Atlantic States Marine Fisheries Commission

South Atlantic State/Federal Fisheries Management Board

August 7, 2013
1:00 p.m.-2:30 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 *(L. Daniel)* 1:00 p.m.

2. Board Consent 1:00 p.m.
   - Approval of Agenda
   - Approval of Proceedings of May 2013

3. Public Comment 1:05 p.m.

4. Spot & Atlantic Croaker Trigger Exercises Update (*H.Rickabaugh)* **Action** 1:15 p.m.

5. Spanish Mackerel Draft Addendum I for final approval **Final Action** 1:40 p.m.
   - Review Management Options (*K. Rootes-Murdy)*
   - Public Comment Summary (*K. Rootes-Murdy)*
   - Consider final approval of Addendum I

6. Consider FMP Review and State Compliance Reports (*K.Rootes-Murdy*) **Action** 2:00 p.m.
   - Atlantic Croaker
   - Red Drum

7. Red Drum Habitat Draft Addendum I for final approval **Final Action** 2:20 p.m.
   - Review draft addendum(*K. Rootes-Murdy)*
   - Public Comment Summary (*K. Rootes-Murdy)*
   - Consider final approval of Habitat Addendum I

8. Other Business/Adjourn 2:30 p.m.

The meeting will be held at the Crowne Plaza Hotel, 901 North Fairfax Street, Alexandria, Virginia; 703-683-6000

MEETING OVERVIEW

South Atlantic State/Federal Fisheries Management Board Meeting
Wednesday, August 7, 2013
1:00 p.m. – 2:30 p.m.
Alexandria, Virginia

Chair: Louis Daniel (NC) Assumed Chairmanship: 02/10	Technical Committee Chairs Atlantic Croaker: Chris McDonough (SC) Red Drum: Mike Murphy (FL)	Law Enforcement Committee Rep: Stephen Adams (GA)
Vice Chair: VACANT	Advisory Panel Chair: Bill Windley (MD)	Previous Board Meeting: May 23, 2013
Voting Members: NJ, DE, MD, PRFC, VA, NC, SC, GA, FL, NMFS, USFWS, SAFMC (12 votes)		

2. Board Consent

- Approval of Agenda

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. Spot & Atlantic Croaker Trigger Exercises Update (1:10 p.m.- 1:40 p.m.)

Background

- Trigger exercises were established for both species for each non-assessment year to review trends in the fisheries.
- At the August 2012 meeting, the Board tasked the Atlantic Croaker Technical Committee to develop similar measures to the Spot Trigger Exercises.
- The Atlantic Croaker Technical Committee and Spot Plan Review Team met via conference call three times during May-July to review the 2012 data.
- The Atlantic Croaker Technical Committee and Spot Plan Review Team have adapted a traffic light analysis to accompany the current trigger exercises. The groups feel this analysis provide a more comprehensive method to monitor the fisheries.
- The original review of the Spot triggers for 2011 which the Board accepted at the 2012 August meeting did not appear to trip the triggers. However using the most recent revised landings data for 2011 the triggers were tripped. (**supplemental material**)
- The 2012 data update does not appear to have tripped the triggers for the past year, but this is based on preliminary data. The PRT is concerned about the trends in landings and length at age data. (**supplemental material**)

Presentations

- Update of the Atlantic Croaker & Spot Trigger Exercises by H. Rickabaugh

Board actions for consideration at this meeting

- Accept the 2013 Annual Review of Assessment Triggers
- Consider management measures in response to meeting a management trigger for Spot and Atlantic Croaker

5. Spanish Mackerel Draft Addendum I for final approval (1:40-2:00p.m.) Final Action

Background

- South Atlantic Fishery Management Council discussed allowing for seasonal flexibly in the Spanish mackerel FMP. Specifically to allow for changes in size limits in the pound nets fishery in the summer months of July through September.
- Only one state held public hearings (North Carolina), with no public comments submitted.

Presentations

- Review Management Options by K. Rootes-Murdy

Board actions for consideration at this meeting

- Review addendum, select management measures, and consider final approval

6. Consider FMP Review and State Compliance Reports (2:00-2:10 p.m.) Action

Background

- Compliance reports were due July 1, 2013 (**Briefing CD**)
- The Red Drum Plan Review Team reviewed each state report and compiled the Fishery Management Plan Review **(Supplemental materials).**
- The Atlantic Croaker Plan Review Team reviewed each state report and compiled the Fishery Management Plan Review **(Supplemental materials).**

Presentations

- Overview of the Fishery Management Plan Review Reports by K. Rootes-Murdy

Board actions for consideration at this meeting

- Approval of *de minimis* status for Delaware and New Jersey state Red Drum fishery
- Approval of *de minimis* status for Delaware (commercial), South Carolina (commercial), Georgia (commercial and recreational), and Florida (commercial) state Atlantic Croaker fishery
- Approval of the 2013 Fishery Management Plan Review and State Compliance Reports.

7. Consider Red Drum Habitat Draft Addendum I (2:20-2:30 p.m.)

Background

- The Habitat Committee updated and revised the red drum habitat section of the FMP
- The draft addendum was made available in June 2013 for public comment

Presentations

- Review draft Addendum by K. Rootes-Murdy

Board actions for consideration at this meeting

- Review addendum and consider final approval

8. Other Business/Adjourn

DRAFT PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

SOUTH ATLANTIC STATE/FEDERAL FISHERIES

MANAGEMENT BOARD

The Crowne Plaza Hotel – Old Town
Alexandria, Virginia
May 23, 2013

These minutes are draft and subject to approval by the South Atlantic State/Federal Fisheries Management Board. The Board will review the minutes during its next meeting.

Draft of the South Atlantic State/Federal Fisheries Management Board Meeting Proceedings
May 2013

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May 2013

ATTENDANCE

Board Members

Russ Allen, NJ, proxy for D. Chanda (AA)
Adam Nowalsky, NJ, proxy for Asm. Albano (LA)
Tom Fote, NJ (GA)
John Clark, DE, proxy for D. Saveikis (AA)
Roy Miller, DE (GA)
Bill Goldsborough, MD (GA)
Tom O'Connell, MD (AA)
Jack Travelstead, VA (AA)
Rob O'Reilly, VA, Administrative proxy
Kyle Schick, VA, proxy for Sen. Stuart (LA)
Louis Daniel, NC (AA)
Bill Cole, NC (GA)
Robert Boyles, Jr., SC (AA)
Malcolm Rhodes, SC (GA)
Spud Woodward, GA (AA)
Patrick Geer, GA, proxy for Rep. Burns (LA)
Jim Estes, FL, proxy for J. McCawley (AA)
Kelly Denit, NMFS
Ellen Cosby, PRFC
Bill Archambault, USFWS

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

Ex-Officio Members

Staff

Bob Beal
Kirby Rootes-Murdy
Toni Kerns

Guests

Steve Meyers, NOAA
Tom McCloy, NJ DFW
Jordan Zimmerman, DE

These minutes are draft and subject to approval by the South Atlantic State/Federal Fisheries Management Board. The Board will review the minutes during its next meeting.

The South Atlantic State/Federal Fisheries Management Board of the Atlantic States Marine Fisheries Commission convened in the Presidential Ballroom of the Crowne Plaza Hotel Old Town, Alexandria, Virginia, May 23, 2013, and was called to order at 11:07 o'clock a.m. by Chairman Louis Daniel.

CALL TO ORDER

CHAIRMAN LOUIS DANIEL: Good morning! Welcome to the South Atlantic State/Federal Fisheries Management Board. We have a fairly aggressive agenda for the South Atlantic Board today, and I will try to get us through it as quickly as I can.

APPROVAL OF AGENDA

We have got an agenda. We do not have proceedings, so the only question I would ask at this point is everybody comfortable with the agenda and can we move on by consensus? Toni is going to tell us why we don't have proceedings.

MS. TONI KERNS: The last time the South Atlantic Board met was at the annual meeting in Philadelphia, and that was the day that the recording wasn't going on, so we do not have proceedings from the October meeting.

PUBLIC COMMENT

CHAIRMAN DANIEL: This is an opportunity for the public to comment on items that are not on the agenda. I don't think we have much public; so seeing nobody coming forward to speak, we will move on to our first agenda item, which is to consider the Draft Black Drum Fishery Management Plan for final approval. Toni is going to go through several items to get us to our discussion.

DRAFT BLACK DRUM FISHERY MANAGEMENT PLAN FOR FINAL ACTION

MS. KERNS: As Louis said, we are going to go through the options in the Black Drum FMP, the public comment, the advisory panel comment and some comments from the Habitat Committee. As you may recall, the statement of the problem in the Draft FMP was that there is a lack of consistent coast-wide regulations or goals for black drum.

The fishery may be targeting juveniles, and there was a desire for the South Atlantic Board to have the ability to address future challenges in the fishery, especially when the coast-wide stock assessment comes out. As a reminder, we are working on a stock assessment for black drum right now, and we will hear terms of reference later in the meeting.

The goals and objectives of the plan are to provide an efficient management structure to implement coast-wide management goals in a timely manner. The objectives are to have a flexible management system; promote cooperative collection of biological, economic and sociological data; to manage to protect both young individuals and establish a breeding stock; and to develop research priorities to maximize the biological, social and economic benefits of the fishery.

The management program for black drum is defined as the range of the stock from the U.S. waters Northwest Atlantic Ocean, from the estuaries eastward to the offshore boundaries of the EEZ, and it is from the east coast of Florida through New Jersey. This is just a list of the current state regulations. They range in minimum size from 10 inches up to 32 inches and has various bag limits in the recreational fishery and various trip limits and quotas in some states for the commercial fishery.

For recreational measures, there are a series of measures that were in the draft addendum. Minimum size limits; they range from 10 inches up to 32 inches for options. For slot limits, it ranges from 10 to 24 inches, up to 30 to 48 inches as the various sets of options for slot limits. There are options that looked at a trophy allowance; either to allow one trophy fish per day or not to allow trophy fish at all.

It had options to bag limits. The bag limit options range from one fish all the way up to fifteen fish per day. There is also a vessel limit to have a bag limit, which ranges from six fish per day per vessel up to twenty fish per day per vessel. The last option under the recreational measures was to allow the states to maintain their current measures. All states have recreational measures for black drum except for North Carolina.

Next I will just quickly go through the commercial measures. There was a minimum size limit under commercial measures. They range from ten inches up to thirty-two inches. For slot limits; again it was ten inches to twenty-four inches for a slot as the smallest size and then the largest was thirty to forty-eight inches as the slot. There are a variety of others between those two size limits.

For trip limits, there are quite a few trip limit options. Some were as low as five fish per person per day, and then other trip limits reflected more of a pound limit; a minimum at 500 pounds per vessel per day and up to 10,000 pounds per vessel per day. There is also a bycatch allowance the board could establish as well through a trip limit option here of a certain percentage to be determined by the board.

Limited entry for the commercial fishery; the options were either to have no limited entry program or to establish a limited entry program. The board's intention in this was just to keep the current fishery at its level and not to allow an expansion of the black drum commercial fishery in the states.

Lastly under commercial measures was for all states to maintain their current measures. All states have some sort of management program for the commercial fishery except for North Carolina. There are also de minimis criteria that the board could establish through this management plan.

The plan has two options; one, that the recreational and commercial would be established as separate de minimis status. Option 2 is to combine the commercial and recreational landings to set the de minimis status. For both options the board could approve de minimis if the average of the preceding three years was a certain percentage less than the coast-wide landings.

That percentage would either be 1, 2 or 3, so the board would need to decide one of those percentages if the de minimis criteria option was to be adopted. The document also allows the board to make recommendations to the Secretary of Commerce when they feel necessary that those regulations should be put in place in federal waters. It has recommendations for monitoring requirements but does not have any required programs in the document. The document also has recommendations for habitat, research and protected species, but none of those are required elements of the plan.

We had five public hearings; North Carolina, Virginia, Maryland, Delaware and New Jersey. I think there were about 35 participants at all of the hearings. There was the largest turnout at the Virginia hearing. There were nine written comments that were submitted, One of those was from a group, the Cape May County Party and Charter Association, and eight individual letters as comments.

Most of the comment favored some sort of measures should be in place for all states within the coast. A lot of commenters stated that states have implemented good management programs for their areas, and they should not have to change them, but that North Carolina should have to put a management program in place.

For recreational measures; for those that did comment on specific size limits, they were in favor of either 14 inches or 16 inches. There was a mixture of recommendations for bag limits that ranged from one to three fish. For the slot limit, there was a recommendation for 14 to 27 inches.

There was a commenter that said that there should be no trophy fish, and then some other commenters that said we should have a trophy

fishery, but that trophy should be a very large size since large black drum are much more of a trophy than not like an 30-inch fish but much larger than a 30-inch fish. One additional commenter favored five fish for the bag limit, and for a vessel limit they said either five fish per vessel or no coast-wide measure on a vessel limit.

On the commercial fishery there were comments in favor to either have an 8 to 10-inch size limit or a 14-inch size limit. A couple of commenters said that the size limit should just reflect that of the recreational size limit; they should be the same. If there was a slot limit put in place, there was favor for 14 to 27 inches.

For those that spoke in favor of a trip limit, they said 500 pounds per day. There was a mixture of support for the limited entry program. Some people felt that their states had already curbed their fishery and that it wouldn't expand from where it is now, and so there was no need for a program. Other folks felt that might not be necessary.

The advisory panel got together. We only had two members of the panel on the call. One was from North Carolina and the other was from Virginia. Jordan also joined the call. The AP expressed agreement to allow the states to continue with their current recreational measures. Although they did agree that North Carolina should put measures in place, they did not find consensus on a specific size limit, but they thought that there was a need to protect juvenile black drum through the sizes of sexual maturity.

Due to the range and the size of black drum juveniles may be before reaching Year One along the Atlantic Coast, the board may want to consider different size limits for each state or region. The AP did not reach a consensus on a specific slot limit to the varying sizes of black drum in the region. They thought that a slot limit, Option 2, may be possible. There was an agreement that the board should allow the take of one fish larger than the maximum size limit. They suggested that the board consider a vessel trophy limit of one or two fish per vessel.

They also suggested that a trophy fish should a very large fish, 32 inches or greater, and may be considered small for a trophy given that the biological data on black drum indicates that they can live up to 50 to 60 years old and grow to a very significant size. For bag limits, they were in favor of using the bag limit.

They suggested that the bag limit could be greater than ten fish. If states were implementing a larger size limit, then the board may want to consider a bag limit that is smaller, maybe five fish or less. For commercial measures, they expressed that the states are doing a good job with commercial measures that they have in place currently and that North Carolina should put measures in place.

They did not come to a consensus on a size limit for the commercial fishery, but did feel one should be used. One member felt that the size limit should consider the gear type used in the fishery so that there is a minimization of dead discards. They also felt that the commercial and recreational size limit should be the same.

For trip limits, there was also no agreement on a standard trip limit to supersede states already enforcing trip limits, although an AP member recommended that North Carolina should implement a trip limit possibly of 500 pounds per vessel per day since this was a trip limit that had been previously considered by the state.

The AP stated that de minimis landing criteria could be up 3 percent of the coast-wide landings. When Jordan was on the call, he suggested that recreational landings alone should not be used to set de minimis due to the high percent standard error in some of the states with the MRIP data. The AP concurred with this statement.

Lastly, there was also one member that was not on the call for the advisory panel and he had sent in specific comments, which were included in your meeting materials. I just wanted to point that out to you. Then Kent Smith send in

comments from Habitat Committee, and the Habitat Committee recommended a few change in some of the figures and suggested adding additional source information for the habitat section of the document.

I have those edits from the Habitat Committee, which, if it is okay with the board, I can make those before we finalize the document. It is just a couple of pieces on new information on some of the life stages at the larval, juvenile and adult section. Those are all the comments.

CHAIRMAN DANIEL: Are there questions for Toni? Yes, Ellen.

MS. ELLEN COSBY: Toni, on Table 2 of the document, PRFC was inadvertently left out.

MS. KERNS: We will make sure you get added in.

MS. COSBY: Page 15 shows our regulation.

CHAIRMAN DANIEL: Are there any other questions or clarifying comments for Toni? Seeing none; thank you, Toni. If there is a motion ready, we can take those. Rob.

MR. ROB O'REILLY: Well, I didn't have a question on the information, but I did want to comment my appreciation for Toni fitting in the Virginia hearing. I hope she had some fun over on the Eastern Shore. I wasn't able to attend. As she indicated, it was well attended. It is very tough for a state to see one hearing like smooth dogfish where there is no attendance in a central location; but going to the Eastern Shore, it is the area where this fishery is most appreciated both recreationally and commercially.

I also wanted to comment that there really is no evidence – at least there has been some really careful attention paid to black drum over the years. Through Old Dominion University and through a cooperative agreement with VMRC, we do see ages out to 64, which is the oldest age so far. The truncation in age distribution is not there, which is a good sign. However, I think this is good that there will be a stock assessment as something we should all look forward to.

With that, I would like to offer a motion. I move adoption of Option 6 under recreational measures and Option 5 under commercial measures, so that states maintain all current recreational and commercial measures, except that all states shall establish a minimum possession limit and possession size limit by January 1, 2014, and a minimum size limit that shall be no less than 12 inches by January 1, 2014, and no less than 14 inches by January 1, 2016. On the recreational measures there is a companion possession limit for the size limit.

DR. MALCOLM RHODES: I just want clarification, because you have a minimum possession limit; wouldn't it be a maximum possession limit?

MR. O'REILLY: It should be a maximum possession limit, but the possession limit is there just as a catchall on the commercial; and I think what I was going to say on the commercial some states do have a possession limit actually like you would for recreational fisheries. If you look at Table 2, other states have annual quotas or trip limits. It is a catchall word and it doesn't necessarily mean that any state would have to have, per se, a possession limit. It might be some other type of measure. But on the recreational fishery, obviously the companion is the possession limit and the size limit. I hope that clarified it.

CHAIRMAN DANIEL: Second by Mr. Cole. Is there discussion on the motion? Yes, sir.

MR. JOHN CLARK: I just had a question in terms of the 12-inch size limit is not actually in the options that went out to public hearing and neither is the time limit; so is there any problem with that or is that okay?

CHAIRMAN DANIEL: That is okay because it is within the range of alternatives, so it is not more or less restrictive than what went out to public hearing. I don't believe we will run into a problem with that. Tom.

MR. THOMAS O'CONNELL: Just for understanding; so under this motion states that already have possession limits will have to maintain those and states that do not have a possession limit would have to establish one by January 2014?

CHAIRMAN DANIEL: That is correct; that is my understanding. Is there any further discussion on the motion? Bill.

MR. WILLIAM GOLDSBOROUGH: I guess this is a question for Rob. Since with this stock we have established fisheries on smaller fish to the south and big fish to the north, it seemed to me – and sometimes we have had wastage of big fish in the north and yet I think everyone would agree you don't need more than one of those in a day; it seemed to me from looking at all the options, that some kind of slot allowing one big fish would be the preferred way to go. I was wondering if that was considered, Rob.

MR. O'REILLY: Well, again, I think we would have to look at all the distribution of landings at size, which are not going to be complete to know just what effect the smaller size limit in the southern areas have compared to, say, a 16-inch limit in Virginia. I know I heard yesterday that very large fish are certainly present even below North Carolina.

This could be an interesting situation because we're getting a foothold for all the states to have something in place, a minimum size limit, and to get that increase; but this is a fishery from experience that even having a 16-inch size limit in Virginia, you wouldn't find a lot of 16-inch fish that are taken.

I don't know the southern states' landings quite as well by size, but I assume that is the case. I think that is the reason not to have the slot limit. I think the other part here is this is consistent with the advisory panel when they looked at that. The third part might be that if a slot limit is something for the future, we should go through the assessment process, see what that looks like, see if other areas are shaping up the way at least my familiarity with the Virginia area is that things do look pretty good. I think we need to go through that process.

MR. ROY MILLER: Mr. Chairman, let me state up front that I intend to support the motion and thank the makers of the motion. However, I wondered if they might consider a friendly amendment of adding a maximum possession limit. When I look at the chart of existing possession limits, all the states with the exception of Georgia that have a possession limit, their possession limit is five or fewer fish per person per day.

Begging the indulgence of Georgia, it sort of leads me to the conclusion that a reasonable possession limit as a precautionary measure in lieu of a stock assessment hasn't been conducted on this particular stock, if the makers of the motion might consider inserting a maximum possession limit of five? Thank you, Mr. Chairman.

CHAIRMAN DANIEL: For the recreational fishery, Roy?

MR. MILLER: Yes, that is for the recreational fishery.

MS. KERNS: Roy, I think the intention, in my discussions, was that this would encompass both the possession limit or a trip limit, some sort of limit for both the recreational and the commercial fishery; and so do you have a suggestion, then, what would be needed for the commercial fishery? This was to put regulations in place in North Carolina because all states have a possession limit or a trip limit of sorts for both the commercial and the recreational fishery except for North Carolina. This was to just have North Carolina establish some sort of possession limit for both fisheries.

MR. MILLER: I have no specific suggestion for the commercial possession limit, so the wording that is up there would be adequate to cover the commercial. For recreational let me just suggest a possession limit of five to see if the makers of the motion would agree with that.

CHAIRMAN DANIEL: I will let them think about that for a minute and go to Tom.

MR. THOMAS FOTE: I think on this fishery, which is not a fishery that is in trouble, the states should be allowed to decide what their recreational bag limit is for the population that wants to fish in their states and the use they have for their fish at this time. In New Jersey we decided that after talking to our fleet, they only want three fish.

That is what they basically came up with and they can live with that. I don't know what other states basically do, how they basically promulgate their fishery or whether they take fish home to eat, and I don't really want to decide on putting a bag limit in arbitrarily just because I think it is right for New Jersey or for another state without really going through what that state feels about it and what their anglers feel about it. We're not dealing with a stock that is being overfished or anything like that. We're just looking to put some regulations and guidelines in place.

MR. O'REILLY: I'm in a similar camp and really to just right now think about what that possession limit or bag limit should be, given the range where you have five to fifteen within the states south of North Carolina, makes it a little tough to do. Certainly, ten might be the place to look at, but I'd prefer that since the size limit is the big issue right now, that this should be revisited. I don't know what plans North Carolina has in terms of when it looks for a bag limit, but I think five might not be the right choice right now. I would not support it.

CHAIRMAN DANIEL: To that point, if the motion carries and the plan is approved, then I will be taking that information to my commission next week. I am expecting that I will get recommendations on how to move forward with a bag limit and a commercial trip limit to implement concomitantly with the new size limits.

That is my intent. I think you're right – I'm not trying to speak for or against Roy's suggestion, but just the opportunities that we have, we're trying to move precautionarily. That is what we've said all along. We've got a stock assessment coming. This is the original plan, but there is nothing that would prevent us from doing an amendment or an addendum in the future.

If North Carolina comes back with a hundred fish limit or something or a 20,000 pound trip limit that the board doesn't feel is appropriate, I don't anticipate that happening. I anticipate somewhere in the five to ten range with a 500 pound trip limit. That is what I expect, but they surprise me all the time, so it is hard for me to guarantee what we will do; but having that flexibility right now is probably good. Roy, did you have your hand up?

MR. MILLER: No, I accomplished my goal in stimulating discussion on this, so I'm not going to offer an amendment to the motion. I'll let the motion stand. Thanks.

CHAIRMAN DANIEL: Yes, we're usually pretty good at working things out around the South Atlantic Board. **Is there anything else on the motion? Seeing none; all those in favor of the motion raise your right hand, 11; all those opposed same sign; null votes; abstentions. The motion carries unanimously.**

MS. KERNS: The only other issue in the documents is the de minimis criteria. The board can consider allowing for de minimis. Because there are no monitoring requirements, typically de minimis gets you out of a monitoring requirement in the plan. Maybe in the future you will put in monitoring requirements, so you could go ahead and set those de minimis provisions now and then later on say what they would be letting you out of.

There were two options for de minimis, either to combine the commercial and the recreational landings or to have them separate and then 1, 2 or 3 percent of the last three years' landings for the board to consider. The technical committee

did recommend to combine the landings due to the high PSEs in the recreational landings.

CHAIRMAN DANIEL: And I believe our technical committee recommended if we select a de minimis to use recreational/commercial combined; is that correct?

MS. KERNS: Yes.

CHAIRMAN DANIEL: What is your pleasure? We don't have to do it right now but we can.

MR. ROBERT H. BOYLES, JR.: **Mr. Chairman, I made a motion that we establish Option 2, recreational and commercial combined de minimis status at 1 percent**. That is what we have done typically, 1 percent.

CHAIRMAN DANIEL: Okay, motion by Robert Boyles; second by Bill Cole. Discussion on the motion? Is there any objection to the motion? **Seeing none; the motion carries unanimously**.

MR. BOYLES: Mr. Chairman, are you ready for a motion to recommend approval to the Policy Board?

CHAIRMAN DANIEL: That's where we are.

MR. BOYLES: **I would like to make a motion that the South Atlantic Board recommend the Commission approve the Draft Interstate Fishery Management Plan for Black Drum.**

CHAIRMAN DANIEL: Second by Mr. Meyers. Okay, move to recommend to the full commission approval of the Black Drum Fishery Management Plan as modified by the South Atlantic Board. Motion by Mr. Boyles; second by Mr. Meyers. All those in favor signify by raising your hand. This is a roll call vote; I'm sorry. Does anybody object? **Okay, without objection it passes to the full commission.** I'm going to recess the South Atlantic Board and turn it over to our Chair so that we can do the full commission action; and then those folks that stayed back can head home.

(Whereupon, a recess was held.)

CHAIRMAN DANIEL: I will reconvene the South Atlantic Board. All right, the next item on our agenda is a white paper from the state of North Carolina regarding Spanish mackerel and Toni will review the information that was provided by North Carolina.

NORTH CAROLINA WHITE PAPER ON SPANISH MACKEREL

MS. KERNS: North Carolina sent in a white paper for the South Atlantic Board to consider. There is a portion of the Spanish mackerel entering their estuarine pound nets during the months of August and September that are just under the 12-inch minimum legal size. When the nets are bunted and the fish are bailed, the undersized Spanish mackerel are difficult to release alive because they did very quickly unlike some other species that are caught in these pound nets.

An allowance for an 11-1/2 inch minimum size for these pound nets in estuarine waters during August and September could reduce the dead discards. The majority of the North Carolina harvest for Spanish mackerel is in state waters. Less than 5 percent occur in federal waters. The majority of their landings are from their gill nets that averages about 92 percent.

Pound nets average about 6.7 percent of the landings. Their largest landing months in pound nets are in June and July. Their fishermen have reported an increased presence of fish a quarter to a half inch below minimum size, and these fish are dying in their pound nets. As a reminder, the most recent stock assessment for Spanish mackerel came out in 2012 through the SEDAR process and the stock is not overfished and overfishing is not occurring.

North Carolina is requesting that the board consider allowing their estuarine pound net fisheries for August and September to reduce the size limit to 11-1/2 inches to reduce or eliminate these dead discards that they're seeing. We would need to do an addendum to allow for this

to occur. I don't know if you have anything to add, Louis.

CHAIRMAN DANIEL: Nothing really to add; just a clarifying point that this has been occurring now for several years. They are dead fish. The estimated pounds of fish that may be caught in this operation are around 10,000 pounds. It is possible there could be about 10,000 pounds.

The fish that are harvested under this provision would count against the coast-wide quota, so they would be counted against the quota even though they were undersized. That is the issue. There is really no other way that I know to address the problem. They're so small and bycatch reduction devices and other mechanisms that we have tried to come up with to avoid this have not worked. This is the one option that we tried to come up with and would like to get your approval to move forward with an addendum. Rob.

MR. O'REILLY: Michelle Duval contacted me and we had some e-mails back and forth. In the late eighties Virginia had a 5 percent tolerance for under 14 inches. I guess with the changes in the South Atlantic Plan at that time we removed that 5 percent. That was done in 1995. Although when I spoke to Michelle Duval, she indicated that at least in the records it indicated it went off the books in 2006. It has been quite a while.

Virginia is not going to have the same situation that North Carolina has. There are only certain nets where that could happen. I think there is enough of a difference there regionally that I wouldn't want to say that this is something that should be looked at pretty closely in Virginia yet, but I certainly want to find out.

I certainly support what is trying to be done in North Carolina given the way the pound net operation is, and I would to just kind of look into this myself as we're going through this process to see if things have changed. We have lost a lot our pound nets over time, and it may be that this is not the issue it once was back in the late 1980's in Virginia.

CHAIRMAN DANIEL: Is there any objection to moving forward with an addendum to address this issue with the understanding that Virginia may add on to any document. Robert.

MR. BOYLES: Maybe not objection; I just need to know a little bit more about it. You have got a gear conflict that results in mortality of undersized fish with a minimum size on it. I just want to think about it.

CHAIRMAN DANIEL: Sure, and obviously I don't want to put staff through the addendum process if this is not something that the board would be interested in approving. If everybody is in objection to this, then obviously there is no need for staff to take the time to make this happen. I want to make sure everybody is comfortable with it. I don't know the solution.

It is not a directed fishery for Spanish. It is a multispecies gear. This particular pound net area; it is fairly isolated, right behind the Outer Banks. It is an age-old problem; a lot spot, a lot of butterfish, a lot of croakers; that type of fishery and just not knowing how to account for those. Just bailing those out has raised concern from the fishermen.

I don't know a whole lot more I can add to it, because it is hard to know precisely how much because they're discarded. We know through some very little observer work that it does occur and it is fairly substantial, a couple hundred pounds, and that is a lot of fish at that size. Spanish aren't very heavy-bodied. That is about all I can add to the issue at this point. Robert.

MR. BOYLES: Tell me what percentage of your quota or your allocation we're talking about.

CHAIRMAN DANIEL: It would probably result in about – I would probably less than 1 percent. Ninety-two percent I believe is gill net so the pound net – and they would not be allowed to retain those fish – only 6.7 I think it

was percent of the entire North Carolina Spanish mackerel harvest comes from pound nets. This is less than 6.7 percent and it is probably down in the – below 1 percent would be my guess, but that is a guess.

MR. BOYLES: Okay, thank you, I'm comfortable.

MS. KERNS: I would need to know the timing. If the board does move forward with this, what the timing of this addendum would be. The white paper, as it was put on the meeting materials, is somewhat similar to an addendum if you take notice. In discussions with North Carolina, there was an interest in fast-tracking this addendum in order to try to have this measure in place for the 2013 fishery.

There is a possibility to turn this white paper around quickly and for the board – we really wouldn't make any changes to the document as it was besides putting a cover on it and a timeline. The board can consider approval of this white paper as an addendum to move forward and then for final approval in August; or, we slow it down to a regular addendum pace and it wouldn't be in place until the 2014 fishery.

MR. MILLER: Mr. Chairman, instead of embarking on the step that Toni mentioned, we just brought up the plan and there is a phrase in there regarding adaptive management and specifically it references bag limits and size limits. I recommend we do this in the easiest way possible, and it seems a full addendum seems somewhat cumbersome for this particular change.

MR. ADAM NOWALSKY: I believe you had indicated that this was primarily an issue in the summertime, July and August, so is final approval of this in August going to help your fishermen?

CHAIRMAN DANIEL: It is specifically for August and September, so we would lose the first half of August, but then we would be able to implement – I could implement in 48 hours after the board approved the addendum in August, and that would give us the remainder of August and all of September. It is just specifically for August and September. It would only be allowed during that time of the year. I don't know of any other way to do it and not do something unusual.

MR. BOYLES: Mr. Chairman, based on the document here, the latest SEDAR the stock is neither overfished nor is overfishing occurring. I would make a motion that we proceed with the expedited process to develop an addendum to make this one specific change to reduce that minimum size of Spanish mackerel in the pound net fishery to alleviate and prevent wastage of dead discarded fish.

CHAIRMAN DANIEL: Second from Mr. Cole. Rob.

MR. O'REILLY: It seems open-ended. Are we going to target a timeframe for that as a suggested friendly amendment here? Most of the information was for the summer months.

CHAIRMAN DANIEL: Yes, the request from North Carolina was for August and September, and it is in the document. We can add that or not but it is in the document – it is in the addendum. Robert.

MR. BOYLES: Mr. Chairman, can you tell me what kind of report you will get out of the fishery; what you may be able to bring back to us in October?

CHAIRMAN DANIEL: Yes, we'll continue to sample the pound nets at the dock, so we will have length frequency distributions and be able to determine what percentage of the fish are those small fish and the disposition of those fish. We will have that information. I doubt we will have observer information between now and next year, but we may have it after that, and then we'd have even more information, but certainly the length frequency distributions of the catches. We'd be able to expand out and determine exactly how much – you know, account for all those fish that were retained at that size. Toni.

MS. KERNS: And North Carolina has committed to providing that information in their compliance reports to be reviewed by the technical committee and the PRT.

MR. O'REILLY: I want to make sure that North Carolina – when you mentioned the size, you had talked about 11-1/2 inches, I think. I'm not necessarily sure that has to be stated right now, but I am thinking again about the Virginia situation. There are undersized fish. It is just so limited compared to 15 years ago or so, but we do have sites down near Lynnhaven that you're familiar with, Mr. Chairman, and that has always been an area where you have some undersized Spanish mackerel.

What I'm wondering is when Virginia eliminated the 5 percent tolerance, it was because of the plan change or the amendment to the plan is the way I remember it back in 1995. It was a situation where it just had to be done, and there was nothing else to do. Now there seems to be – North Carolina seems to be, given the status of the stock, able to at least have this approach.

I just want to be sure that Virginia can come back under this motion – and I would think the timing is right, that if it is August and September, that would fill in as well for Virginia. Again, I will report back on that, but would like to be included at this time as Virginia representative.

CHAIRMAN DANIEL: So ordered. I think we can do that. Bob.

EXECUTIVE DIRECTOR ROBERT E. BEAL: Just a question probably to you, Mr. Chairman, on content of the addendum. Do you want options in there to allow this to sort of be a one-year pilot program with an extension by the board; do you want it to be an open-ended approval and then it goes on; or do you want to draft in there first and then you can see what it looks like?

There seems to be some discussion on let's potentially try it this year and see what length frequency distribution you guys come up with in your sampling and then the board wanted to look at that. I'm just thinking of different ways to give the board some more flexibility as they move forward and we don't get tripped up later on by folks saying we wish we had this flexibility in there when we go to final approval in August.

CHAIRMAN DANIEL: I would feel more comfortable with it as a pilot program, but I would ask for it to be for '13 and '14 since I'm only going to get a partial year this year. If we could do a pilot for 2013 and 2014 with a report back to the technical committee on the length frequency distributions, the impacts, the amount of harvest, et cetera, et cetera, that may give some folks that may have a little discomfort more comfort. Then if it was to continue, it would have to be at the order of the board.

EXECUTIVE DIRECTOR BEAL: Louis, we have set up other addendum where the board can take action to extend. We don't have to go back through the addendum process. Is that what you had in mind?

CHAIRMAN DANIEL: Yes, if that is okay with the board. Robert.

MR. BOYLES: That's fine. Rob, this is a very ambiguous motion. Would you like to try to perfect it a little bit? May I try?

CHAIRMAN DANIEL: You certainly can. I would rather you do it than me.

MR. BOYLES: **I would move to proceed with the expedited process to develop an addendum to the Spanish Mackerel FMP to allow states to reduce minimum size to 11-1/2 inches for the fishing year 2013 and 2014.** I will ask Rob is that too specific?

MR. O'REILLY: For the pound nets.

MR. BOYLES: For the pound net fishery to eliminate the waste of dead discards.

CHAIRMAN DANIEL: Rob, are you comfortable with that, giving you the flexibility and latitude you need and are you comfortable with the pilot provision?

MR. O'REILLY: I think that's fine. Again, if in the document it is talking about August and September, then at least if we could say summertime or something like that, it would be a help, too, because it is a little open-ended on the timeframe. The reason I say that, if I may, Mr. Chairman, is I'm fairly sure that it might be even in late July to late August is more the Virginia time. I haven't thought about it for a little while, but we do sample those nets down there.

CHAIRMAN DANIEL: Yes, how about a parenthetic after 2014; July through September; and that way it kind of gives that latitude to factor in Virginia if it is a little earlier. That does set a limit. It is three months but we only requested two, but it might not be a bad idea to include July. Does that do it for the board? Robert.

MR. BOYLES: Rob, I'll ask the same question to the Commonwealth I did to Louis. You will be able in the compliance report to give us kind of a postscript on how this worked and what kind of landings you saw just to give us a sense of how the pilot program worked?

MR. O'REILLY: Yes, and I think right now we can tell you about the harvest aspects for Spanish mackerel. We also have sampling data; but again I wasn't kidding, it all depends on what kind of mood the fisherman is in whether he cooperates, but we will have some of that as well.

CHAIRMAN DANIEL: All right, is everybody comfortable with the motion while we're making all these friendly amendments? **Okay, the motion is move to proceed with the expedited process to develop an addendum to the Spanish Mackerel FMP to allow states to reduce minimize size to 11-1/2 inches for the fishing year 2013 and 2014, July through September, for the pound net fishery to eliminate waste of dead discards. Motion by Mr. Boyles; seconded by Mr. Cole. Is there any objection to the motion? Seeing none; the motion carries.** All right, the next item on our agenda is the technical committee report. The first part is the Florida Red Drum Recreational Measures.

TECHNICAL COMMITTEE REPORT

MS. KERNS: A while back Florida had changed their recreational measures for red drum. In November of 2011 the Florida Fish and Wildlife Commission moved forward with regional regulations and created three management zones; the northwest, the northeast and the south. They increased the number of red drum that the recreational fishermen can take per day in the two northern regions from one fish to two fish.

Then they established a state-wide vessel limit of eight red drum and a limited number of red drum that could be transported on land to six red drum per person. The South Atlantic Board has asked the technical committee just to review the change in those measures since they were taking place before the technical committee had an opportunity to review them.

The technical committee did review the change from one fish to two fish back in December and found that it would not threaten the status of the stock as was presented by the Florida Fish and Wildlife Commission information. The board did see the report from Florida I think back in August of last year, so the technical committee was fine with that change in bag limit.

CHAIRMAN DANIEL: So we don't need to do anything; it is just a piece of information.

MR. JIM ESTES: So we didn't follow the rules. I just learned about this the other day. I wasn't a part of this, but I'm responsible, though, so I was kind of like set as the lamb. I'm bearing my throat. I would like to give you a satisfactory explanation about why this happened, but I can't. We got in a hurry apparently. All I can tell you is that at least while I'm the

administrative proxy, that I don't think this will happen again.

CHAIRMAN DANIEL: Thank you very much for that clarification. I don't think there was any harm. Robert.

MR. BOYLES: Louis, just a question and clarification for Toni. Doesn't the Red Drum FMP require the board to approve changes?

MS. KERNS: It was my understanding that you had approved the changes contingent upon the technical committee's review, but I will go back and confirm that. That was my understanding from the notes left from the last coordinator.

CHAIRMAN DANIEL: Is there anything else?

Okay, next is the black drum terms of reference.

MR. JORDAN ZIMMERMAN: I understand you guys have seen terms of reference for the tautog assessment earlier today, so this may look very similar to you. Essentially we have nine terms of reference here; the first one being characterize the precision of fishery-dependent and independent data used in the assessment, including the following but not limited to descriptions of each data source, a summary of biological data; describe calculation and potential standardization of abundance indices; discuss trends and associated estimates of uncertainty; justify inclusion or elimination of all available data sources and discuss the effects of the data strengths and weaknesses.

TOR Number 2; review estimates and PSEs of recreational fishing from MRIP; compare historical and current data collection and estimation procedures; describe data caveats that may affect the assessment.

Term Number 3 would be to develop simple empirical indicators of stock abundance characteristics and fishery characteristics; maybe possibly incorporating a stoplight approach for this. By the way, I should have mentioned that these are essentially the same for the stock assessment peer review terms of reference; the only difference being primarily that the peer review will be an evaluation of the same terms of reference.

Develop models used to estimate population parameters; for example, fishing mortality, biomass, abundance and biological reference points and analyze model performance. Through this we will describe stability of models; perform sensitivity analyses for starting parameter values and conduct other model diagnostics as necessary; clearly and thoroughly explain model strengths and limitations; describe history of model usage, its theory and framework; and document associated peer-reviewed literature.

We have considered multiple models to date and we will provide justification of the choice of the preferred model and an explanation of any differences in results among models. Also state assumptions made for all models and explain the likely effects of assumption violations on synthesis of input data and model outputs.

Characterize uncertainty of model estimates and biological or empirical reference points; recommend stock status as related to reference points, if that is possible and if available; develop detailed short- and long-term prioritized list of recommendations for future research, data collection and assessment methodology; also highlight improvements to be made by the next benchmark review.

Finally, recommend timing of next benchmark assessment and intermediate updates, if necessary, relative to the biology and current management of black drum. With that, if anyone has any questions.

MR. NOWALSKY: With respect to TOR Number 2, the recreational catch estimates based on MRIP, the black drum fishery is often a prosecuted recreational fishery at night, which has had limited to no sampling, and that sampling effort through MRIP is going to get underway in the future, so you're not going to have that data to look at. How is that going to

be incorporated here, if at all, into the assessment?

MR. ZIMMERMAN: We are aware of the concerns with nighttime sampling in MRIP, and the discussion so far by the technical committee have been that the coast-wide estimates – if you look at the PSEs of the coast-wide estimates, we're more confident with that, so it will probably be a model that looks at these coast-wide estimates as a whole as opposed to breaking it down to regions. I would like to add to that the issue as you pointed out with the PSEs are largely in the northern part of its range. I think we have a lot better estimates in the southern part of its range.

CHAIRMAN DANIEL: Are there any other questions on the TORs for the black drum assessment? Bill.

MR. COLE: Mr. Chairman, I'm going to move board approval of the terms of reference.

CHAIRMAN DANIEL: Motion by Mr. Cole; second by Mr. Woodward. Okay, move for board approval of the black drum terms of reference**. Motion by Mr. Cole; second by Mr. Woodward. Is there any objection to the motion? Seeing none; the motion carries**.

PROPOSED RULE THAT DESIGNATES BEACHES AS CRITICAL HABITAT

The next item on the agenda is just an item that I wanted to make sure everybody was aware of – and I'm sure they all are – the potential or the proposal to designate beaches as critical habitat for loggerhead sea turtles essentially from Beaufort Inlet, North Carolina, all the way down through Florida.

What I've done is instead of getting into a discussion and conversation about this, what I did was the Department of Environment and Natural Resources in North Carolina has put together a very good briefing document on this issue that was done by multiple divisions in our department. I have sent that letter to Toni and Bob so that they can get them out to the board members in the affected states. Anybody else that wants them, you're welcome to get that information, but I just wanted to make sure – at the time I put it on the agenda, it was fresh and now I think everybody is familiar with it. I really don't have any more to add to that other than we will get you the letter from North Carolina for your information. Robert.

MR. BOYLES: Mr. Chairman, there has been a lot of chatter in the last couple of days because the deadline for comments is tomorrow. I'm not clear and can you share with me what the implications of this designation might be.

CHAIRMAN DANIEL: Yes, and I'm going to read some provisions of the letter. The state of North Carolina supports the protection and recovery of the turtles, but also has significant concerns related to the process used for this designation and the lack of clarity regarding regulatory impacts and the potentially significant economic implications.

It is not clear to us what the requirements may be from this critical habitat listing. It certainly will have impacts on any federally funded actions that occur. At least in North Carolina we have a lot of beach renourishment issues and those types of things that have got the local communities and towns extremely concerned about the opportunity.

What we have tried to do is put forward all of the things that we have been doing to protect sea turtles through our department. NMFS states that the designation of critical habitat in areas currently occupied by the loggerhead sea turtle may impose nominal additional regulatory restrictions to those currently in place and therefore may have little incremental impact on state and local governments in their activities.

