	138 days
FF-29-2012			Apr 19, 2012	
FF-60-2012	12/03/2012	150 fish	Until quota reached	

ATLANTIC OCEAN TRAWL

Proclamation #	Open Date	Quota	Close Date	Days Open
FF-1-2012	01/17/2012	100 fish	Until quota reached	92 days
FF-29-2012			Apr 19, 2012	

ASMA – COMMERCIAL

Proclamation #	Open Date	Quota	Close Date	Days Open
FF-86-2011	01/01/2012	10 fish	Apr 30, 2012	194 days
FF-7-2012	02/01/2012	15 fish	Apr 30, 2012	
FF-28-2012	04/15/2012	10 fish	Apr 30, 2012	
FF-43-2012	10/01/2012	10 fish	December 31, 2012	

ASMA – RECREATIONAL

Proclamation #	Open Date	Quota	Close Date	Days Open
FF-67-2011	10/01/2011	3 fish	Apr 30, 2012	212 days
FF-42-2012	10/01/2012	3 fish	Apr 30, 2013	212 days

RECREATIONAL ATLANTIC OCEAN OCRACOKE INLET TO NC/VA STATE LINE

Proclamation #	Open Date	Quota	Close Date	Days Open
FF-32-2011	05/01/2012	2 fish	Oct 31, 2012	180 days

Mike Waine

From: drsciis@myfairpoint.net
Sent: Friday, January 10, 2014 11:49 AM
To: Mike Waine
Subject: Fishery Management Plan Atlantic Striped Bass

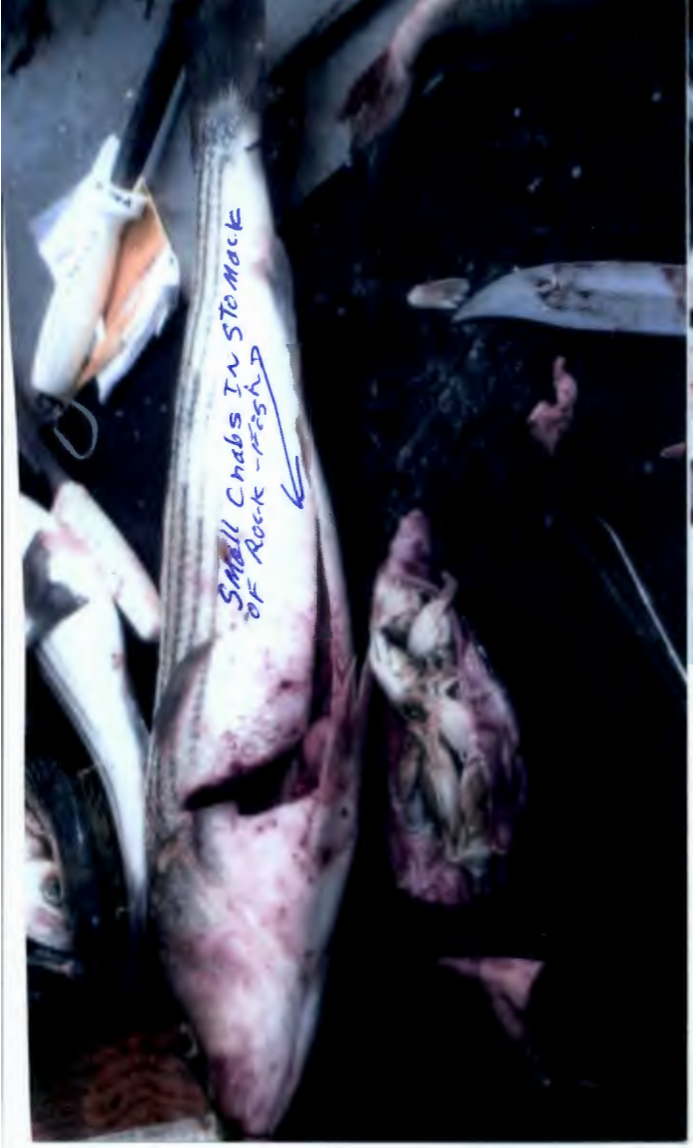
Dear ASMFC (Mike Waine)
Re: The Atlantic Striped Bass Stock

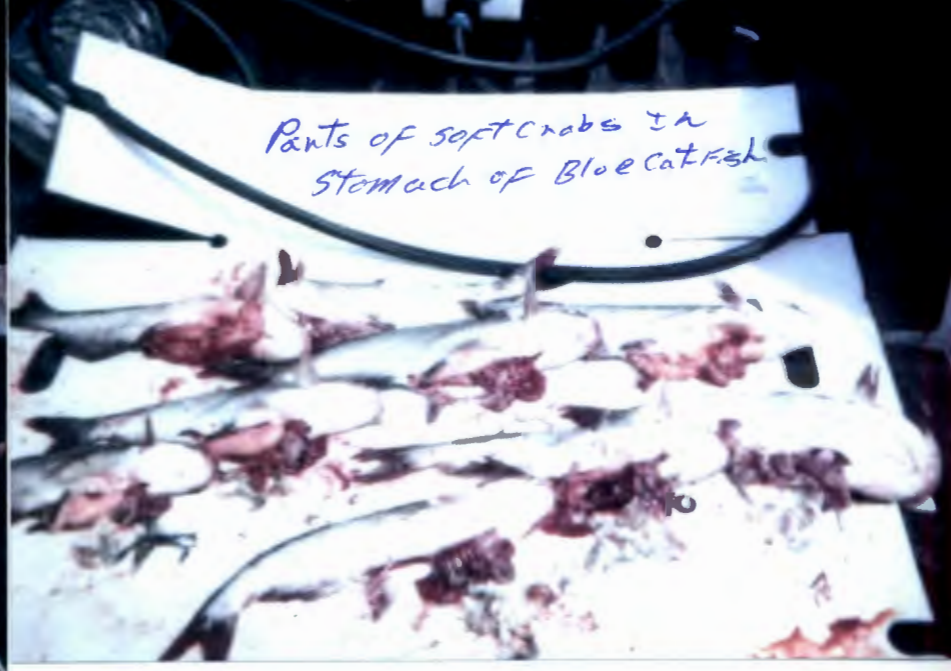
An examination (which I have undertaken) of the time series autocorrelation (lag-1 yr, N/2 yr sliding window) pattern of ASMFC's total population abundance and female spawning stock biomass estimates (both detrended) shows a clear signal of a "critical slowing down"* of striped bass resilience to ecological perturbations of undetermined origin, beginning around 2006-2007, but with marginal amelioration 3-4 years later.

I'm concerned because this signal is so reminiscent of the one that preceded by several years the Newfoundland cod stock collapse, that was ultimately precipitated by overfishing, and by similar autocorrelation spikes recently exhibited by groundfish and boreal shrimp in the Gulf of Maine. Consequently, I'm inclined to believe that the Atlantic striped bass stock is still in some danger and that, eventhough it may not be overfished, technically speaking, prudence dictates that the precautionary principle be considered when establishing any new fishing regulations. Let's not give the fishing public a false sense of security in the face of what could be an unstable situation.

Sincerely,
Fred Cichocki
67 Pearl St.
Bath, Maine 04530
207-443-1332

*See e.g.: Scheffer, et al. 2012. Anticipating Critical Transitions. Science vol. 338 (19 October 2012); Dai, et al. 2012. Generic indicators for Loss of Resilience Before a Tipping Point Leading to Population Collapse. Science vol 336 (1 June 2012)





Enjoy Virginia Seafood Twice A Week!

1-8-14

Hi Mike;

Hope you Received the E-Mail we Sent yesterday. It was very short, But we will Have Important data & Scientific INFORMation to Prove without a doubt that Predators, such as Rock-fish, Puppy Drum & Blue Catfish are the main cause of declining crab STOCKS.

Thanks

Virginia Marine Products Board
554 Denbigh Blvd., Suite B
Newport News, VA 23608
Tel: 757-874-3474 Fax: 757-886-0671
Web Site: www.state.va.us/~vdacs/seafood.htm

Predators claim large numbers of young crabs, and crab populations may vary from year to year according to the abundance of predators. Blue crabs are subject to predation throughout their life cycle and are particularly susceptible when they are soft during the molting process.