The Department of Environment and Natural Resources disagrees and anticipate that the proposed rule impact a wide variety of coastal projects involving federal actions, including but not limited to coastal management activities; i.e., navigation and beach nourishment projects that

are permitted, funded or implemented by the U.S. Army Corps, hurricane recovery activities funded by the Federal Emergency Management Agency and federal grants for public access and infrastructure projects.

Those are some of the main concerns, Robert. It goes into CZMA consistency and various other issues as well as – and this was what kind of surprised me. They asked about economic impacts, and I didn't know that they ever considered economic impacts in the ESA issues, but they are here.

We have worked with the local communities basically from Beaufort Inlet to the North Carolina Line – at least North Carolina/South Carolina Line to estimate the potential impacts and the value of the beaches to coastal North Carolina and the potential impacts that may have if those beaches were closed or whatever.

I don't if it is a Chicken Little issue or not, but my biggest concern is the lack of access that has come from the National Parks Service in North Carolina off of Dare County. We have lost the driving on most of our Dare County beaches and that has had catastrophic economic impacts on the tackle shops, on the commercial fishermen, on a lot of folks in North Carolina.

That was done primarily through the court system to protect turtles and birds. There is this kind of sense that this is all kind of migrating south from Dare County and that they're going to start looking at core banks and then they're going to start looking at these areas and it may impact activities that are currently allowed. Now, the majority of the activities that I'm aware of occur outside of the turtle nesting time periods, so it may not have that substantive an impact, but there is that potential and we're very concerned about it. Are there any other questions on this issue? Is was really more for information, and, again, we will get that letter out to you ASAP. The next is Melissa or Toni or somebody us going to do the SEAMAP Report.

SEAMAP REPORT

MS. KERNS: SEAMAP has not received information on funding as of today. We are hoping that we will get information soon. Once Melissa does get that information, what we will do is send an e-mail out to the South Atlantic Board. We can have that information and then provide an update if it is still pertinent at the August South Atlantic Board Meeting.

CHAIRMAN DANIEL: The South Atlantic members from the South Atlantic; do we want to take this opportunity as a board to request the SEAMAP information be handled and treated like the NEAMAP information to try to generate some indexes on Atlantic sturgeon? It is the SEAMAP Board.

We're not getting anything – it doesn't sound like we're getting a whole lot on the South Atlantic, and I think we're all equally concerned about this. The fact that they've done an analysis on NEAMAP, I think they could do one on SEAMAP and provide us with that information to at least to give us a hint on what it looks like.

I think one of the DPSs is exclusive to the South Atlantic, and so I think it is important for us to get that information for the South Atlantic states. Without objection, perhaps we could submit a letter requesting that analysis be done for SEAMAP data as well. Okay, do you have a preference on requesting SEAMAP, whether it comes from you or me?

MR. PAUL DIODATI: I think it should probably come from you.

CHAIRMAN DANIEL: Okay, thank you. Is there anything else on SEAMAP? Okay, the last item I have is to consider Red Drum Habitat Draft Addendum I for Public Comment. Toni.

RED DRUM HABITAT DRAFT ADDENDUM I FOR PUBLIC COMMENT

MS. KERNS: The Habitat Committee, working with an intern that was at the Florida Fish and Wildlife Commission, put together a revision to the habitat section of the Red Drum FMP. Typically what we do with these revisions to the habitat sections is do a 30-day public – or has the addendum out for 30 days if approved by the board for public comment with no hearings.

This habitat section has information on the spawning habitat, the eggs and larvae habitat, juvenile habitat, sub-adult and adult habitat for red drum. It also identifies and describes habitat areas of concern, the present conditions of habitat areas of concern specific to coastal spawning, estuarine spawning nursery, juvenile and sub-adult and adult habitat.

The document has a section that would identify habitat bottlenecks although there are currently no habitat bottlenecks identified for red drum. It then also discusses any ecosystem considerations that should be taken under red drum. What we're looking for is approval of this addendum for public comment.

MR. COLE: Mr. Chairman, I move approval of the draft addendum for public comment.

CHAIRMAN DANIEL: Second by Mr. Goldsborough. All right, move to approve Draft Red Drum Habitat Addendum I for public comment. Motion by Mr. Cole; second by Mr. Goldsborough. **Is there any objection to the motion? Seeing none; the motion carries**.

ADJOURNMENT

All right, this takes us to other business. Is there any other business to come before the South Atlantic Board? Seeing none; we are adjourned.

(Whereupon, the meeting was adjourned at 12:25 o'clock p.m., May 23, 2013.)

Draft Addendum for Public Comment

Atlantic States Marine Fisheries Commission

DRAFT ADDENDUM I TO THE OMNIBUS AMENDMENT TO THE INTERSTATE FISHERY MANAGEMENT PLANS FOR SPANISH MACKEREL, SPOT, AND SPOTTED SEATROUT FOR PUBLIC COMMENT

Spanish Mackerel Commercial Management Measures for 2013 and 2014

***ASMFC Vision Statement*:**
Healthy, self-sustaining populations for all Atlantic coast fish species or successful restoration well in progress by the year 2015

June 2013

Draft Addendum for Public Comment

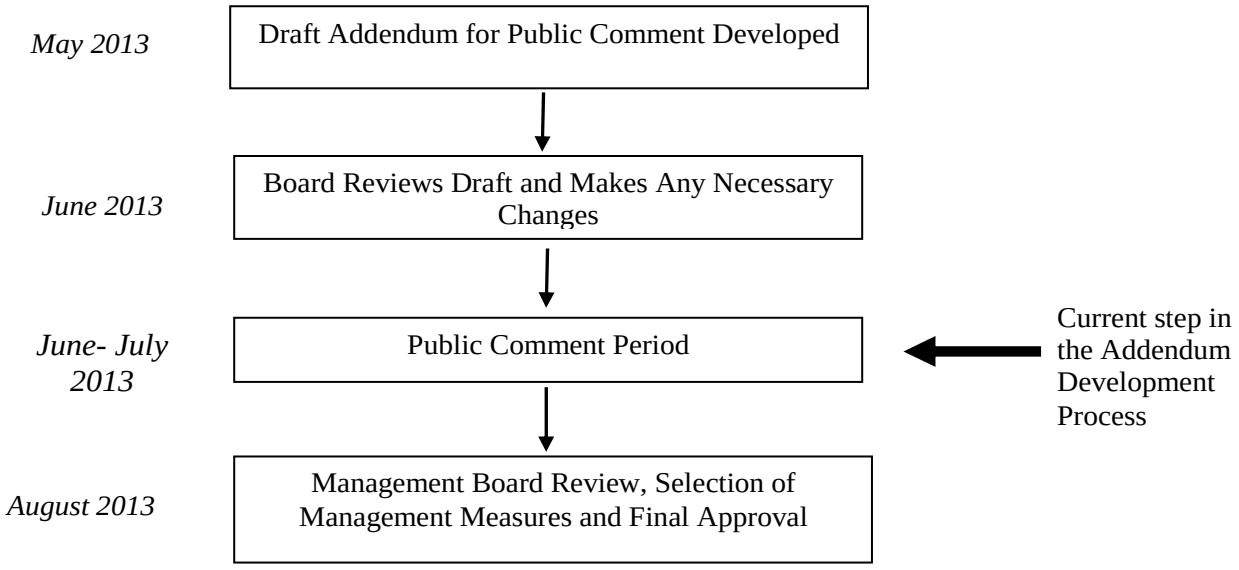
Public Comment Process and Proposed Timeline

At the May 2013 Commission meeting, the Atlantic States Marine Fisheries Commission's South Atlantic State-Federal Fisheries Management Board approved a motion to initiate the development of an addendum to the Omnibus Amendment to the Interstate Fishery Management Plans for Spanish Mackerel, Spot, and Spotted Seatrout (Omnibus Amendment). The Draft Addendum proposes alternative measures that could be considered under the adaptive management/framework procedures of the Omnibus Amendment. This Draft Addendum presents background on the Atlantic States Marine Fisheries Commission's (ASMFC) management of Spanish mackerel; the addendum process and timeline; a statement of the problem; and proposed management options for public consideration and comment.

The public is encouraged to submit comments regarding this document at any time during the public comment period. The final date comments will be accepted is **July 19, 2013 at 5:00 p.m (EST)**. Comments may be submitted by mail, email, or fax. If you have any questions or would like to submit comment, please use the contact information below.

Mail: Kirby Rootes-Murdy
Atlantic States Marine Fisheries Commission
1050 N. Highland St., Suite 200 A-N
Arlington, VA 22201

Email: krootes-murdy@asmfc.org
Phone: (703) 842-0740
Fax: (703) 842-0741



1.0 Introduction

Spanish mackerel are cooperatively managed by the states through the Commission in state waters (0-3 miles from shore), and by the South Atlantic Fishery Management Council and NOAA Fisheries in federal waters (3-200 miles from shore). The management unit for Spanish mackerel consists of all estuarine waters to the inshore boundary of the exclusive economic zone (EEZ) from New York through the east coast (Monroe/Dade county line) of Florida.

The South Atlantic State-Federal Fisheries Management Board (Board) met on May 23, 2013 to discuss alternative measures that could be considered under the adaptive management/framework procedures of the Omnibus Amendment to the Interstate Fishery Management Plans for Spanish Mackerel, Spot, and Spotted Seatrout (Omnibus Amendment). The purpose of proposed alternative measures was to consider seasonal flexibility in setting the minimum size limit of Spanish mackerel for pound nets gear type in the commercial sector. This would allow for conversion of dead discards so as to minimize waste from this fishery. The Board initiated this draft addendum through the following action:

Move to proceed with expedited process to develop an addendum to the Spanish Mackerel FMP to allow states to reduce minimum size to 11 ½ inches for the fishing year 2013 and 2014 (July through September) for the pound net fishery to eliminate waste of dead discards.

2.0 Overview

2.1 Statement of the Problem

A portion of the Spanish mackerel entering estuarine pound nets during the summer months are just under the legal size limit of 12 inches fork length. When the nets are bunted and the fish bailed, the undersized Spanish mackerel are difficult to release alive and quickly die, unlike other species. An allowance for a minimum size limit of 11.5 inches fork length for pound nets during summer months would reduce these dead regulatory discards.

2.1.2 Background

Spanish mackerel (*Scombermorus maculates*) are distributed throughout the western Atlantic and Gulf of Mexico (Collette and Russo 1979, 1984). The most recent assessment report continues to support the existence of two stocks, one in the eastern Atlantic and one in the eastern Gulf of Mexico (SEDAR 2012). The Miami-Dade/Monroe County, Florida boundary has been used as the management boundary for the two stocks, separating the South Atlantic Fishery Management Council and the Gulf of Mexico Fishery Management Council jurisdictions.

Atlantic group Spanish mackerel generally range from the Florida Keys northward through New York and occasionally to southern New England. They migrate seasonally, overwintering off the east coast of Florida and migrating northward to the Carolinas and the mid-Atlantic in the spring as waters warm (Berrien and Finan 1977). The spawning season for Spanish mackerel generally increases from north to south, due mainly to warmer water temperatures (SEDAR 2012).

Since 1950, the majority (greater than 85% on average) of commercial landings has been attributed to the east coast of Florida, followed by North Carolina and Virginia. While these three states account for greater than 99% of commercial landings, the states of Maine, Massachusetts, New York, Rhode Island,

Connecticut, Delaware, Maryland, New Jersey, South Carolina and Georgia also have recorded commercial landings of Spanish mackerel.

2.1.3 Stock Status

A benchmark assessment of the Atlantic group Spanish mackerel stock was conducted through the South East Data, Assessment, and Review (SEDAR) process in 2012. SEDAR 28 assessed both Gulf and Atlantic migratory groups of Spanish mackerel, and the results indicate that the Atlantic stock is neither overfished (SSB/MSST = 2.29) nor experiencing overfishing (F_{2011}/F_{msy} = 0.521).

2.1.4 North Carolina Pound Net Commercial Fishery Description

The majority of North Carolina's commercial Spanish mackerel fishery occurs in state waters, with less than five percent of harvest, on average, occurring in federal waters (Table 1). Landings from state waters are split between the ocean (53.09%) and Pamlico Sound (37.27%), with other estuarine water bodies accounting for less than five percent of remaining harvest (Table 1).

Commercial harvest of Spanish mackerel in North Carolina is dominated by landings from gill nets, with an average of 92.12% of landings attributed to this gear (Table 2). Pound nets account for an average of 6.69% of Spanish mackerel landings with remaining gears each contributing less than 1% of total landings. Of the pound net landings, on average, over 99% of all harvest occurs in Pamlico Sound (Table 3). Pound net harvest generally occurs during the summer and fall months, with the highest average landings of Spanish mackerel occurring in June (Table 4). The second and third highest average landings occur during the months of July and August, respectively.

In recent years, fishermen have noted the presence of increased numbers of Spanish mackerel that are ¼-inch to ½-inch short of the 12 inch fork length minimum size limit in pound nets during August and September. While the fish are alive in the pound, once the net is bunted and bailing commences, they die before being released. This may be due to a combination of temperature, stress and crowding. Most pound nets are constructed using 1 ½-inch to 1 5/8-inch inch mesh in the pound and 4-inch to 6-inch mesh for the leads. While individual fishermen have experimented with different wall or panel mesh sizes depending on the target species, there is no consistent use of cull panels. Those who have used cull panels have noted the difficulty and lack of success in being able to release the undersized fish quickly enough to prevent dead discards during this time of year.

In order to further illustrate the impact of the existing minimum size limit on this gear during August and September, an analysis was conducted using fishery-dependent and fishery-independent sampling data (Appendix A). The results of the analysis indicate that approximately 200 pounds of Spanish mackerel between 11 ½ and 12 inches (i.e., undersized fish) were landed annually from pound nets during the months of August and September in North Carolina. These results illustrate the difficulty in culling the undersized Spanish mackerel from the catch at this time of the year, and the impact of the minimum size limit on dead discards.

3.0 Proposed Management Options

Option 1: Status Quo

Commercial Management Measures

Maintain current commercial management measures of 12" fork length or 14" total length minimum size limit, with seasonally changing day and vessel trip limits and a decrease in commercial quotas if total annual catch limit is exceeded AND stock is overfished

Option 2: Alternative size limit

To alleviate the issue of dead discards from pound nets during the months of July through September, states may establish a seasonal exemption from the current minimum size limit of 12-inch fork length minimum size to 11 ½-inch fork length. This exemption would apply to only pound net fisheries during one or more of the summer months of July through September for the 2013 and 2014 fishing years only. A state must notify the Commission of the specific month or months it intends to use the minimum size limit exemption.

The impacts of these measures would be reviewed by the Technical Committee and/or Plan Development Team as part of its annual fishery management plan review. If this addendum is approved, the Board may extend the use of the summer month minimum size limit exemption through Board action.

4.0 Compliance

Adopted measures would be implemented immediately upon approval of the Draft Addendum.

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Collette, B. B., and J. L. Russo. 1984. Morphology, systematics, and biology of the Spanish mackerels (*Scomberomorus*, Scombridae). Fish. Bull., U.S. 82(4):545-692.

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Table 1. North Carolina commercial landings of Spanish mackerel by water body (2000-2012).

Year	Other Waterbodies	Ocean > 3 miles	Ocean 0-3 miles	Pamlico Sound	Grand Total
2000	66,293	22,807	448,755	121,572	659,427
2001	45,053	29,513	402,104	177,003	653,673
2002	80,692	16,590	449,574	151,591	698,447
2003	12,481	20,120	350,237	73,947	456,785
2004	12,705	33,902	327,743	81,893	456,243
2005	13,847	56,295	205,376	170,484	446,002
2006	7,669	49,998	316,980	96,015	470,662
2007	8,630	51,090	374,857	53,301	487,878
2008	32,517	13,224	257,820	111,844	415,405
2009	47,910	30,805	431,166	451,931	961,812
2010	45,781	3,830	177,566	684,690	911,867
2011	21,536	34,644	255,384	559,653	871,217
2012	13,383	39,697	464,799	398,560	916,439
Total	**408,497**	**402,515**	**4,462,361**	**3,132,484**	**8,405,857**
Average (2000-2012)	**31,423**	**30,963**	**343,259**	**240,960**	**646,604**
Percent Average (2000-2012)	**4.86**	**4.79**	**53.09**	**37.27**	**100.00**

Table 2. North Carolina commercial landings of Spanish mackerel by gear type (2000-2012).

Year	Gill Nets	Beach Seine	Pound Net	Trawl	Handlines	Pots	Haul Seine/ Swipe Net	Other Gears	TOTAL
2000	624,750	5,273	21,792	1,611	2,839	1,098	1,952	111	659,426
2001	598,447	3,356	33,163	780	15,972	165	1,738	54	653,675
2002	669,295	337	24,118	1,746	1,571	749	529	104	698,449
2003	448,390	365	5,218	658	1,060	494	560	40	456,785
2004	449,784	207	3,524	186	2,087	29	407	19	456,242
2005	437,948	801	2,184	355	2,988	22	1,654	49	446,001
2006	458,727	6,155	2,783	109	2,366	11	503	8	470,662
2007	477,824	1,458	3,440	195	3,799	730	301	132	487,879
2008	362,013	378	49,534	653	2,041	184	563	40	415,406
2009	720,702	3,156	228,201	1,237	4,698	205	3,573	40	961,812
2010	808,308	1,676	96,490	324	2,639	63	2,349	18	911,867
2011	812,876	443	53,702	65	1,715	-	2,356	60	871,217
2012	874,160	15	38,612	978	2,289	10	197	178	916,439
Grand Total	**7,743,225**	**23,620**	**562,761**	**8,894**	**46,064**	**3,760**	**16,682**	**853**	**8,405,858**
Average (2000-2012)	**595,633**	**1,817**	**43,289**	**684**	**3,543**	**289**	**1,283**	**66**	**646,604**
Percent Average (2000-2012)	**92.12**	**0.28**	**6.69**	**0.11**	**0.55**	**0.04**	**0.20**	**0.01**	**100.00**

Table 3. North Carolina Spanish mackerel pound net landings by waterbody (2000-2012).

Waterbody	Total Pounds (2000-2012)	Average (2000-2012)	Percent Average (2000-2012)
Albemarle Sound	941	72	0.17
Core Sound	1,314	101	0.23
Croatan Sound	924	71	0.16
Neuse River	39	3	0.01
Pamlico River	28	2	0.00
Pamlico Sound	559,467	43,036	99.42
Roanoke Sound	5	< 1	<1
Grand Total	**562,718**	**43,286**	**100.00**

Table 4. North Carolina Spanish mackerel pound net landings by month (2010-2012).

Year	May	June	July	August	September	October	Total
2010	3,500	55,471	26,038	11,182	283	16	96,490
2011	2,118	35,463	10,571	5,291	214	45	53,702
2012	3,173	24,191	5,761	2,719	2,622	146	38,612
Grand Total	8,791	115,125	42,370	19,192	3,119	207	188,804
Monthly Average	**2,930**	**38,375**	**14,123**	**6,397**	**1,040**	**69**	**62,935**

Appendix A. Pound net analysis

Biological data collected from Spanish mackerel in the North Carolina Division of Marine Fisheries' (NCDMF) various fisheries-dependent and fisheries-independent programs were used to fit the allometric length-weight (in-lb) relation:

$$W = aL^b$$

where L is length in inches, W is weight in pounds, and *a* and *b* are parameters of the function. The predicted value of *a* was 0.000385 and the predicted value of *b* was 2.95.

Length samples of Spanish mackerel collected from the NCDMF Sciaenid Pound Net Sampling Program during 2010 through 2012 were used to characterize the length-frequency distribution of Spanish mackerel landed in North Carolina by pound nets. The numbers at length were converted to weight at length using the allometric length-weight function described above. This was done to estimate the proportion of weight at length.

The average landings per year of Spanish mackerel by pound nets in North Carolina during August and September were computed using landings data from 2010 through 2012 (Table 1). This average was applied to the estimated proportion of weight at length to estimate landed weight at length.

The estimated weight of Spanish mackerel landed by pound nets in North Carolina during August and September for fish greater than or equal to 11.5 inches and less than 12.0 inches is 197.2 pounds.

Table 1. Annual landings of Spanish mackerel by pound nets in North Carolina during August and September, 2010–2012.

Year	Pounds
2010	11,465
2011	5,505
2012	5,341
Average	7,437

State of New Jersey
Department of Environmental Protection

DIVISION OF FISH AND WILDLIFE

Annual State Compliance Report for Atlantic Croaker: 2012 and Fishery Summary for 2013

June 2013

Report By: Jennifer Pyle

Submitted to the Atlantic States Marine Fisheries Commission as a Requirement of Amendment 1 to the Interstate Fisheries Management Plan for Atlantic Croaker

I. Summary of Atlantic Croaker Fishery And Resource Monitoring in New Jersey

Amendment 1 to the Interstate Fishery Management Plan (ISFMP) for Atlantic Croaker (November 2005) does not require restrictions for the harvest of Atlantic croaker along the Atlantic coast. There have been no significant changes in monitoring or regulations regarding this species during 2012.

The ISFMP for Atlantic Croaker includes triggers to assess the population during non-assessment years. After collecting data from 2011, the recreational landings trigger was activated because coastwide landings were less than 70% of the previous two years' average landings. The Atlantic States Marine Fisheries Commission is currently looking into trigger and management options. No changes were made during 2012, but an update will be given in the 2013 compliance report.

II. Request for *De minimus* Status

New Jersey is not requesting *de minimus* status for its Atlantic croaker fisheries.

III. New Jersey Atlantic Croaker Fishery and Management Program: 2011

A. Fishery Dependent Monitoring

New Jersey initiated biological monitoring of commercially harvested Atlantic croaker in 2006 in conjunction with funding from the Atlantic Coastal Cooperative Statistics Program. Length data (FL and TL, mm) and otoliths were collected from 660 Atlantic croaker in 2012 (Table 1). The mean size (total length) of commercially harvested Atlantic croaker in 2012 was 289.4 mm with a range of 197 mm to 360 mm (Figure 1). Both the mean length and weight for 2012 were lower than the overall average (2006-2012).

Age determination of Atlantic croaker samples collected in 2012 continued to show the strength of the 2008 and 2010 year classes (Figure 2). The 2008 year class was dominant in years 2010-2012. This was consistent with high abundance in the Delaware Estuary surveys (Table 2, Figure 4).

The recreational fishery for Atlantic croaker in New Jersey is not monitored by any state program. Fork length data for 2004 to 2012 was acquired through the Marine Recreational Information Program (MRIP). The size range of recreationally harvested fish was 102 mm to 305 mm with the majority of the 2012 harvest (42.9%) in the 225 mm range (Figure 3).

B. Fishery Independent Monitoring

The New Jersey Ocean Trawl Survey 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. All species taken during these surveys were weighed and measured. Catch per unit effort (CPUE) in number of fish per tow and length frequency was calculated for each year. For this report, indices of abundance for Atlantic croaker and length frequency were calculated for the August and October trawls only, when juveniles recruit to the gear and abundance is most consistent.

Juvenile abundance for New Jersey was measured in two additional surveys in the Delaware Estuary. A near shore fixed station trawl survey has been conducted in Delaware Bay from April through November since 1991 at eleven stations using a 16 foot otter trawl. A seine survey utilizing a bagged, 100-foot long by 6-foot deep by ¼-inch mesh beach seine has been conducted

for striped bass young-of-year in the Delaware River since 1980. The survey consists of seining 32 stations twice monthly from August through October. For Atlantic croaker the CPUE is calculated for the lower 24 stations within the Delaware River.

Data for the three surveys can be found in Table 2. The August – October CPUE index for the ocean trawl, as well as the Delaware River seine survey, were above average for 2012. The Delaware Bay trawl survey index was slightly below the time series average. All of the indices varied greatly from year to year but have generally increased since the early 1990s through the present (Figure 4). Length frequency of Atlantic croaker caught during the 2012 Ocean Trawl Survey ranged from 30 to 380 mm with a mean of 245.8 mm (Figure 5). This average is below the time series average of 272.7 mm.

C. New Jersey Regulations on Atlantic Croaker in 2012

New Jersey had not enacted any size or possession limits through 2012 for its Atlantic croaker recreational or commercial fisheries.

D. New Jersey Atlantic Croaker Harvest

Commercial fishery landings for Atlantic croaker were obtained from the National Marine Fisheries Service statistics website (1950-2007) and the Standard Atlantic Fisheries Information System (2008-2012) (Table 3, Figure 6). The 2012 landings of 363,381 pounds were 21.9% less than the 2011 landings of 465,117 pounds. The 2012 landings are well below the long term average.

Recreational catch data were obtained from the MRIP website for the years 1991-2012 (Table 4, Figure 7). Queried 6/26/12, recreational catch (1,372,772 fish) and harvest (237,994 fish) were the highest since 2008. Catch was above the long term average of 1,334,095, while harvest was well below the long term average of 459,672.

E. Addendum III Habitat Requirements

No mandatory measures related to habitat or habitat protection are implemented through this amendment.

IV. New Jersey Atlantic Croaker Fishery and Management Program: 2013

A. New Jersey Regulations on Atlantic Croaker in 2013

The New Jersey recreational fishery regulations at N. J. A. C. 7:25-18.1 will remain the same for 2013.

B. Atlantic Croaker Monitoring Programs for 2013

New Jersey will continue to collect commercial harvest data through ACCSP sampling and abundance index data through various programs.

C. Changes in Management and/or Monitoring of Atlantic Croaker in 2013

No changes from the previous year.

V. Plan Specific Requirements

There are no plan specific requirements in Amendment 1.

VI. Law Enforcement Reporting Requirements

There are no plan specific law enforcement reporting requirements in Amendment 1.

ACKNOWLEDGEMENTS

The enthusiasm and hard work of the many individuals and groups involved with the Atlantic croaker data collection is greatly appreciated. These include the following Division employees for their assistance with data processing/analysis, laboratory analysis, and field sampling: Russ Allen, Tom Baum, Hugh Carberry, Heather Corbett, Maryellen Gordon, Greg Hinks, Debbie Vareha, Matt Heyl, Dan Allen, Patrick Barker, Shana Fehring, Kirsten Gash, Amber Johnson, Heather Konell, Adrianna Kreuzer-Wozniak, Steve Luell, Armando Paralejo, Chad Power, Ed Truitt, Stacy Belgiovene, Linda Barry, Anthony Mazzarella and other participants of the Ocean Trawl Survey.

Ray Ringen, of the Division's Wildlife Conservation Corps, volunteered his time to assist on the Delaware River Recruitment Survey.

The cooperation of businesses and the general public are greatly appreciated. The Division thanks the personnel of the various marinas whose boat ramps and facilities were utilized by the Division. These include RiverGate Boat Ramp in West Deptford and Hawk Island Marina in Delanco.

Table 1. Biological characterization sample summary from commercially harvested Atlantic croaker landed in New Jersey: 2006-2012

	2006	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**Mean**
# Lengths	363	340	608	960	750	274	660	565
Mean length (total, mm)	337.1	345.8	307.4	302.3	289.4	313.6	289.4	306.2
# Weights	364	340	608	960	750	274	660	565
Mean weight (kg)	0.54	0.56	0.38	0.37	0.33	0.43	0.32	0.39
# Otoliths	364	340	500	560	750	274	619	487
# Aged	363	338	497	558	749	261	614	483

Table 2. New Jersey indices of abundance, geometric mean, for Atlantic croaker: 1980-2012

Year	DRseine	DBtrawl	OTAug	OTOct	OTAug-Oct
1980	0.00	-	-	-	-
1981	0.00	-	-	-	-
1982	0.00	-	-	-	-
1983	0.00	-	-	-	-
1984	0.00	-	-	-	-
1985	0.07	-	-	-	-
1986	0.11	-	-	-	-
1987	0.00	-	-	-	-
1988	0.00	-	-	-	-
1989	0.06	-	0.00	0.00	0.00
1990	0.00	-	0.00	0.00	0.00
1991	0.07	0.09	0.32	0.19	0.25
1992	0.04	0.95	0.08	0.25	0.16
1993	0.24	0.75	0.09	0.27	0.18
1994	0.09	0.33	0.49	0.18	0.33
1995	0.46	2.31	1.41	1.24	1.32
1996	0.45	2.23	0.31	0.91	0.58
1997	0.16	2.79	0.84	0.54	0.68
1998	0.48	7.67	0.25	0.22	0.23
1999	0.21	4.95	1.12	0.93	1.02
2000	0.39	2.55	2.51	1.08	1.70
2001	0.24	2.75	1.17	1.66	1.40
2002	**0.90**	**29.02**	**4.17**	**10.07**	**6.60**
2003	0.02	0.25	0.69	3.54	1.79
2004	0.16	0.67	**5.07**	**13.32**	**8.32**
2005	0.14	1.51	2.90	**10.78**	5.78
2006	**0.52**	**28.40**	0.70	1.13	0.91
2007	0.33	0.95	1.57	5.06	2.93
2008	0.43	**17.74**	0.42	6.62	2.29
2009	0.09	0.69	1.59	0.09	0.68
2010	0.06	0.50	1.45	1.30	1.37
2011	0.00	0.38	**16.16**	2.92	**7.20**
2012	**0.52**	5.08	1.08	7.97	3.32
Mean	0.19	5.12	1.85	2.93	2.04

Table 3. New Jersey's Atlantic croaker commercial landings: 1950-2012

Year	Pounds	Year	Pounds	Year	Pounds
1950	37,900	1971	100	1992	51,600
1951	50,000	1972	400	1993	183,414
1952	82,700	1973	37,100	1994	117,256
1953	156,700	1974	45,100	1995	334,654
1954	369,200	1975	885,100	1996	621,889
1955	741,300	1976	700,600	1997	1,994,446
1956	76,800	1977	1,478,600	1998	1,029,332
1957	103,500	1978	654,900	1999	2,071,046
1958	400	1979	91,000	2000	2,130,465
1959	1,800	1980	12,000	2001	1,389,837
1960	8,100	1981	23,500	2002	1,828,484
1961	56,900	1982	100	2003	1,575,738
1962	4,300	1983	200	2004	2,067,992
1963		1984	57,700	2005	1,847,753
1964		1985	48,800	2006	1,617,144
1965		1986	106,000	2007	1,358,000
1966		1987	357,600	2008	946,062
1967		1988	30,100	2009	585,552
1968		1989	137,100	2010	342,116
1969		1990	644	2011	465,117
1970	200	1991	31,292	2012	363,381
				Mean Weight	465,222

Table 4. New Jersey's Atlantic croaker recreational catch (number) and harvest (number and weight) from MRIP: 2004-2012

Year	Catch	Harvest	Weight (lbs)	Mean Weight (lbs)
2004	2,093,090	855,927	861,987	1.00
2005	2,919,750	1,227,349	1,183,631	1.00
2006	1,014,711	511,220	638,138	1.20
2007	996,316	406,238	441,806	1.10
2008	2,974,920	600,975	526,458	0.90
2009	301,835	193,464	127,115	0.70
2010	230,218	63,027	36,087	0.60
2011	103,246	40,855	21,460	0.50
2012	1,372,772	237,994	85,093	0.40
Mean	1,334,095	459,672	435,753	

Figure 1. Length frequencies from commercially harvested Atlantic croaker landed in New Jersey: 2010-2012

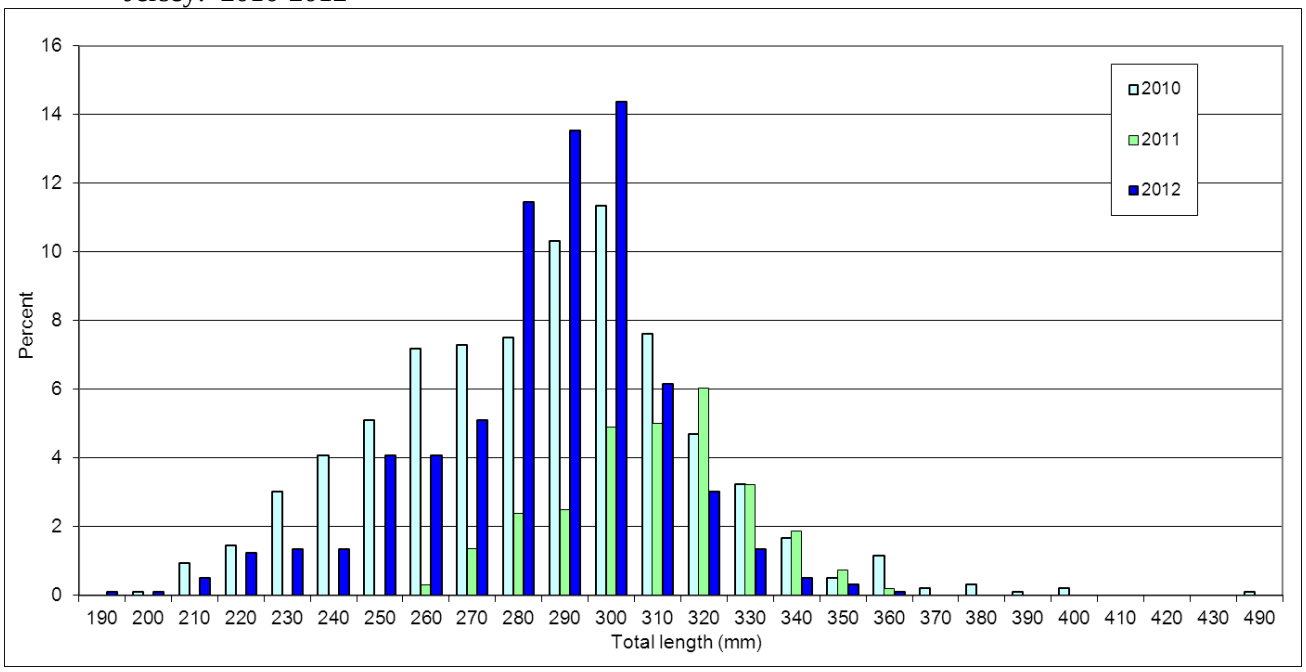


Figure 2. Age frequencies from commercially harvested Atlantic croaker landed in New Jersey: 2006-2012

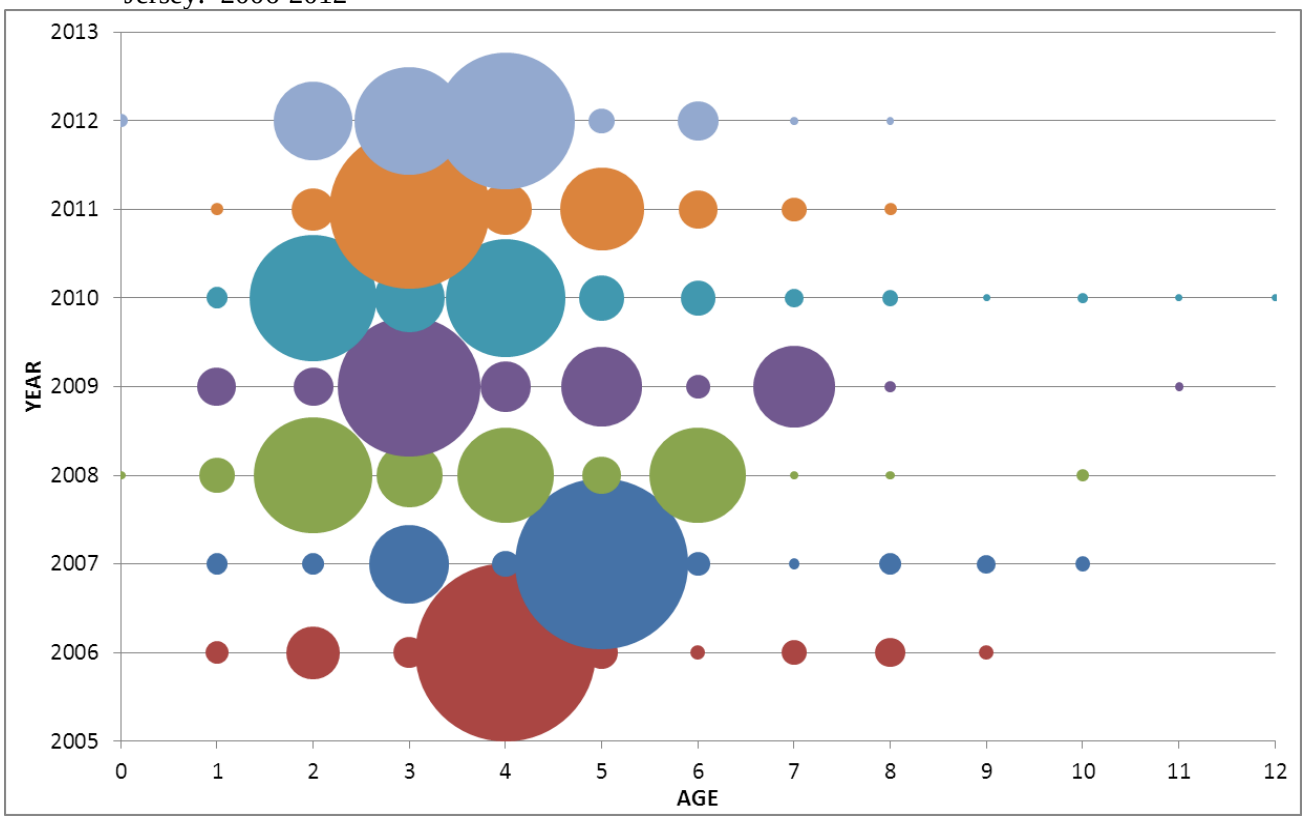


Figure 3. New Jersey's recreational length frequencies, from MRIP: 2009-2012

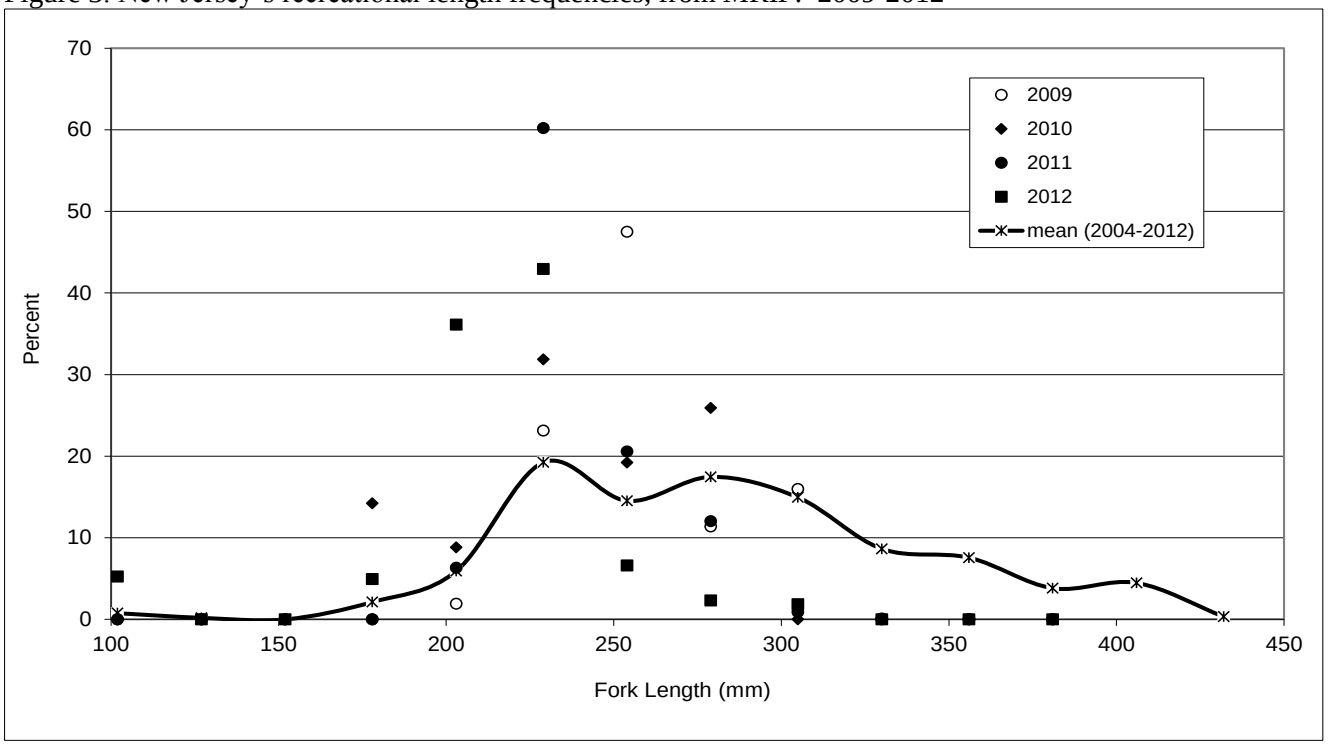


Figure 4. New Jersey indices of abundance, geometric mean, for Atlantic croaker: 1991-2012