As larvae, they are vulnerable to fishes, jellyfish, shrimp, and other planktivores. Plankton feeders eat the larvae as they drift in the water; after they settle, eel, drum, striped bass, sea trout, catfish, spot, and other blue crabs* are primary predators.

The megalopae and juvenile crabs are consumed by various fishes and birds, as well as other blue crabs*.

Adults are consumed by other blue crabs*, American eels, striped bass, Atlantic croakers, cobia, red drum, black drum, oyster toadfish, sandbar sharks, bull sharks, cownose rays, speckled/spotted trout, weakfish, catfish, gars, largemouth bass, loggerhead turtles, Atlantic Ridley turtles, herons and egrets, various diving ducks and raccoons.

*The blue crab is well known for its cannibalistic habits. Cannibalized blue crabs make up as much as 13% of a crab's diet. Blue crabs in poor health, missing important appendages, heavily fouled with other organisms, and those during or immediately following molt are more likely to be cannibalized.

blue catfish
the only non-native resident top-level predator in the list

Autotomy & Regeneration

Autotomy & Regeneration

Blue crabs have the ability to sacrifice limbs (called autotomy) in order avoid capture. Missing limbs are regrown by a process called regeneration.

See Autotomy & Regeneration for detailed information.

Range

Range

The range of the blue crab is from Nova Scotia, down the east coast of North America (including the Chesapeake Bay), off Bermuda, throughout the Gulf of Mexico and the Caribbean Sea (including the Antilles Islands), and down the east coast of South America to northern Argentina. Although the blue crab is rarely found north of Cape Cod, it has been seen in Maine and Nova Scotia following consecutive warm years.

The blue crab has been introduced, probably via ship ballasts into Europe, north Africa, and southwest Asia. Introductions into the Mediterranean Sea and adjacent waters have produced breeding populations whereas others were probably temporary

January 4, 2014

Ms. Tina Berger, Director of Communications
Atlantic States Marine Fisheries Commission
1050 N. Highland
Suite 200 A-N
Arlington, VA 22201

SUBJECT: Comments to Atlantic Striped Bass Stock Assessment for 2013.

Dear Ms. Berger:

Attached, please find Stripers Forever's comments on the subject Stock Assessment.

Stripers Forever is a non-profit, internet-based conservation organization seeking game fish status for wild striped bass on the Atlantic Coast in order to significantly reduce striper mortality, to provide optimum and sustainable public fishing opportunities for anglers from Maine to North Carolina, and to secure the greatest socio-economic value possible from the fishery. We believe that striped bass should be managed for the best overall economic return to society. Trying to manage this fishery on the brink of catastrophe for the benefit of a relatively small commercial industry fails to capitalize on the current value of the fishery and jeopardizes its economic future as well.

The full stock assessment report was not available at the annual meeting in GA, there has been no other formal opportunity for public comment on this document, and the Atlantic Striped Bass Management Board is expected to approve some range of management policy changes based on this assessment at the winter meeting in February. Given the levels of data uncertainty described in the assessment report, we feel that the most conservative approach to restoring this over-fished resource is justified.

Please ensure that these comments are provided to the Atlantic Striped Bass Management Board and included on the briefing cd.

Sincerely,

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Stripers Forever
Comments on Striped Bass Stock Assessment for 2013

INTRODUCTION.

Stripers Forever recognizes the challenges to making accurate estimates of stock assessment parameters given the seemingly endless data uncertainties. It is not our intention to be critical of ASMFC staff or the vast array of technical experts wrestling with this challenging endeavor. We also do not intend to second-guess the statistical techniques used or the estimates derived from them. For the purpose of this review of the 2013 SB Stock Assessment report, our goal is to reinforce the vast threats, fueled by seemingly endless compounded uncertainties, as a means of influencing ASMFC management policies away from its legacy Maximum Sustainable Yield (MSY) mindset. We believe that these quotes copied from "Development and Use of Reference Points, ASMFC Assessment Science Committee, December 2008" should be reinforced by the candid explanations of uncertainties in the SA report:

"Managers should understand not all variables are under their control. They should account for this by using harvest strategies and control rules that apply a precautionary approach to scientific uncertainty."

"The more uncertainty in the estimate of fishing mortality rate, the greater the buffer zone should be between F_{target} and $F_{threshold}$ (NAFO SCS Doc. 4/12, 2004)."