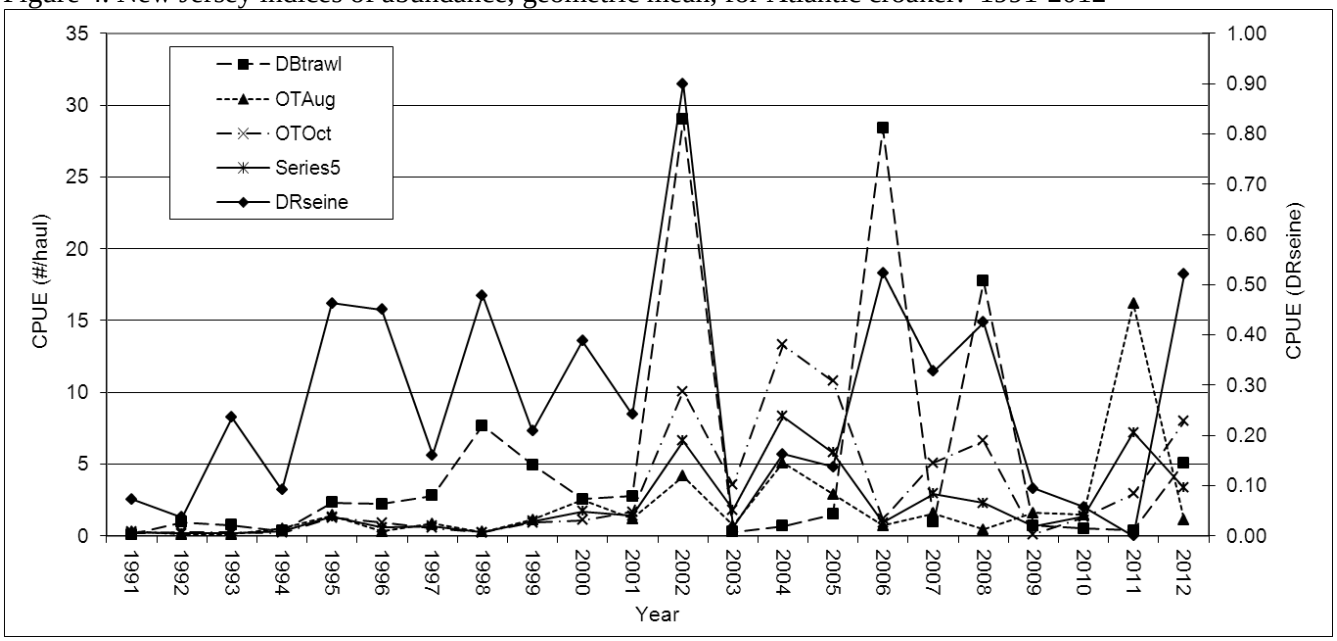


Figure 5. Ocean Trawl Survey Atlantic croaker length frequency: 2012

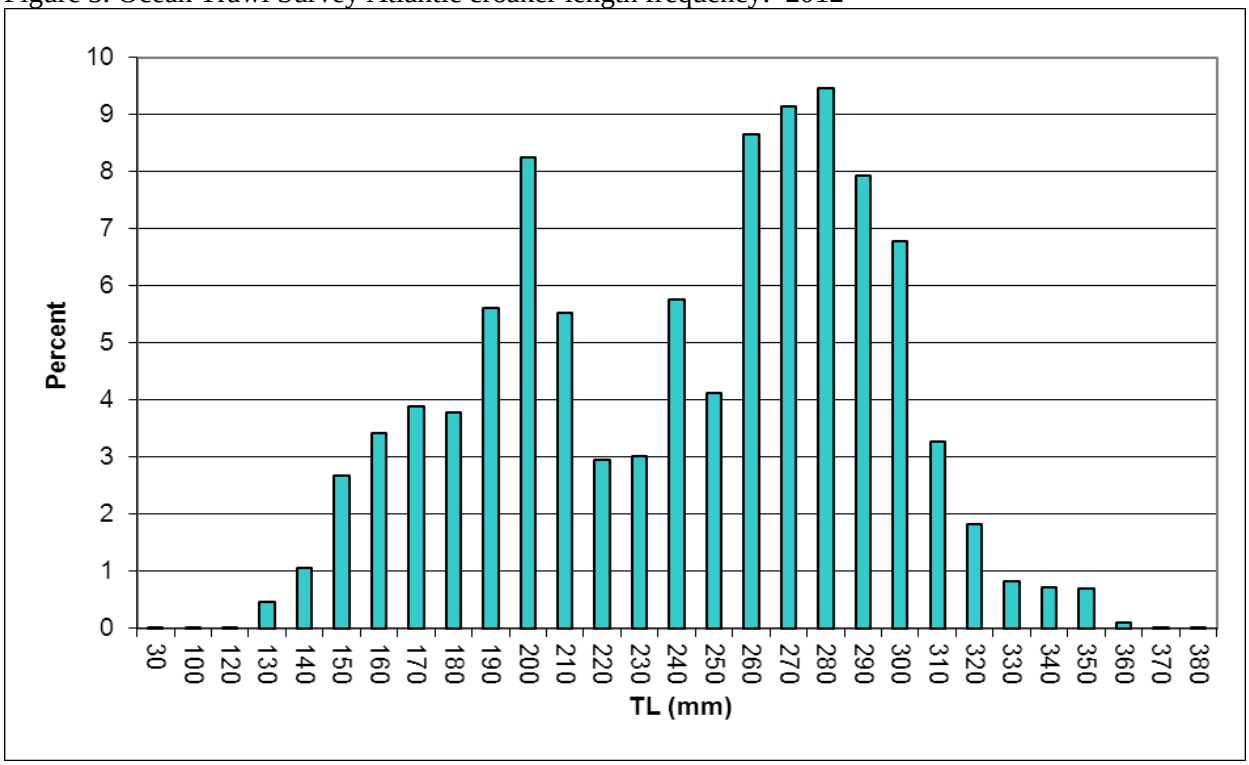


Figure 6. New Jersey's Atlantic croaker commercial landings: 1950-2012

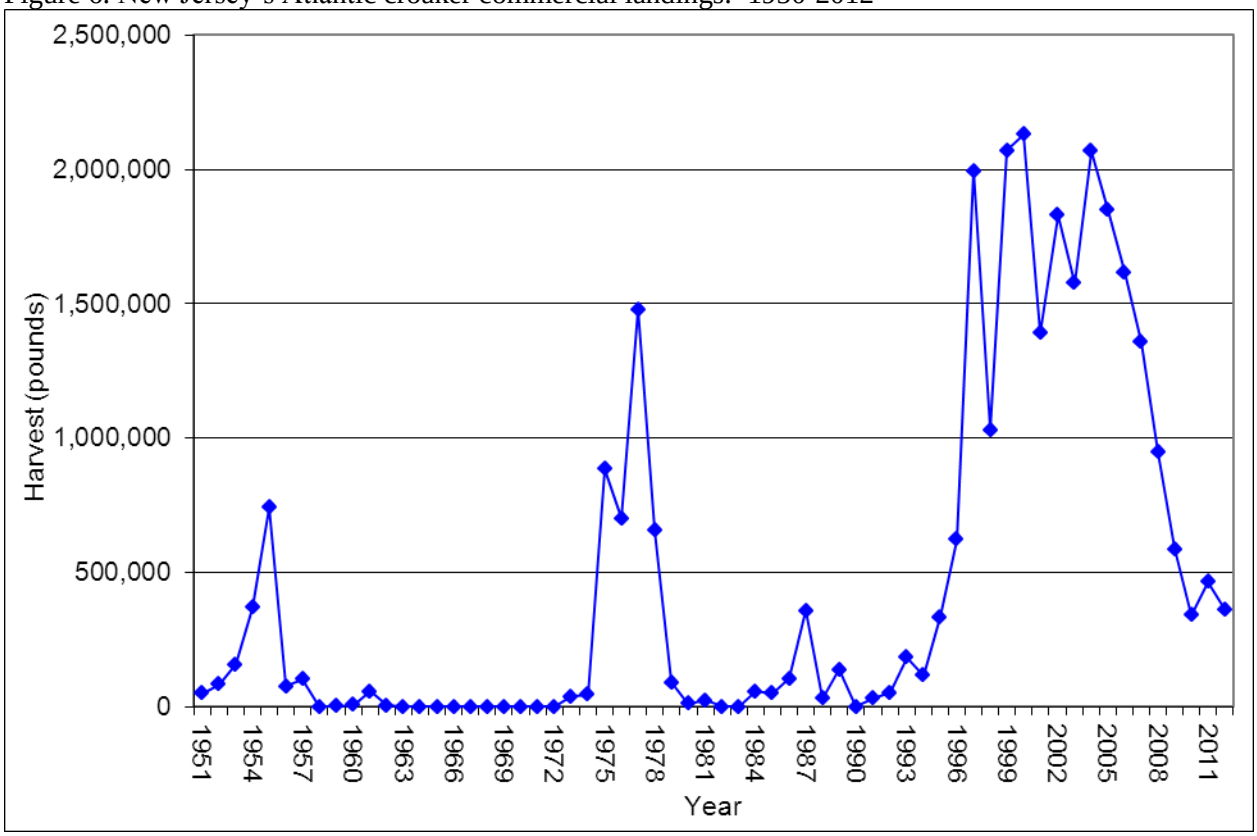
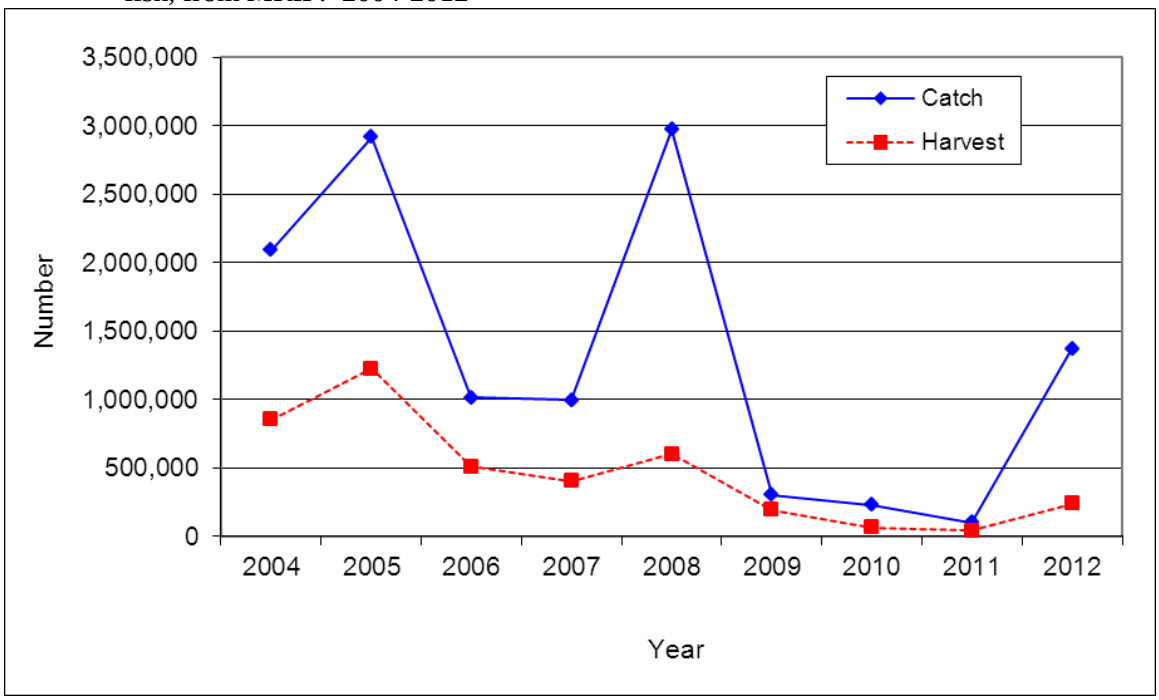


Figure 7. New Jersey's Atlantic croaker recreational catch and harvest, in number of fish, from MRIP: 2004-2012



State of Delaware
Atlantic Croaker Annual Compliance Report

July 1, 2013

1. Introduction

Delaware maintained previously enacted Atlantic croaker regulations during the past year and stayed in compliance with the Atlantic States Marine Fisheries Commission (ASMFC) Fishery Management Plan (FMP) Amendment 1 for Atlantic croaker. Atlantic croaker supported a minor commercial fishery and a major recreational fishery in Delaware during 2012.

2. Request for *de minimis* status

Delaware's 2012 commercial Atlantic croaker harvest (2,811 lbs.) was less than 1% of coast wide landings for the year, thus qualifying Delaware for commercial fishery *de minimis* status.

Delaware's 2012 recreational Atlantic croaker harvest (84,314 fish or 59,075 lbs.) was approximately 2% of coast wide landings and does not qualify Delaware for recreational fishery *de minimis* status.

3. 2012 fishery and management program

a. Fishery-dependent monitoring

Commercial fishermen are required to report daily landings (weight) of all species taken by month, location, and gear type. No additional fishery-dependent Atlantic croaker monitoring was conducted in 2012.

b. Fishery-independent monitoring

Atlantic croaker abundance was monitored by the Delaware Division of Fish and Wildlife's two trawl surveys. The adult finfish trawl survey used a

30’ trawl to sample nine offshore Delaware Bay and River stations monthly during March through December. The juvenile finfish trawl survey used a 16’ trawl to sample 39 inshore Delaware Bay and River stations monthly during April through October. The annual report for both trawl surveys (Greco 2013) is available from the Delaware Division of Fish and Wildlife.

A total of 8,885 Atlantic croaker were caught by the adult finfish trawl survey in 2012, which made Atlantic croaker the second most abundant species caught by the survey in 2012. The 2012 Atlantic croaker catch per nautical mile towed was a 662% increase from 2011 (Table 1).

Atlantic croaker were the second most abundant fish species caught in 2012 by the juvenile finfish survey. The young-of-the-year index, calculated as the geometric mean number of young-of-the-year (YOY) Atlantic croaker caught by the juvenile finfish trawl survey during September and October in Delaware Bay and River decreased 4% from 2011 and fell below the time-series mean of 21.3 (Table 1).

Table 1. Juvenile finfish annual index of abundance of YOY Atlantic croaker, and adult finfish trawl relative abundance (number per nautical mile (n/NM)) of adult Atlantic croaker in the Delaware Estuary from 2006 through 2012.

Year	YOY index	Relative abundance (n/NM)
2012	4.3	99
2011	4.5	13
2010	17.6	9
2009	16.5	107
2008	7.5	42
2007	4.5	7
2006	11.8	193
1980 – 2012 mean YOY index	21.3	

c. Atlantic croaker regulations

1. Synopsis of commercial regulations in place

a. *Open Season*: All year

b. *Minimum Length*: 8 inches total length

c. *Trip Limit*: No limit

d. *Gear Limit:* No limit

A commercial food fishing license is required to sell Atlantic croaker. Commercial food fishing licenses cost $150 for residents and $1,500 for non-residents per year. The gears used to harvest Atlantic croaker in 2012, gill net, fish pot, and hook and line, have additional permitting requirements. Gill net permits cost $5 per 300 feet of net and fish pot permits cost $1 per pot for residents and $10 per pot for non-residents. The number of gill net permits issued is fixed at 111 permits and all those permits were issued in 2012. The number of commercial hook and line permits is fixed at 172 permits, but 24 permits were still available at the end of 2012. There is no charge for a commercial hook and line license.

2. Synopsis of recreational regulations in place

a. *Open Season*: All year

b. *Minimum Length*: 8 inches total length

c. *Possession Limit*: No daily limit

A recreational fishing license was required to fish in Delaware tidal waters during 2012. The fishing license cost $8.50 for residents and either $20 for an annual license or $12.50 for a one week license for non residents. In addition to hook and line fishing, Atlantic croaker may be taken with recreational gill nets. Recreational gill net licenses cost $5 for residents and $50 for non-residents. Recreational gill net fishermen may fish up to 200 ft. of fixed gill net in certain areas and at certain times of the year, and are required to follow the same size, creel limits, and seasons as hook and line fishermen.

d. Atlantic croaker harvest

1. Commercial harvest

Delaware commercial Atlantic croaker landings were 2,811 pounds during 2012, a 77% decrease from the 12,252 pounds landed during 2011. The 2005 landings (37,492 pounds) were the highest recorded in Delaware since landings reporting was mandated in 1984 (Newlin and Glanden 2013a). Hook and line landings accounted for 72%, and gill net and fish pot landings combined accounted for 28% of the 2012 commercial catch.

2. Recreational harvest

Estimate of 2012 recreational catch from the Marine Recreational Information Program (MRIP) report (Newlin and Glanden 2013b).

Months (2012)	Number of Atlantic croaker harvested[1]
May - June	3,987
July –August	45,165
September-October	35,162
TOTAL	**84,314**

[1] Atlantic croaker harvested was an estimate based on creel surveys. Atlantic croaker landings were reported in numbers rather than pounds as this estimate was considered more accurate than weight.

Atlantic croaker was first in numbers harvested among all Delaware's marine recreational species in 2012. The 2012 estimated Atlantic croaker recreational harvest was 9% lower than the 2011 estimated harvest (92,289) and 12% higher than the 2010 estimated harvest (75,404). The 2012 Atlantic croaker harvest was 90% lower than the 2005 estimated harvest (825,267), which was the highest recreational harvest in the 1981 through 2012 time series.

4. Planned management programs for 2012

a. Regulations

No changes in Atlantic croaker regulations are anticipated for 2012.

b. Monitoring programs to be conducted in 2012

Commercial landings reports will continue to be mandated. Delaware will continue its trawl surveys for the foreseeable future.

c. Changes from 2011

None.

References cited

Newlin, S. and G. Glanden. 2013a. Commercial fishing in Delaware 2012. Annual landings report. Delaware Division of Fish and Wildlife, Dover, DE 19901.

Newlin, S. and G. Glanden. 2013b. Marine recreational fishing in Delaware 2012 Annual landings report. Delaware Division of Fish and Wildlife, Dover, DE 19901.

Greco, M. J. 2013. Coastal finfish assessment survey 2012. Delaware Division of Fish and Wildlife, Report F-42-R-24, Dover.

MARYLAND DEPARTMENT OF NATURAL RESOURCES

Martin O'Malley, Governor
Anthony G. Brown, Lt. Governor
John R. Griffin, Secretary
Joseph P. Gill, Deputy Secretary

Maryland Atlantic Croaker (*Micropogonias undulatus*) Compliance Report to the Atlantic States Marine Fisheries Commission - 2012

Prepared by

Harry W. Rickabaugh Jr.

Maryland Department of Natural Resources
Fisheries Service

June 2013

Harry Rickabaugh Jr. Matapeake Terminal 301 Marine Academy Drive Stevensville, MD 21666
(410) 643 – 6776 extension 2109 • www.dnr.maryland.gov • TTY users call via Maryland Relay

I. Introduction

Atlantic croaker (*Micropogonias undulatus*) are found in Maryland's Chesapeake Bay, offshore waters and coastal bays from late spring through early fall. Landings are highest in the southern portion of Maryland's Chesapeake Bay, with adults becoming less common north of the Bay Bridge. Atlantic croaker support important recreational and commercial fisheries in Maryland. They are part of a mixed species fishery, with commercial catch historically dominated by pound nets, and recreational harvest primarily from bottom fishing boat anglers. Maryland waters also provide extensive juvenile croaker habitat.

Maryland has a minimum size limit of nine inches (229mm) total length (TL) for both commercial and recreational fishermen. Recreational harvest is restricted to 25 fish per day and is open year round, while commercial fishermen have no quota, but are limited to a season of March 16th through December 31st.

Preliminary 2012 commercial harvest of 901,455 pounds increased 28% compared to the 2011 harvest. The recreational harvest estimate increased 21% to 701,482 fish in 2011, and 2011 release estimates increased over fourfold from 2010 levels to 1,578,524 fish.

II. Request for *de minimis* status

N/A

III. 2012 Fishery and Management Programs.

a. Fishery dependent monitoring

MD DNR fisheries biologists sampled commercial pound nets bi-weekly in Maryland's portion of the Chesapeake Bay from May 22 through September 11, 2012. One onboard gill net sampling trip was conducted on July 1, 2012. Atlantic croaker mean length from the onboard pound net survey decreased for the third year to 274 mm TL, and was the third lowest value of the 20 year time series (Table 1). Gill net caught fish had a mean length of 296 mm TL (n = 571) and a mean weight of 381 g (n = 61, Table 2). The onboard pound net length frequency distribution for 2012 indicated an increase in smaller croaker, but otherwise was very similar to the 2011 distribution, with the primary peak occurring in the 250 and 270 mm length groups (Figure 1). Onboard gill net length frequency peaked in the 270 and 290 mm length groups with catches dropping of quickly for both smaller and large fish (Figure 2). This is most likely an indication of net selectivity, but could be an artifact of the sample being from a single catch (two sets by one fisherman on one day). Mean lengths and weights for Atlantic croaker sampled from gill nets in 2012 by sex were 295 mm TL and 375 g for females (n = 47) and 308 mm TL and 400 g for males (n = 14). Gill net samples were 77% female and 23% male, but sample size was low, so these percentages may not reflect the actual male to female composition of the gill net harvest. Pound net samples were not randomly selected, therefore no sex specific analysis was conducted.

Ages derived from pound net caught Atlantic croaker otoliths in 2012 ranged from 0 to 8 (n=255). The number of Atlantic croaker sampled for length in 2012 (n=1,842) was applied to the age-length key for 2012 (Table 3). This application indicated that 34% of the fish were age four, 22% were age two, 22% were age three, 10% were age zero and 6% were age five. The remaining age groups each accounted for three percent or less of the fish sampled. Atlantic croaker greater than six years old have become less abundant in recent years compared to the mid 2000s.

b. Fishery independent monitoring

A 4.9-m semi-balloon otter trawl has been used to sample Maryland's Atlantic coastal bays since 1972 (Bolinger *et al* 2007). Since 1989, 20 fixed stations have been trawled for six minutes at monthly intervals during April-October. Prior to 1989, monthly effort, tow time and locations sampled varied considerably. Consequently, index values for juvenile Atlantic croaker prior to 1989 are not as reliable and, therefore, were not computed. The geometric mean catch per hectare (GM) of juvenile croaker was used as a standardized index of abundance (Bolinger *et al* 2007). The 2010 GM of 1.52 was near to the 24 year time series mean of 1.65 (Figure 3, Table 4).

Finfish collected by Maryland's Chesapeake Bay blue crab trawl survey have been enumerated since 1980, (Davis et al.1995). However, since some data entry inconsistencies make electronic data files prior to 1989 incomplete for all species, only data from 1989 through 2010 were used to generate a Chesapeake Bay Atlantic croaker juvenile index. The Chester River, Eastern Bay, Choptank River, and Patuxent River each contain six fixed sampling locations, while Tangier Sound has five stations and Pocomoke Sound, eight. Each site is sampled once a month from May thru October. A 4.9 m semi-balloon otter trawl with a body and cod end of 25-mm-stretch-mesh and a 13-mm-stretch-mesh cod end liner is towed for 6 min at 4.0-4.8 km/h.

A Chesapeake Bay juvenile trawl index was calculated as the geometric mean catch per tow. Since juvenile Atlantic croaker have been consistently caught only in Tangier Sound, Pocomoke Sound and the Patuxent River, only these areas were utilized in this analysis to minimize zeros that may represent unsuitable habitat rather than abundance. The Atlantic croaker Chesapeake Bay juvenile index was lower from 2005-2007 than in the late 1990s. However, this index increased to the third highest of the 24 year time series for 2008 at 4.51 fish per tow, but was below the time-series mean from 2009 to 2011. The 2012 index value increased to 3.76 the seventh highest value of the 24 year time series (Figure 4, Table 4).

Seine surveys are also conducted in the Maryland coastal bays and Chesapeake Bay. These surveys, designed primarily to catch other species, utilize a 30.5 meter, 6.35mm stretch mesh beach seine (4 ft. height in Chesapeake Bay and 6 ft. height in the Coastal bays). Atlantic croaker presence in these surveys is incidental; however, a GM index is calculated for each survey. The surveys do tend to capture juvenile croakers in years of high abundance and little to none during low abundance years (Figure 5, Table 4).

c. Atlantic Croaker Regulations

From the Code of Maryland Regulations: 08.02.05.18.18 Croaker:

A. Minimum Size.

(1) A recreational angler may not catch or possess a croaker less than 9 inches total length.

(2) A person licensed to catch finfish for sale may not catch or possess a croaker less than 9 inches total length.

B. Recreational Catch Limit. Except for a person licensed to catch finfish for sale, a person may not catch or possess more than 25 croaker per day.

C. Commercial Season. The commercial season for taking croaker is March 16 through December 31.

D. General.

(1) The Secretary may modify catch limits or open or close a season for croaker by publishing notice in a daily newspaper of general circulation at least 48 hours in advance, stating the effective hour and date of the modification.

(2) The Secretary shall make a reasonable effort to disseminate public notice of a modification under §D(1) of this regulation through various other media so that an affected person has reasonable opportunity to be informed of the modification.

d. Commercial and Recreational Harvest

Commercial Harvest

The following 2012 landings are considered preliminary and may change slightly. The 2012 commercial harvest of 901,455 pounds increased 28% compared to the 2011 harvest of 704,019 pounds (Table 5, Figure 6). Gill nets accounted for 51% of the harvest followed by pound nets at 44%, while all other gear types combined accounted for 5% of the 2012 harvest (Table 6). Pound net was the dominate gear in Maryland for catching croaker in 2008, as in most years historically, but was exceeded by gill net harvest in 2009 through 2012. Gill net harvest increased by 12% in 2012, catches from the pound net increased 82%, but catches from all other gear types declined (Table 7). Ninty-five percent of the preliminary MD harvest in 2012 was from the Chesapeake Bay and the remaining catch occurred in Atlantic coastal waters and Maryland's coastal bays.

Recreational Harvest

Recreational harvest estimates from the Marine Recreational Information Program (MRIP) for Maryland increased 21% from 554,206 fish (PSE = 22.3) in 2011 to 701,482 fish (PSE = 24.7) in 2012 (Table 5, Figure 7; MRIP 2013, personnel communication). Croaker harvest in 2012 was near the 1981-2011 average of 756,175 fish. Recreational release estimates for Atlantic croaker in Maryland increased over fourfold from 365,716 fish (PSE = 28.3) in 2011 to 1,578,524 fish (PSE = 24.7) in 2012 (Figure 7; MRIP 2013, personnel communication). The 2012 release estimate was above the long term average of 1,250,815 fish, indicating sub-legal fish were more common in 2012, potentially corroborating the above average JI index.

Maryland charter boat captains are required to maintain daily logs of where they fish, how many fish of each species they harvest, how many they release and how many anglers participated. No indication of target species is recorded, so the catch per unit effort (CPUE) includes only trips in which croaker were captured. The number of anglers was used as effort and the number of croakers harvested was used as catch. The annual geometric mean number of croaker per angler was calculated for 1993-2012. The 2012 data is preliminary but should not change significantly. Reported charter

boat harvest and effort peaked in 2000, and effort has steadily declined through 2011 (Figure 8). Harvest declined from 2000 through 2003, but was relatively stable through 2009, and declined from 2010 to 2012. Geometric Mean CPUE increased steadily from 2.7 fish per angler in 2003 to the time series high of 6.0 fish per angler in 2010 before declining to 4.7 in 2011 and 4.6 in 2012 (Figure 9). The 2012 value is still above the long term mean of 4.1 fish per angler. The majority of croaker caught by charter boat anglers were harvested, with the years of highest releases coinciding with the years of highest harvest (Figure 10).

e. Habitat Recommendations

There were no habitat requirements in Amendment 1.

IV. Planned Mangement Programs for 2013

a. No regulation changes are planned for 2013

b. Maryland will continue to monitor commercial pound nets and collect otoliths for aging. Maryland may also resume fish house sampling of commercial catch in 2013 to maintain adequate sample sizes of Atlantic croaker if necessary.

V. Plan Specific Requirements

None

References

Bolinger, A., S. Doctor, A. Luettel, M. Luisi, and G. Tyler. 2007. Investigation of Maryland's Coastal Bays and Atlantic Ocean Finfish Stocks. Federal Aid Project Report No. F-50-R-15. Maryland Department of Natural Resources. Annapolis, Maryland.

Davis, G. R., B. K. Daugherty, and J. F. Casey. 1995. Analysis of blue crab, *Callinectes sapidus*, stocks in the Maryland portion of the Chesapeake Bay from summer trawl data. Maryland Department of Natural Resources, Annapolis, Maryland.

Table 1. Atlantic croaker mean total length in mm, standard deviation and number sampled from the onboard pound net survey, 1993 – 2012.

Year	Mean Length	Standard Deviation	n
1993	233	35	471
1994	259	34	1081
1995	286	42	974
1996	294	31	2190
1997	301	39	1450
1998	310	40	1057
1999	296	54	1399
2000	302	45	2209
2001	317	37	733
2002	279	73	771
2003	287	55	3352
2004	311	43	1653
2005	317	48	2398
2006	304	66	1295
2007	307	54	2963
2008	298	62	1532
2009	320	50	91
2010	295	34	1970
2011	281	31	1764
2012	274	42	1842

Table 2. Mean total length in mm, mean weight in grams and number sampled for Atlantic croaker during onboard gill net sampling, 2012.

Year	Mean Length	n Measured	Mean Weight	n Weighed
2012	296	571	381	61

Table 3. Proportion at age, number of length samples and number of age samples for Atlantic croaker captured in commercial pound nets, 1999-2012.

Year	Age 0	Age 1	Age 2	Age 3	Age 4	Age 5	Age 6	Age 7	Age 8	Age 9	Age 10	Age 11	Age 12	Age 13	# Aged	# Measured
1999	0.0	34.0	22.5	3.3	9.4	4.2	16.0	6.0	4.2	0.4					180	1,399
2000	0.0	10.1	42.5	25.1	1.0	1.4	4.9	7.4	5.3	2.2					145	2,209
2001	No Data															
2002	18.4	4.0	10.1	8.9	29.4	24.0	1.0	0.0	3.0	0.5	0.6				66	771
2003	0.0	15.2	38.6	1.3	12.2	26.6	3.8	0.1	0.2	0.1	0.7	0.3	1.0		129	3,352
2004	0.0	0.6	54.9	5.0	5.4	6.9	23.3	3.1	0.0	0.2	0.0	0.6			161	1,653
2005	0.0	10.1	4.8	51.5	7.6	1.5	7.3	11.4	5.6	0.0	0.1	0.1			190	2,398
2006	16.7	6.3	18.1	4.8	36.8	2.3	3.2	5.0	5.2	1.8	0.0	0.0	0.0	0.1	253	1,295
2007	0.0	11.2	14.4	30.0	8.8	27.0	1.3	1.1	1.6	3.3	1.0	0.3			275	2,963
2008	5.5	7.2	28.3	14.0	19.0	4.5	17.6	1.0	0.4	0.5	1.7	0.3			288	1,532
2009	0.0	30.9	8.5	37.4	11.1	7.8	1.8	2.2	0.3						222	1,381
2010	0.0	1.2	25.7	8.7	36.5	15.8	9.4	0.9	1.3	0.3	0.0	0.3			267	2,516
2011	0.0	0.8	17.4	48.2	11.3	16.6	3.6	1.7	0.3	0.1					245	1,886
2012	10.2	0.9	22.5	21.8	34.1	6.5	2.8	0.9	0.3						255	1,842

Table 4. Maryland juvenile Atlantic croaker geometric mean indices. Both seines and the Chesapeake trawl are per haul and the coastal bays trawl is per hectare.

	Chesapeake Bay		**Coastal Bay**	
	Trawl	Seine	Trawl	Seine
Year	Geometric Mean	Geometric Mean	Geometric Mean	Geometric Mean
1959		0.00		
1960		0.00		
1961		0.00		
1962		0.00		
1963		0.00		
1964		0.02		
1965		0.00		
1966		0.00		
1967		0.00		
1968		0.00		
1969		0.00		
1970		0.00		
1971		0.00		
1972		0.04		
1973		0.01		
1974		1.30		
1975		3.11		
1976		0.06		
1977		0.00		
1978		0.07		
1979		0.00		
1980		0.00		
1981		0.00		
1982		0.01		
1983		0.47		
1984		0.00		
1985		0.00		
1986		0.00		
1987		0.00		
1988		0.00		
1989	0.83	0.00	1.01	0.06
1990	0.18	0.01	0.11	0.02
1991	4.06	0.94	3.09	0.70
1992	1.28	0.01	0.91	0.10
1993	3.67	0.01	2.02	0.06
1994	4.25	0.24	3.52	0.09
1995	0.74	0.03	3.01	0.05
1996	2.15	0.00	1.46	0.10
1997	5.32	0.24	3.20	0.35
1998	30.05	0.84	4.88	0.19
1999	4.18	0.10	2.24	0.02
2000	2.76	0.02	0.97	0.06
2001	0.86	0.00	0.40	0.02
2002	3.50	0.30	2.28	0.08
2003	0.81	0.00	0.85	0.00
2004	3.51	0.00	0.68	0.00
2005	0.44	0.00	0.41	0.00
2006	2.10	0.11	1.93	0.18
2007	0.54	0.01	0.53	0.00
2008	4.51	0.28	0.96	0.03
2009	0.67	0.01	1.46	0.00
2010	0.59	0.00	0.97	0.00
2011	1.15	0.00	1.05	0.00
2012	3.76	0.93	1.52	0.02

Table 5. Maryland Atlantic croaker commercial harvest in pounds and MRIP recreational estimated harvest in numbers.

Comercial				Recreational		
Year	Pounds	Year	Pounds	Year	Number Harvested	Number Released
1929	2,215,799	1971	200	1981	0	16,233
1930	2,113,380	1972	500	1982	10,452	0
1931	900,825	1973	37,300	1983	108,355	1,507,184
1932	1,355,501	1974	120,300	1984	211,035	70,192
1933	1,806,866	1975	639,700	1985	21,276	13,132
1934	2,131,100	1976	1,069,100	1986	123,578	43,399
1935	3,399,900	1977	692,300	1987	208,488	32,074
1936	2,812,800	1978	597,000	1988	1,005,452	273,231
1937	982,900	1979	97,400	1989	22,871	41,822
1938	3,024,900	1980	7,080	1990	100,673	88,688
1939	2,498,600	1981	2,104	1991	288,471	3,352,190
1940	3,432,000	1982	7,091	1992	117,427	856,292
1941	4,406,000	1983	417	1993	805,560	2,504,362
1942	5,960,000	1984	27,072	1994	1,633,581	1,628,824
1943		1985	9,510	1995	827,183	496,046
1944	4,998,915	1986	135,922	1996	775,115	403,776
1945	2,510,803	1987	119,409	1997	1,053,232	1,497,670
1946	2,992,316	1988	98,855	1998	1,126,058	3,021,780
1947	1,914,323	1989	89,173	1999	1,209,572	2,483,800
1948	2,216,778	1990	2,473	2000	2,674,880	4,967,856
1949	2,351,731	1991	6,183	2001	1,319,928	1,585,806
1950	2,517,692	1992	17,050	2002	1,223,385	2,523,276
1951	1,850,611	1993	114,159	2003	1,619,766	1,393,224
1952	850,304	1994	158,918	2004	870,844	819,473
1953	462,927	1995	489,506	2005	809,894	950,695
1954	912,825	1996	792,326	2006	833,190	1,791,610
1955	1,704,639	1997	1,088,969	2007	1,092,784	1,630,587
1956	1,748,667	1998	1,006,529	2008	689,154	2,068,910
1957	1,399,996	1999	948,191	2009	1,038,428	774,805
1958	658,471	2000	902,379	2010	848,050	930,477
1959	838,201	2001	1,488,815	2011	657,672	1,086,149
1960	585,934	2002	894,879	2012	701,484	1,578,524
1961	48,769	2003	713,205			
1962	11,100	2004	1,354,982			
1963	1,500	2005	972,801			
1964	2,400	2006	466,833			
1965	400	2007	474,388			
1966	800	2008	592,211			
1967	1,200	2009	433,238			
1968	100	2010	490,067			
1969	400	2011	546,896			
1970	100	2012	901455			

Table 6. Maryland 2012 preliminary commercial Atlantic croaker harvest by gear.

Gear	Harvest	Percent of Harvest
Pound net	395,318	43.9
Gill Net	461,385	51.2
Trawl	3,917	0.4
Pots	3,978	0.4
Hook and line	4,842	0.5
Fyke Nets	24,922	2.8
Other	7,093	0.8
Total	901,455	

Table 7. Percent difference in Maryland Atlantic croaker 2011 and 2012 preliminary harvest by commercial fishing gear.

Gear	2011	2012	Percent Difference
Pound net	217,208	395,318	82.0
Gill Net	413,583	461,385	11.6
Trawl	7,514	3,917	-47.9
Hook and line	13,523	4,842	-64.2
Fyke nets	32,275	24,922	-22.8
Other Pots and Traps	19,917	11,071	-44.4

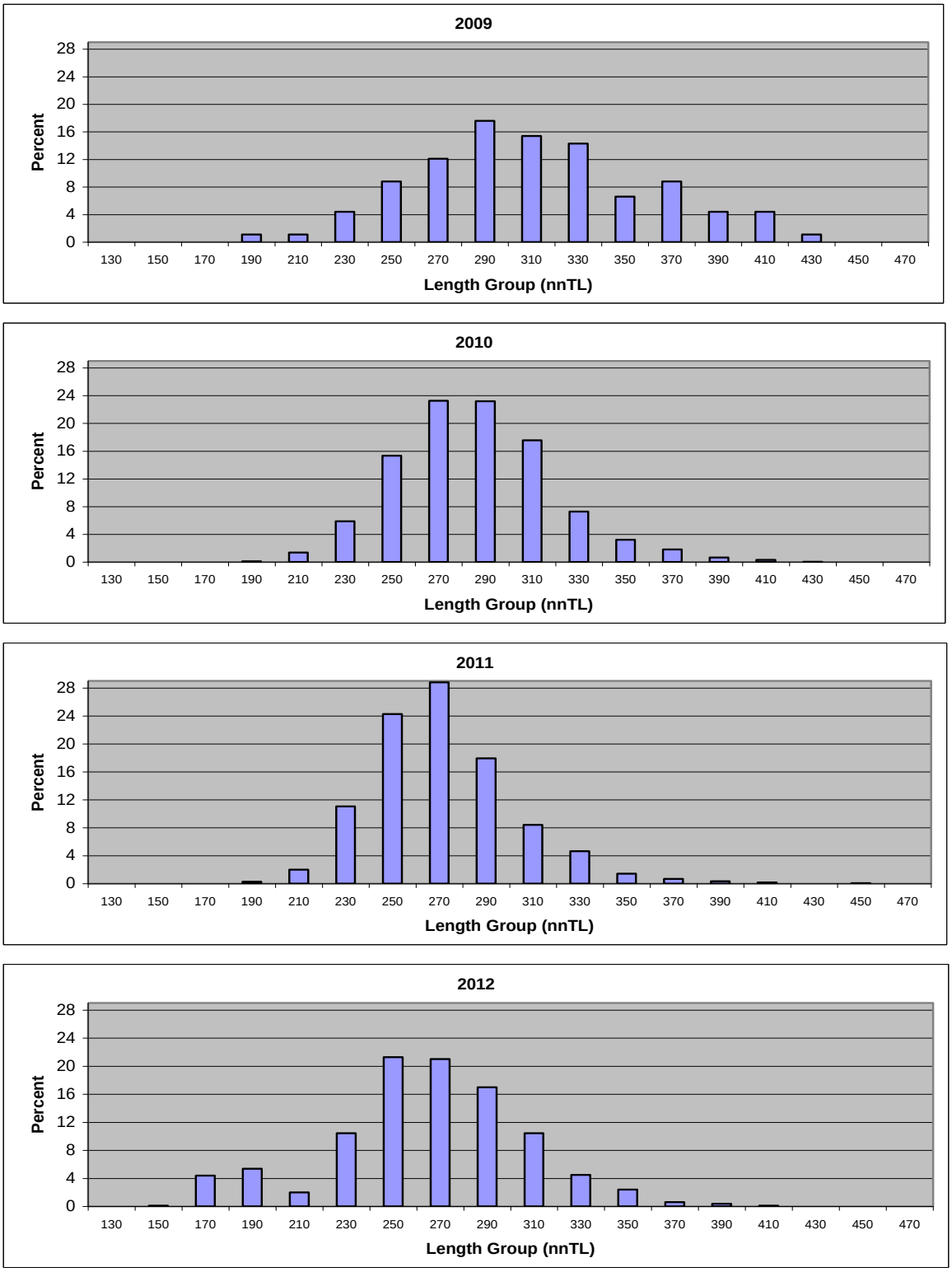


Figure 1. Atlantic croaker length frequency distributions from onboard pound net sampling, 2009-2012.

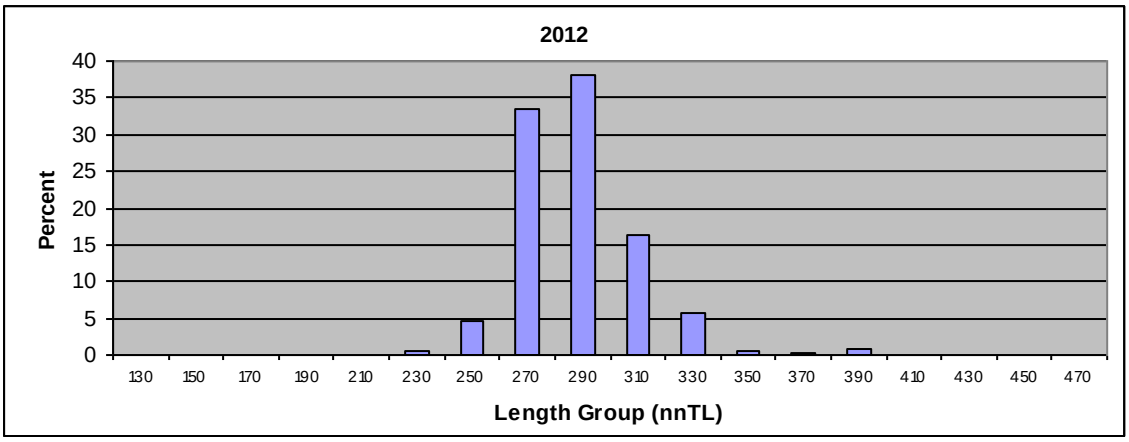


Figure 2. Atlantic croaker length frequency distributions from onboard gill net sampling, 2012

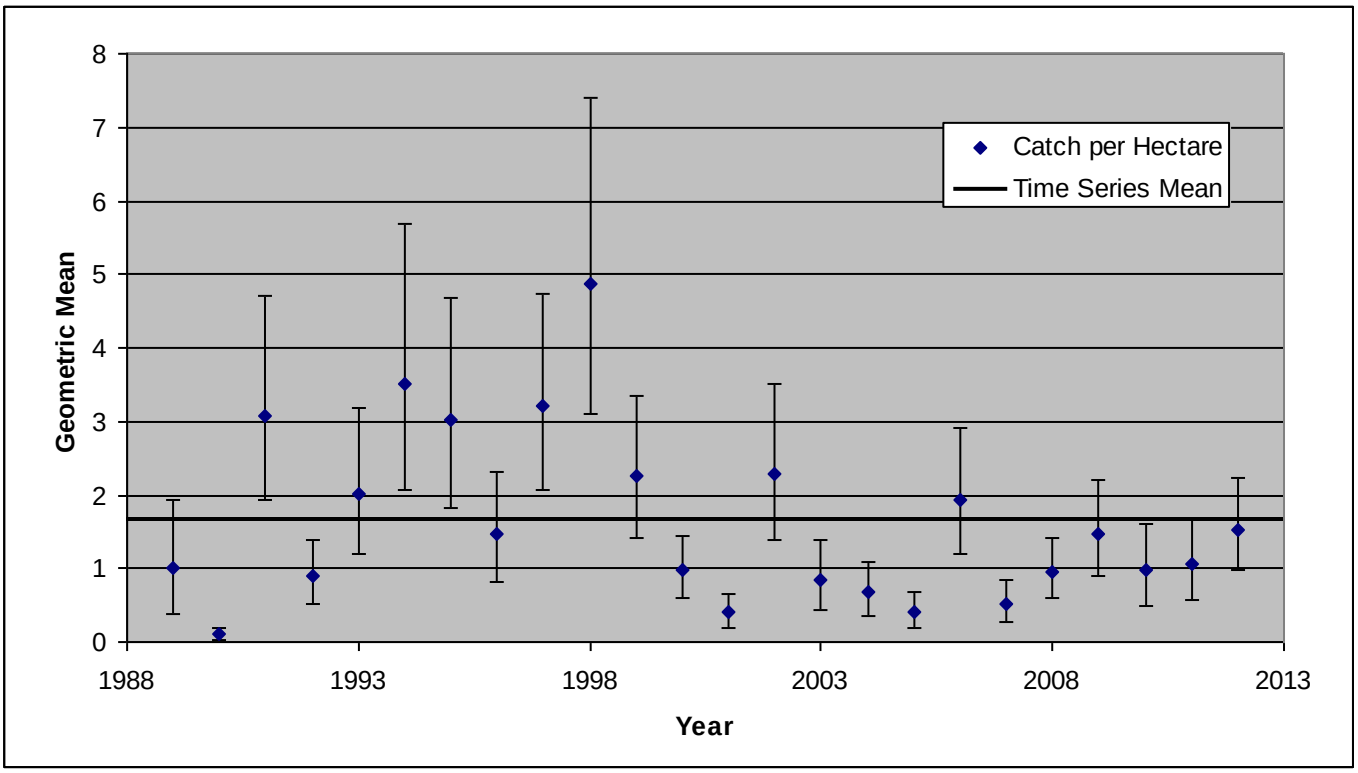


Figure 3. Coastal bay trawl juvenile Atlantic croaker annual geometric mean catch per hectare, upper and lower 95% confidence limits and time series mean, 1989-2012.