For reference, some of the variables are discussed below. Note that each key issue was first addressed by ASMFC either in public at the GA annual meeting or in the SA report. Quotations from the SA report are in bold italics.

VARIABLES AND RISKS.

Tagging.

Much of the uncertainty regarding Fishing Mortality (F) and Natural Mortality (M) apparently stems from tagging recovery results. The Stock Assessment (SA) report is very candid in its description of the associated threats. For examples copied from the report:

"It should be noted that the reporting rate is used mainly to apportion the total mortality into its F and M components. Hence, a modest misestimation of the reporting rate leads to little error in the estimated total mortality, but has a large effect on estimates of F and M."

"Tagging data suggest there has been an increase in M in recent years (Kahn and Crecco 2006; Section B8 of this report). However, some of that increase may be a function of misspecification of parameters such as tag reporting rates, which makes the absolute estimates of natural mortality less reliable"

"….even small errors in our ability to estimate fishery sector-specific tag reporting rates are propagated into large errors in the harvest and catch and release tag reporting rate estimation…"

"Tag returns for most of the programs have been historically low and have continued to decline in recent years. This has likely only served to inflate the magnitude of the sampling error."

"In recent assessments of the striped bass fishery, doubt was raised over the validity of low fishing mortality (F) estimates produced by the tagging models. The low F estimates obtained could reflect reality, or more likely given the recent static management of the fishery, reflect an artifact created by the tag reporting rate (λ) declining or natural mortality rate (M) increasing."

The number of uncontrolled variables associated with the tagging results seems overwhelming. First, it appears that the expected return rate is something of an educated guess based on assumptions about how many tags would be returned if all of the intercepted tags were returned and no fish died of natural causes. Deviations from this best case scenario could be caused by any one or a combination of natural mortality, poaching (poachers don't return tags), lack of fisherman cooperation, changes in catch success, etc. – none of which can realistically be treated as constants.

Fishing Mortality

It is assumed that fishing mortality (F) includes all the ways in which fish die that would not be present for an un-fished population and that poaching is not included. Intentional removals by commercial and recreational fishermen along with the dead discards are all included in F but not those fish released alive that don't die later from the experience.

In a perfect world, the intentional removals should be a solid, accountable number. However, in those jurisdictions that rely on un-audited reports of fish weights to ensure the total catch doesn't exceed their weight quota, the actual harvest weight could be higher than what is reported to ASMFC on compliance reports. Even when each dead fish is supposed to have a harvest tag, the fishermen sometimes under-report the weight as a ploy to catch more than the allocated weight. Since estimates of dead discards are related to the estimates of discards in general, which are in turn related to catch data, poor catch data could tend to corrupt the dead discard data contribution to F.

Estimates of commercial discards are especially difficult since the commercial sector has by far the lowest reporting rates. By basing the commercial rates on the questionable recreational rates, discard data are further compromised.

"Discard estimates for fisheries in Chesapeake Bay, and coastal locations since 1982 are based on the ratio of tags reported from discarded fish in the commercial fishery to

tags reported from discarded fish in the recreational fishery, scaled by total recreational discards."

"Expanding recreational discards to commercial discards based on reported tag returns assumes equal reporting tag rates in commercial and recreational fisheries but in fact this is not true. To correct for this bias, a correction factor is calculated by dividing the three-year mean of ratios of commercial to recreational landings by the three-year mean of ratios of tags returned by the two fisheries."

There also appears to be an issue with the estimates of which sizes of fish are resident, resulting in yet another threat to F estimates:

"These low values of F in recent years are not consistent with the high levels of harvest in the Chesapeake Bay. The assumption that 18-28 inch males are all resident fish may be incorrect. If the fish are emigrating from the Bay at a smaller size and the tags are not recovered or not used in the analysis, the emigration will result in an over-inflated estimate of natural mortality. This in turn will lead to an underestimated fishing mortality, as will overestimating the reporting rate."