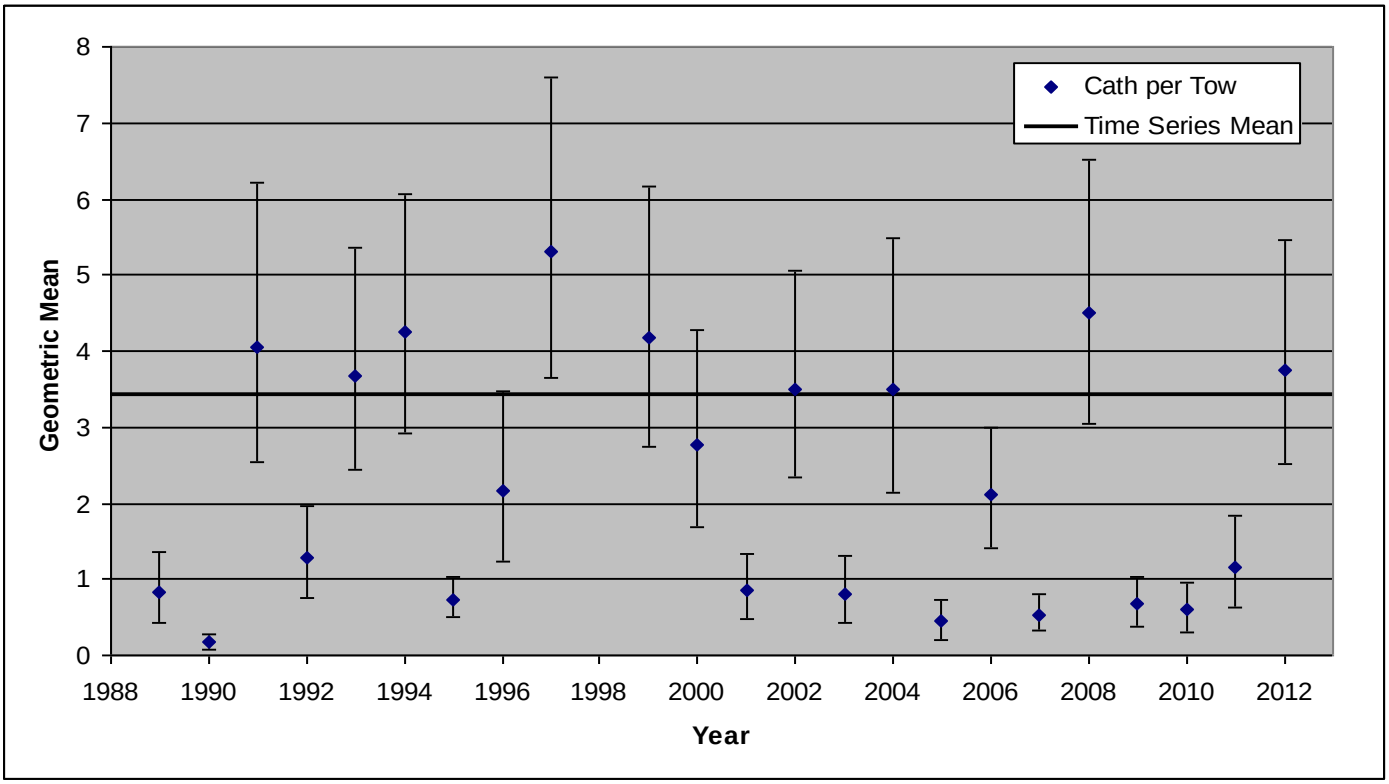


Figure 4. Maryland juvenile Atlantic croaker annual geometric mean catch per trawl, 95% confidence intervals and time series mean for Maryland's lower Chesapeake Bay, 1989 – 2012. The 1998 value of 30.05 Atlantic croaker per tow was omitted to preserve the scale of the graph.

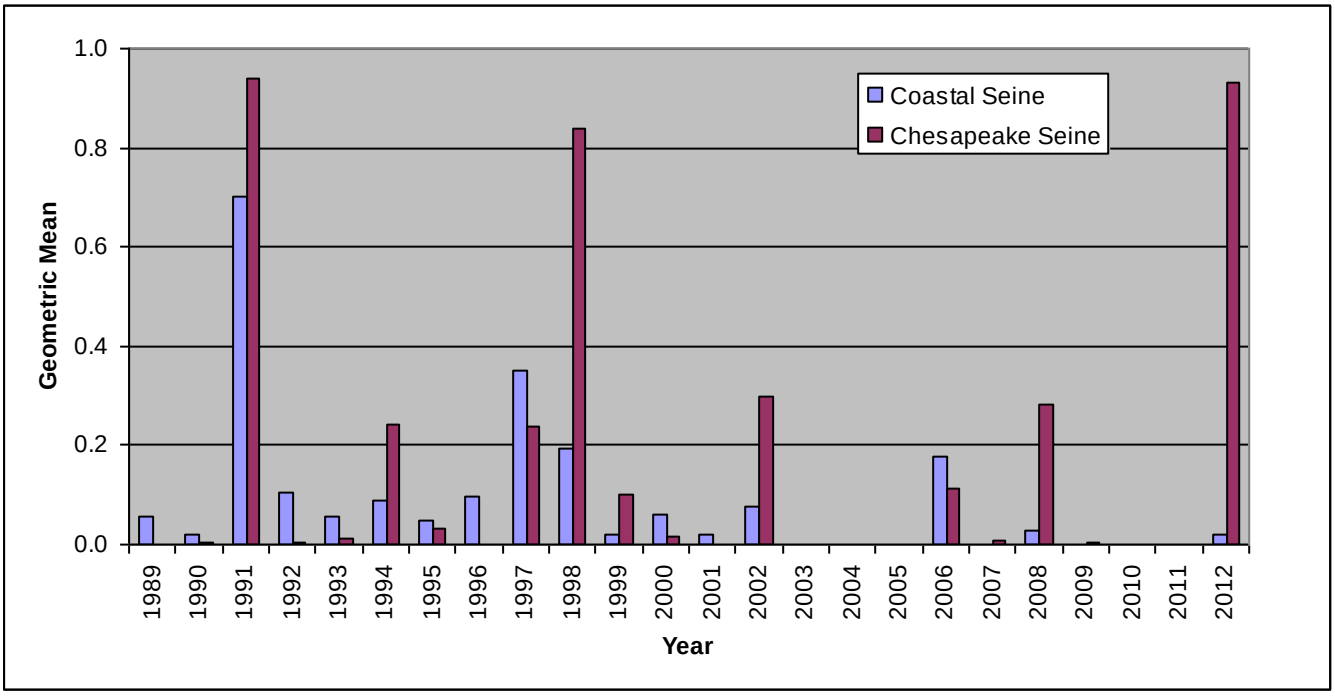


Figure 5. Geometric mean catch per haul for juvenile croaker derived from two seine surveys in Maryland, 1989-2012.

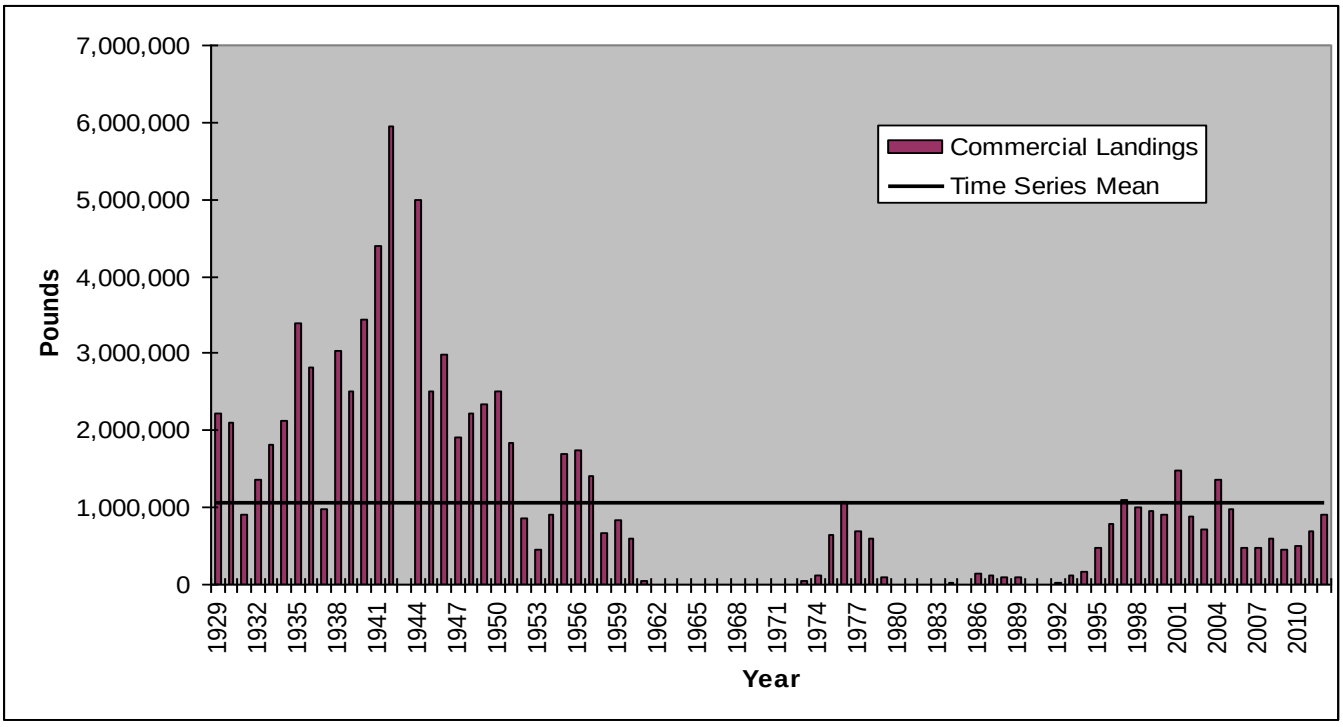


Figure 6. Maryland commercial landings from 1929 – 2012 (2012 landings preliminary) and time series mean.

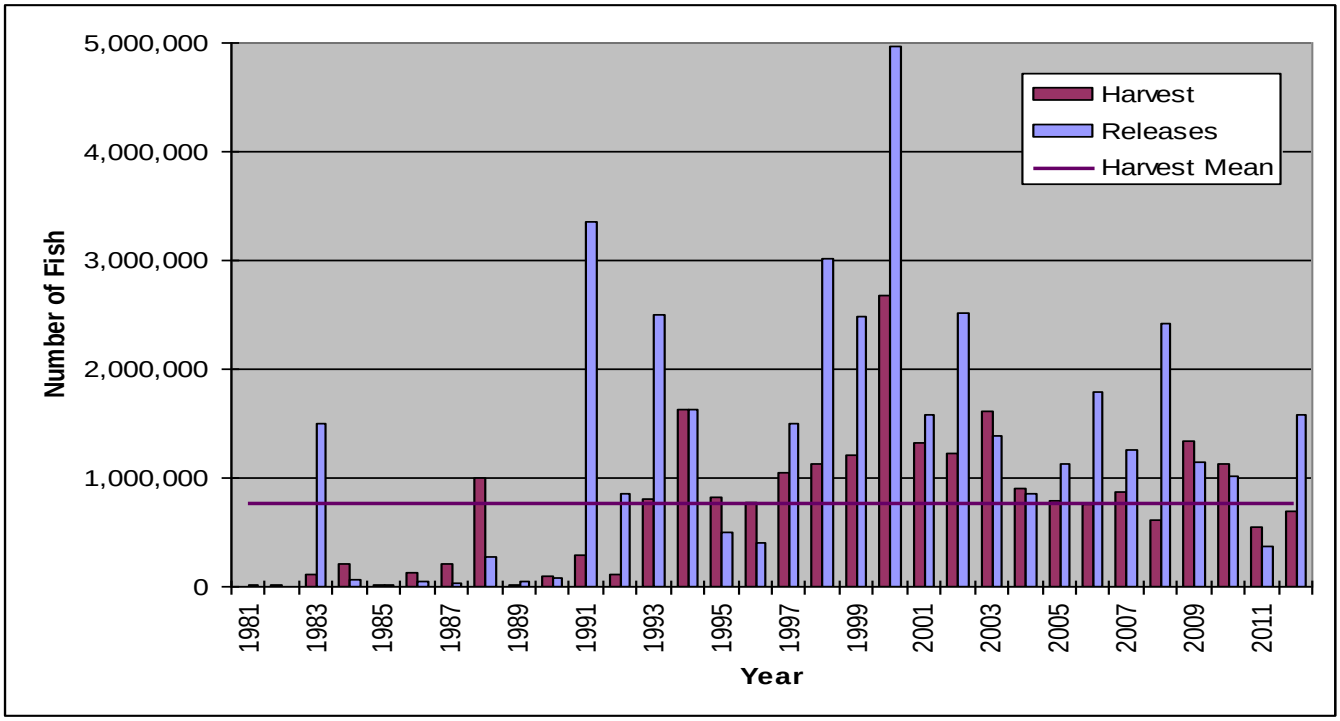


Figure 7. Recreational MRIP Atlantic Croaker harvest estimates, release estimates and harvest time series mean for Maryland waters, 1981-2012.

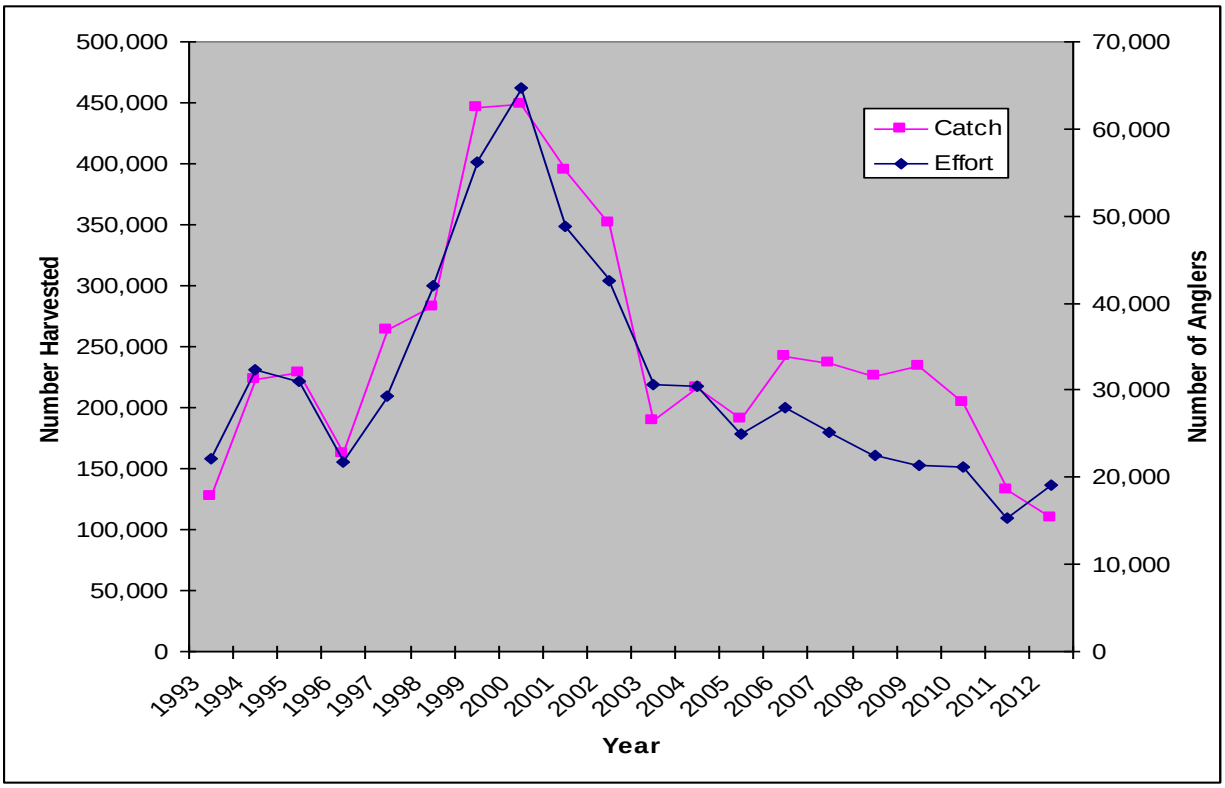


Figure 8. Maryland charter boat Atlantic croaker harvest and number of anglers, 1993-2012.

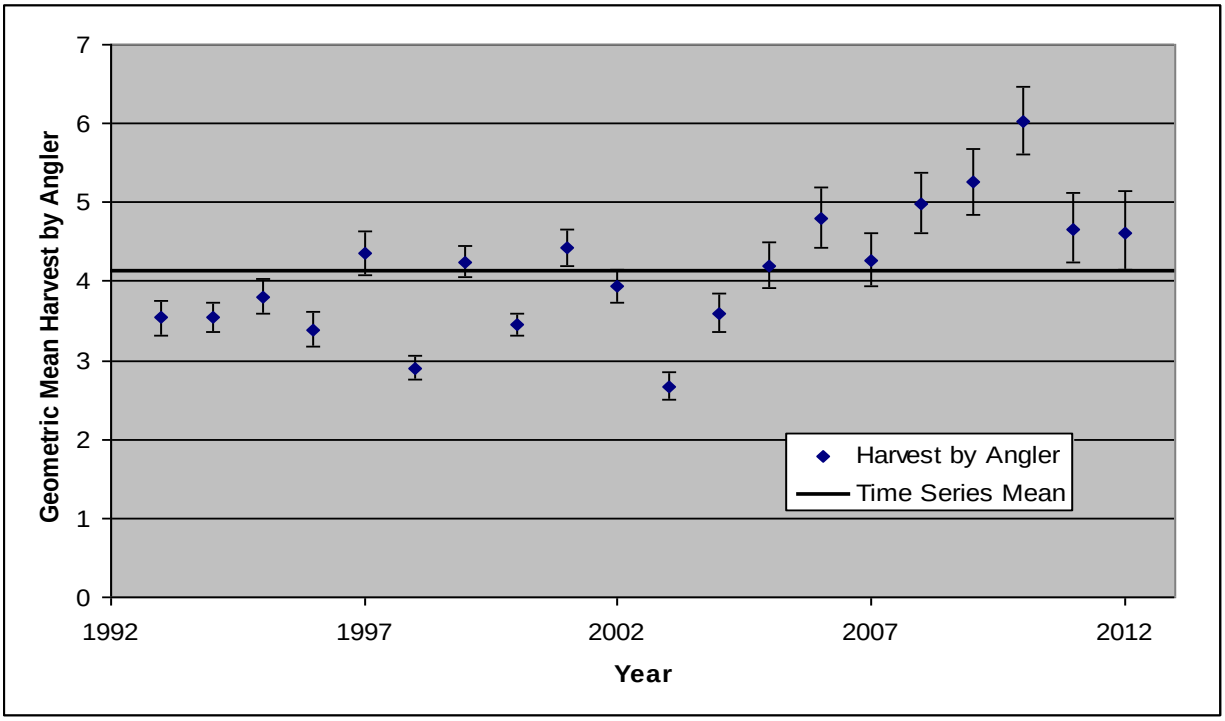


Figure 9. Maryland charter boat Atlantic croaker harvest geometric mean catch per angler, 95% confidence intervals and time series mean, 1993-20112.

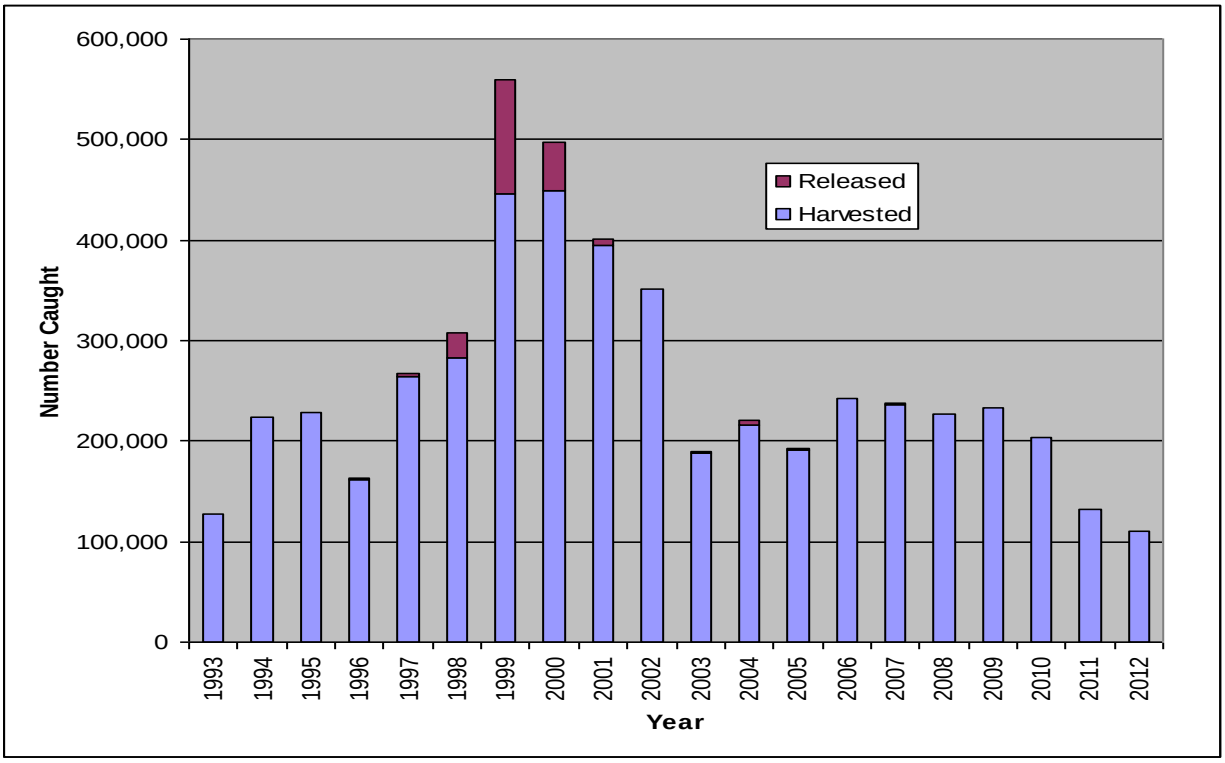


Figure 10. Number of reported Atlantic croaker harvested and released from Maryland charter boat logs, 1993-2012.

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

July 1, 2013

MEMORANDUM

TO: Kirby Rootes-Murdy, Atlantic Croaker FMP Coordinator
Atlantic States Marine Fisheries Commission

FROM: Joe Grist, Deputy Chief, Fisheries Management Division
Virginia Marine Resources Commission

SUBJECT: Virginia's 2012 Atlantic Croaker Compliance Report

1. Introduction

Summary of the year: highlight any significant changes in monitoring, regulations, or harvest.

Virginia continued its collection of biological data from commercial fisheries. A sample of 7,121 total lengths was collected in 2012. For age determination, 400 Atlantic croaker were sampled in 2012, and an average of 371 Atlantic croaker has been sampled, for age, per year, since 1998.

Commercial landings in 2012 (6,908,462 pounds) were higher than in 2011 (5,611,027 pounds) but lower than the long-term average of 9,905,982 pounds (1994 through 2011). The 2012 Marine Recreational Information Program (MRIP) estimate for Virginia recreational landings (A+B1) is 1,905,100 pounds, below the 2004 through 2011 MRIP average landings estimate of 5,032,209 million pounds.

Delta random stratified index values for Atlantic croaker young-of-year relative abundance estimates based on the spring recruitment window of April through June are provided by the Virginia Institute of Marine Science (VIMS). The 2011 croaker index value was 4.09 which was down 68.5% from the 2010 value of 13.00. The 2012 index value is not yet available.

No direct changes in management measures or regulatory requirements occurred in 2012 or are planned for 2013.

2. There is no request for *de minimis*, by the VMRC.

3. Previous calendar year's fishery and management program

   a. Activity and results of fishery-dependent monitoring (provide general results and references to technical documentation).

      Tables 1 and 2 characterize the recent collections of biological data from Atlantic croaker fisheries. Table 1 provides a summary of the numbers of Atlantic croaker measured for length and weight, the number of fish sexed, and the number of fish that were aged based on otoliths. Please note that age data collections began in 1998, under a cooperative agreement between the Old Dominion University (ODU) Center for Quantitative Fisheries Ecology and the VMRC. Table 2 provides seasonal information on length and age collections, according to sampled commercial gear types.

   b. Activity and results of fishery-independent monitoring (provide general results and references to technical documentation).

      Relative abundance index values for Atlantic Croaker young-of-year are based on catches from the Virginia Institute of Marine Sciences (VIMS) Trawl Survey in April, May, and June. A 'mean all' value, using all strata in the Bay and rivers, and a 'mean rivers' value, using only river strata, are provided. The 2012 value, representing the 2011 year class, is the third highest on record, from 1988 to 2012, for both the 'mean all' and 'mean rivers' indices.

   c. Copy of regulations that were in effect, including a reference to the specific compliance criteria as mandated in the FMP.

      At this time, there is no regulation in effect or required by the ASMFC. Trawling within Virginia waters has been banned since July 1, 1989.

   d. Harvest broken down by commercial (by gear type where applicable) and recreational, and non-harvest losses (when available).

      Gill net, pound net, and haul seine harvests accounted for 39.6%, 32.6%, and 16.9% of the 2012 landings, respectively (Table 4). In 2012, 70% of the landings occurred during the months of June through September (Table 5). Table 6 provides information on landings of Atlantic croaker, by market category. In recent years, large, medium, and unclassified (mixed market categories) fish have accounted for most of the landings.

      The 2012 estimate of Virginia's recreational landings (A+B1) for Atlantic croaker in terms of weight was 1,905,100 pounds (Table 7). Recreational landings have declined over the last seven years from a high of 7,134,012 pounds in 2006 to a low of 1,749,128

pounds in 2011 (Table 7). Virginia's recreational landings of Atlantic croaker, in terms of numbers, was 3,445,231 fish, 47% less than the average annual landings over the 2004 through 2011 time-period (Table 8).

Non-harvest losses from the commercial fishery are not monitored by the VMRC. However, the gill net fishery utilizes mesh sizes that select for marketable fish. The number of Atlantic croaker released alive by the recreational fishery in 2012 was 5,091,063 fish (Table 9). The number of Atlantic croaker released alive by recreational anglers exceeded the number landed for the fourth straight year from 2009 through 2012 (Figure 1).

e. Review of progress in implementing habitat recommendations.

Locations of juvenile Atlantic croaker are known from the monthly trawl surveys performed by the VIMS. Both the Juvenile Fish and Blue Crab Trawl Survey and the CHESMMAP Trawl Survey of adult fishes and the VMRC field collection program have compiled data, concerning the locations (habitats) of adult Atlantic croaker.

The VMRC collaborates with other state agencies (VIMS, Department of Environmental Quality, ODU, Division of Shellfish Sanitation, and the Department of Health) as part of a Harmful Algal Bloom Response Team Network that monitors and assesses hypoxic and other water quality events. The VMRC and Department of Environmental Quality collaborate on fish kill events, and is the lead agency for fish kill events and the response team.

All permit applications for dredging undergo a joint permit application process involving federal and state agencies, including the VMRC, and are gauged against habitat requirements for fisheries resources.

4. Planned management programs for the current calendar year

a. Summarize regulations that will be in effect (copy of current regulations if different from 3c.

No change.

b. Summarize monitoring programs that will be performed.

Fishery-dependent (VMRC) and fishery-independent (VIMS trawl survey and ChesMMAP) collections will continue, as in 2012.

c. Highlight any changes from the previous year.

No change.

North Carolina Department of Environment and Natural Resources
Division of Marine Fisheries

Pat McCrory
Governor

Dr. Louis B. Daniel III
Director

John E. Skvarla, III
Secretary

North Carolina Atlantic Croaker Compliance Report for 2012

Jason Rock
North Carolina Department of Environment and Natural Resources
Division of Marine Fisheries
943 Washington Square Mall
Washington, NC 27889

June 27, 2013

I. INTRODUCTION

In 2012, 5,316 commercial trips harvested 3,106,616 lbs. of Atlantic croaker valued at $2,135,458 in North Carolina. Compared to 2011, landings decreased by approximately 39%, while the number of trips increased 10%. The increase in trips comes primarily from estuarine gill nets (a low volume fishery). In North Carolina, commercial landings have declined each year from 2003 to 2008, increased in 2009 and 2010, and then declined again in 2011 and 2012. The recent decrease in landings is just 37% of the 10-yr average (8,342,350 lbs.). The decrease in commercial landings for 2011 and 2012 is likely the result of decreased effort in the ocean fly net fishery caused by shoaling in Oregon Inlet. The fly net fishery is a high volume fishery and typically accounts for over 50% of commercial Atlantic croaker landings. Recreational harvest (105,541 lbs.) accounts for 3% of the total state croaker landings and increased 5% when compared to 2011. During 2012 there were no changes to regulations or monitoring programs, specifically for Atlantic croaker.

II. REQUEST FOR DE MINIMIS

North Carolina does not request *de minimis* status for 2012.

III. 2012 FISHERY AND MANAGEMENT PROGRAM (Atlantic Croaker Plan Specific)

A. FISHERY DEPENDENT MONITORING

Directed Commercial Harvest

Four gear types (gill nets, fly nets, flounder trawl, and haul seines) are used in directed commercial trips and harvest of Atlantic croaker, and account for approximately 99% of the total landings. In 2012, 5,316 commercial trips harvested 3,106,616 lbs. of Atlantic croaker valued at $2,135,458 in North Carolina. These catches are reported by the North Carolina Trip Ticket Program, a fishery-dependent program initiated by the North Carolina Division of Marine Fisheries (NCDMF) in 1994. The program was designed to better assess fisheries with more detailed harvest data.

A trip ticket is the form used by fish dealers to report commercial landings information. Trip tickets collect information about the fisherman, the dealer purchasing the product, the transaction date, crew number, area fished, gear used and the quantity of each species landed for each trip. Some trip tickets also collect the species of shrimp landed and disposition (heads on/off), the state of catch, bottom type (public or leased) and lease number. Each month, dealers are required to send these forms to the NCDMF for processing (http://portal.ncdenr.org/web/mf/46).

Commercial fishing activity is monitored through fishery-dependent sampling conducted under Title III of the Interjurisdictional Fisheries Act and has been ongoing since 1982. Data collected in this program allows the size distribution of Atlantic croaker to be characterized by gear/fishery (Assessment of North Carolina Commercial Finfish Fisheries, Completion Reports 1984-2012, North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries). Further sub-sampling is conducted to procure samples for age determination (sectioned otoliths), sex ratio, reproductive condition, and weight (Survey of Population Parameters of Marine Recreational Fishes in North Carolina. Completion Report Project F-42 Segments, North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries).

Recreational Harvest Estimate

Marine Recreational Information Program (MRIP)

The MRIP consists of two complementary surveys: 1) a telephone survey of households in coastal counties to get trip information and 2) an intercept survey of anglers at shore side access sites to obtain catch rates and species composition. The data from the two surveys are combined to provide estimates of the total number of fish caught, released, and harvested; the weight of the harvest; the total number of trips; and the number of people participating in marine recreational fishing. In 2012, an estimated 373,794 directed recreational trips harvested 105,541 lbs. (PSE=12) of Atlantic croaker.

Recreational Commercial Gear License (RCGL)

Commercial fishing gears such as gill nets, crab pots, and shrimp trawls have been used for recreational purposes in the coastal waters of North Carolina for many years. The use of these types of gears provides pleasure and a source of sustenance for both North Carolina residents as well as individuals from other states. To participate in these activities the user must possess a RCGL that entitles the individual to use limited amounts of commercial gear to catch fish for personal consumption but does not allow for sale of the catch. The RCGL survey was discontinued in 2009 due to budget cuts.

B. FISHERY INDEPENDENT MONITORING

North Carolina has no current fishery-independent monitoring programs specifically for Atlantic croaker. However, the North Carolina Division of Marine Fisheries (NCDMF) has conducted a stratified random trawl survey in Pamlico Sound (Pamlico Sound Survey, Program 195) since 1987 to obtain juvenile abundance indices (JAI) for several economically important species, including Atlantic croaker. The 2012 Atlantic croaker JAI (mean number of individuals/tow) was 1,142 (2011 JAI=90). The JAI for 2012 was the second highest recorded in North Carolina (2010 JAI=1,185 was the highest). From 2003-2012 the average JAI was 388.

C. REGULATIONS IN EFFECT (INCLUDING CRITERIA MANDATED BY FMP)

Commercial Regulations

There are no direct restrictions on the commercial harvest of Atlantic croaker within coastal, joint, or inland waters of NC. There are however numerous indirect restrictions that effect the commercial harvest and bycatch of Atlantic croaker in North Carolina (coastal and joint waters Table 1, inland waters Table 2). Atlantic croaker has nongame fish status in inland waters and a noncommercial special device license is required if three (3) or fewer special devices are used regardless of purpose (commercial or recreational).

Table 1. NC commercial fishery restrictions that indirectly affect the harvest and bycatch of Atlantic croaker in **coastal and joint waters**.

Action	Proclamation/Rule	Year
Area restrictions and incidental finfish limits taken by shrimp and crab trawls in inside waters limit these gears from having no more than 500 pounds of finfish from December 1	Rule: 15A NCAC 3J .0104(a)	1991

Action	Proclamation/Rule	Year
through February 28 and 1,000 pounds of finfish from March 1 to November 30.		
Finfish taken in shrimp and crab trawls in the Atlantic Ocean. It is unlawful to possess finfish incidental to shrimp or crab trawl operations from December 1 through March 31 unless the weight of the combined catch of shrimp and crabs exceeds the weight of finfish.	Rule: 15A NCAC 3J.0202 (5)(a)	1997
Limits the catch of unclassified bait to 5,000 lbs. per vessel per day	Rule: 15A NCAC 3M.0162	
Establish a minimum mesh size restriction in shrimp trawls (1 ½" tail bag) and crab trawls (3").	Rule: 15A NCAC 03L.0103 and 0292	
Limit head rope length internally to 90 feet and establish shrimp trawl prohibited areas	Rule: 15A NCAC 03L. 0103 &15A NCAC 03R. 0114	2006
Bycatch reduction devices (BRDs) required in all shrimp trawls.	Proclamation and consent of the MFC. Rule: 15A NCAC 3J .0104	
Increase minimum mesh size restrictions for crab trawls to 4" in western Pamlico Sound.	By proclamation. (NC southern flounder FMP)	2005
Minimum mesh size for fly nets. A minimum stretched mesh length of less than 3" hung on the square or 3 ½" hung on a diamond. Fly nets are defined as nets having the first body (belly) section consisting of 35 or more continuous meshes of 8" or greater (stretched mesh) webbing behind the bottom and top line with tail bags less than 15 feet in length. Tail bags constructed of square mesh may have the terminal 3 feet of mesh hung on a diamond with a minimum stretched mesh length of 2".	Proclamation: FF-26-92 (ASMFC Weakfish FMP)	
Closure of ocean waters south of Cape Hatteras to the SC State line to fly nets.	Proclamation: FF-18-94 Rule:15A NCAC 3J.0202 (4)	1994
No person may possess aboard or land from any vessel using a fly net more than 100 pounds of weakfish during any one day or trip, whichever is longer, in state waters or within 200 miles of the shore in the Atlantic Ocean. The weight of the weakfish possessed shall not exceed 10% of the combined catch up to 100 pounds of weakfish, unless all fly nets onboard meet the following requirements: 1) The fly net has a large mesh in the wings that measure 8" to 64" (inside stretched mesh length; and 2) The first body section (belly) of the net has 35 or more meshes that are at least 8 inches (inside stretched mesh length); 3) Mesh decreases in size throughout the	Proclamation: FF-14-96 (Revised FF-66-2010) (implement restrictions required to comply with Addendum IV of Amendment 4 of the ASMFC weakfish FMP)	1996

Action	Proclamation/Rule	Year
body of the net to a tail bag of a minimum length of 15 feet in length with a minimum inside stretched mesh length of 3 ½" hung on the square or 3 ¾" hung on a diamond. 4) Tail bags constructed of square mesh may have the terminal three feet constructed of material hung on a diamond with a minimum inside stretched mesh length of 2".		
Mandatory use of long haul cull panels and swipe nets south/west of a line from Bluff Point in Pamlico Sound to Ocracoke Island.	Rule: 15A NCAC 3J .0109 (3)	1999, 2004
No person may possess aboard or land from, any vessel using or having on board a gill net with a mesh length less than 2 7/8 inches stretched mesh, more than 100 pounds of weakfish during any one day or on any trip, whichever is longer, in state waters or within 200 miles of the shore in the Atlantic Ocean. The weight of weakfish possessed shall not exceed 10% of the total weight of the combined catch up to 100 pounds of weakfish.	Proclamation: FF-14-96 (Revised FF-66-2010) (implement restrictions required to comply with Addendum IV of Amendment 4 of the ASMFC weakfish FMP)	1996
Small mesh (< 5") estuarine gill net attendance requirements from May 1 to November 30 in select areas in inside waters. Also the small mesh gill net attendance requirement extended to include weekends, December through February under spotted seatrout FMP.	Rule: 15A NCAC 3J .0103 (h) (NC red drum and spotted seatrout FMPs)	1998, 2008, 2010
Authorized gear allowed and restrictions applied to the Recreational Commercial Gear License. Modified 2008 to allow mechanical retrieval of shrimp trawl.	Rule: 15A NCAC 3O .0302	1999, 2008
Inside large mesh gillnets (excluding strike nets) which are defined as: $\geq$ 4 in through 6 ½ in. stretch mesh, protective turtle restrictions are: Restrict the number of days during the week that fishermen could operate (Mon – Fri) and limit soak times to night time. Establish a maximum yardage limit of 2,000 yards. Nets must be deployed as low profile with a net height of no more than 15 meshes, all cork and other buoys removed except as required for identification, and set in individual 100-yard shots with at least a 25-yard break between individual shots. Provide observer coverage of gill nets	Proclamation M-8-2010	2010

Action	Proclamation/Rule	Year
Exempts portions of Croatan and Roanoke sounds and all of Albemarle and Currituck sounds and their tributaries and the Neuse, Bay, and Pamlico rivers from actions of Proclamation M-8-2010 above. Closes Southern Core Sound, Back Sound, the Straits, North River and tributaries to large mesh gill nets from April 1 through November 30, 2012.	Proclamation M-28-2012	2012
Exempt areas in Pamlico, Bay, and Neuse rivers (Proclamation M-28-2012) must check gill nets at least once during a 24 hour period no later than noon each day.	Proclamation M-52-2012 (NC Southern Flounder FMP)	2012
Exempt areas in Pamlico, Bay, and Neuse rivers (Proclamation M-28-2012) limited to no more than 2,000 yards of large mesh gill net per vessel	Proclamation M-3-2013 (NC Southern Flounder FMP)	2013
In Deer and Schoolhouse (Rocky Run) creeks from October 1 through March 31: Unlawful to use gill nets or seines from 8:30pm to sunrise. Unlawful to use a gill net or seine more than 200 yards in length. Gill nets and seines must have reflective markers every 50 yards on top line or cork line of nets. Nets shall be attended at all times to facilitate movement of nets so as not to obstruct navigation.	Proclamation M-9-2013	2013
Closes Southern Core Sound, Back Sound, the Straits, North River and tributaries to large mesh gill nets from May 8 through October 14, 2013.	Proclamation M-12-2013	2013

Table 2. NC commercial fishery restrictions that indirectly affect the harvest and bycatch of Atlantic croaker in inland waters.

Action	Proclamation/Rule	Year
Nongame fishes, except alewife and blueback herring (greater than six inches in length) and bowfin, taken by hook and line, grabbling or by licensed special devices may be sold. Alewife and blueback herring less than 6 inches in length may be sold except in those waters specified in Paragraph (d) of Rule .0402 of this Section, where their possession is prohibited	Rule: 15A NCAC 10C.0401 (b)	?
Game fishes and their young taken while netting for bait shall be immediately returned unharmed to the water	Rule: 15A NCAC 10C.0402 (c)	?
Except in designated public mountain trout waters, and in impounded waters located on the Sandhills Game Land, there is a year-round open season for the licensed taking of nongame fishes by bow and arrow. The use of special fishing devices in impoundments located entirely on game lands is prohibited. Seasons and waters in which the use of other special devices is authorized are indicated by counties below:	Rule: 15A NCAC 10C.0407 (b)	?

Recreational Regulations

Hook and Line

Currently there are no direct recreational restrictions on the harvest of Atlantic croaker within coastal, joint, or inland waters of North Carolina.

RCGL

15A NCAC 3O .0302: AUTHORIZED GEAR FOR RCGL
(a) The following are the only commercial fishing gear authorized (including restrictions) for use under a valid Recreational Commercial Gear License:

(1) One seine 30 feet or over in length but not greater than 100 feet with a mesh length less than 2 1/2 inches when deployed or retrieved without the use of a vessel or any other mechanical methods. A vessel may be used only to transport the seine;
(2) One shrimp trawl with a head rope not exceeding 26 feet in length per vessel.
(3) With or without a vessel, five eel, fish, shrimp, or crab pots in any combination, except only two pots of the five may be eel pots. Peeler pots are not authorized for recreational purposes;
(4) One multiple hook or multiple bait trotline up to 100 feet in length;
(5) Gill Nets:
    (A) Not more than 100 yards of gill nets with a mesh length equal to or greater than 2 1/2 inches except as provided in (C) of this Subparagraph. Attendance is required at all times;
    (B) Not more than 100 yards of gill nets with a mesh length equal to or greater than 5 1/2 inches except as provided in (C) of this Subparagraph. Attendance is required when used from one hour after sunrise through one hour before sunset in internal coastal fishing waters east and north of the Highway 58 Bridge at Emerald Isle and in the Atlantic Ocean east and north of 77° 04.0000' W. Attendance is required at all times in internal coastal fishing waters west and south of the Highway 58 Bridge at Emerald Isle and in the Atlantic Ocean west and south of 77° 04.0000' W; and
    (C) Not more than 100 yards of gill net may be used at any one time, except that when two or more Recreational Commercial Gear License holders are on board, a maximum of 200 yards may be used from a vessel;
    (D) It is unlawful to possess aboard a vessel more than 100 yards of gill nets with a mesh length less than 5 1/2 inches and more than 100 yards of gill nets with a mesh length equal to or greater than 5 1/2 inches identified as recreational commercial fishing equipment when only one Recreational Commercial Gear License holder is on board. It is unlawful to possess aboard a vessel more than 200 yards of gill nets with a mesh length less than 5 1/2 inches and more than 200 yards of gill nets with a mesh length equal to or greater than 5 1/2 inches identified as recreational commercial fishing equipment when two or more Recreational Commercial Gear License holders are on board;
(6) A hand-operated device generating pulsating electrical current for the taking of catfish in the area described in 15A NCAC 03J .0304;
(7) Skimmer trawls not exceeding 26 feet in total combined width.

(8) One pound net used to take shrimp with each lead 10 feet or less in length and with a minimum lead net mesh of 1 1/2 inches, and enclosures constructed of net mesh of 1 1/4 inches or greater and with all dimensions being 36 inches or less. Attendance is required at all times and all gear must be removed from the water when not being fished. Gear is to be marked and set as specified in 15A NCAC 03J .0501.

(b) It is unlawful to use more than the quantity of authorized gear specified in Subparagraphs (a)(1) through (a)(7) of this Rule, regardless of the number of individuals aboard a vessel possessing a valid Recreational Commercial Gear License.

(c) It is unlawful for a person to violate the restrictions of or use gear other than that authorized by Paragraph (a) of this Rule.

(d) Unless otherwise provided, this Rule does not exempt Recreational Commercial Gear License holders from the provisions of other applicable rules of the Marine Fisheries Commission or provisions of proclamations issued by the Fisheries Director as authorized by the Marine Fisheries Commission.

D. COMMERCIAL AND RECREATIONAL HARVEST

Directed Commercial Harvest

Four gear types (gill nets, fly nets, flounder trawl, and haul seines) are used in directed commercial trips and harvest of Atlantic croaker, and account for more than 99% of the total landings. The total harvest of Atlantic croaker in 2012 was 3,106,616 lbs. (Table 3) and occurred in 5,316 trips (Table 4). The decrease in commercial landings for 2011 and 2012 is likely the result of decreased effort in the ocean fly net fishery caused by shoaling in Oregon Inlet. The ocean fly net fishery is a high volume fishery for Atlantic croaker and typically accounts for over 50% of annual landings. Although the number of trips increased by 10%, the increase came largely from the estuarine gill net fishery, a relatively low volume fishery for Atlantic croaker.

Table 3. North Carolina commercial harvest (lbs.) of Atlantic croaker by gear, 1994-2012.

YEAR	ESTUARINE GILLNET	OCEAN SINK GILLNET	FLOUNDER TRAWL	FLYNET	HAUL SEINE	OTHER	Grand Total
1994	93,172	1,373,566	109,399	2,869,275	103,573	66,768	4,615,754
1995	151,519	1,923,282	70,676	3,650,520	162,890	62,397	6,021,284
1996	183,373	4,102,497	71,846	4,615,359	358,764	629,997	9,961,834
1997	81,238	2,810,345	225,337	6,944,964	61,423	588,360	10,711,667
1998	159,212	5,608,831	1,081,913	3,964,733	25,270	25,937	10,865,897
1999	101,445	3,903,184	466,319	5,656,496	7,159	50,903	10,185,507
2000	94,826	3,805,749	660,116	5,481,846	67,146	12,945	10,122,627
2001	140,116	5,230,828	470,800	6,025,709	99,776	50,195	12,017,424
2002	130,055	4,209,753	448,727	5,362,031	31,545	7,042	10,189,153
2003	89,234	4,114,734	688,888	9,476,207	51,480	8,653	14,429,197
2004	82,587	3,970,134	461,163	7,432,523	34,643	11,952	11,993,003
2005	66,982	4,440,748	130,448	7,223,644	32,114	9,356	11,903,292
2006	61,167	2,756,604	39,526	7,499,038	35,964	4,255	10,396,554
2007	28,384	2,057,705	246,428	4,939,253	17,999	11,528	7,301,296
2008	67,405	2,180,372	202,939	3,326,199	11,789	3,063	5,791,766
2009	52,582	2,000,817	187,291	3,847,541	33,251	13,945	6,135,437
2010	171,825	3,037,799	112,504	3,807,850	171,746	10,435	7,312,159
2011	45,923	4,437,331	22,970	459,381	80,810	7,771	5,054,186
2012	77,023	2,668,307	27,864	314,244	6,794	12,383	3,106,616
Mean	98,846	3,401,715	301,324	4,889,306	73,376	83,572	8,848,140

Table 4. North Carolina commercial trips that landed Atlantic croaker by gear, 1994-2012.

YEAR	ESTUARINE GILLNET	OCEAN SINK GILLNET	FLOUNDER TRAWL	FLYNET	HAUL SEINE	OTHER	Grand Total
1994	7,906	2,730	66	148	455	3,044	14,349
1995	11,054	3,131	61	166	459	3,394	18,265
1996	8,222	3,899	107	163	497	2,530	15,418
1997	8,881	3,507	73	304	296	2,153	15,214
1998	5,486	3,520	343	188	192	933	10,662
1999	7,999	2,863	192	175	98	1,653	12,980
2000	7,891	2,081	152	137	216	1,334	11,811
2001	7,983	2,565	104	147	234	1,922	12,955
2002	5,874	1,715	75	147	169	835	8,815
2003	4,862	1,540	60	179	153	567	7,361
2004	5,341	1,360	66	173	161	777	7,878
2005	4,488	1,246	31	166	125	454	6,510
2006	3,971	1,230	25	170	213	291	5,900
2007	4,216	1,082	56	116	131	346	5,947
2008	4,484	1,078	34	105	109	294	6,104
2009	5,474	1,019	47	162	165	321	7,188
2010	5,249	1,119	16	125	239	526	7,274
2011	2,622	1,729	5	25	199	258	4,838
2012	3,440	1,409	13	14	59	381	5,316
Mean	6,076	2,043	80	148	220	1,159	9,726

Directed Recreational Harvest Estimates

Hook and line

The total recreational hook and line harvest of Atlantic croaker in 2012 was 105,541 lbs., with 373,794 trips taken (Table 5). Data from 1994-2003 uses the old MRFSS calculation method and 2004-2012 uses the new MRIP calculation method.

Table 5. North Carolina recreational harvest of Atlantic croaker 1994-2012, with number of directed trips, landings in number and pounds, and number of discards.

Year*	Directed Trips	Harvest Number	Harvest (lbs.)	PSE	Discard Number
1994	679,123	1,179,735	351,230	6.9	3,110,528
1995	462,683	850,606	326,135	10.4	1,172,716
1996	447,907	662,240	346,501	10.9	1,218,799
1997	396,140	661,116	309,457	15.6	1,443,568
1998	343,675	387,427	161,117	11.2	1,060,928
1999	372,719	442,185	212,991	12.1	1,368,478
2000	473,684	391,056	201,306	13.0	1,569,385
2001	447,251	635,552	355,009	14.4	1,256,807
2002	300,282	408,944	242,184	16.9	925,806
2003	465,690	490,399	317,606	17.7	1,552,315
2004	458,658	511,418	300,440	17.4	1,656,049
2005	418,723	326,777	163,751	21.8	1,401,413
2006	598,319	556,024	218,775	21.1	2,578,819
2007	452,667	461,162	129,675	17.8	1,608,120
2008	462,894	317,940	133,416	17.0	1,419,019
2009	479,822	368,990	132,895	16.5	1,912,670
2010	500,412	478,156	233,607	11.9	1,598,139
2011	434,567	246,676	100,692	13.4	1,798,230
2012	373,794	288,812	105,541	11.9	1,255,215
Mean	445,144	508,696	228,544		1,574,053

*1994-2003 use old the MRFSS calculation and 2004-2012 use the new MRIP calculation method

RCGL

Refer to 2009 Atlantic croaker compliance report for past trends in RCGL data.

Non-harvest losses

Non-harvest losses of Atlantic croaker within North Carolina are not available at this time.

E. REVIEW OF PROGRESS IN IMPLEMENTING HABITAT RECOMMENDATIONS

There were no new implementations in the habitat recommendations during the past year.

IV. PLANNED MANAGEMENT PROGRAMS FOR THE CURRENT CALENDAR YEAR

A. Regulations that will be in effect

No new regulations are planned for the current year.

Summary of monitoring programs that will be performed

Monitoring programs will be the same as the previous fishing year. As listed and described in sections 3A – 3C, the NCDMF will continue to monitor Atlantic croaker harvest in the commercial and recreational fisheries through the utilization of the NC Trip Ticket Program and MRIP.

Highlight any changes from the previous year

There was a change in the recreational index from MRFSS data to include the new MRIP data.

South Carolina
Atlantic Croaker Fishery and Management Program
Compliance Report for the Year 2012

1 July, 2013

Prepared by: Christopher McDonough

Marine Resources Division
South Carolina Department of Natural Resources

I. INTRODUCTION

There were 62 lbs reported for commercial landings for Atlantic croaker in 2012. This follows very limited reported commercial landings for Atlantic croaker in 2010 (44 lbs) and 2009 (219 lbs) which was primarily incidental by-catch from shrimp trawlers. Commercial landings are monitored through the South Carolina commercial fisheries monitoring program, which reports its data to the National Marine Fisheries Service (NMFS) and the ACCSP (Atlantic Coastal Cooperative Statistics Program). This species is also a relatively minor component of the coast wide recreational landings (see below). No regulatory changes were implemented under State law that would affect South Carolina's croaker landings or any reporting requirements for the fishery.

II. REQUEST FOR *de minimis*

The Atlantic croaker ISFMP allows for a state to request ***de minimis status if, for the preceding three years for which data are available, their average commercial landings or recreational landings (by weight) constitute less than 1% of the coast wide commercial or recreational landings for the same two year period. A state that qualifies for de minimis based on their commercial landings will qualify for exemptions in their commercial fishery only, and a state that qualifies for de minimis based on their recreational landings will qualify for exemptions in their recreational fishery only.***

Although there have been reported commercial landings for Atlantic croaker in South Carolina for eight of the past ten years ((2002-2012), all reported years made up significantly less than 1% of the reported Atlantic coast landings required for *de minimis* status. This fulfills the above requirement for the commercial fishery in South Carolina to be in *de minimis* status.

The recreational landings of Atlantic Croaker (A + B1) for South Carolina and the percentage of the coast wide landings made up by these catches were:

Table 1. Recreational landings (by weight) for Atlantic croaker in South Carolina.

Year	SC Landings (lbs) (A + B1)	Coastal Landings (lbs) (A+B1)	SC Percentage of Landings (2-yr mean)
2006	19,010	9,226,037	0.603
2007	39,368	8,242,078	0.368
2008	35,322	5,306,627	0.323
2009	39,112	5,443,248	0.792
2010	14,462	4,303,466	0.916
2011	234,916	2,747,968	4.288
2012	10,050	2,931,106	4.570

After a greater than an order of magnitude increase in recreational landings between 2010 and 2011 in South Carolina landings for 2012 dropped back to a level below 2010 and represented a 95.1% decrease from 2011. South Carolina landings in 2012 did not meet criteria for *de minimis* status at less than 1% of the 3 year total Atlantic coast average. Recreational Atlantic croaker landings were above *de minimis* levels in 2012 since that determination was made using the 3-year average and the high numbers in 2011 are still keeping that average catch level high. The actual landings harvest in 2012 (10,050 lbs) represents the lowest annual level in the 2006-2012 time period. There are currently no ASMFC management measures restricting the recreational harvest of Atlantic croaker in Amendment 1.

III. ATLANTIC CROAKER FISHERY AND MANAGEMENT PROGRAM

A. Fishery Dependent Monitoring:

South Carolina's croaker fishery is recreational in nature. Fishery dependent data related to Atlantic croaker are available primarily through the SCDNR State Finfish Survey (SFS), the National Marine Fisheries Service's Marine Recreational Information Program Survey (MRIPS), and an SCDNR-managed mandatory trip reporting system for licensed charterboat operators.

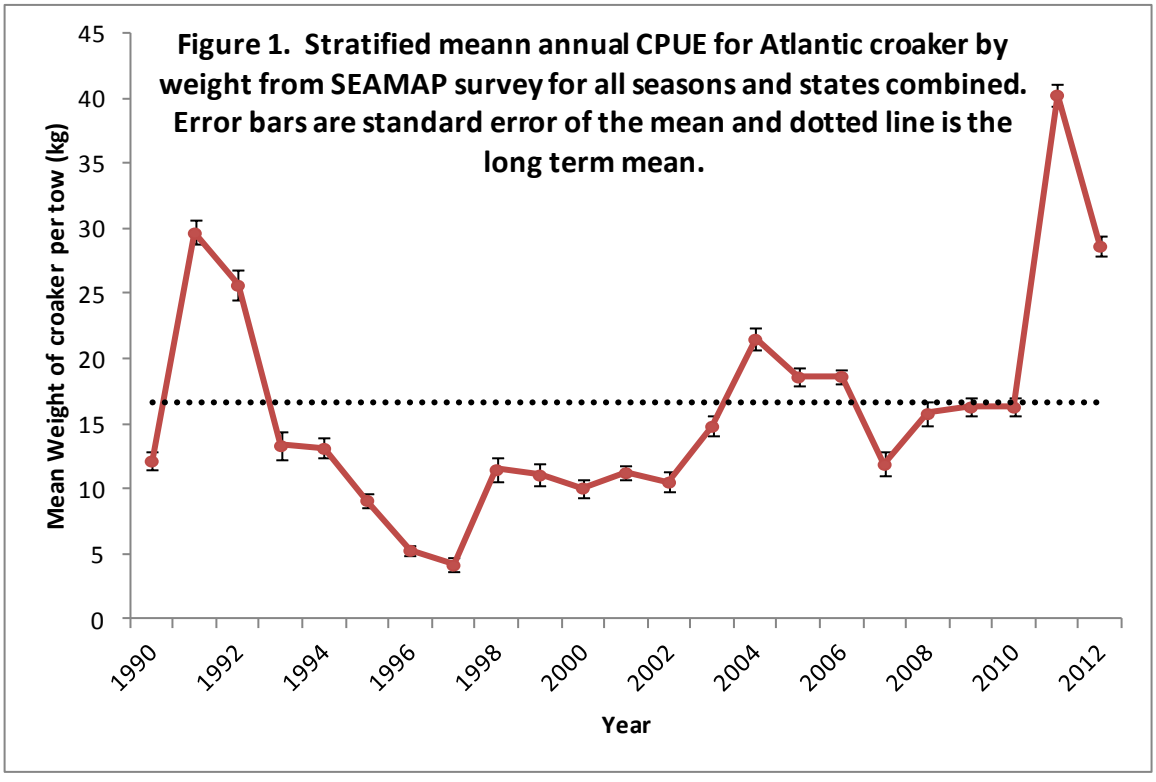
State Finfish Survey - The State Finfish Survey (SFS) is a fishery dependent intercept survey designed to collect primarily catch/effort data and length measurements of selected species taken by private boat anglers in South Carolina waters and federal waters off the state. There were 721 Atlantic croaker counted in the SFS with 10 kept for bait, 207 kept to eat, and 504 thrown back alive. The SFS measured 137 Atlantic croaker in 2012 ranging from 169-325 mm total length. The mean size ± standard error for the group was 228.2 ± 2.44 mm total length. The SFS began collecting length data on Atlantic croaker in 2009.

Marine Recreational Information Program - The MRIP data indicated a sizable decrease in harvest (A + B1) in 2012 (10,050 lbs) from the previous year in 2011 (234,916 lbs). This represented an approximate 95% decrease in harvest over 2011 harvest levels. Large annual increases in harvest (like that in 2011) have been observed in previous years (1984, 1986, 1994, 2009) and do not necessarily reflect changes in stock status, as the changes occurred over a single year after which they generally decreased by at least 50% the following year, which was the case in 2012. The percent standard error (PSE) level for 2012 was relatively high (36.7%) indicating expansion of harvest estimates from intercept data may have some issues. (www.st.nmfs.gov/st1/recreational/queries/index.html)

B. Fishery Independent Monitoring:

While Atlantic croaker are not necessarily a specifically targeted species for SCDNR monitoring programs or projects, they are a common component species of three fishery independent monitoring efforts conducted by the SCDNR. The summary catch effort data for each of the fishery independent surveys can be found in Table 2 at the end of this report.

The first is the Southeast Area Monitoring and Assessment – South Atlantic Program (SEAMAP-SA) conducted by SCDNR staff. This shallow water (15 to 30 ft) trawl survey monitors status and trends of numerous coastal species within the South Atlantic Bight from Cape Canaveral, FL to Cape Hatteras, NC. The annual stratified mean catch per tow in weight for Atlantic croaker in 2012 decreased by 31.1% (28.6 kg/tow) over 2011 (40.3 kg/tow) (Fig. 1). However, even though there was a decrease in CPUE, catch levels were still well above the long term mean catch for the entire series and the overall increasing trend in Atlantic croaker in the SEAMAP survey that began in 1997 continued.



The second survey was an inshore estuarine trammel net survey. The trammel net survey has been conducted since 1991 and is currently an ongoing program. It uses a stratified random sampling protocol from seven different estuaries (as strata) with individual sampling sites chosen at random within each estuarine area on a monthly basis. The trammel net program was designed to monitor important recreational finfish species over a broad geographic range. Because of size selectivity due to mesh size, the trammel net survey typically caught age 1+ Atlantic croaker, although age 0 were captured during the fall once they were large enough to entangle in the net mesh. While Atlantic croaker were common in the trammel net, their occurrence is highly seasonal, with the months of May through September accounting for 95% or greater of the total annual catch. Therefore, only those months were used to calculate the index. Additionally, not all estuarine strata were sampled equally over the entire time series, so individual differences in CPUE between strata were not factored into the index. In 2012 there was a 52.9% decrease in CPUE from 2011 (1.14 fish per set down from 2.23 fish per set), to a similar level seen in 2010 (Fig. 2). Annual CPUE values ranged from 0.39 to 3.60 fish per set and catch effort in 2012 was just below the long term mean of 1.46 fish per set.

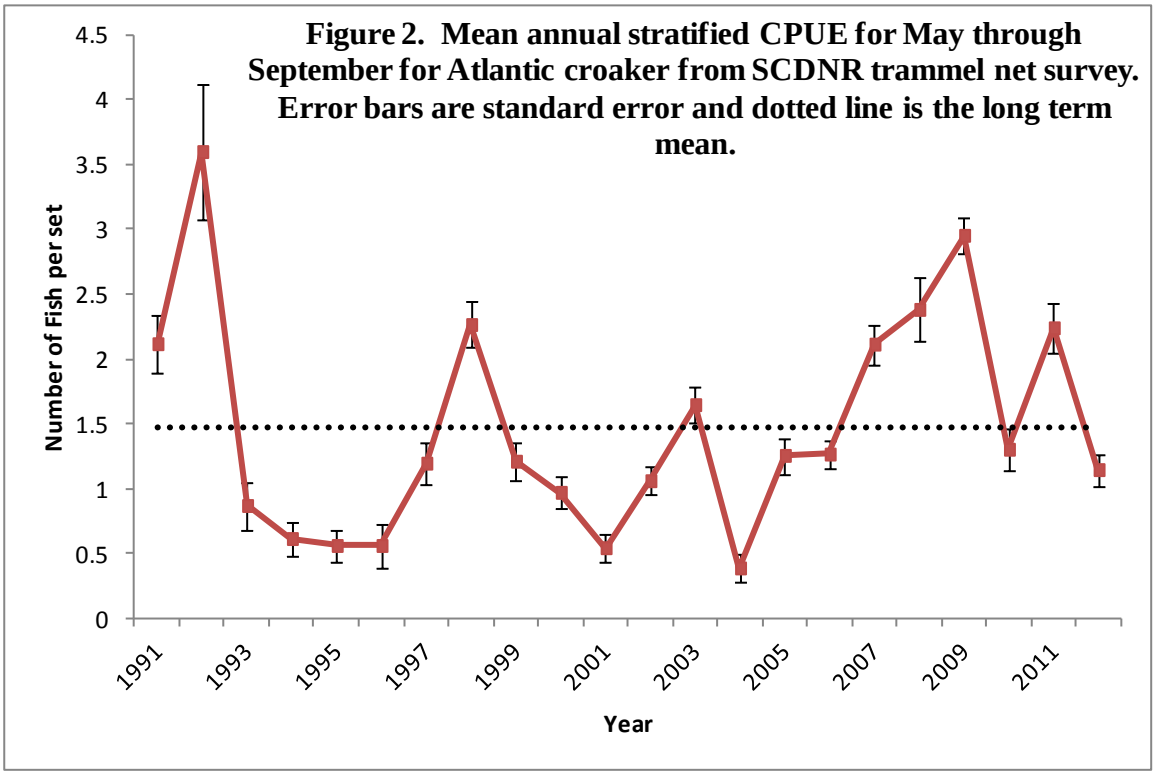


Figure 2. Mean annual stratified CPUE for May through September for Atlantic croaker from SCDNR trammel net survey. Error bars are standard error and dotted line is the long term mean.

The third survey was an electroshock survey conducted in low salinity brackish and tidal freshwater portions of different South Carolina

estuaries. The electroshock program monitors the abundance and trends of recreationally important finfish in these low salinity estuarine areas using a monthly random stratified design of 6 estuarine strata. The majority of croaker captured by the electroshock survey were juveniles (< 100 mm standard length), with stratified mean catch effort data (CPUE) being equivalent to the number of fish captured per set. The standard electroshock set sampled 0.25 mile of shoreline. Since the electroshock survey captured primarily juvenile croaker (fish < 100 mm standard length), the mean annual CPUE values serve as a proxy index for relative juvenile abundance. The majority of juveniles (89.5%) were captured during the peak recruitment months (Feb-July), so the index was calculated using only those months. The CPUE index value for 2012 decreased almost 50% from 2011 (0.43 in 2012 from 0.81 in 2011) and equaled one other year (2003) as the lowest values in the index.

Overall mean annual CPUE ranged from 0.43 to 2.57 for the entire time series with a long term mean of 1.13 fish per set (Fig. 3). The other years where significant drops in CPUE were observed included 2003 (-76.2%) and 2009 (-80.1%). 2012 represents the fourth year in a row where annual CPUE remained below the long term mean for the series.

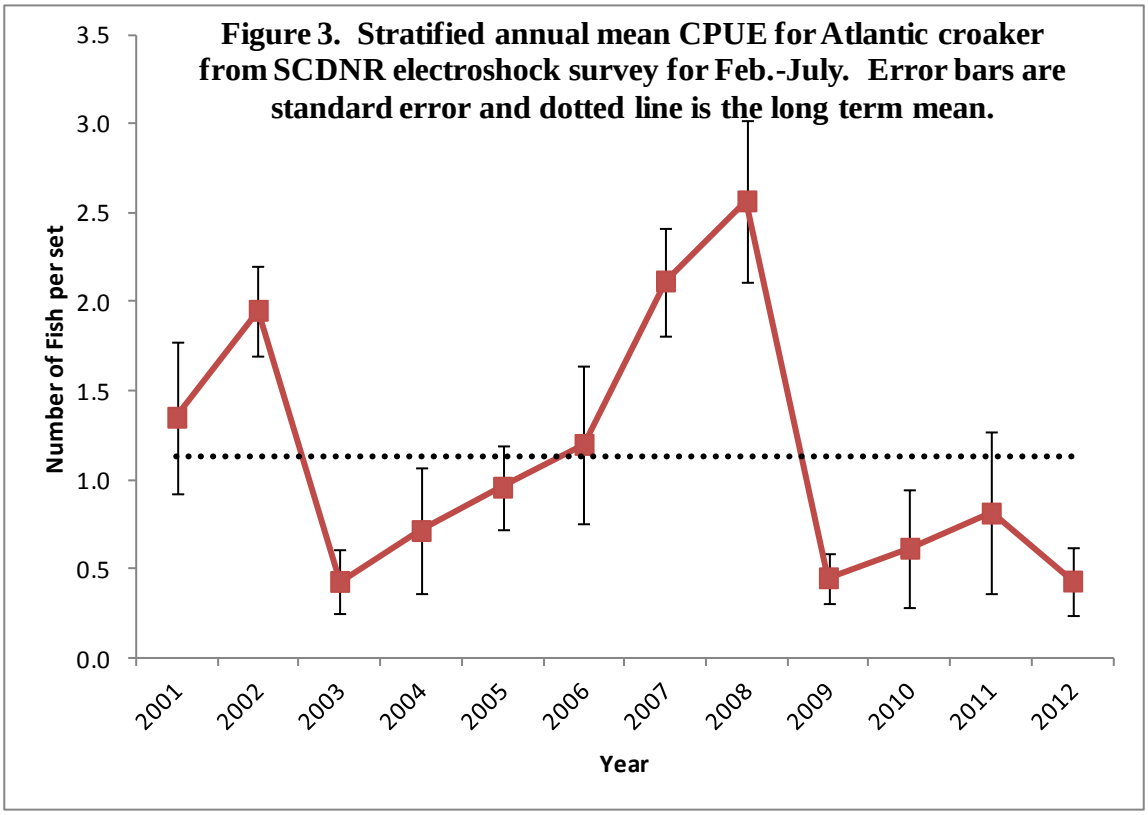


Figure 3. Stratified annual mean CPUE for Atlantic croaker from SCDNR electroshock survey for Feb.-July. Error bars are standard error and dotted line is the long term mean.

Table 2. South Carolina Atlantic croaker CPUE indices (weight or number of Atlantic croaker per set or tow) for fishery independent surveys from 1990 to 2012. All CPUE values are stratified (arithmetic) mean annual CPUE based on randomly stratified sampling protocols.

Year	SEAMAP (Fall) Weight (kg/Tow)	SEAMAP (Fall) Number (Num/Tow)	SEAMAP-SC (Fall) Weight (kg/Tow)	SEAMAP-SC (Fall) Number (Num/Tow)	Trammel Survey Number/Set	Electroshock Suvey Number/Set
1990	12.18	243.9	9.94	240.9		
1991	29.71	452.1	9.23	166.1	2.11	
1992	25.69	424.0	10.85	179.8	3.60	
1993	13.36	209.1	4.14	62.6	0.87	
1994	13.15	237.7	3.14	52.9	0.61	
1995	9.15	150.5	3.85	62.4	0.56	
1996	5.32	117.4	4.83	92.6	0.56	
1997	4.18	73.7	1.44	33.7	1.19	
1998	11.51	238.7	4.56	99.4	2.26	
1999	11.10	221.1	5.44	105.9	1.21	
2000	10.10	171.3	8.03	175.4	0.97	
2001	11.28	236.1	2.49	81.0	0.54	0.66
2002	10.56	166.4	5.98	135.2	1.06	1.05
2003	14.85	220.6	6.93	89.1	1.64	0.25
2004	21.54	353.5	5.70	96.9	0.39	0.46
2005	18.64	365.0	6.84	139.5	1.25	0.59
2006	18.68	378.2	7.90	150.1	1.26	0.63
2007	11.93	174.1	5.53	92.5	2.11	1.23
2008	15.82	270.5	19.06	228.2	2.38	1.37
2009	16.33	332.2	18.47	462.4	2.95	0.27
2010	16.33	314.9	8.94	169.6	1.30	0.37
2011	40.30	827.6	25.08	518.7	2.24	0.51
2012	28.69	476.9	15.83	279.4	1.14	0.28

C. Atlantic Croaker Regulations in Effect:

Section 50-5-1915 requires for-hire boats to maintain a logbook of catch data.

Section 50-5-380 of the South Carolina Code gives the Department authority to require wholesale dealers and others to submit mandatory

landings reports on a monthly basis. This information forms the basis for the state's commercial landings monitoring. Additionally, Section 50-5-360 requires that anyone, who buys, receives or handles any live or fresh saltwater fish or any saltwater fishery products taken or landed in the state must obtain a wholesale dealers license. South Carolina currently has no specific laws pertaining to size or possession limits for Atlantic croaker in state waters.

D. Atlantic Croaker Harvest:

Currently, there is no directed commercial fishery for Atlantic croaker in South Carolina and the only reported landings come from incidental shrimp trawl by-catch data. The reported landings for 2012 were low at 62 lbs reported.

The reported total recreational harvest of Atlantic croaker for South Carolina for 2012 from the MRIPS was 10,050 lbs (PSE = 36.7%). However, while there was a 95% decrease in landings, the South Carolina portion of the total Atlantic coast landings was still above the 3 year average landings required for *de minimis* status.

E. Habitat Recommendations – Not applicable.

IV. PLANNED ATLANTIC CROAKER MANAGEMENT PROGRAMS

A. Regulations in Effect:

No regulatory changes are anticipated for croaker in 2012.

B. Monitoring programs that will be performed:

No new programs dedicated to the monitoring of this species are planned at this point however all previously described sampling activities will continue.

C. Changes from the Previous Year:

None.

V. PLAN SPECIFIC REQUIREMENTS – Not applicable.

GEORGIA
DEPARTMENT OF NATURAL RESOURCES
COASTAL RESOURCES DIVISION

MARK WILLIAMS
COMMISSIONER

A.G. 'SPUD' WOODWARD
DIRECTOR

June 27, 2013

Kirby Rootes-Murdy
FMP Coordinator
Atlantic States Marine Fisheries Commission
1050 N. Highland St., Suite 200 A-N
Arlington VA, 22201

Kirby:

Please find enclosed Georgia's 2012 Atlantic Croaker Compliance Report. The State of Georgia requests *de minimis* status for the Atlantic croaker commercial and recreational fisheries. Please let me know if you require additional information.

Sincerely,

Dawn Franco

Dawn Franco
Marine Fisheries Section

cc: Pat Geer

ONE CONSERVATION WAY | BRUNSWICK, GEORGIA 31520-8686
912.264.7218 | FAX 912.262.3143 | WWW.COASTALGADNR.ORG

State of Georgia Atlantic croaker Compliance Report for the Year 2012

1. Introduction: Summary of the year: highlight any significant changes in monitoring, regulations, or harvest.

The minimum size limit for Atlantic croaker landed in Georgia was eight (8) inches total length for both commercial and recreational fisheries. The bag/creel limit was 25 fish per person per day for both fisheries except that there was no quantity limit for trawlers harvesting shrimp for human consumption. The season was open year round for both.

Commercial harvest of Atlantic croaker in Georgia was limited to sales of fish caught within the recreational size and bag limit. During 2012, less than three dealers reported landings thereby making that information confidential. Pursuant to the requirement in Section 4.2.6, the Georgia Department of Natural Resources, Coastal Resources Division (CRD) has a trip ticket system for commercial fisheries that conforms to ACCSP standard data element requirements. Through this program, commercial harvest will be continuously monitored.

The Atlantic croaker was not ranked among the top species targeted by recreational anglers in Georgia. From 2008-2012, only ~0.60 % of the average ~622,059 directed trips in Georgia are for croaker. However, recreational harvest will continue to be monitored through the National Marine Fisheries Service's (NMFS) Marine Recreational Information Program (MRIP). CRD has been the state sub-contractor for the intercept survey since 2000.

The Marine Sportfish Population Health Survey (MSPHS) used a variety of sampling gear including trammel nets, gill nets, and hook and line to collect fishes of recreational importance from two Georgia estuaries. During 2012, 373 trammel and gill net sets resulted in the capture of 158 Atlantic croaker.

The Ecological Monitoring Survey continues to monitor estuarine finfish data as part of the monthly trawl surveys in six Georgia estuaries. In 2012, 493 trawls were conducted capturing 7508 croaker with a total weight of 112.69 kg.

2. Request for *de minimis*, where applicable.

There were no Atlantic croaker landings reported by Georgia dealers in 2012. The most recent three-year (2009, 2010, and 2011) coastwide average landings was 14.6 million pounds (Table 1). The State of Georgia requests *de minimis* status for the Atlantic croaker commercial fisheries based on Georgia's reported landings of less than 1,000 pounds.

Table 1. Atlantic Croaker, NMFS Commercial Landings Query, Atlantic Coastwide	
Year	Pounds
2009	15,887,616
2010	16,148,333
2011	11,895,004
GRAND TOTALS:	43,930,953
3-YR AVERAGE	14,643,651
2012 coastwide commercial landings were not available at the time of reporting.	

The three-year average of Atlantic croaker recreational landings along the Atlantic coast, as estimated by the NMFS Marine Recreational Information Program (MRIP), was 3.5 million pounds. In contrast, Georgia's coastwide estimated average landings were 15,039 pounds or 0.4% of the Atlantic coastal landings for the same time period (Table 2). The state of Georgia requests *de minimis* status for Atlantic croaker recreational fisheries based on the low average state landings.

Table 2. Atlantic Croaker, NMFS Marine Recreational Information Program (MRIP) Annual Data for Catch Type A+B1 (Harvest), all fishing modes and areas combined.				
	Atlantic Coast		Georgia Coast	
Year	Weight (lbs)	PSE	Weight (lbs)	PSE
2010	4,743,197	13.1	10,067	29.4
2011	2,824,749	11.6	21,548	48.1
2012	2,873,301	12.5	13,503	29.6
3-yr AVERAGE	3,480,416		15,039	
			0.4% of Coastwide landings	

3. Previous calendar year's fishery and management program

a. Activity and results of fishery dependent monitoring.

Finfish Carcass Recovery: The Marine Sportfish Carcass Recovery Project, a partnership with recreational anglers along the Georgia coast, was used to collect biological data from finfish such as red drum, spotted seatrout, southern flounder, sheepshead, and southern kingfish. Chest freezers were located at public access points along the Georgia coast. Each freezer was clearly marked and contained a supply of plastic bags, pencils, and data cards. Anglers placed their filleted fish carcasses in plastic bags along with completed data card in the freezer. CRD personnel collected the carcasses and processed them to determine species, length, sex, and maturity stage when possible. Sagittal otoliths were removed and processed to determine the age of the fish. In 2012, a total of 4,411 fish carcasses were donated through this program.

Even though not on the list of requested species there was 1 Atlantic croaker donated in 2012.

b. **Activity and results of fishery independent monitoring.**

The Marine Sportfish Population Health Survey (MSPHS) was used to collect information on the biology and population dynamics of recreationally important finfish. Two Georgia estuaries were sampled on a seasonal basis using entanglement gear. Specific information collected included: 1) age composition of the stock; 2) size and age at first spawning; 3) ratio of males to females in the stock; 4) movement and/or migration; 5) fishing mortality; 6) growth; and 7) spawning season. To provide age information, otoliths were removed from a size-stratified sub-sample of the catch from select sampling events.

Trammel and Gill Nets: From June to August, young-of-the-year red drum in the Altamaha River Delta and Wassaw estuary were targeted using gillnets to gather data on relative abundance and location of occurrence. From September to November, fish populations in the Altamaha River Delta and Wassaw estuary were monitored using trammel nets to gather data on relative abundance, size composition, and general species composition. Atlantic croaker were measured (CL) and then released (Table 3).

Table 3. Preliminary annual trammel net and gill net data summarized by estuary, including effort, catch-per-unit-effort and length statistics for Atlantic Croaker, 2012.

Gear	Sound	Effort	GM	CPUE	Total N	CL Mean	CL Min	CL Max
Trammel	Wassaw	75	0.02	0.03	2	213.00	168	258
	Altamaha	83	0.17	0.61	51	233.34	197	298
Gill	Wassaw	108	0.29	0.43	46	220.50	143	260
	Altamaha	107	0.36	0.55	59	218.46	115	288

Ecological Monitoring Survey: CRD continually monitored estuarine finfish data as part of the monthly Ecological Monitoring Survey conducted onboard the research vessel Anna. A 40-foot flat otter trawl was towed for 15 minutes through each of 42 stations every month in six Georgia estuaries. In 2012, 493 tows (observations) were conducted totaling 124.05 hours of tow time. A total of 7,508 Atlantic croaker were observed totaling 112.69 kg. Lengths ranged from 10 mm TL to 221 mm TL, with a mean of 112.93 mm TL (Table 4).

Table 4. Atlantic Croaker observed during Ecological Monitoring Surveys.					
Year	2008	2009	2010	2011	2012
Total Number	33,102	31,316	28,061	15,733	7,508
Total Weight (kg)	550.4	546.52	301.6	218.45	112.69
Avg. Length (mmTL)	115.53	123.47	109.82	115.96	112.93
Minimum Length (mmTL)	21	17	10	24	10
Maximum Length (mmTL)	250	250	217	215	221
# of tows (n)	517	511	500	509	493
CPUE (#/15 min tow)	64.03	61.28	56.12	30.91	15.23
Geometric mean	10.43	9.96	7.06	3.36	3.99

c. Copy of regulations that were in effect, including a reference to the specific compliance criteria as mandated in the FMP.

4.1 Recreational Fisheries Management Measures

4.1.1 Recreational Bag and Size Limits - Georgia's current minimum size limit for Atlantic croaker is 8 inches total length with a twenty-five (25) fish bag limit (DNR Rule 391-2-4-.04).

4.2 Commercial Fisheries Management Measures - Trawlers fishing for shrimp for human consumption are exempt from the creel and possession limits for Atlantic croaker; however, the minimum size of eight (8) inches total length does apply. A commercial fishing license is required to sell (O.C.G.A. 27-4-110).

4.2.4 Commercial Gear Restrictions - Hook and line and trawl gear is the only feasible methods for direct harvest of Atlantic croaker in Georgia as gill nets have been banned in state waters since the 1950's, except for shad. There is no directed fishery for Atlantic croaker using either gear.

4.2.6 Data Collection and Reporting Requirements - Georgia is in full compliance with the ACCSP data collection and reporting requirements. Seafood dealers are required to maintain a record and report seafood purchased for commercial harvests in Georgia. Records must be submitted to the Department by the 10th day of the

month subsequent to fishing (O.C.G.A. 27-4-110 and 136 and DNR Rule 391-2-4-.09). Harvesters are required to maintain a logbook of fishing activity but at this time, are not required to report that activity (O.C.G.A. 27-4-118).
4.2.6.1 Vessel Registration System - Any commercial vessel fishing in Georgia waters is required to purchase either a trawler or non-trawler boat license, dependent on fishing practices (O.C.G.A 27-2-8).

4.3 For-Hire Fisheries Management Measures

4.3.1 Bag and Size Limits and 4.3.2 Maximum Size Limit - Georgia for-hire and charter boats, if licensed as commercial fishermen, may harvest and sell their catch, as would other commercial fishermen, however they are restricted to a recreational limits.
4.3.3 Data Collection and Reporting Requirements - If a for-hire captain sells his catch in Georgia, he is subject to the same reporting requirements as dealers and harvesters as noted above.

d. Harvest broken down by commercial (by gear type where applicable) and recreational, and non-harvest losses (when available).

Commercial: No Georgia dealers reported Atlantic croaker landings in 2012.

Recreational: Since the year 2000 CRD has been the contractor for the intercept survey within the NMFS Marine Recreational Information Program (MRIP). In 2012, survey clerks interviewed 1,826 anglers. It is estimated that 299,605 anglers (PSE 8.4) completed 892,417 trips (PSE 10.5). Coastal Georgia residents accounted for 44.2% (132,508 PSE 12.1) of the total anglers. Non-coastal residents accounted for 31.6% (94,660 PSE 16.8) and out of state anglers accounted for the remaining 24.2% (72,437 PSE 19.1). Expanded data are presented in tabular format below.

Table 5. Atlantic Croaker (# fish) expanded NMFS data for Georgia, 2012.

		Number of Angler Trips		A +B1 + B2 Released + Harvest		B2 Released Alive		A+B1 Harvest	
FISHING AREA	MODE	Total	PSE	Total	PSE	Total	PSE	Total	PSE
INLAND	CHARTER	15,663	10.8	1,501	38.9	1,050	48.2	450	64.3
	PRIVATE	469,527	13.8	122,467	25.3	97,468	30.5	24,998	35.8
	SHORE	228,634	23.9	66,010	43.3	59,044	47.5	6,966	77.8
INLAND Total		**713,824**	11.9	**189,978**	22.2	**157,563**	25.9	**32,415**	32.3
OCEAN (<= 3 MI)	CHARTER	1,144	23.6	0		0		0	
	PRIVATE	14,793	32.6	0		0		0	
	SHORE	147,617	26.7	15,912	43.9	9,926	56.4	5,986	69.7
OCEAN (<= 3 MI) Total		**163,554**	24.3	**15,912**	43.9	**9,926**	56.4	**5,986**	69.7
OCEAN (> 3 MI)	CHARTER	3,112	18.7	0		0		0	
	PRIVATE	11,926	36.1	0		0		0	
OCEAN (> 3 MI) Total		**15,038**	28.9	**0**		**0**		**0**	
Grand Total		**892,417**	10.5	**205,890**	20.8	**167,488**	24.6	**38,402**	29.3

e. Review of progress in implementing habitat recommendations.

With over 2,344 linear miles of coastline and tidal marsh covering 378,000 acres, the entirety of Georgia's coast provides habitat for Atlantic croaker. CRD is involved in activities related to many of the recommendations in Section 4.3, but without a specific focus on Atlantic croaker. The Georgia Coastal Management Program (GCMP) provides an overarching entity under which many activities related to habitat protection are conducted both by CRD staff and others who are funded with Coastal Incentive Grants.

CRD entered into an oyster reef restoration & enhancement partnership with the University of Georgia's Marine Extension Service. Oyster reefs are considered essential fish habitat and their enhancement has numerous benefits. During this report period, oyster cultch material and oak limb bundles have been deployed in the inter-tidal zone to restore/enhance one Recreational Shellfish Harvest Area in Glynn County Georgia. Oyster spat will attach to the cultch material, as well as already recruited oysters, causing these habitats to increase in size and enhance ecological value for years to come.

Georgia's "Marshland Protection Act" requires permits from the Coastal Marshlands Protection Committee and the U.S. Corps of Engineers for all activities that alter the marsh. This includes oyster restoration / enhancement projects. Thus, the appropriate federal and state regulatory agencies are informed of all restoration / enhancement sites. This minimizes the potential of negative impacts to critical habitats from other permitted activities.

During 2012, the Coastal Marshlands Protection Committee issued 11 new permits for structures such as commercial, industrial and community docks. CRD also issued 26 bank stabilization permits and 118 revocable licenses for private docks.

4. Planned management programs for the current calendar year

a. Summarize regulations that will be in effect. (Copy of current regulations if different from 3c.)

There are no planned changes to Atlantic croaker regulations in 2013. The eight (8) inch minimum limit and twenty-five fish bag limit will remain in effect for recreational fisheries. A commercial fishing license is required in order to sell Atlantic croaker and the eight (8) inch minimum size applies but there is no quantity limit for food shrimp trawlers.

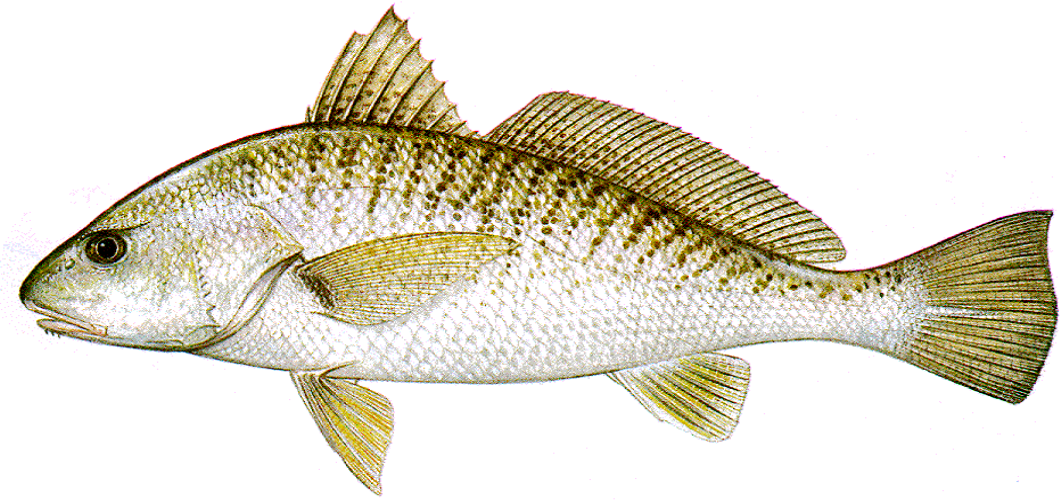
b. Summarize monitoring programs that will be performed.

Monitoring described in Section III will continue throughout 2013.

c. Highlight any changes from the previous year.

There were no changes from the previous year.

The 2013 Atlantic States Marine Fisheries Commission Compliance Report for Atlantic croaker, *Micropogonius undulates,* on Florida's Atlantic coast



Joseph Munyandorero
Florida Fish and Wildlife Conservation Commission
Fish and Wildlife Research Institute
St. Petersburg, Florida

May 24, 2013

Executive Summary

In 2012, Florida's total harvests of Atlantic croaker on the Atlantic coast were 361,7436lbs, of which 81% were from the recreational fishery.

Average recreational harvests of Atlantic croaker on Florida's Atlantic coast for 2010-2012 represented 5.1% of the 2010-2012 average coast wide recreational harvests. Average commercial landings of Atlantic croaker Florida's Atlantic coast during 2009-2011 and 2009-2012 represented 0.26% and 0.31%, respectively, of the 2009-2011 coast wide commercial landings. Consequently, the Florida Fish and Wildlife Conservation Commission requests continuation of the State of Florida's *de minimis* status for the Atlantic croaker commercial fishery on the Atlantic coast.

Preliminary estimates of commercial landings and effort for Atlantic croaker in 2012 amounted to 69,378 pounds from 2,063 trips. These landings were mostly taken from inland waters (23%) and the federal EEZ (71%) using gillnets (55%), cast nets (11%), hook-and-lines (19%), and trawls (15%).

In 2012, evaluation of trip limit and quota compliance was not made for the Atlantic croaker commercial fishery on the Atlantic coast of Florida, because such management regulations are nonexistent. However, the limitation on the use of entangling gears since 1995 subsequently resulted in substantial reductions of Atlantic croaker commercial landings on the east coast of Florida.

There are no bag and minimum size limits for Atlantic croaker caught by commercial fishers on Florida's Atlantic coast. However, comparison with the most conservative size limit of Maryland (i.e., 9 inches or 228. 6 mm TL) indicated that the size of most fish caught by commercial fishermen was well above 228.6 mm since 1995. In 2012, 39 fish out of 43 fish measured were larger than 228.6 mm TL. However, this observation cannot be regarded as representative of the fishery because the sample size was small and the fish were mainly sampled from landings by hook-and-line.

In 2012, an estimated number of 589,642 Atlantic croaker weighing approximately 292,365 pounds were kept by anglers on Florida's east coast. The ratio "fish released alive /fish kept" was 1.09.