Recreational harvest, discards and discard mortality are all based on MRFSS/MRIP data. In an attempt to reduce uncertainty with the older Marine Recreational Fishing Statistics Service (MRFSS) data, a transition to Marine Recreational Information Program (MRIP) was made but initial attempts to recalculate the MRFFS into MRIP standards did not yield significant changes. One limitation of both systems is that neither covers the inland portion of the fisheries, biasing the recreational harvest lower than it really is. Another limitation is the absence of MRIP data collection during wave 1. The stock assessment team assumed the resulting errors were negligible.

<u>Reliance on the 2011 year class</u>.

The remarkable Chesapeake Bay YOY index in 2011 spurred hope that the stock would recover on its own if given enough time. By 2016, it is anticipated that the 2011 year class will help bolster the decreasing spawning stock biomass (SSB). The F reduction scenarios rely heavily on this factor as evidenced by these quotations from the SA report:

"Young-of-the-year and age-1 indices in Chesapeake Bay were variable but declines were observed during 2004-2010 and in some years close to low values not observed since 1990."

"Even if F in 2015 was reduced to zero, the probability of SSB in 2015 being below the SSB reference point would decline to only 0.71, but it would drop precipitously in the following years as SSB grows rapidly."

Missing from this analysis is the fact that the following year (2012) had the worst index ever and there are no more fish coming along to help the SSB – it is all up to the 2011 year class. Also, the analysis apparently didn't take into account the fact that the Bay

quota is based on an analysis of the exploitable biomass of resident fish. If coast-wide reductions had been approved by ASMFC, they wouldn't have had any influence on the Bay quota bolstered by the 2011 year class just entering the over 18" size range in 2014. The Bay jurisdictions (MD, VA, PRFC) have decided to increase their quotas above the 2013 limit by 14% for 2014. It should be noted that a prior SB addendum approved this approach for the Bay without considering that the day might come when the future of the striped bass (SB) fishery could rest on one year class being plundered by the Bay jurisdictions with no regard for the future. It should also be noted that the quota is specified in pounds and this new contribution to the exploitable biomass will be smaller fish so a greater number of fish will be sacrificed in order to meet the weight quota. It would be interesting to see how that 14% increase in weight would translate into reduced SSB estimates for 2016 and beyond.

Natural Mortality.

There is evidence that natural mortality has increased within striped bass stocks in Chesapeake Bay but the SA report included 0.15, 0.26 and 0.82 as estimates of constant age-independent mortality. The 0.15 value was based on biological assumptions prior to the appearance of mycobacteriosis .With each iteration of estimates, the apparent errors associated with the 0.15 value grew and were "compensated" for by new estimates – first 0.26 and then 0.82. All the data pointed to increases in M, possibly due to disease, but a firm value for all ages of fish was not determined. The newest approach was for a tiered approach with highest estimates for the youngest fish graduated down to 0.15 for fish over seven years old. From the SA report:

"The Baywide estimate of natural mortality for 2011 was 0.82 (Table B8.25). Estimates of natural mortality for Chesapeake Bay fish increased from 0.26 during the first mortality period (1987-1996) to 0.82 during the second mortality period (1997-2011). Both values are substantially higher than the previously assumed, biologically based value of M=0.15."

The range of these "estimates" is staggering and it appears that for most years since 1987, the estimated natural mortality was never as low as 0.15.

"In previous assessments, M of 0.15 was assumed constant across ages. In the current assessment, age-specific Ms for ages 1-6 were derived from a curvilinear model fitted to tag-based Z estimates (assuming Z=M) for fish <age3 from NY and tag-based M estimates (Jiang et al., 2007) for striped bass from MD made for years prior to 1997 (Appendix B5). The age-specific M estimates used in the base model are:"

Age	**1**	**2**	**3**	**4**	**5**	**6**	**>7**
M	1.13	0.68	0.45	0.33	0.25	0.19	0.15

"The stock assessment committee chose to use the curve fit/M=0.15 estimates in the SCA model because they thought the estimates were more realistic than the Lorenzen

estimates and M for ages <7 were based on tag model estimates prior to the suspected increase in Mycobacterium related mortality in Chesapeake Bay."

In spite of detailed discussions in the SA report, it isn't clear which method or combination of methods was finally used in the SA but it appears that some combination of the tiered estimates for different ages coupled with a constant offset was used. However, the obvious uncertainties warrant a risk-averse cautious approach.