In 2012, evaluation of compliance with the minimum size limit and daily recreational bag limit was not made because there are no such management regulations for Atlantic croaker caught by anglers on the east coast of Florida. However, the size of most fish sampled from the recreational fishery until 2011 was below 228. 6 mm.

The head boat fishery for Atlantic croaker on the east coast of Florida landed only 140 pounds of Atlantic croaker in 2011 (recent year of the harvest time series).

There are no size and bag limits for Atlantic croaker caught by the head-boat fishery on Florida's Atlantic coast. However, most of the fish sampled from this fishery exceeded Maryland's size limit of 9 inches in the most recent years.

Seine-based IOAs and trawl-based IOAs for YOY Atlantic croaker peaked in 2001, 2005, or 2010. IOAs for sub-adult/adult Atlantic croaker trended upward during 2001-2011 but dropped in 2012.

No management programs are planned for the current year.

I. INTRODUCTION

Atlantic croaker (*Micropogonius undulates*) occur in the Atlantic coastal waters from the Gulf of Maine to Argentina. This species is one of the most abundant inshore demersal fish along the US Atlantic coast supporting important recreational and commercial fisheries especially from New York to North Carolina. On Florida's Atlantic coast, Atlantic croaker are seldom found south of the Indian River Lagoon.

There are no regulations directed at Atlantic croaker in Florida. However, the ban of entangling gears in Florida enacted during the mid-1990s may have had direct effects on Atlantic croaker harvests by commercial fishermen. This report provides with an account of the response to such regulations of Atlantic croaker recreational and commercial fisheries on Florida's Atlantic coast in 2012. Because of the lack of Florida-specific management regulations for Atlantic croaker, information in this respect is compared with those documented in ASMFC (2005).

Total harvests of Atlantic croaker in the commercial and recreational sectors for 2012 amounted to 361,743 pounds (Table 1; Fig. 1). They represented 187% of the 1995-2011 average harvest. In general, total harvests of Atlantic croaker on Florida's Atlantic coast varied without trend since 1995, averaging about 193,359 pounds annually.

The proportion of Atlantic croaker harvested by the recreational fishery varied without trend over years at above 55% (Fig. 1). Since 1995, that proportion varied between 57 (in 2010) and 96%. Head boat-fishery was nearly nonexistent during 1985-2012.

II. REQUEST FOR *De Minimis* STATUS

To determine whether the State of Florida met the *de minimis* requirements for Atlantic croaker fisheries on the Atlantic coast, the commercial landings for 2009-2011 or 2009-2012 and the recreational harvests (Type A+B1, pounds) for 2010-2012 were used (Table 2). The Atlantic coast wide commercial landings came from the Atlantic Coastal Cooperative Statistics Program (ACCSP)'s Data Warehouse. The commercial landings from Florida's Atlantic coast were extracted from the state of Florida's Marine Fisheries Information System or "trip tickets" (TTK) program. The Atlantic coast wide and Florida's Atlantic coast recreational landings (Type A+B1) were extracted from the NMFS' Marine Recreational Fisheries Statistics Survey (MRFSS).

The average of Atlantic croaker recreational harvests on Florida's Atlantic coast for 2010–2012 represented 5.1% of the 2010–2012 coast wide average recreational harvests. The average of Atlantic croaker commercial landings on Florida' s Atlantic coast during 2009-2011 and 2009-2012 represented 0.26% and 0.31%, respectively, of the 2009-2011 coast wide average commercial landings. The Florida Fish and Wildlife Conservation Commission (FWC) requests continuation of Florida' s *de minimis* status for the Atlantic croaker commercial fishery on the east coast of Florida.

III. PREVIOUS CALENDAR YEAR'S FISHERY AND MANAGEMENT PROGRAM

A. Activity and Results of Fishery Dependent Monitoring Program

Commercial Fishery

Description of 2012 Fishery

The commercial fishery data came from the State of Florida's TTK system. The landings for 2012 were preliminary and are subject to change.

Preliminary Atlantic croaker commercial landings in 2012 amounted to 69,378 pounds from 2,063 trips. They were 54% higher than those of 2011 (Fig. 2; Table 3). The Atlantic croaker commercial landings declined steadily since 1988 but varied without trend, at low levels, during 1995-2005 (average = 23,000 pounds$\times$year^{-1}). The number of trips varied without trends prior to 1995 and during 1995-2005, averaging 3200 trips$\times$year^{-1} and 1376 trips$\times$year^{-1}, respectively. Both commercial landings and the number of trips increased slightly in most recent years.

In 2012, the commercial landings and trips were lowest during winter months and July-August (Fig. 3).

The number of primary fishermen (i.e., those who landed more than 100 pounds a year) varied between 97 and 175 during 1987-1994. Since 1995, they varied between 23 and 85 fishermen. Their preliminary estimate in 2012 was 80. No fisherman landed more than 10,000 pounds a year since 1995. Between 1995 and 2012, primary fishermen represented 10-31% of all fishermen, made 34-66% of trips and contributed for 66-94% of landings. In 2012, these percentages were 23.5%, 55%, and 94%, respectively.

Based on dealer records for 2012, the share of Atlantic croaker landed on the east coast of Florida was 71% for the federal EEZ, 23% for inland waters, and 6% for the state territorial sea, where 30%, 55%, and 15% of trips were made, respectively. Atlantic croaker landed in 2012 (Table 4; Fig. 4) were caught using cast nets (11%), gillnets (55%), hook-and-lines (19%), and trawls (15%). Compared with 2011, the commercial landings in 2012 declined for cast nets (-6%) but they increased by 45%, 92%, and 348% for gill nets hook and lines, and trawls, respectively. Cast-netting, gillnetting, and hook-and-lining accounted for 43%, 27%, and 28% of trips made in 2012, respectively (Table 4; Fig. 5).

Trip Limit and Quota Compliance

There are no commercial trip or vessel limit and annual commercial quota established for Atlantic croaker on the east coast of Florida either by FWC or by the Atlantic States Marine Fisheries Commission (ASMFC). However, the limitation on the use of entangling gears since 1995 resulted in substantial reductions of annual Atlantic croaker commercial landings on the east coast of Florida in subsequent years (Fig. 2).

Size Limit

There is no minimum size limit for Atlantic croaker caught by commercial fishermen on the east coast of Florida. However, compared with the most conservative size limit for Maryland (9 inches or 228. 6 mm TL; ASMFC, 2005), the size distributions of Atlantic croaker measured in the commercial fishery on the Atlantic coast of Florida during 1992-

2012 indicate that, apart from 1997, 2000-2002, and 2007, most fish sizes were above 228.6 mm during the last fifteen years (Fig. 6). The median total length (TL) of fish showed a slightly increasing linear trend during the period of record, and also was above 228.6 mm TL in most years. In 2012, 39 fish out of the 43 fish measured were larger than 228.6 mm TL. However, this observation cannot be regarded as representative of the fishery because the sample size was small and the fish were mainly sampled from landings by hook-and-line.

Recreational Fishery

Description of 2011 Fishery

Estimates of the recreational fishery data came from the NMFS' MRFSS website. It was impossible to evaluate the compliance with the bag and size limits for any one year. In fact, no management regulations are directed at Atlantic croaker recreationally harvested on the east coast of Florida. Moreover, lack of intercept data in 2012 did not permit to update non-website recreational fishery statistics in that year.

The time series of Atlantic croaker recreational harvests, standardized numbers of trips (estimated by dividing the total number of fish caught – Type A+B1+B2 – each year by the annual standardized total catch rates, derived themselves from a GLM for catch rates), and directed trips made on Florida's Atlantic coast broadly followed a similar pattern (Fig. 7; Table 5).

The recreational harvests (Type A+B1) of Atlantic croaker on the east coast of Florida averaged about 2,436,500 fish and 1,265,900 pounds annually during 1982-1987. They stabilized at annual averages of about 399,000 fish and 209,000 pounds thereafter (Fig. 7; Table 5). The lowest recreational harvests of Atlantic croaker over 1982-2012 were observed during 1996-1998 and 2002-2003. In 2012, the anglers' harvest of Atlantic croaker on Florida's Atlantic coast was estimated at a number of 589,642 weighing approximately 292,365 pounds. The number and weight of Atlantic croaker harvested in 2012 were 82% and 76% larger than the average harvests during 1996-2011 (i.e., 323,684 fish and 165,953 pounds, respectively). The ratio of released fish to those kept by anglers trended up over years, varying between 0.06 and 2.4 fish released for 1 fish kept (Fig. 8). In most years, less than one fish was released alive for every Atlantic croaker kept by anglers. In 2012, the ratio "fish released alive/fish kept" was 1.09.

Size and Bag limits

There are no management regulations about the size and bag limits for the recreational fishery directed at Atlantic croaker on the east coast of Florida. However, two aspects can be noted about the sizes of Atlantic croaker measured in the recreational fishery (Fig. 9). First, the annual size distributions of Atlantic croaker have somehow changed, perhaps due also to changes in the sampling designs. Second, the annual median sizes of fish showed a slight linear increase. Except in 1985 and 2010, fish median sizes and the total-length-intercept for their long-term trend were well above the size limits documented in ASMFC (2005).

Head boat fishery

Description of 2011 Fishery

Head-boat fishery for Atlantic croaker on the Atlantic coast of Florida has been insignificant (Fig. 1; Table 1). Head-boat fishery data were available during 1981-2011. In 2010, this fishery landed about 140 pounds of Atlantic croaker.

Size and Bag limits

There are no management regulations about the size and bag limits for Atlantic croaker caught by the head-boat fishery on the east coast of Florida. Biological samples from this fishery have been available during 1972-2011, but a few or no Atlantic croaker have been measured each year on Florida's Atlantic coast (Table 6). The few Atlantic croaker targeted by the head-boat fishery on Florida's Atlantic coast exceeded Maryland's size limit of 9 inches in the most recent years.

B. Activity and Results of Fishery Independent Monitoring (FIM) Program

The FWC-Fish and Wildlife Research Institute (FWRI)'s FIM program initiated sampling activities on estuarine, bay and coastal systems of the Florida Atlantic at northern Indian River Lagoon in 1990, southern Indian River Lagoon in 1997 and northeast Florida (Jacksonville study area) in 2001. The sampling gears commonly used were a 21.3-m center bag seine, a 6.1-m otter trawl and a 183-m haul seine. These gears were designed to collect, respectively, juvenile and sub-adult fishes (especially young-of-the-year, YOY) in shallow areas (< 1.8 m), juvenile, sub-adult and adult fish in deep waters (1 – 7.6 m) and sub-adult and adult fish in shallow waters (< 2.5 m) along shorelines. Additional sampling methods and strata are provided in various FWC/FWRI FIM annual data summary reports.

Indices of abundance (IOAs) data for juvenile (YOY) Atlantic croaker (< 41 mm standard length, SL) were available from 21.3-m seine and 6.1-m trawl samples. They were examined to assess recruitment along Florida's east coast (northeast Florida and the northern Indian River Lagoon). Habitats in these estuaries suitable for recruitment of Atlantic croaker were primarily sampled from December-April, a period considered as general recruitment season for Florida's east coast. IOAs data for large juvenile and sub-adult/adult Atlantic croaker (SL: 6-10 inches, i.e. >149 mm SL; White and Chittenden, 1977) were collected using 183-m haul seines in the previous estuarine systems and also in the Southern Indian River Lagoon. These indices were derived by including all fish that were greater than 149 mm SL collected between May and October. For the YOY IOAs, analyses covered 1996-2011. IOAs for fish at least 149 mm SL were derived over 2001-2011, just to standardize both the time periods and the gears used between the three labs located along Florida's Atlantic coast (i.e., Jacksonville, Indian River, and Tequesta).

Standardized catch rates for juvenile Atlantic croaker were estimated using a Generalized Linear Model (GLIM) with either the Poisson or Negative binomial error distribution to analyze observed abundance data. The median value for the distribution (generated through Monte Carlo simulations) of the back-transformed values of LSMs

provided annual indices. The same GLIM approach was used to derive IOAs for adult Atlantic croaker caught each month in the 183-m haul seines.

Seine-based IOAs (1996-2012) and trawl-based IOAs (2002-2012) for YOY Atlantic croaker suggested strong year-classes in 2001, 2005, and 2010 (Figs. 10 and 11; Table 8). IOAs for sub-adult/adult Atlantic croaker trended upward during 2001-2011 but dropped in 2012 (Fig. 12; Table 8).

C. Copy of regulations that were in effect, including a reference to the specific compliance criteria as mandated in the FMP.

N/A – Atlantic croaker is not a regulated saltwater species in Florida. However, it is generally believed that the limitation on the use of entangling gears in state waters and the requirement on the possible use of nets measuring up to 500 sq ft with stretched-mesh size up to 2 inches have substantially affected any harvest by commercial fishermen.

D. Harvest broken down by commercial and recreational and non-harvest losses.

See Table 1 and Figure 1 for the cumulative harvest of Atlantic croaker on the Atlantic coast of Florida by fishery.

See Table 3 and Figure 2 for the commercial landings and effort and Table 4 and Figures 4 and 5 for commercial landings and effort by gear type.

See Table 5 and Figure 7 for recreational harvests in numbers and weight.

E. Review of Progress in implementing habitat recommendations.

N/A

IV. PLANNED MANAGEMENT PROGRAMS FOR THE CURRENT YEAR

No management programs are planned for the current year.

ACKNOWLEDGENMENT - Dr. Richard Paperno developed the fishery-independent indices of relative abundance for young-of the-year and sub-adult/adult Atlantic croaker on the Atlantic coast of Florida.

5.0 LITERATURE CITED

ASMF, 2005. Amendment 1 to the interstate fishery management plan for Atlantic croaker. Fishery Management Report 41. 92 p.

White, M. L. and M.E. Chittenden, Jr. 1977. Age determination, reproduction and population dynamics of the Atlantic croaker, *Micropogonias undulatus*. Fish. Bull., US 75:109-123.

Table 1 - Summary of Atlantic croaker harvests (pounds) by fishery sector on the Atlantic coast of Florida, 1985-2012. The recreational harvests are fish kept by anglers (Type A+B1). The 2012 recreational and commercial harvests were preliminary and are subject to change. The 2012 head-boat harvests were not available.

	Commercial landings (lbs)	Recreationl landings (Type A + B1; lbs)	Head boat landings (lbs)	Total lbs
1985	153,803	684,449		838,252
1986	173,531	2,783,651		2,957,182
1987	217,932	1,005,052	23	1,223,007
1988	140,033	316,899	12	456,944
1989	95,021	268,335	16	363,372
1990	104,402	127,526		231,928
1991	56,739	460,454		517,193
1992	79,040	407,671	172	486,883
1993	52,031	180,517	35	232,583
1994	96,018	337,474	1	433,493
1995	22,879	301,918		324,797
1996	26,045	50,038		76,083
1997	36,577	113,095	1	149,673
1998	26,418	141,755		168,173
1999	26,824	231,694	2	258,520
2000	37,953	242,914	6	280,873
2001	14,831	320,487	8	335,326
2002	17,191	117,880		135,071
2003	16,348	79,397		95,745
2004	11,413	155,105	1	166,519
2005	16,520	118,587		135,107
2006	30,272	111,401		141,673
2007	27,028	158,054	8	185,090
2008	31,560	223,699	52	255,311
2009	32,313	221,032	36	253,381
2010	36,960	48,843	31	85,834
2011	44,932	194,848	140	239,920
2012	69,378	292,365		361,743

Table 2-Annual recreational (Type A+B1) and commercial landings (lbs) used to determine the *de minimis* status for the state of Florida with regard to Atlantic croaker fisheries on Florida's Atlantic coast. Commercial landings for 2012 were preliminary for the state of Florida; they were not available for other Atlantic coastal states. Florida's and coastwide recreational landings in 2012 were preliminary.

	Coastwide commercial landings (lbs)	Florida's commercial landings (lbs	Coastwide recreational landings (Type A+B1, lbs)	Florida's recreational landings (Type A+B1, lbs)
2009	15,530,099	32,313		
2010	14,944,113	36,960	4,743,197	48,843
2011	14,048,201	44,932	2,824,749	194,848
2012		69,378	2,873,301	292,365
Average	14,840,804	38068*	3,480,416	178,685
		45896**		
(Florida's average landings/coastwide average landings)x100		0.26%***		5.13%
		0.31%****		

* Estimated using landings reported during 2009-2011. ** Estimated using landings reported during 2009-2012.
Estimated using averages of coastwide and Florida's commercial landings during 2009-2011 * Eistimated using averages of coastwide commercial landings during 2009-2012 and of Florida's commercial landings during 2009-2012.

Table 3 - Commercial landings (pounds) and number of trips for Atlantic croaker on the east coast of Florida, 1985-2012. Estimates for 2012 were preliminary and are subject to change.

	Landings (lbs)	Trips
1985	153,803	3,163
1986	173,531	3,351
1987	217,932	3,505
1988	140,033	2,968
1989	95,021	2,865
1990	104,402	3,407
1991	56,739	3,188
1992	79,040	4,074
1993	52,031	2,405
1994	96,018	3,170
1995	22,879	1,262
1996	26,045	1,391
1997	36,577	1,441
1998	26,418	1,120
1999	26,824	1,433
2000	37,953	1,640
2001	14,831	1,163
2002	17,191	1,400
2003	16,348	1,653
2004	11,413	1,305
2005	16,520	1,331
2006	30,272	1,578
2007	27,028	1,704
2008	31,560	2,100
2009	32,313	2,215
2010	36,960	1,685
2011	44,932	1,781
2012	69,378	2,063

Table 4 - Florida's Atlantic coast commercial landings (pounds) and trips made by gear type for Atlantic croaker, 1984-2012. The 2012 estimates were preliminary and are subject to change. Gear-specific records prior to 1991 were unavailable. * Not indicated for confidentiality purposes.

Landings

	CAST NET	GIG/SPEAR	GILL NET	HOOK AND L	OTHER	TRAMMEL	TRAWL	UNKNOWN	Grand Total
1984								5653	5653
1985								153803	153803
1986								173531	173531
1987								217932	217932
1988								140033	140033
1989								95021	95021
1990								104402	104402
1991	1064		10016	2762	343	2702	380	39472	56739
1992	3897		47194	4290	76	16777	946	5860	79040
1993	2897	*	27290	5468	363	12983	1953	1071	52031
1994	1738	*	34239	5226	159	4180	49335	1136	96018
1995	6059		6454	6833	225	460	2802	46	22879
1996	15606	*	92	5414	438		4433	60	26045
1997	15366	*	1406	11574	*		7946	280	36577
1998	8250		3397	14426	*		160	176	26418
1999	7723		1349	16362	121		645	625	26824
2000	11073	11	1396	23169	776		974	554	37953
2001	6856	56	300	6511	378		660	71	14831
2002	5053	*	161	11246	634		95		17191
2003	10749	13	63	5445	15		64		16348
2004	7022		175	3752	458		*		11413
2005	9039		1715	2153	3370		244		16520
2006	7924	*	9351	10101	425		2463		30272
2007	6527		10718	6049	1098		2637		27028
2008	14574	35	4959	5432	2526		4034		31560
2009	11395	82	9090	4548	2704		4494		32313
2010	10020	122	15436	6258	3590		1534		36960
2011	8082	13	26085	6766	1632		2355		44932
2012	7589	116	37917	13009	191		10556		69378

Trips

	CAST NET	GIG/SPEAR	GILL NET	HOOK AND L	OTHER	TRAMMEL	TRAWL	UNKNOWN	Grand Total
1984								361	361
1985								3163	3163
1986								3351	3351
1987								3505	3505
1988								2968	2968
1989								2865	2865
1990								3407	3407
1991	50		616	94	47	294	18	2069	3188
1992	158		2140	130	5	1381	24	236	4074
1993	262	*	1065	153	10	837	24	53	2405
1994	277	*	2204	124	18	373	126	47	3170
1995	441		531	163	20	67	31	9	1262
1996	1171	*	14	166	*		27	9	1391
1997	958	*	71	335	*		61	14	1441
1998	615		92	395	*		10	7	1120
1999	689		80	579	5		54	26	1433
2000	853	8	55	650	21		37	16	1640
2001	738	*	30	344	25		17	6	1163
2002	928	*	15	413	32		10		1400
2003	1296	6	5	339	5		*		1653
2004	989		13	288	14		*		1305
2005	929		123	238	34		7		1331
2006	984	*	259	282	36		16		1578
2007	936		401	290	52		25		1704
2008	1417	4	288	310	50		31		2100
2009	1436	5	426	281	46		21		2215
2010	1031	4	292	295	53		10		1685
2011	967	4	328	415	49		18		1781
2012	888	5	557	569	24		20		2063

Table 5 - Estimated MRFSS numbers and pounds of Atlantic croaker harvested, released alive and caught and estimated standardized total catch rates, standardized and directed numbers of trips made by recreational anglers on the Atlantic coast of Florida (1982-2012). The last three time series were not estimated for 2012 because there were no intercept data in 2012.

Years	Harvests (A+B1, numbers)	released (B2, numbers)	Harvests (A+B1; lbs)	caught (A+B1+B2; #)	Standardized CPUE	Standardized trips	Directed Trips
1982	1,682,619	188,276	754,955	1,870,896	2.3974	780,369	107,473
1983	1,148,228	379,021	510,597	1,527,248	1.5001	1,018,087	186,058
1984	2,781,743	236,432	1,856,600	3,018,173	1.9573	1,541,970	244,051
1985	1,306,955	1,146,583	684,449	2,453,537	2.7553	890,465	115,153
1986	5,118,552	318,511	2,783,651	5,437,064	3.0096	1,806,591	281,197
1987	2,580,728	1,770,697	1,005,052	4,351,424	2.5361	1,715,794	250,783
1988	685,778	200,630	316,899	886,408	2.2102	401,055	97,895
1989	359,417	72,821	268,335	432,238	2.1804	198,240	105,207
1990	304,065	168,143	127,526	472,208	2.4236	194,840	60,377
1991	1,030,115	647,824	460,454	1,677,940	2.9475	569,274	209,143
1992	754,596	251,342	407,671	1,005,939	2.6211	383,784	228,624
1993	304,067	138,875	180,517	442,942	2.1162	209,308	80,500
1994	599,032	331,735	337,474	930,768	2.3855	390,172	92,898
1995	438,076	141,732	301,918	579,808	2.2019	263,325	67,925
1996	116,575	126,299	50,038	242,875	1.6678	145,626	30,359
1997	235,430	116,276	113,095	351,706	2.2916	153,478	39,120
1998	234,361	152,744	141,755	387,105	2.3548	164,393	36,910
1999	403,982	967,894	231,694	1,371,874	2.7997	490,014	104,051
2000	455,871	428,132	242,914	884,002	2.5270	349,823	87,407
2001	426,264	282,461	320,487	708,726	2.4470	289,636	97,650
2002	177,752	217,054	117,880	394,805	1.9359	203,939	53,380
2003	165,459	192,357	79,397	357,815	1.9888	179,915	58,301
2004	415,570	253,952	155,105	669,521	2.4945	268,404	110,914
2005	302,785	293,693	118,587	596,476	2.0624	289,208	74,382
2006	172,586	187,561	111,401	360,148	1.9858	181,363	60,449
2007	310,130	321,559	158,054	631,688	2.1962	287,623	108,626
2008	449,054	596,450	223,699	1,045,504	2.1821	479,124	111,287
2009	438,209	406,821	221,032	845,032	2.7629	305,847	105,955
2010	132,664	188,637	48,843	321,302	1.7276	185,978	69,000
2011	476,292	452,669	194,848	928,961	2.1435	433,375	91,012
2012	589,642	641,570	292,365	1,231,213	-	-	-

Table 6 – Atlantic croaker samples collected from the head-boat fishery on Florida's Atlantic coast, 1989 – 2011. To compare with Maryland's size limit in the recreational sector, the sample sizes are split into fish of size smaller than 9 inches and of size greater or equal to 9 inches.

	Samples with fish		
Year	<9 inch	>=9 inch	Total
1989	3		3
1990	1	1	2
1992	12		12
1993	8		8
1996		1	1
1999	2	2	4
2000	4	1	5
2001	1	2	3
2002		1	1
2004		1	1
2005		12	12
2006		4	4
2008		10	10
2009	2	7	9
2010	1	18	19
2011	1	26	27

Table 8 - Fishery-independent catch in number (No), effort (number of sets), and various statistics derived for the YOY and sub-adult/adult indices of relative abundance (i.e., catch rates, expressed as median number of fish per set) for Atlantic croaker on the east coast of Florida (IRL = Indian River Lagoon; JAX = Jacksonville).

Florida's East Coast Atlantic croaker IOAS - YOY
Do not include northern IRL Zone H prior to 1998; 1998-2001: do not include JAX but all of northern IRL (Zone H added); 2002-2011: include all of nothern IRL and JAX
23.3 - m Bag seines
< 41 mm - SL

Year	No. animals	No. sets	Median	25th	75th	min	max
1996	18	25	1.183	1.014	1.409	0.437	2.458
1997	3	30	0.163	0.110	0.246	0.043	0.832
1998	22	56	0.611	0.527	0.708	0.266	1.238
1999	88	60	1.186	1.103	1.285	0.828	1.582
2000	593	60	3.550	3.441	3.644	3.093	3.971
2001	1745	91	14.278	14.030	14.493	13.031	15.517
2002	1216	243	4.544	4.463	4.625	4.150	5.052
2003	1118	248	3.304	3.234	3.376	3.025	3.591
2004	1335	258	4.224	4.132	4.304	3.839	4.608
2005	10461	290	25.812	25.620	26.016	24.908	26.843
2006	2057	291	4.871	4.789	4.948	4.549	5.239
2007	577	306	1.459	1.422	1.498	1.233	1.645
2008	2514	310	5.846	5.755	5.921	5.444	6.204
2009	1466	310	2.952	2.894	3.014	2.694	3.255
2010	2336	310	4.575	4.499	4.645	4.278	4.859
2011	846	300	1.881	1.834	1.927	1.707	2.084
2012	836	264	2.773	2.706	2.843	2.494	3.033
Total	**27,231**	**3,452**					

Florida's East Coast Atlantic croaker (include all northern IRL and JAX)
IOAs -YOY
6.1 - m trawls
< 41 mm - SL

Year	No. animals	No. sets	Median	25th	75th	min	max
2002	2975	148	10.349	10.214	10.512	9.686	11.085
2003	4922	188	11.908	11.776	12.051	11.290	12.544
2004	4436	204	15.155	14.977	15.301	14.459	15.861
2005	16918	205	41.852	41.605	42.141	40.595	43.139
2006	5469	205	13.230	13.092	13.351	12.770	13.788
2007	3332	205	11.450	11.298	11.586	10.850	12.218
2008	9583	205	26.635	26.427	26.845	25.734	27.588
2009	3282	205	10.275	10.143	10.403	9.706	10.775
2010	21984	205	55.712	55.338	56.065	53.991	57.136
2011	3258	205	12.526	12.362	12.685	11.798	13.184
2012	3691	205	13.202	13.069	13.364	12.619	13.937
Total	**79,850**	**2,180**					

Florida's East Coast Atlantic croaker (include JAX , all northern IRL and southern IRL). IOA - Sub-Adult/Adult
183 - m Haul seines
> 149 mm - SL

Year	No. animals	No. sets	Median	25th	75th	min	max
2001	133	272	0.488	0.459	0.519	0.370	0.616
2002	311	278	1.118	1.073	1.167	0.913	1.301
2003	352	282	1.249	1.202	1.291	1.051	1.517
2004	236	283	0.831	0.799	0.871	0.684	1.034
2005	240	280	0.855	0.824	0.892	0.694	1.045
2006	318	282	1.126	1.087	1.173	0.969	1.367
2007	353	282	1.247	1.206	1.294	1.011	1.488
2008	443	270	1.628	1.575	1.680	1.437	1.943
2009	341	258	1.323	1.279	1.376	1.108	1.537
2010	344	258	1.338	1.286	1.388	1.130	1.589
2011	820	258	3.178	3.099	3.260	2.849	3.532
2012	189	258	0.733	0.698	0.768	0.599	0.910
Total	**4,080**	**2,741**					

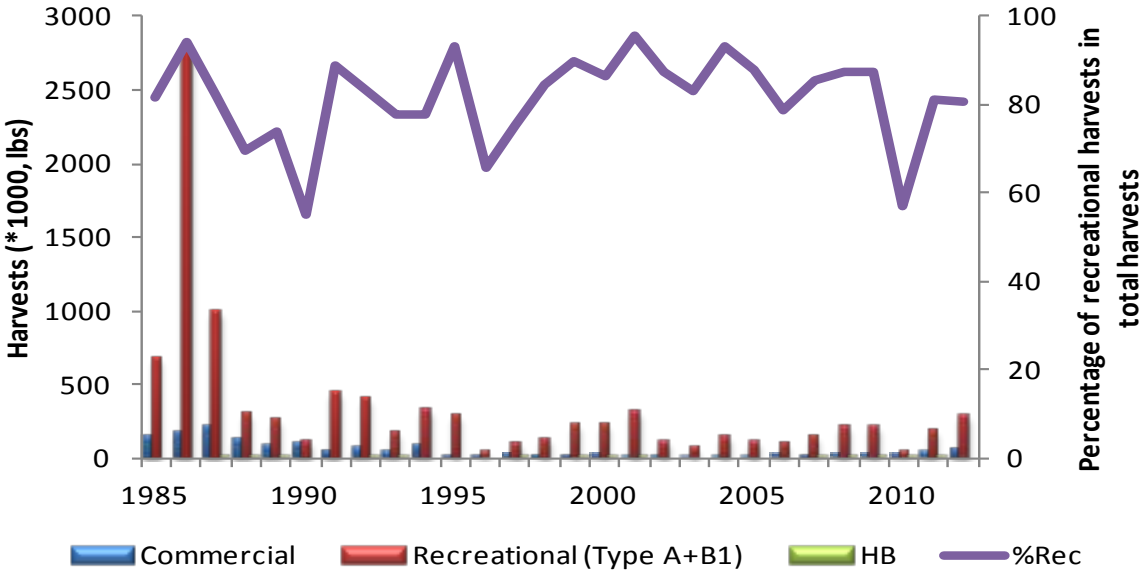


Figure 1 - Total harvests (lbs) and proportions of recreational harvests of Atlantic croaker on Florida's Atlantic coast, 1985-2012. The Recreational harvests are fish kept by anglers (Type A+B1). Harvests for 2012 were preliminary and are subject to change. The contribution of the head boat (HB) fishery in total harvests has been insignificant.

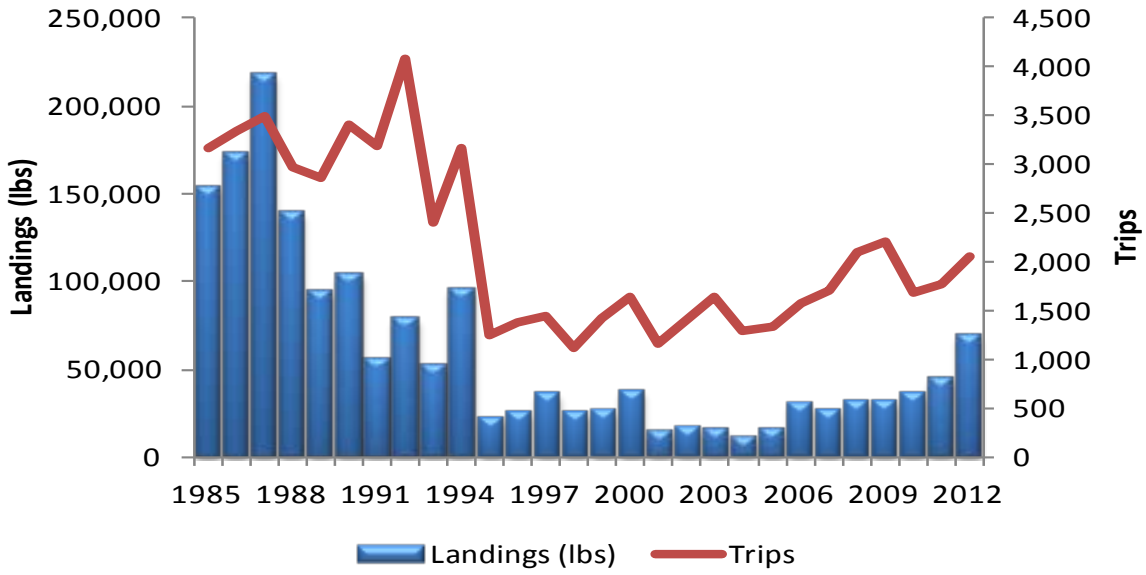


Figure 2 - Commercial landings (lbs) of Atlantic croaker and number of trips reporting Atlantic croaker commercial landings on Florida's Atlantic coast, 1985-2012. The 2012 estimates were preliminary and are subject to change.

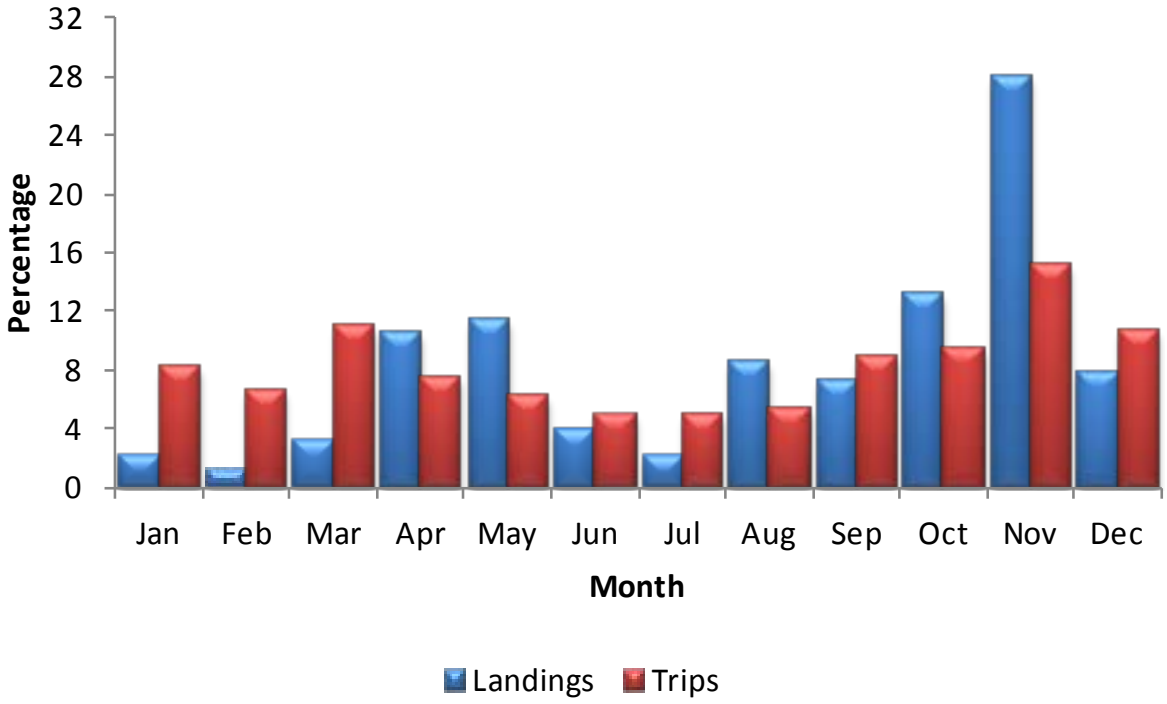


Figure 3 – Monthly percentages of Atlantic croaker commercial landings and trips on the Atlantic coast of Florida in 2012.

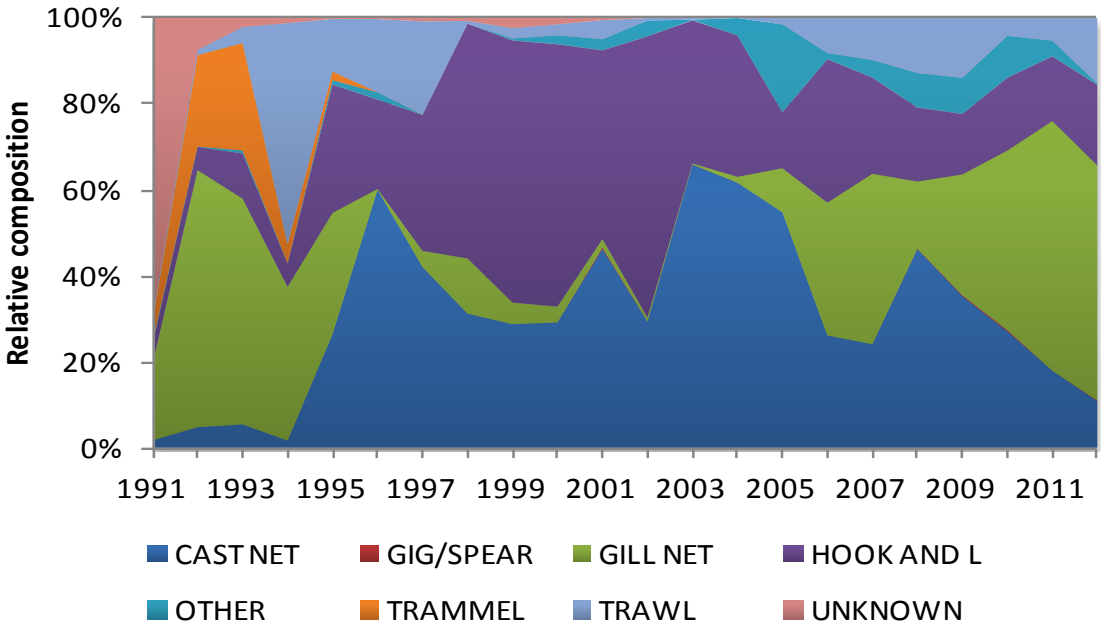


Figure 4 – Composition (%) of Atlantic croaker commercial landings by gear type on Florida's Atlantic coast, 1991–2012. The 2012 commercial landings were preliminary and are subject to change.

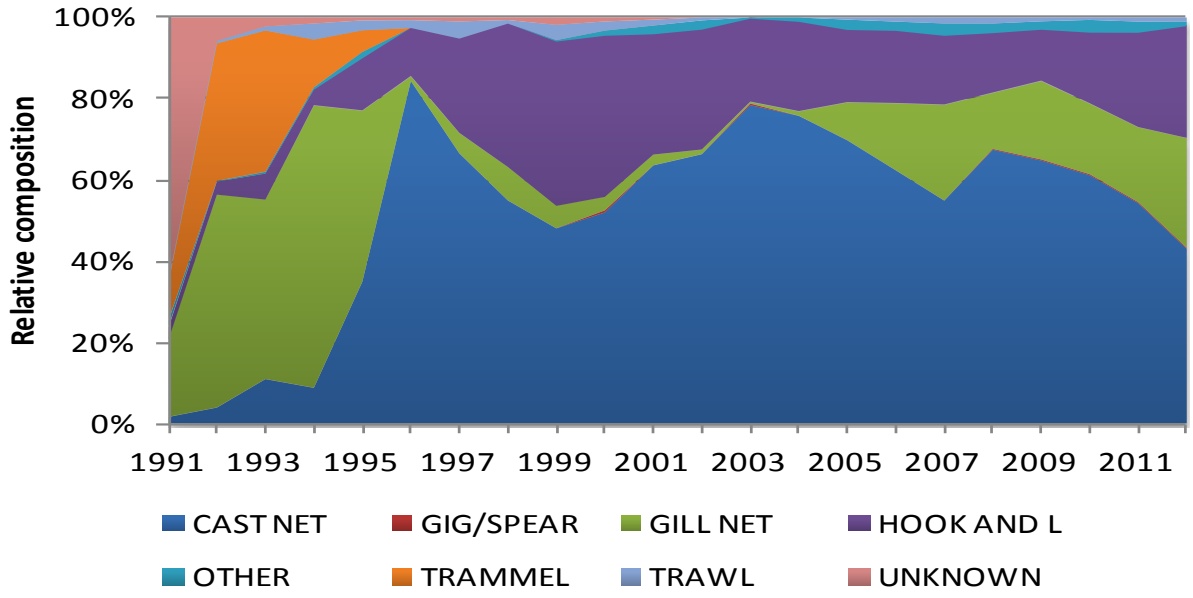


Figure 5- Composition (%) of commercial trips by gear type reporting Atlantic croaker on Florida's Atlantic coast, 1991–2012. The 2012 commercial trip estimates were preliminary and are subject to change.

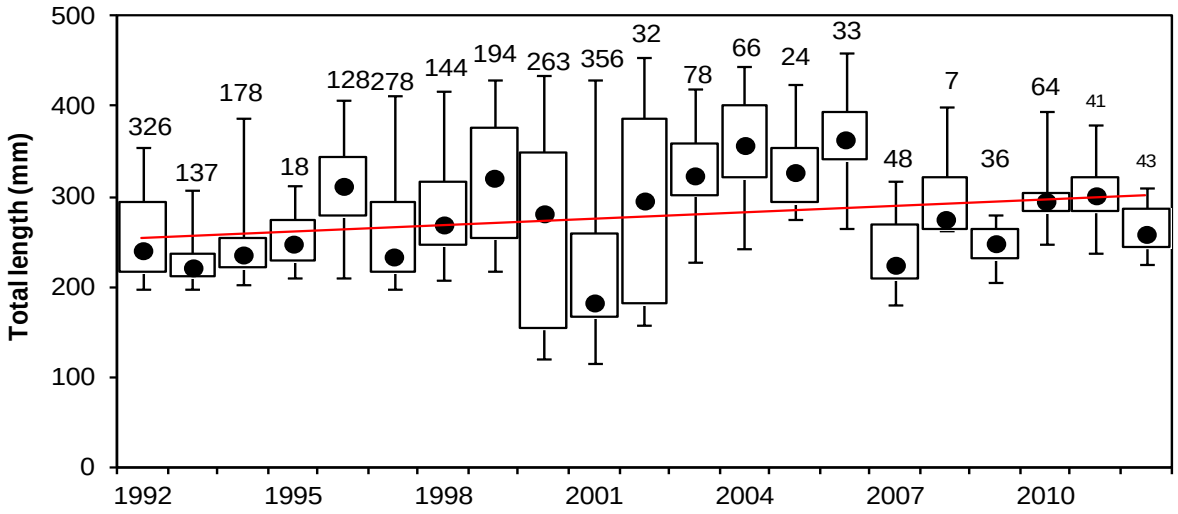


Figure 6 - Size distributions of Atlantic croaker measured in the commercial fishery on the Atlantic coast of Florida, 1992-2012. The dark circle represents the median, the box represents the 25th-75th percentiles and the vertical whiskers extend from 2.5th -97.5th percentiles. Numbers of fish measured are shown above the upper whiskers. The red line indicates the long-term trend of the annual median total length of fish measured.

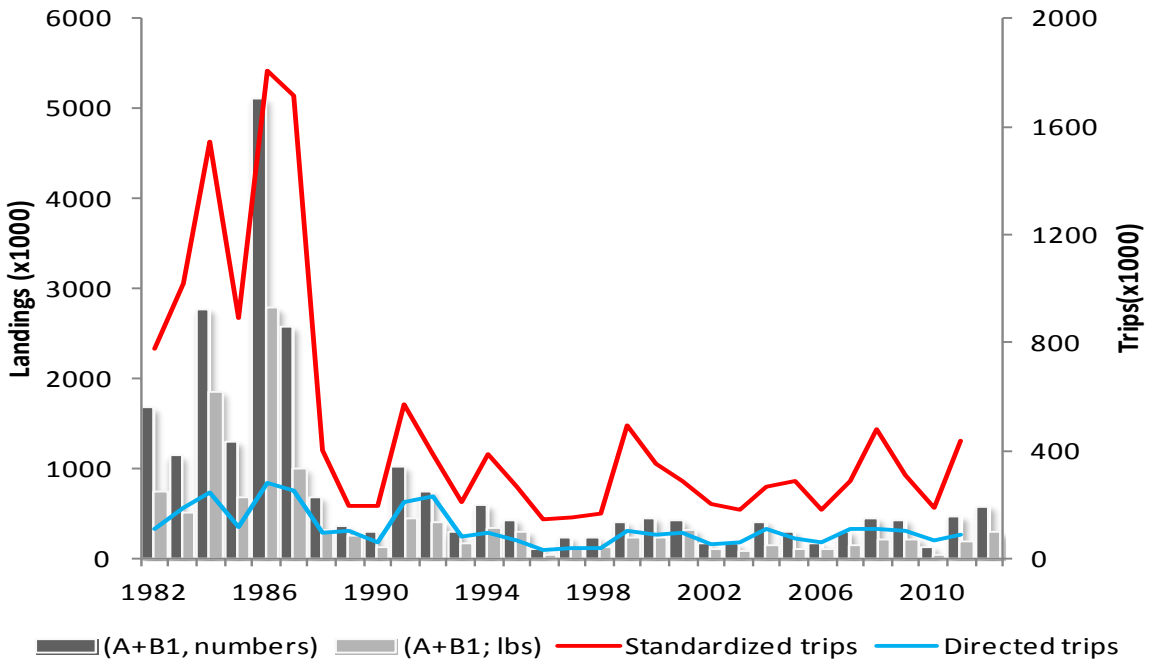


Figure 7 – Time series of the recreational harvests in number and weight (lbs) and of the numbers of standardized and directed angler-trips reporting Atlantic croaker on Florida's Atlantic coast, 1982-2012. The 2012 estimates were preliminary and are subject to change. The 2012 numbers of standardized and directed angler-trips were not estimated because there were no intercept data in 2012.

Figure 8 – Variations of the ratio "fish released alive (type B2)/fish kept (Type A+ B1)" for Atlantic croaker recreationally harvested on the east coast of Florida, 1982 – 2012. The ratio in 2011 was preliminary and subject to change.

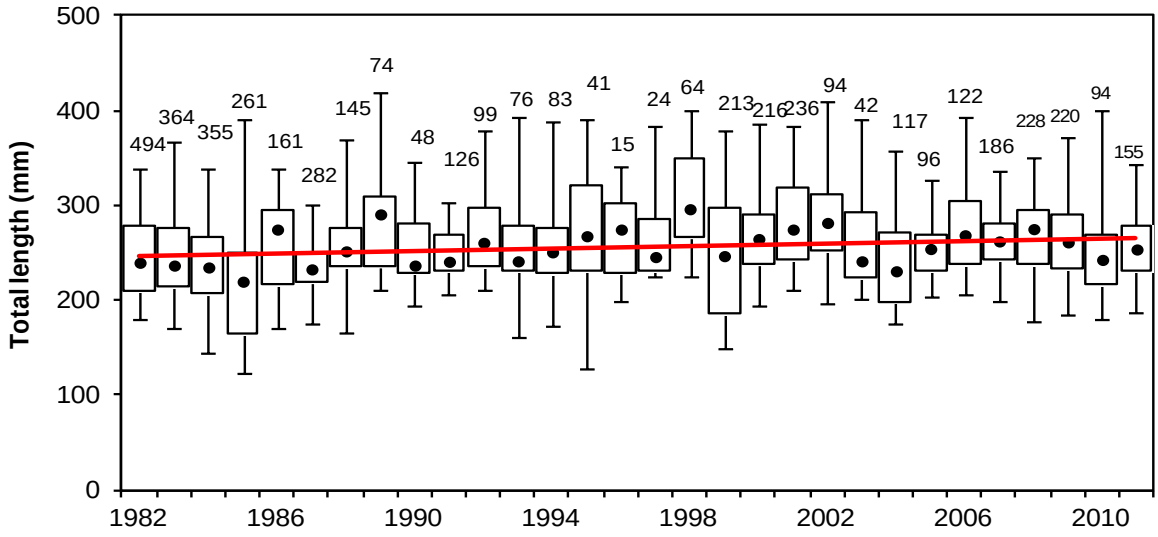


Figure 9 – Size distributions of Atlantic croaker measured in the recreational fishery on the Atlantic coast of Florida, 1982-2011. The dark circle represents the median, the box represents the 25th – 75th percentiles and the vertical whiskers extend from 2.5th -97.5th percentiles. Numbers of fish measured are shown above the upper whiskers. The red line indicates the long-term trend of the median total length. The 2012 size distribution is not shown because there were no intercept data in 2012.

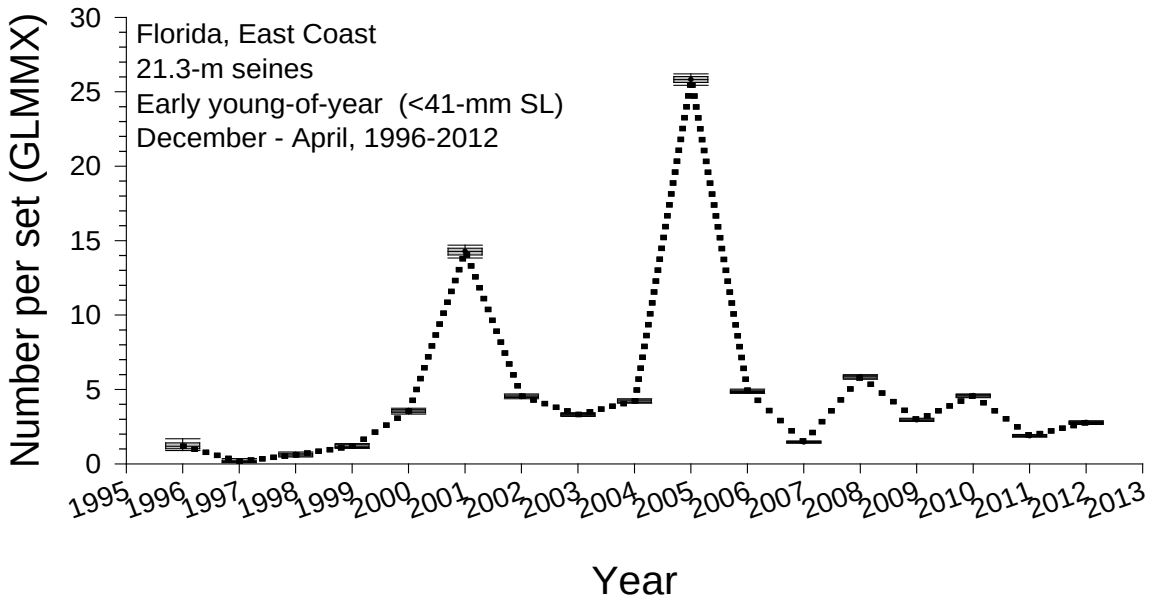


Figure 10 – Indices of relative abundance for young-of-the year Atlantic croaker (< 41-mm SL) collected using 21.3-m seines during monthly stratified-random sampling surveys on the east coast of Florida, 1996-2012. The box represents the 25th and 75th percentiles, the vertical line represents the 10th to 90th percentiles, and the horizontal line represents the median estimate

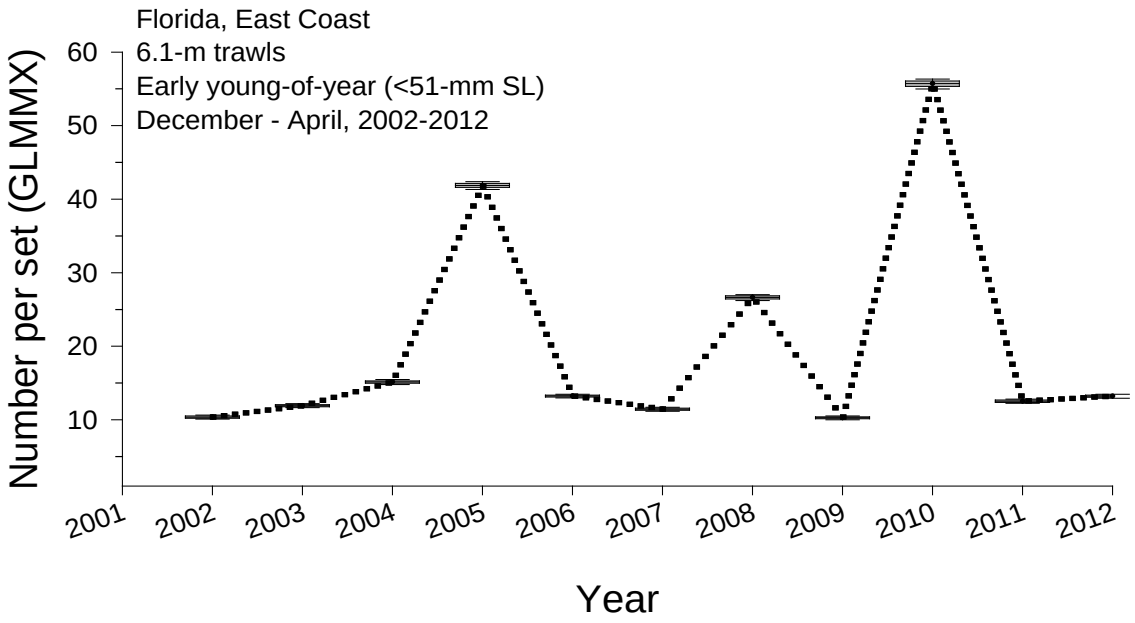


Figure 11 – Indices of relative abundance for young-of-the year Atlantic croaker (< 41-mm SL) collected using a 6.1-m trawl during monthly stratified-random sampling surveys on the east coast of Florida, 2002-2012. The box represents the 25th and 75th percentiles, the vertical line represents the 10th to 90th percentiles, and the horizontal line represents the median estimate

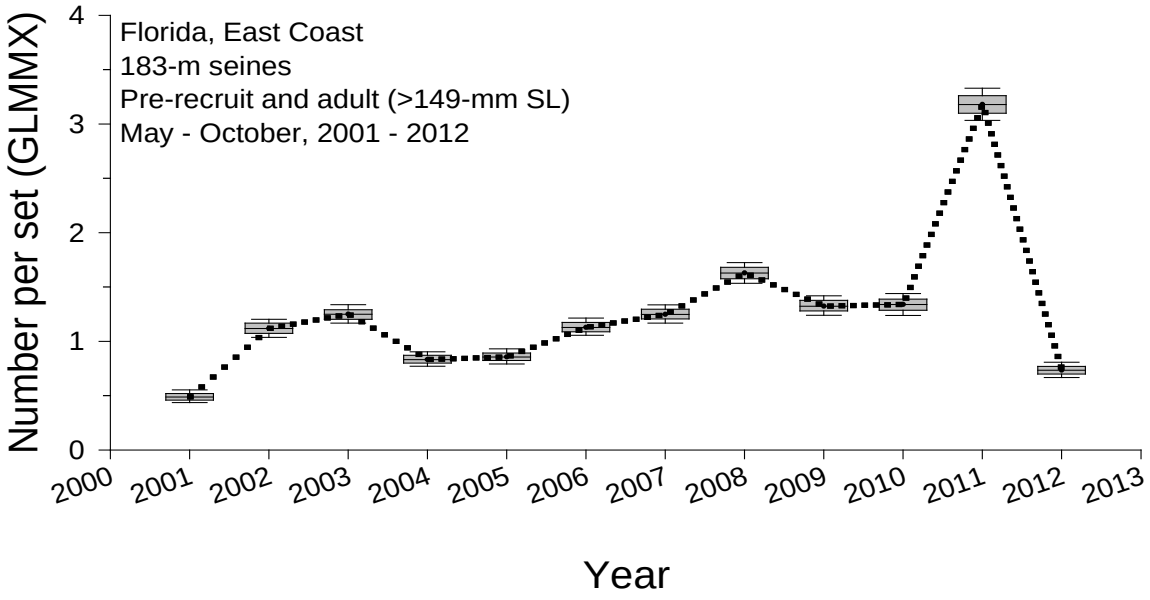


Figure 12 – Indices of relative abundance for large juvenile and sub-adult/adult Atlantic croaker (> 149-mm SL) collected using 183-m Haul seines during monthly stratified-random sampling surveys on the east coast of Florida, 2001-2012. The box represents the 25th and 75th percentiles, the vertical line represents the 10th to 90th percentiles, and the horizontal line represents the median estimate.

State of New Jersey
Department of Environmental Protection

Division of Fish & Wildlife

Annual State Report for Red Drum in 2012 and Fishery Summary for 2013

June 2013

Report By: Jennifer Pyle

Submitted to the Atlantic States Marine Fisheries Commission as a Requirement of Amendment 2 to the Interstate Fisheries Management Plan for Red Drum

I. SUMMARY OF RED DRUM FISHERY AND RESOURCE MONITORING IN NEW JERSEY

In compliance to Amendment 2 to the Interstate Fishery Management Plan (FMP) for Red Drum, New Jersey has maintained the required size and possession limits of 1 fish between 18 and 27 inches for both recreational and commercial fishermen.

II. REQUEST FOR *DE MINIMUS* STATUS

New Jersey requests *de minimus* status under Amendment 2 to the Interstate Fishery Management Plan for Red Drum.

III. NEW JERSEY RED DRUM FISHERY AND MANAGEMENT PROGRAM: 2012

A. Fishery Dependent Monitoring

The Bureau of Marine Fisheries does not conduct any fishery dependent monitoring for red drum.

B. Fishery Independent Monitoring

The New Jersey Bureau of Marine Fisheries conducts five nearshore (within 12 nautical miles) trawl surveys each year. These surveys occur in January/February, April, June, August, and October. All species taken during these surveys are weighed and measured. Catch per unit effort in number of fish per tow and biomass (kilograms) per tow is calculated each year. No red drum have been caught in nearshore waters since this survey began in 1988.

C. New Jersey Regulations on Red Drum in 2012

On May 22, 2002, the Atlantic States Marine Fisheries Commission approved Amendment 2 to the FMP, at which time, those States in the Northern region of red drum distribution, such as New Jersey, were required to develop and implement size and possession limits to meet the FMP's management goal. In November 2002, New Jersey adopted by Notice of Administrative Change the following red drum management measures for both recreational and commercial fishermen under N.J.A.C. 7:25-18.1:

(a) For the purpose of this subchapter, the following common names shall mean the following scientific name(s) for a species or group of species, except as otherwise specified elsewhere in this subchapter.

Common Name	Scientific Name
Red Drum	Sciaenops ocellatus

(b) A person shall not purchase, sell, offer for sale, or expose for sale any species listed below less than the minimum length, measured in inches, except as may be provided elsewhere in this subchapter, and subject to the specific provisions of any such section. Any commercially licensed vessel or person shall be presumed to possess the following species for sale purposes and shall comply with the minimum sizes below. Fish length shall be measured from the tip of the snout to the tip of the tail (total length), except as noted below.

Species	Minimum Size
Red Drum	18 inches

3. A person shall not take in any one day or possess more than the possession limit specified below for each species listed, except as may be provided elsewhere in this subchapter, and subject to the specific provisions of any such section.

Species	Possession Limit
Red Drum	1 fish, no more than 27 inches

(c) A person angling with a hand line or with a rod and line or using a bait net or spearfishing shall not have in his or her possession any species listed below less than the minimum length, nor shall such person take in any one day or possess more than the possession limits as provided below, nor shall such person possess any species listed below during the closed season for that species. Exceptions to this section as may be provided elsewhere in this subchapter shall be subject to the specific provisions of any such section. Fish length shall measure from the tip of the snout to the tip of the tail (total length), except as noted below:

Species	Open Season	Minimum Size	Possession Limit
Red Drum	Jan. 1 to Dec. 31	18 inches	1 fish, no more than 27 inches

D. New Jersey Red Drum Harvest

Commercial fishery landings for red drum were obtained from the National Marine Fisheries Service statistics website (1950-2004) and the Standard Atlantic Fisheries Information System from 2005 to present (Table 1). Recreational catch data were obtained from the Marine Recreational Information Program from 1980-2012.

E. Addendum III Habitat Requirements

No mandatory measures related to habitat are implemented through this amendment.

IV. NEW JERSEY RED DRUM FISHERY AND MANAGEMENT PROGRAM: 2013

A. New Jersey Regulations on Red Drum in 2013

See III C above for New Jersey's 2013 red drum regulations.

B. Red Drum Monitoring Programs for 2013

There will be no fishery dependent resource monitoring program for red drum in 2013. The State's ocean stock assessment program will continue in 2013 and any red drum taken will be weighed and measured.

C. Significant Changes in Management and/or Monitoring of Red Drum in 2013

No changes from the previous year.

V. PLAN SPECIFIC REQUIREMENTS

There are no plan specific requirements in Amendment 2.

VI. LAW ENFORCEMENT REPORTING REQUIREMENTS

There are no plan specific law enforcement reporting requirements in Amendment 2.

Table 1. New Jersey's Commercial and Recreational Red Drum Landings: 1950-2012

Year	Commercial (pounds)	Recreational (number)
1951	100	-
1992	-	301*
1998	311	-
1999	241	-
2004	12	-
2005	517	-
2006	186	-
2009	129	-
2011	-	955 (2,421 pounds)
2012	7,971	-

*number caught, not harvested

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES
& ENVIROMENTAL CONTROL
DIVISION OF FISH & WILDLIFE
89 Kings Highway
Dover, Delaware 19901

OFFICE OF THE
DIRECTOR

July 15, 2013

1. Introduction

Delaware is a *de minimis* state for red drum with no landings of red drum reported commercially. Recreational landings were estimated at 294 in numbers and 143 kg (316 lbs.) in 2012. There were no changes in monitoring, regulations or harvest for 2012 and there are none planned for 2013.

2. Request for *de minimis* status

Delaware requests continuation of its *de minimis* status. There were no landings of red drum commercially. Recreationally, there were 143 kg (316 lbs.) in Delaware in 2012. Any action by Delaware with respect to a particular management measure would not contribute significantly to the overall red drum management program.

3. Previous calendar year's fishery and management program

a. Fishery Dependent Monitoring

Red drum were not commercially harvested in Delaware as reported through either the Delaware commercial fisherman log book system or the Federal Dealers reporting system (SAFIS) in 2012. Historically, there have not been any reported commercial landings of red drum in Delaware since 1999 through the fisherman log books and since 2006 through the federal dealer system.

According to the Marine Recreational Information Program, red drum was recreationally caught and harvested in Delaware in 2012. During wave 5 (Sep - Oct) of 2012, 2,076 red drum were reported caught and 79 pounds were landed from the Atlantic Ocean less than 3 miles offshore. During wave 6 (Nov – Dec), 3,978 red drum were reported caught and 236 pounds were landed from the Atlantic Ocean less than 3 miles offshore. Few red drum were caught in Delaware from 1981 (first year of recreational records) to 2006.

Year	No. Caught	No. Released	No. Kept	Pounds Kept
2004	0	0	0	0
2005	0	0	0	0
2006	1,343	875	468	2,064
2007	0	0	0	0
2008	75	75	0	0
2009	0	0	0	0
2010	0	0	0	0
2011	0	0	0	0
2012	6,156	5,862	294	316

The Delaware survey is augmented annually to three times the base level of interviews by the Delaware Division of Fish and Wildlife.

b. Fishery Independent Monitoring

No red drum were taken in 2012 by the 30-ft adult finfish abundance trawl survey in the Delaware Bay, the 16-ft juvenile finfish abundance trawl survey in the Delaware Bay, or the 16-ft juvenile finfish abundance trawl survey in Delaware's Inland Bays.

c. Regulations

Delaware's red drum regulations remained unchanged for 2012 with a legal slot of 20-27 inches TL and a daily possession limit of 5 fish/person/day. This regulation brings Delaware in compliance with the 40% reduction as detailed in Table 19 from Amendment 2 to the Interstate Fishery Management Plan for Red Drum. No red drum below or above this legal slot limit may be possessed. These regulations apply to both recreational and commercial fishermen. No red drum may be caught and sold in Delaware by anyone not in possession of a commercial foodfishing permit which costs $150 for residents and $1,500 for non-residents. Commercial gill netting (Delaware's principle commercial fishing gear-type) is a limited entry fishery with the number of commercial gill net permits being fixed at 111. Between 1988 and 2003, Delaware had a legal slot of 18-27 inches with an allowance for one fish/day over 27 inches and a daily harvest limit of five red drum. Prior to 1988, there were no specific regulations pertaining solely to red drum in Delaware.

4. Planned calendar year's fishery and management program

a. Regulations

1. Size limit: 20-27 inches total length
2. Creel limit: 5 fish per day

3. Closed seasons: open year round

b. Monitoring Programs

1. Monitoring of commercial fishery landings will be performed by the Division of Fish and Wildlife of the State of Delaware.
2. Recreational fishery statistics will be collected by NOAA through MRIP.
3. No State of Delaware fishery-independent surveys will occur in 2013.

c. Changes from previous year

There are no planned changes from the previous year.

MARYLAND DEPARTMENT OF NATURAL RESOURCES

Martin O'Malley, Governor
Anthony G. Brown, Lt. Governor
John R. Griffin, Secretary
Joseph P. Gill, Deputy Secretary

Maryland Red Drum (*Sciaenops ocellatus*) Compliance Report to the Atlantic States Marine Fisheries Commission – 2012

Prepared by

Harry W. Rickabaugh Jr.

Maryland Department of Natural Resources
Fisheries Service

June 2013

Harry Rickabaugh Jr. Matapeake Terminal 301 Marine Academy Drive Stevensville, MD 21666
(410) 643 - 6776 extension 2109 • www.dnr.maryland.gov • TTY users call via Maryland Relay

I. Introduction

Red drum (*Sciaenops ocellatus*) are captured in the Atlantic Ocean off the coast of Maryland and in Maryland's portion of Chesapeake Bay by both commercial and recreational fishermen. Red drum is an infrequent species in Maryland's portion of Chesapeake Bay. However, when Bay salinity increases because of reduced freshwater inflow, red drum catch by bottom fishing anglers becomes more common. Surf casters along the 35 miles of Maryland's Atlantic coast may occasionally catch legal size fish, but more commonly catch oversized individuals.

In 2003, the Maryland Department of Natural Resources (MD DNR) instituted an 18 – 27 inch total length (TL) size limit and one fish per person per day creel limit for recreational fishermen, and an 18 – 25 inch TL size limit and five fish per day catch limit for commercial fishermen. These changes were instituted to meet the requirements outlined in Table 19 of Amendment 2 to the Red Drum Fisheries Management Plan (ASMFC 2002).

II. Request for *de minimis* status

N/A

III. 2011 Fishery and Management Programs.

a. MD DNR fisheries biologists sampled commercial pound nets bi-weekly in Maryland's portion of the Chesapeake Bay from May 22 through September 11. Four hundred fifty-eight red drum were encountered during onboard pound net sampling in 2012, the highest value of the 20 year time series. Only one of the previous 19 years of sampling exceeded 21 fish, and no red drum were encountered in eight of the survey years. Three of the specimens were greater than the 25 inch TL maximum commercial limit, and the remaining 455 were less than the 18 inch minimum TL limit, none of the measured fish were of legal size. Mean TL was 318mm.

b. There was no fishery independent monitoring for red drum in 2012.

c. Red drum regulations:

"FISHERIES SERVICE 08.02.05"

.16 Red Drum.

A: Recreational Fishery.

(1) Notwithstanding Natural Resources Article, 4-734, Annotated Code of Maryland, a person may not catch or possess red drum less than 18 inches in total length or greater than 27 inches in total length.

(2) A person may not catch or possess more than one red drum per day.

B: Commercial Fishery.

(1) Notwithstanding Natural Resources Article, 4-734, Annotated Code of Maryland, a commercial licensee may not catch or possess red drum less than 18 inches in total length or greater than 25 inches in total length.

(2) A commercial licensee may not catch or possess more than five red drum per day.

SOURCE: COMAR (http://www.dsd.state.md.us/comar/08/08.02.05.16.htm).

The above regulations conform to those outlined in Table 19 of Amendment 2 (ASMFC 2002).

III. 2011 Fishery and Management Programs (Continued)

d. Commercial fishermen in MD are required to report all red drum harvested on daily fishing reports submitted to DNR. The preliminary 2012 commercial harvest was 334 pounds (Figure 1). All red drum harvest in 2012 was from the Chesapeake Bay, with pound nets accounting for 60% of harvest and gill nets the remaining 40%. Red drum harvest has been very low in recent years; however, this low level of harvest may not reflect a decrease in abundance in Maryland, since more liberal regulations were in effect during previous years. Prior to the regulation change in 2003, commercial fishermen in Maryland were allowed to keep one fish over 27 inches per day. Harvests were lower prior to 1986, with years of zero reported harvest being more common, than in subsequent years.

   The Marine Recreational Information Program (MRIP) estimated that recreational fishermen in Maryland harvested 17,869 red drum in 2012 (Figure 2; MRIP 2013), the highest estimate number of the time series. The 2012 estimated number of red drum released was 280,000 fish (Figure 3; MRIP 2013), 15 times higher then the next highest release estimate in the time series. The MRIP survey design may not adequately sample the recreational red drum harvest or catch and release fishery, because of the seasonal nature of Maryland's red drum fishery. The current MRIP survey indicates harvest or releases only occurring in 16 of 32 years. While Maryland's red drum fishery is quite modest, it is very likely anglers caught some fish each year. Licensed charter boat captains in Maryland are also required to keep log books of their clients catch. Log books from 2012 indicate 299 red drum were caught, 271 of which were harvested. The 2012 harvest is the highest harvest of the 20 year time series (Figure 4). Interestingly only 28 red drum were reported as released, which contradicts the MRIP estimates, pound net survey data and anecdotal reports that undersized red drum were widely available through most of Maryland's portion of Chesapeake Bay in the summer of 2012. It could be that the gear used or areas fished by charter captains in 2012 differed from that of private boat anglers, and they were therefore less likely to capture smaller red drum. Charter boat red drum catches were reported every year from 1993-2012, except for 1996. MRIP estimated no harvest in nine years with reported charter boat harvest.

e. There were no habitat requirements in Amendment 2.

IV. Planned Management for 2013.

a. No regulation changes are planned for 2013.

b. MD DNR will continue to monitor commercial pound nets in 2013. MD DNR also may monitor fish houses for other species throughout the summer, and red drum will be measured if they are available, and time permits.

V. Plan Specific Requirements

None

VI. Law enforcement requirements

None.

References

ASMFC. 2002. Amendment 2 to the Interstate Fisheries Management Plan for Red Drum. Fisheries Management Report No. 38 of the Atlantic States Marine Fisheries Commission. Washington, D.C.

MRIP. 2013. Personal communication from the National Marine Fisheries Service, Fisheries Statistics Division.

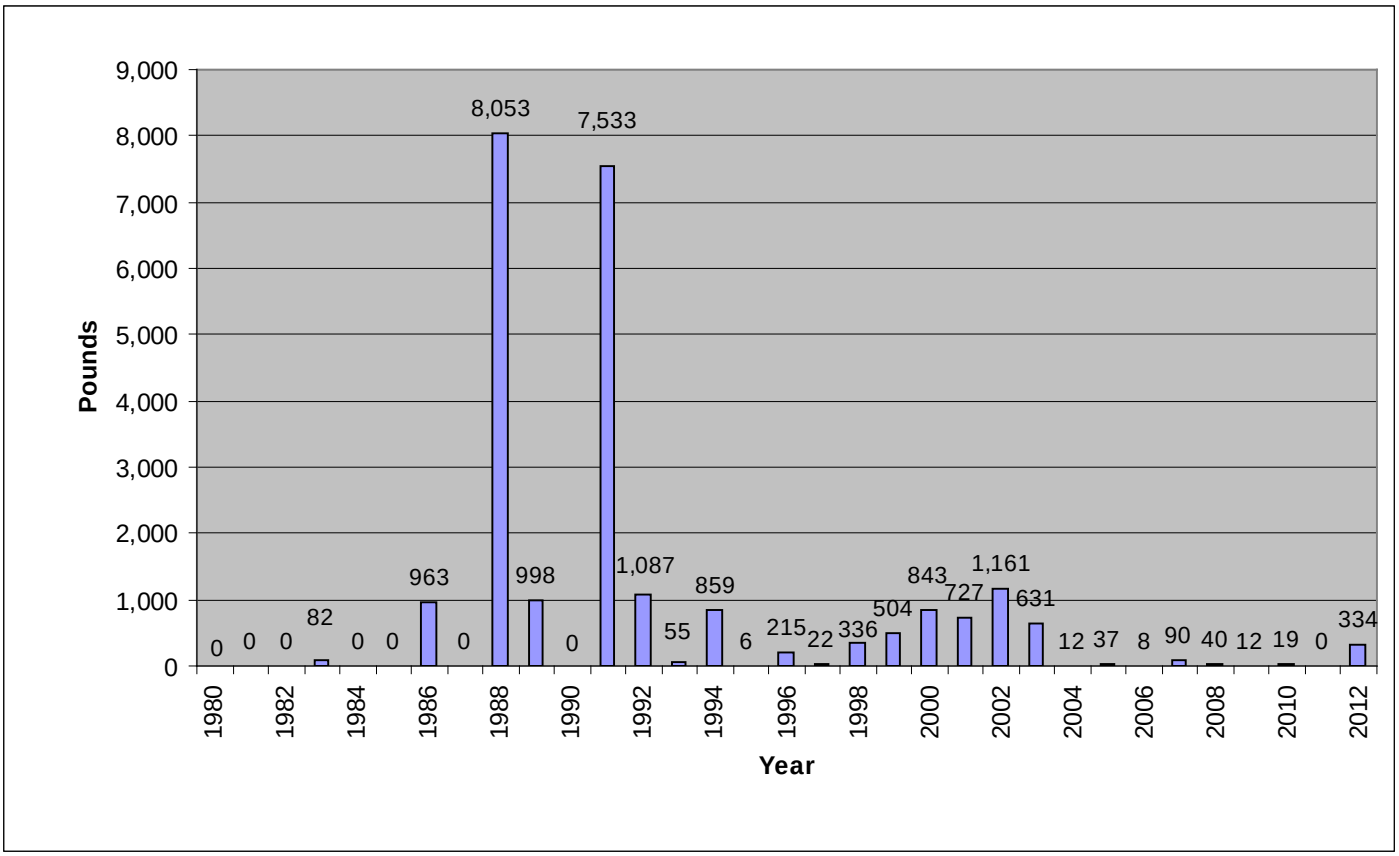


Figure 1. Commercial red drum landings reported to Maryland DNR, 1980-2013.

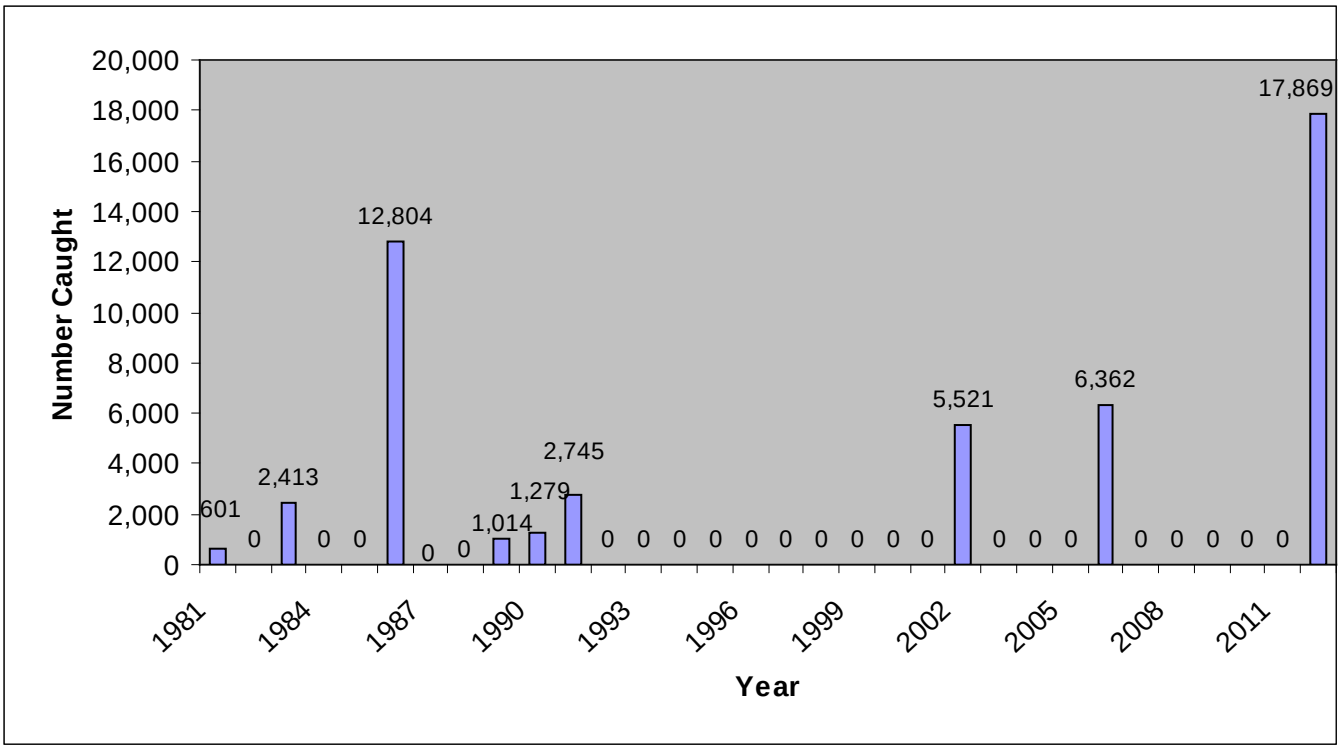


Figure 2. MRIP harvest estimates for red drum in Maryland, 1981-2012.

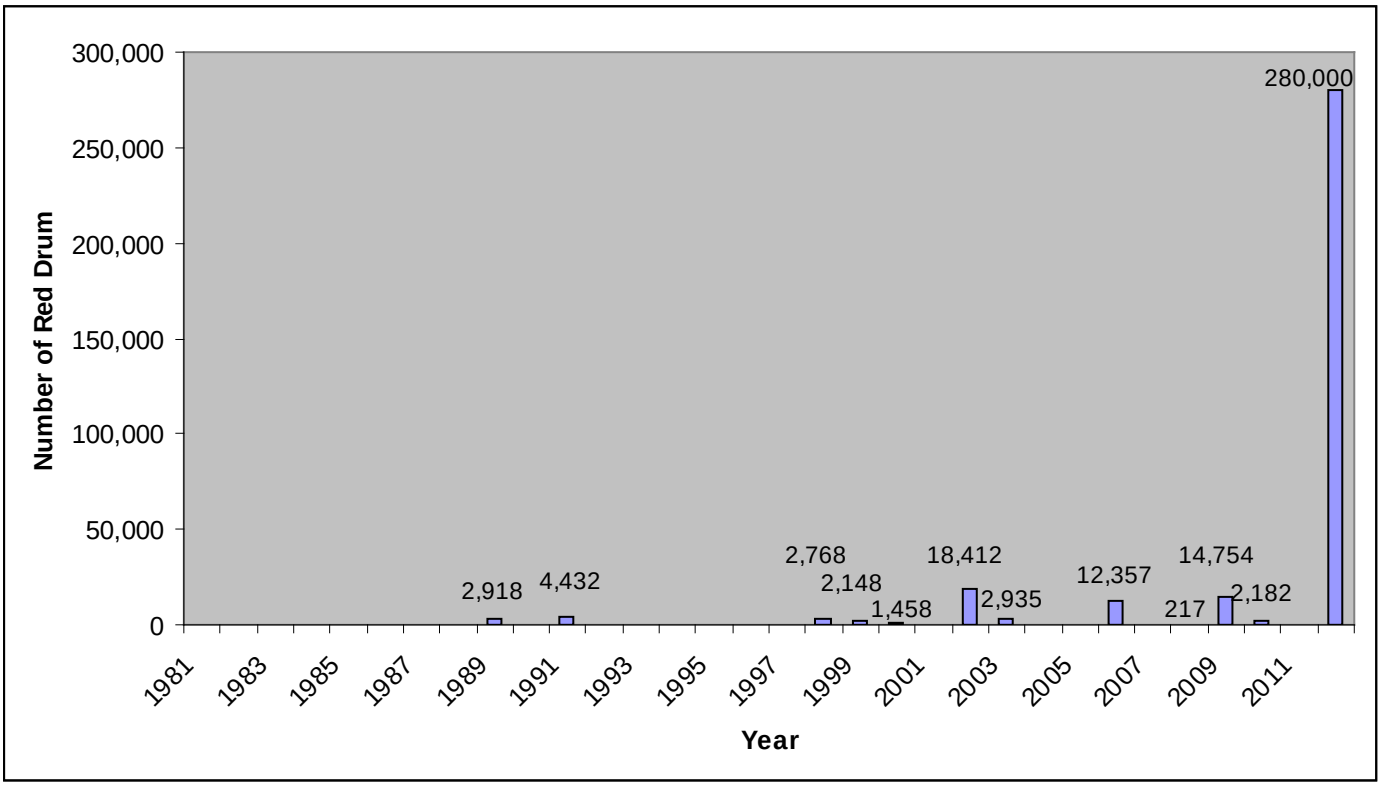


Figure 3. MRIP release estimates for red drum in Maryland, 1981-2012.

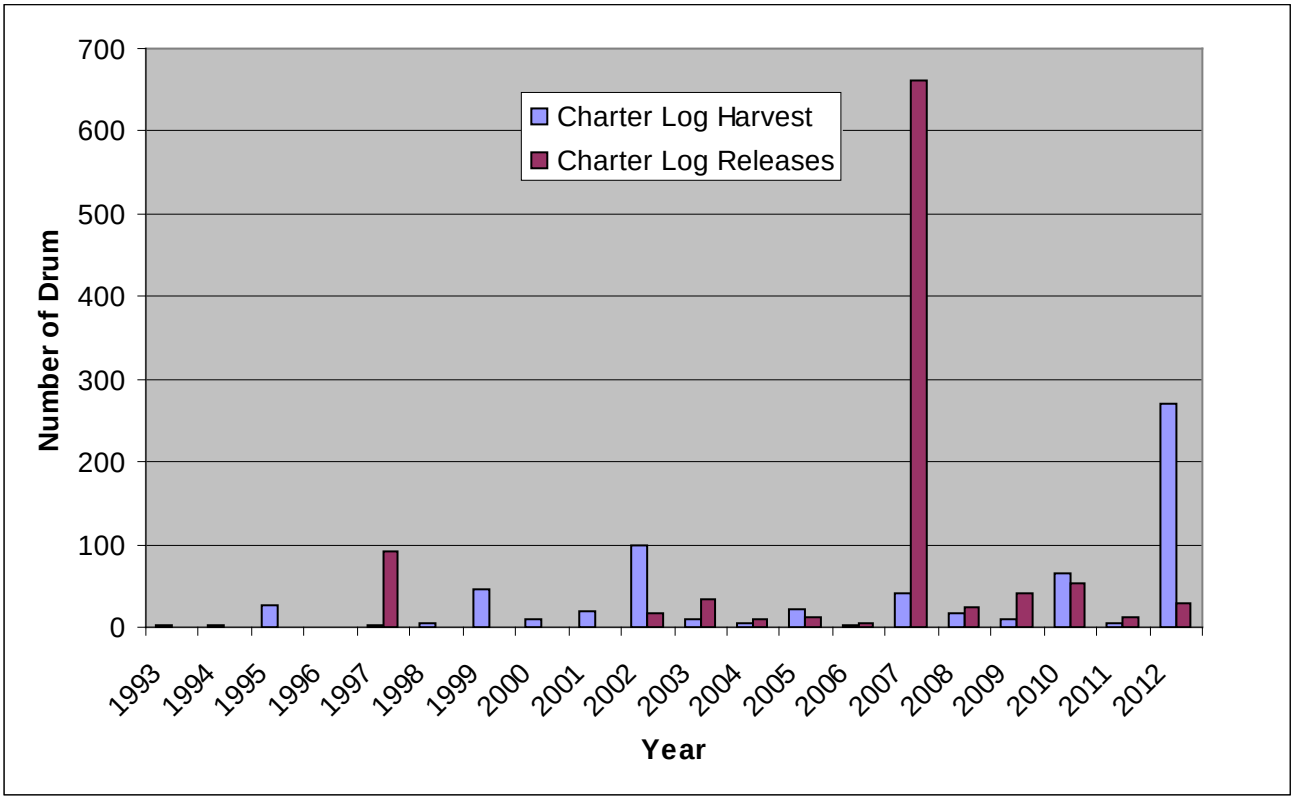


Figure 4. Red drum harvest and releases reported from Maryland's charter boat fishery in numbers, 1993-2012.

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

July 1, 2013

MEMORANDUM

TO: Kirby Rootes-Murdy, FMP Coordinator
Atlantic States Marine Fisheries Commission

FROM: Joseph Grist, Deputy Chief, Fisheries Management Division
Virginia Marine Resources Commission

SUBJECT: Virginia's 2012 Compliance Report for Red Drum

I. Introduction

From spring to fall, red drum *(Sciaenops ocellatus)* are harvested in the coastal waters of Virginia. All fisherman in Virginia, whether recreational or commercial, are limited to the possession of three red drum. It is unlawful for any person to take, catch or possess any red drum less than 18 inches in length or greater than 26 inches in length (Chapter 4 VAC 20-280-10 et seq. "Pertaining to Speckled Trout and Red Drum").

The Virginia Marine Resources Commission (VMRC) currently operates a mandatory reporting program (Chapter 4 VAC 20-610-10 et seq. "Pertaining to Commercial Fishing and Mandatory Harvest Reporting"), for recording commercial harvests, and obtains recreational fisheries data from the Marine Recreational Information Program (MRIP), the Virginia Game Fish Tagging Program and the Marine Sportfish Collection Project.

II. Request for *de minimis* status

The VMRC does not request *de minimis* status for this fishery.

III. Previous Calendar Year's Fishery and Management Program

a. Activity and results of Fishery Dependent Monitoring

1. Commercial fishery dependent monitoring

Because of the small number of red drum captured by the commercial fishery, sampling opportunities are limited. The total number of red drum sampled ranged

from a high of 113 in 1999 to a low of six in 2004. In 2012, there were 38 fish sampled from gill nets, pound nets, and haul seines. Ages of those fish, determined by otolith techniques, ranged from one to three years of age (37 one-year olds and 1 three-year old). All samples taken outside of the legal harvest ranges were obtained from confiscated fish or biological research projects.

2. Recreational fishery dependent monitoring

The Virginia Game Fish Tagging Program (VGFTP) began in 1995 and is jointly operated by the VMRC and the Virginia Institute of Marine Science (VIMS). It utilizes trained volunteers who target and tag several primary species depending on data needs for the current year. Since 1995, volunteer participants in the VGFTP have tagged 47,014 red drum and recorded 4,881 recaptures. Volunteer anglers with the VGFTP tagged and released 18,371 red drum in 2012 and recaptured 1,612 red drum.

Starting in June 2007 VMRC began the Marine Sportfish Collection Project (MSCP). This project involves freezers placed at various high frequency weigh stations, where recreational anglers can voluntarily leave whole fish or carcasses. Red drum is one of the species the project collects. Four recreational red drum samples were collected through the MSCP during 2012 (all one year olds).

b. Activity and results of fishery independent monitoring

There were no fishery independent monitoring programs during the 2012 calendar year.

c. Copy of regulations in effect for 2012

See appendix 1.

d. Harvest for commercial and recreational fisheries

Virginia's commercial fishery harvested 2,565 pounds of red drum in 2012 (Table 1). This is a decrease compared to the previous year. Gill nets accounted for the greatest percentage of the red drum harvest in 2012, with 62% of the total harvest. Hook-and-line, pound nets, crab pot and haul seines, combined, accounted for 38% of the 2012 harvest (Table 2).