Biological Reference Points (BRP)Confusion.

From the presentation entitled **"2013 Stock Assessment of Atlantic Striped Bass"** presented at the GA annual meeting by Gary Nelson and Alexei Sharov, it appears that the new F target was exceeded several times between 1997 and 2012 and the F threshold was exceeded between 2004 and 2008 and again in 2011. While the statement about overfishing not occurring in 2012 is technically accurate, it also paints a misleading picture of a stock with F continuously above the new target from 2003 thru 2006 and mostly in the new "over-fishing" region above the threshold between 2004 and 2012.

If the new BRPs are the best way to proceed, then the old ones were not the best way. In retrospect, we needed more conservative BRPs to ensure the stocks are never overfished and overfishing will never occur.

Inconsistent MRFSS/MRIP Results.

A comparative review of the "Recreational Harvest" and "Recreational Dead Releases" slides from the **"2013 Stock Assessment of Atlantic Striped Bass"** presentation reveals some apparent inconsistencies in data derived from the MRFSS/MRIP data. Recreational harvest and recreational dead releases were plotted for 11 ASMFC member states. The data seems extremely erratic given the general consensus that abundance has been steadily decreasing for almost a decade. While absolute accuracy is not expected from MRFSS/MRIP, the data should generally follow trends associated with abundance in the absence of other competing factors. However, the time series values defy correlation with any apparent long-term trends.

Nine of the 11 states show a sharp reduction in recreational harvest in 2012 but the other two show an increase. Both DE and MA showed abrupt increases with MA recovering from a sharp decrease in 2011 to show a sharper increase in 2012. According to the slides, between 2010 and 2011, the harvest in MA dropped 26% but between 2011 and 2012, it increased by 50%. Conversely, the MA recreational dead discards (derived from total estimated discards) decreased very slightly between 2011 and 2012. It appears from this data that MA anglers caught 50% more fish in 2012 but only released as many as they did the prior year. It isn't clear where a spurt in legal-size fish came from when overall abundance was decreasing and it would appear that no additional fish were released as a result of catching the additional 50%. This doesn't seem right.

Further comparison of dead releases with harvest revealed a startling ratio for MD in 2012 where 250,000 were harvested and 200,000 were wasted as dead releases. The ratio of harvested fish to dead releases was 1.25 – for every five fish harvested in MD, four more died and were wasted. Surely, the slides are wrong and this data was not used for stock assessment purposes. However, a spot check for MD in 2005 revealed a ratio of 1.6 – not significantly better.

In 2012, an argument can be made that there was an excess of sub-legal fish from the 2011 year class but they would have only been one year in age at that time. Having an excess of sub-legal fish would tend to account for abnormal numbers of releases but, using .09 as the proportion of discards that died, MD anglers would have released a total of 2.2 million fish.

These are just obvious examples and not intended to include all the potential discrepancies with the data. We should proceed carefully to mitigate the risks of using inconsistent data unless we can come up with rational explanations for why it appears inconsistent.

What is Missing.

Completely missing from ASMFC policies and priorities, as exhibited by various documents, is any interest in ensuring a quality recreational fishery for the majority stakeholders. The SSB threshold is based exclusively on the abundance needed to ensure that the fishery doesn't crash – not the abundance needed to support some theoretically desirable fishing success rate. Setting more conservative BRPs would increase the abundance to ensure suitable recreational success rates while establishing a wider buffer between SSB targets and thresholds to also help mitigate the adverse effects of data uncertainties.

Of course, this would require more information than is presently available. Without knowing how many people are fishing for SB, how often they fish, and how many fish they are catching, it is impossible to compare an existing Catch Per Unit Effort (CPUE) against a target CPUE selected to ensure a quality fishery. MRFSS/MRIP is neither accurate enough nor consistent enough to meet this challenge.

Regardless of what decisions the SB Management Board makes in Feb., it seems virtually impossible to avoid an over-fished condition since the SSB appears to be in a steep dive already at the threshold level. Decreasing abundance cannot be turned around quickly and the majority stakeholders using relatively inefficient recreational gear will get hurt first. A compelling argument can be made that the current policies for setting BRPs discriminates against recreational fishermen and also fails to counter data uncertainties.