The 2012 MRIP estimated recreational landings of red drum in Virginia totaled 28,149 fish (A+B1). The 2012 MRIP estimated number of fish released (B2) totaled 2,503,237 fish (Table 3), representing a 40-fold increase in released red drum when compared to 2011 (61,330 fish). In Virginia, saltwater anglers took 2,517,758 trips in 2012 for all species (Table 4).

Currently, no fishery-independent sampling programs or estimates of non-harvest loss are available.

e. Review of progress in implementing habitat recommendations
There have not been programs initiated relating specifically to red drum.

IV. 2013 Planned Red Drum Fisheries Management

a. Summarize regulations that will be in effect for 2013

In 2013 the Virginia commercial and recreational fisheries will continue to be constrained by a three-fish possession limit, and it shall be illegal possess any red drum less than 18 in length or greater than 26 inches in length (Appendix I)

b. Summarize monitoring programs that will be performed
The VMRC will continue to monitor commercial harvests of red drum through the mandatory reporting program and to collect biological data from commercial and recreational fisheries, as well as fishery-independent sampling when possible. The VGFTP will continue to tag red drum in 2013. A yearly summary report, which includes annual data of all tagged and recaptured fish, is available by July 1st.

c. Highlight any changes from the previous year
N/A

Table 1. Virginia commercial harvest of red drum, 1996-2012.

Year	Pounds
1996	2,006
1997	3,820
1998	6,456
1999	10,856
2000	11,512
2001	4,951
2002	7,361
2003	2,716
2004	638
2005	527
2006	2,607
2007	6,505
2008	4,910
2009	8,315
2010	3,634
2011	4,369
2012	2,609
Total	83,792

Table 2. Virginia commercial harvest of red drum, by gear, in 2012.

Gear	Pounds
GILL NET, SINK/ANCHOR, OTHER	1,614
OTHER*	296
POUND NET, FISH	435
SEINE HAUL, COMMON	264
Total	2,609

*Other includes hand line and crab pot
Data combined into other category because of confidentiality rules.

Table 3. Virginia red drum recreational landings (A+B1) and releases (B2) 1996-2012.

	Landings (Type A +B1)				Released Alive (Type B2)	
Year	Number	PSE [Number]	Weight [Pounds]	PSE [Weight]	Number	PSE [Number]
1996	572	99.2	1,513	0	2,424	46.3
1997	1,920	62.3	1,810	0	109,754	36.1
1998	13,070	30.2	34,861	34.4	93,660	22.3
1999	12,425	38.7	92,794	39.1	232,893	31.4
2000	22,603	27.8	95,596	28.8	196,541	35.7
2001	6,967	39.8	51,890	16.9	30,365	31.1
2002	49,795	22.8	155,212	24.7	801,239	14.7
2003	13,607	38.1	57,213	39.3	43,379	40.1
2004*	5,005	84.7	32,415	78.9	33,777	33.4
2005	2,766	101.6	7,624	101.6	28,351	44.9
2006	12,665	62.8	21,039	61.4	185,859	41.6
2007	46,405	28.8	209,248	30.4	110,566	28.9
2008	20,847	29	72,510	29.1	236,787	18.5
2009	38,670	27.2	148,573	31.2	178,396	44.1
2010	11,076	32.3	40,323	31.7	28,580	32.2
2011	0	.	0	.	61,330	61.8
2012	28,149	56.1	27,422	59.1	2,503,237	20.9

*2004-2012 taken from MRIP data

Table 4. Total number of recreational trips taken in Virginia, all species combined, 1996-2012.

Year	Trips
1996	2,743,913
1997	3,712,259
1998	2,956,024
1999	2,693,943
2000	3,390,719
2001	4,128,242
2002	3,253,844
2003	3,113,183
2004*	3,663,879
2005	3,964,054
2006	3,787,818
2007	3,511,486
2008	3,498,928
2009	3,047,706
2010	2,596,891
2011	2,898,696
2012	2,517,758
Average	3,263,491

*2004-2012 taken from MRIP data

Appendix 1.

VIRGINIA MARINE RESOURCES COMMISSION
"PERTAINING TO SPECKLED TROUT AND RED DRUM"
CHAPTER 4VAC20-280-10 ET SEQ.

PREAMBLE

This chapter establishes minimum size limits for the taking or possession of speckled trout and red drum (channel bass) by commercial and recreational fishermen. The minimum size limits will protect the spawning stocks and increase yield in the fishery. This chapter is designed to assure that Virginia is consistent with all federal and interstate management measures for speckled trout and red drum. In addition, this chapter establishes a commercial landings quota for speckled trout. The goal of these management measures is to perpetuate the speckled trout and red drum resources in fishable abundance throughout their range and generate the greatest possible economic and social benefits from their harvest and utilization over time.

This chapter is promulgated pursuant to authority contained in §§28.2-201 and 28.2-304 of the Code of Virginia. This chapter amends and re-adopts, as amended, previous Chapter 4VAC20-280-10 et seq., which was adopted December 17, 2002, and effective January 1, 2003. The effective date of this chapter, as amended, is April 1, 2011.

4VAC20-280-10. Purpose.

The purpose of this chapter is to protect and rebuild the spawning stocks of speckled trout and red drum, minimizing the possibility of recruitment failure, and to increase yield in their fisheries.

4VAC20-280-20. Definitions.

The following words and terms, when used in this chapter, shall have the following meanings unless the context clearly indicates otherwise.

"Red drum" means red drum or channel bass and is any fish of the species *Sciaenops ocellatus*.

"Speckled trout" means speckled trout or spotted seatrout and is any fish of the species *Cynoscion nebulosus*.

4VAC20-280-30. Size limits.

A. It shall be unlawful for any person to take, catch, or possess any speckled trout less than 14 inches in length provided however, the catch of speckled trout by pound net or haul seine may consist of up to 5.0%, by weight, of speckled trout less than 14 inches in length.

B. It shall be unlawful for any person fishing with hook-and-line, rod-and-reel, or hand-line to possess more than one speckled trout 24 inches or greater from December 1 through March 31 of any year.

C. It shall be unlawful for any person to take, catch or possess any red drum less than 18 inches in length or greater than 26 inches in length.

D. Length is measured in a straight line from tip of nose to tip of tail.

4VAC20-280-40. Possession limits.

A. It shall be unlawful for any person fishing with hook-and-line, rod-and-reel, or hand-line to possess more than 10 speckled trout from April 1 through November 30 in any year.

B. It shall be unlawful for any person fishing with hook-and-line, rod-and-reel, or hand-line to possess more than 5 speckled trout from December 1 through March 31 in any year.

C. It shall be unlawful for any person to possess more than three red drum.

4VAC20-280-50. Commercial landings quota.

A. For each 12-month period of September 1 through August 31, the commercial landings of speckled trout shall be limited to 51,104 pounds.

B. When it is projected that the commercial landings quota will be met by a certain date within the above period, the Marine Resources Commission will provide notice of the closing date for commercial harvest and landing of speckled trout during that period; and it shall be unlawful for any person to harvest or land speckled trout for commercial purposes after such closing date for the remainder of that period.

4 VAC 20-280-60. Penalty.

A. Pursuant to §28.2-304 of the Code of Virginia, any person violating any provision of 4VAC20-280-40 C of this chapter shall be guilty of a Class 1 misdemeanor.

B. Pursuant to §28.2-903 of the Code of Virginia, any person violating any provision of this chapter other than 4VAC20-280-40 C shall be guilty of a Class 3 misdemeanor, and a second or subsequent violation of any provision of this chapter, other than 4VAC20-280-40 C, committed by the same person within 12 months of a prior violation is a Class 1 misdemeanor.

MARYLAND - VIRGINIA
"Potomac River Compact of 1958"
Potomac River Fisheries Commission
222 Taylor Street
P.O. BOX 9
Colonial Beach, Virginia 22443
TELEPHONE: (804) 224-7148 · (800) 266-3904 · FAX: (804) 224-2712

Red Drum
2012 Annual State Report
June 1, 2013

I. Introduction

Although commercial harvest of red drum in the Potomac River in 2012 was negligible, it increased slightly from 2011. There was an increase in the amount of juvenile (small) red drum reported as encountered and released in 2012 in the Potomac River.

II. Request *de minimis,* where applicable – N/A

III. Previous calendar year's fishery and management program

A. Fishery Dependent Monitoring

Red drum are taken as incidental harvest in the commercial pound net fishery. The PRFC has a mandatory commercial harvest daily reporting system that collects harvest as well as discards or releases. Pound netters reported releasing 428 pounds of red drum that were too small and 80 pounds of red drum that were too large. Miscellaneous gear reports indicated that 25 pounds of small red drum were released.

B. Fishery Independent Monitoring - None.

C. Regulations in Effect

The commercial red drum season was January 1st through December 31st. There was an 18" minimum and a 25" maximum size limit and the catch limit was five fish per person per day.

The recreational red drum season was January 1st through December 31st. There was an 18" minimum and a 25" maximum size limit and the catch limit was five fish per person per day.

D. Characterization of Harvest

Commercial red drum harvest in 2012 was reported as 81 pounds, from the PRFC's mandatory commercial harvest reporting system. The pound net fishery effort is expressed as "PN fishing days' which is one pound net fished one time (net-days fished). The term "gear days" is used to express effort for the miscellaneous gear types.

Harvest (lbs)	Gear	Effort
71	Pound Net	10 PN fishing days
10	Miscellaneous	2 gear days

We know of no directed recreational harvest of red drum. The PRFC 'adds-on' to the MRFSS phone survey. Results are reported and included as either MD or VA catch.

Tables and Figures:

Table 1 shows the annual Potomac River commercial harvest of red drum from 1988 through the reporting year.
Table 2 shows commercial pound net harvest of red drum and CPUE.

Figure 1 illustrates the Potomac River commercial red drum harvest.
Figure 2 illustrates the Potomac River commercial red drum harvest and pound net CPUE.

IV. Planned management programs for the current calendar year

A. Summarize regulations that will be in effect

The pound net fishery is a limited entry fishery, with a maximum of 100 licenses on a total riverwide basis. A pound net is defined as a fixed fishing device with one head, trap or pound measuring not less than 20 feet square at the surface of the water on the channel end and only one leader or hedging not less than 300 feet in length. We have no specific regulations for red drum.

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.

B. Monitoring programs - We will continue our mandatory daily harvest reports.

C. Any changes from the previous year. - None

Table 1

Potomac River Commercial Harvest (lbs) for Red Drum by gear type

				LBS LANDED		
YEAR	POUND NET	HOOK & LINE	MISCELLANEOUS	IN MARYLAND	IN VIRGINIA	TOTAL
1988	2	-	-	-	2	2
1989	86	-	-	-	86	86
1990	86	-	-	29	57	86
1991	3,808	-	-	1,033	2,775	3,808
1992	196	-	-	-	196	196
1993	-	-	-	-	-	0
1994	-	-	-	-	-	0
1995	-	-	-	-	-	0
1996	-	-	-	-	-	0
1997	4	-	-	-	4	4
1998	-	-	-	-	-	0
1999	186	-	-	-	186	186
2000	10	-	-	-	10	10
2001	191	-	-	-	191	191
2002	285	23	2	2	308	310
2003	47	-	-	-	47	47
2004	-	-	-	-	-	0
2005	51	-	-	-	51	51
2006	2	-	-	-	2	2
2007	58	-	-	-	58	58
2008	69	-	-	-	69	69
2009	157	-	-	35	122	157
2010	22	-	-	-	22	22
2011	3	-	-	-	3	3
2012	71	-	10	13	68	81

Table 2

Potomac River Commercial Red Drum Pound Net Harvest & CPUE

Year	Pounds	Effort	CPUE
1988	2	18	0.11
1989	86	78	1.10
1990	86	88	0.98
1991	3,808	304	12.53
1992	196	62	3.16
1993			
1994			
1995			
1996			
1997	4	8	0.50
1998			
1999	186	44	4.23
2000	10	3	3.33
2001	191	10	19.10
2002	310	75	4.13
2003	47	5	9.40
2004			
2005	51	5	10.20
2006	2	1	2.00
2007	58	12	4.83
2008	69	13	5.31
2009	157	27	5.81
2010	22	5	4.40
2011	3	1	3.00
2012	71	10	7.10

Figure 1

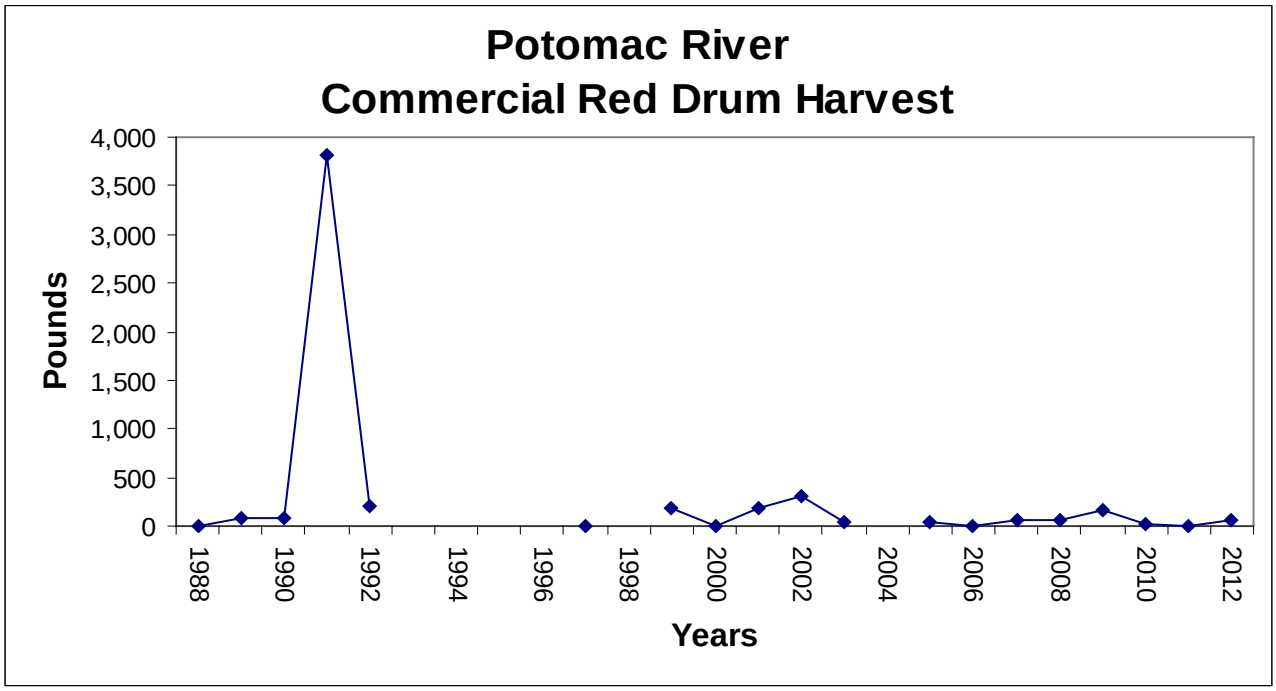
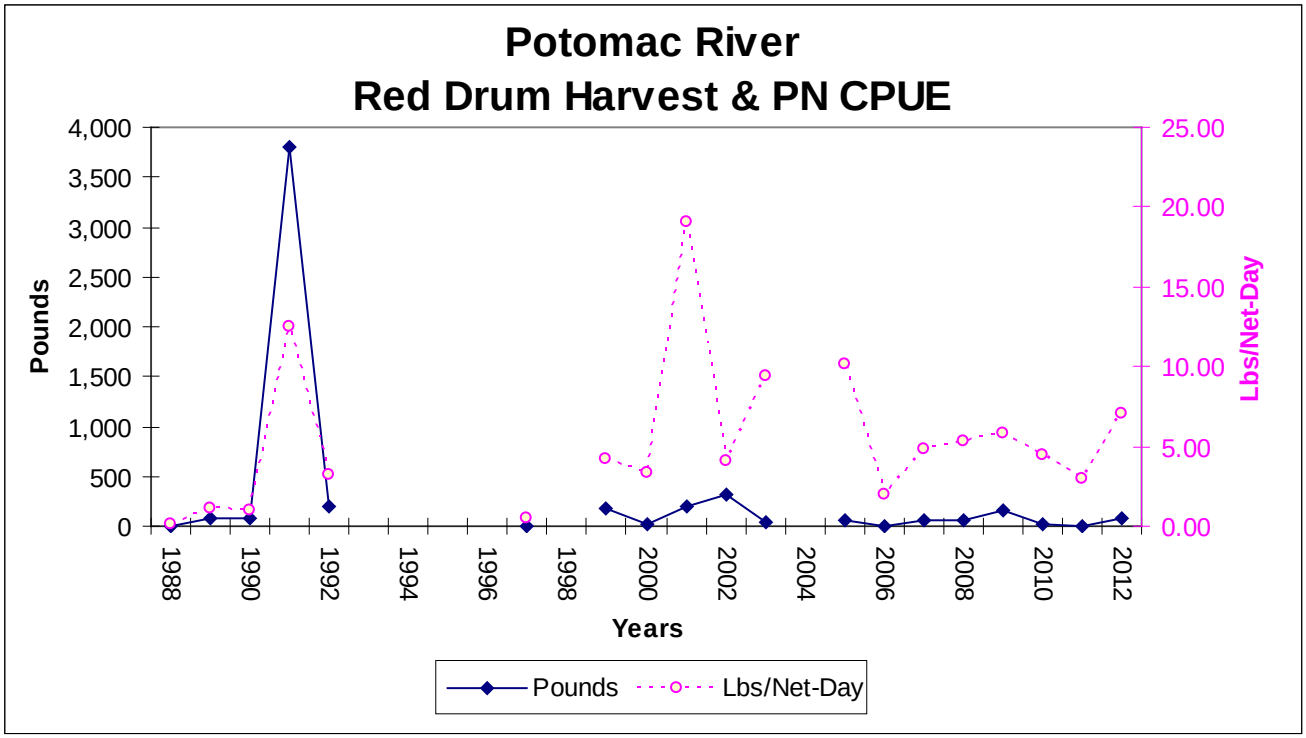


Figure 2



North Carolina's 2012 Red Drum Compliance Report
June 25, 2013

1. Introduction

The management goal for Amendment 2 is to achieve and maintain the Optimum Yield for the Atlantic coast red drum fishery as the amount of harvest that can be taken by U.S. fishermen while maintaining the Spawning Potential Ratio (SPR) at or above 40%. The regulatory requirements of Amendment 2 state that:

1) All states are required to implement red drum harvest controls (e.q. bag and size limits) in order to achieve a minimum 40% SPR.
2) A maximum size limit of 27 inches or less shall be implemented for all red drum fisheries.
3) All states must maintain current or more restrictive commercial fishery regulations for red drum, i.e. no relaxation of current fisheries management measures.

In August 2003, the ASMFC South Atlantic Board approved a motion to allow the NC Fisheries Director to raise or lower the daily commercial trip limit while maintaining the 250,000 pound harvest cap. More recently in 2009, the Board honored a request by North Carolina to monitor the annual 250,000 lb commercial cap based on a September 1 to August 31 fishing year. Changes to the fishing year were considered resource equivalent and were made to be consistent with existing monitoring conducted by North Carolina under the NC Red Drum FMP.

No regulatory changes occurred during 2012.

2. Current/Previous Years Management Program in North Carolina

a. Activity and results of fishery dependent monitoring.

Commercial red drum landings and the red drum commercial cap are monitored through the North Carolina trip ticket program. Under this program licensed fishermen can only sell commercial catch to licensed NCDMF fish dealers. The dealer is required to complete a trip ticket every time a licensed fisherman lands fish. Trip tickets capture data on gears used to harvest fish, area fished, species harvested, and total weights of each individual species. Trip tickets are submitted to NCDMF on the 10^{th} of the month following the month in which the landings occurred. Landings are available approximately 30-45 days after they are submitted from the dealers.

Commercial fishing activity is monitored through fishery dependent sampling conducted under Title III of the Interjurisdictional Fisheries Act and has been ongoing since 1982. Data collected in this program allow the size and age distribution of red drum to be characterized by gear/fishery. Predominant fisheries for red drum include estuarine gill nets, long haul seine/swipe nets, pound nets, and beach haul seines. (Assessment of North Carolina Commercial Finfisheries, North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries Completion Reports 1984-2012; NCDMF unpublished data). Over the past decade gill nets have been the dominant gear used for red drum accounting for >90% of the overall harvest. In 2012, 92% of the red drum harvest was taken in gill nets, followed by pound nets with 6%. In all, 359 red drum, primarily from set gill

nets, were measured from the commercial fishery (Table 1). With the 18 to 27 inch slot limit on harvest, nearly all landings were from age one and two year old fish.

Recreational fishing activity is monitored through the Marine Recreational Information Program (MRIP).

b. Activity and results of fishery independent monitoring.

NCDMF has conducted a juvenile red drum seine survey on an annual basis since 1991 (Survey of Population Parameters of Marine Recreational Fishes in North Carolina, North Carolina Department of Enviroment and Natural Resources, Division of Marine Fisheries Completion Report, Grant F-42, 1991-2012). The seine survey provides an index of abundance for juvenile (age-0) red drum with sampling occurring from September through November. The relative abundance of juvenile red drum is highly variable with both high and low abundance occurring in recent years. In 2012, 326 juvenile red drum were taken in 120 seine samples for an overall state mean CPUE of 2.7. The 2012 overall mean CPUE was lower than 2011 (10.9) and was lower than the long term average of the survey (5.9; Figure 1). Information gathered from this survey is currently used as an input parameter in the ASMFC Atlantic coast red drum stock assessment.

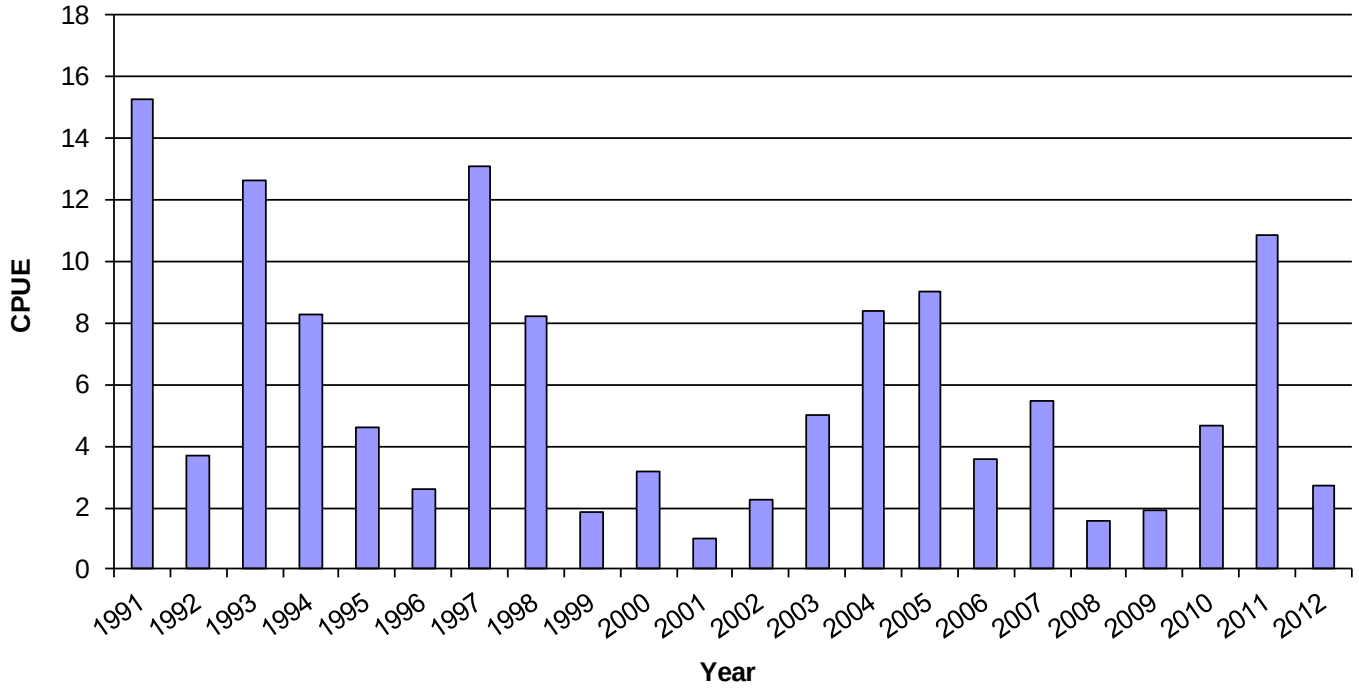


Figure 1. The annual juvenile (age-0) abundance index from the North Carolina Red Drum Juvenile Seine Survey for the period of 1991-2012.

A fishery independent gill net survey was initiated by the NCDMF in May of 2001. The survey utilizes a stratified random sampling scheme designed to characterize the size and age distribution for key estuarine species in Pamlico Sound (Pamlico Sound Independent Gill Net Survey, North Carolina

Department of Environment and Natural Resources, Division of Marine Fisheries Completion Report, Grant F-70, 1991-2012). By continuing a long-term database of age composition and developing an index of abundance for red drum this survey will help managers assess the red drum stocks without relying solely on commercial and recreational fishery dependent data. Additionally, data collected is used to help improve bycatch estimates, evaluate the success of management measures, and look at habitat usage. The overall red drum CPUE was 3.06 (n=752) in 2012, the third highest in the time series (Figure 2). The age composition for 2012 is currently unavailable but lengths from the survey are generally representative of ages 1-4. During 2012, the average fork length was 15 inches with a range of 9 to 49 inches.

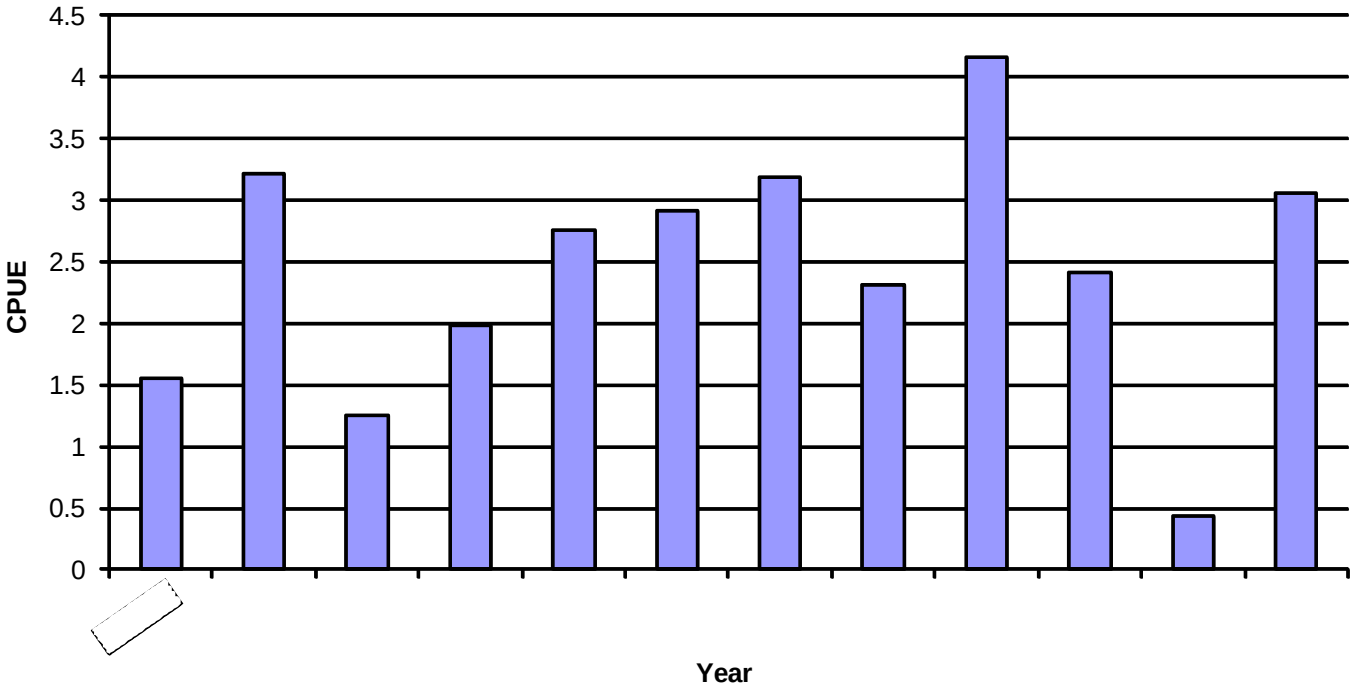


Figure 2. Annual weighted red drum CPUE (ages combined) from the North Carolina Pamlico Sound Independent Gill Net Survey.

North Carolina initiated an adult red drum longline survey in 2007 that has continued through 2012. The primary objective of the survey is to develop a sampling protocol that provides a fisheries independent index of abundance for adult red drum occurring in North Carolina. Initially, all sampling was non-random (exploratory) and was used to standardize proper methods and effort. From July through October, sampling was standardized and a stratified random sample design was implemented and has been in place since 2007. A standard sample consisted of 1,500 meters of mainline set with 100 gangions placed at 15 meter intervals (100 hooks/set). Soak times were approximately 30 minutes. All random sampling took place in Pamlico Sound. During the 2012 season, 376 red drum were captured out of 72 stratified random sets (5.2 red drum per set) which was near the time series average of 5.3 red drum per set. Red drum ranged from 30 to 50 inches fork length with most being >40 inches in length. Sampling is scheduled to continue in 2013.

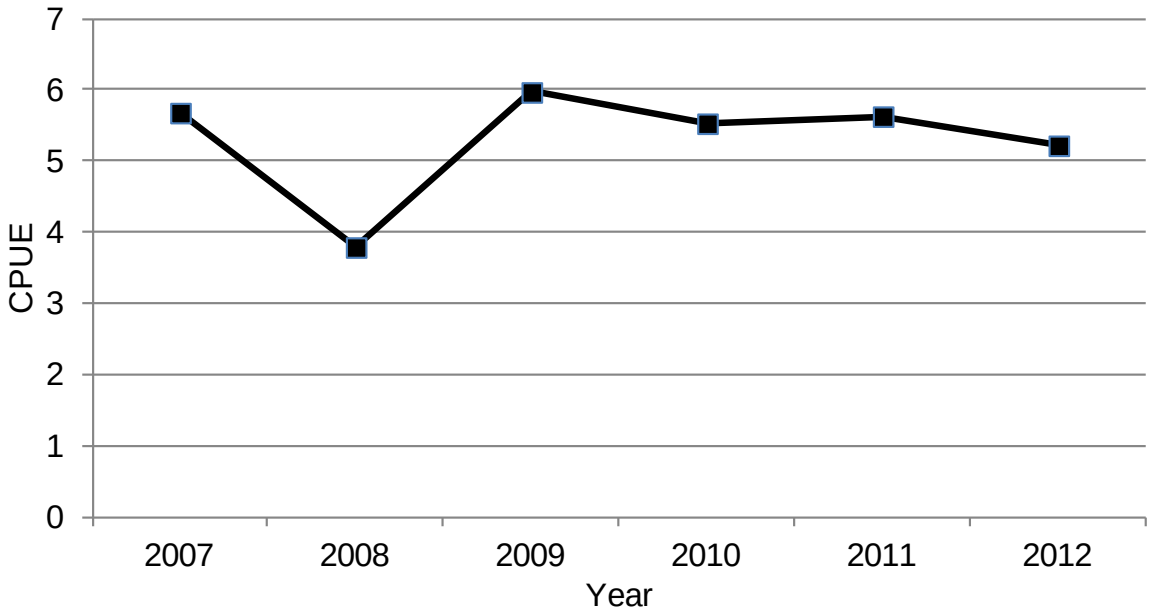


Figure 3. Red drum CPUE calculated from stratified random sampling occurring in the North Carolina Red Drum Longline Survey for the period of 2007 to 2012.

c. Regulations in effect for North Carolina in 2012.

15A NCAC 03M .0501 RED DRUM

(a) It is unlawful to remove red drum from any type of net with the aid of any boat hook, gaff, spear, gig, or similar device.

(b) It is unlawful to take or possess red drum taken by any boat hook, gaff, spear, gig, or similar device.

(c) It is unlawful to possess red drum less than 18 inches total length or greater than 27 inches total length.

(d) It is unlawful to possess more than one red drum per person per day taken-by hook-and-line or for recreational purposes.

(e) The annual commercial harvest limit (September 1 through August 31) for red drum is 250,000 pounds. The annual commercial harvest limit is allotted in two periods: September 1 through April 30 at 150,000 pounds, and May 1 through August 31 at 100,000 pounds plus any remainder from the first period allotment. Any annual commercial harvest limit that is exceeded one year will result in the poundage overage being deducted from the subsequent year's commercial harvest limit and the Fisheries Director shall adjust the period allotments accordingly. If the harvest limit is projected to be taken in any period, the Fisheries Director shall, by proclamation, prohibit possession of red drum taken in a commercial fishing operation for the remainder of that period.

History Note: Authority G.S. 113-134; 113-182; 113-221; 113-221.1; 143B-289.52;
Eff. January 1, 1991;
Amended Eff. March 1, 1996; October 1, 1992; September 1, 1991;
Temporary Amendment Eff. May 1, 2000; July 1, 1999; October 22, 1998;
Amended Eff. April 1, 2001;
Temporary Amendment Eff. May 1, 2001;
Amended Eff. April 1, 2009; October 1, 2008; August 1, 2002.

15A NCAC 03M .0512 COMPLIANCE WITH FISHERY MANAGEMENT PLANS
(a) In order to comply with management requirements incorporated in Federal Fishery Management Council Management Plans or Atlantic States Marine Fisheries Commission Management Plans or to implement state management measures, the Fisheries Director may, by proclamation, take any or all of the following actions for species listed in the Interjurisdictional Fisheries Management Plan:
(1) Specify size;
(2) Specify seasons;
(3) Specify areas:
(4) Specify quantity;
(5) Specify means and methods; and
(6) Require submission of statistical and biological data.
(b) Proclamations issued under this Rule shall be subject to approval, cancellation, or modification by the Marine Fisheries Commission at its next regularly scheduled meeting or an emergency meeting held pursuant to G.S. 113-221.1.
History Note: Authority G.S. 113-134; 113-182; 113-221; 113-221.1; 143B-289.4;
Eff. March 1, 1996;
AMENDED EFF. OCTOBER 1, 2008.

Under proclamation authority the NCDMF Director maintains the following restrictions:

- Commercial trip limit - set by NCDMF Director at a level that reduces discard mortality while still maintaining harvest below the commercial cap. Unchanged at 10 fish per day during 2012.
- 50% bycatch rule - no person may possess red drum incidental to any commercial fishing operation unless the weight of the combined catch of finfish (excluding menhaden) exceeds the weight of the red drum retained.

The intent of these rules are to prevent the targeting of red drum and to only allow red drum harvest incidental to legitimate fisheries where red drum bycatch is most common.

d. Harvest by commercial (gear type), recreational, and non-harvest losses (when available)

Commercial landings in 2012 were 66,518 lb; a decrease from 2011 landings (91,951 lb) and lower than the ten-year mean of 150,663 lb (2003-2012). Gill nets dominated the catch in 2012 accounting for 92% of the commercial landings (Table 1).

Table 1. North Carolina's 2012 red drum commercial harvest (lb and percent by gear) and the number of individuals measured by NCDMF.

Gear	Landings (lb)	%	Number Measured
Long Haul/Seine Net	77	<1%	2
Pound Net	4,065	6%	28
Gill Net	61,178	92%	329
Other Gears	1,198	2%	0
Total	66,518	100%	359

In addition to calendar year landings, North Carolina monitors the 250,000 lb annual cap based on a fishing year starting September 1 and ending August 31. For the 2008/2009 fishing year, landings totaled 148,875 lb. During the 2009/2010 fishing year, North Carolina exceeded the 250,000 lb annual cap with landings totaling 275,858 lb. Under the compliance requirements of Amendment 2, North Carolina was required to reduce the 250,000 lb cap in 2010/2011 by 25,858 lb. Landings during the 2010/2011 fishing year totaled 126,185 lb. In the most recent fishing year, 2011/2012, landings totaled 94,210 lb.

Table 2. North Carolina's annual commercial harvest based on a fishing year beginning September 1 and ending August 31.

Fishing Year	Landings (lb)	Annual Cap
2009/2010	275,858	250,000
2010/2011	126,185	224,142*
2011/2012	94,210	250,000
2012/2013	TBD	250,000

*adjusted to pay back overage in 2009/2010 fishing year

Recreational landings in 2012 were 238,310 lb; a slight increase from 2011 landings (212,245 lb) and near the ten-year average (2003-2012 – 229,575 lb).

Non-harvest loss in the commercial fishery is currently not fully known. The primary loss is likely due to undersized bycatch of red drum in the gill net fishery. Small mesh gill nets (<5 inch stretch mesh) select for red drum less than 18" TL and are a significant source of the bycatch mortality, particularly in months when water temperatures are high. In October of 1998, as part of the state NC Red Drum FMP, measures were taken requiring the attendance of small mesh gill nets (<5" stretch mesh). These regulations required the attendance of small mesh gill nets from May 1 through October 31 in areas known to be critical for juvenile red drum. Amendment 1 to the NC Red Drum FMP, passed in 2008, takes further action by extending small mesh gill net attendance rules through November.

Adequate NCDMF observer data is available to provide some estimates of estuarine gill net discards from 2004 to 2006. Total dead red drum discards were estimated by multiplying the total number of trips for a fishery (NC Trip Ticket Program) by the CPUE (number or weight of dead red drum discards per observed trip) of that fishery. Overall, estimates of dead discards ranged from 20,142 lb in 2004 to 68,997 lb in 2005 and represented between 20% and 39% of the total commercial removals by weight. The majority of the dead discards were undersized (<18 inch). By number, commercial dead red drum discards represented approximately 50% of the total commercial removals. Estimates from this study were included in the most recent stock assessment (SEDAR 18).

Non-harvest loss in the recreational fishery is primarily the result of regulatory discards. The total number of releases in the recreational fishery is estimated through the MRIP. The most recent stock assessment assumes an 8% mortality rate for all releases. With the low recreational bag limit of one fish and an increasing trend in the catch and release fishery, non-harvest losses are a significant contributor to the overall fishing mortality in the red drum fishery. Beginning in 2009, as a result of Amendment 1 to the NC Red Drum FMP, barbless circle hooks along with short leaders and fixed sinkers are required in the

Pamlico Sound adult red drum fishery from July through September. The rule applies to anyone fishing at night using natural bait and a hook size greater than 4/0. This rule is designed to reduce deep hooking which traditionally was common in this fishery. Research has shown that for this fishery, circle hooks rigged in this fashion can significantly reduce discard mortality.

e. Review of progress in implementing habitat recommendations.
No new implementation at this time.

3. Planned management program for the current calendar year.
   a. Regulations Summary
   In compliance with the requirements of the ASMFC Red Drum Amendment 2 FMP North Carolina will continue under its current management program.
   North Carolina's current regulations:
   - Maintain a prohibition on the possession of all red drum <18 inches or >27 inches TL
   - Maintain the current recreational bag limit at 1 fish
   - Maintain a commercial trip limit along with the 50% bycatch requirement. Director maintains the authority to adjust the trip limit as necessary to avoid commercial cap overages and to prevent excessive discards.
   - Maintain commercial landings within the commercial cap (250,000 lb) based on a September 1 to August 31 fishing year and implement management measures that require that any annual overages in the commercial cap be deducted from the following year (see 3c. below).
   - Require attendance of small mesh gill nets from May 1 through November 30 in order to help reduce non-harvest mortality in the commercial fishery (See Section 2d).

   b. Current monitoring programs outlined in Section 2a,b will be continued.

   c. Changes from previous year.
   No changes planned.

South Carolina

Red Drum Fishery and Management Program

Compliance Report for the Year 2012

July 1, 2013

Prepared by: Erin Levesque, Eric Hiltz & Steve Arnott
Marine Resources Division
South Carolina Department of Natural Resources

I. INTRODUCTION

The red drum, ***Sciaenops ocellatus***, is one of the most sought after recreational fish species along the South Carolina coastline, with a status equivalent to that of striped bass in the mid-Atlantic and southern New England states.

Anglers of all modes (beach-bank, private-rental boats and charter boats) target a variety of sizes of red drum in both the estuarine and near-shore coastal waters of South Carolina. Initial analysis of fishery dependent and fishery independent data in the 1980s showed that red drum were overfished along the southeastern coast of the U.S., with survival of young fish until sexually maturity considered insufficient to ensure a 'healthy' spawning stock biomass.

A series of management measures were put in place to reduce fishing mortality to levels that permitted sufficient escapement of sub-adults into the adult spawning population. These included US Exclusive Economic Zone regulations that banned both recreational and commercial harvest, and South Carolina state water regulations that banned commercial harvest and imposed new recreational regulations, including seasonal gear restrictions and size, slot and bag limits.

The history of changes in the management measures passed by the South Carolina legislature and signed into law by the governor was summarized in a document entitled "Marine Resources Division Background Information Related to Red Drum Creel Limits" by David Whitaker and Mel Bell on April 27, 2005. The authors indicated that South Carolina's creel and size limits for red drum have changed at least seven times within the past 20 years (**Table 1**). A full history of regulations for all the Atlantic states is available from the SEDAR 18 stock assessment[1].

The 2006 session of the South Carolina legislative process resulted in the most recent changes to red drum regulations within the state. These modification were implemented in 2007 and increased the bag limit to three fish per angler per day (previously two), but decreased the maximum allowable size by one inch, with a new slot of 15 to 23 inches total length (previously 15 to 24 inches). Gear restrictions remained unchanged, allowing for capture by rod and reel (year-round) or by gig (March through November).

II. REQUEST FOR *de minimis*

Not applicable.

[1] SEDAR18-DW03 Atlantic States Red Drum Management Overview

III. PRESENT RED DRUM FISHERY AND MANAGEMENT PROGRAM

A. Fishery Dependent Monitoring:

Current fishery dependent monitoring only covers the recreational sector, since commercial harvest was banned when red drum was designated a state game fish in 1987.

Fishery dependent data on red drum are available through the SCDNR State Finfish Survey (SFS), the National Marine Fisheries Service's Fisheries Statistics Division, and a SCDNR-managed mandatory trip reporting system for licensed charter boat operators.

Additional biological data are obtained by SCDNR staff from (i) angler-donated fish carcasses left at prescribed freezer drop-off locations (freezer program), (ii) measurements and biological samples taken from fish at tournament weigh-ins (although most tournaments have now eliminated red drum as a target species), (iii) fishery-based evaluation of the impacts of SCDNR's experimental red drum stocking program, and (iv) public participation in various SCDNR tag-return programs. The size composition of harvested red drum measured at tournaments and from the freezer program is shown in **Fig. 1**.

State Finfish Survey (SFS) - The SFS is a fishery dependent survey designed to collect catch, effort and length data for certain species taken by private boat anglers in either South Carolina state waters or adjacent federal waters. Data are not collected for other fishing modes, and are available since 1988.

Among the 1,945 angler parties that were interviewed during 2012, 533 (27%) of them said they were targeting red drum. These 533 parties had a statewide mean catch rate of 0.71 red drum per targeted fishing hour and caught a total of 1,386 red drum, of which 433 (31.2%) were harvested. Together, all of the 1,945 angler parties that were interviewed (including those not targeting red drum) caught 2,381 red drum, harvesting 717 (30.1%) of them.

Marine Recreational Information Program - MRIP (formally Marine Recreational Fisheries Statistics Survey - MRFSS) – According to the catch data time series database of the National Marine Fisheries Service's Fisheries Statistics Division[1], the total number of red drum caught in South Carolina (all areas combined) by all modes of anglers in 2012 was 664,686, with 623,927 (93.9%) caught in inland waters (creeks, estuaries, etc), 28,566 (4.3%) caught within 3 miles of shore, and 12,193 (1.8%) caught further than 3 miles offshore.

[1] http://www.st.nmfs.noaa.gov/st1/recreational/queries/index.html, accessed 25 June 2012.

Of the 664,686 red drum that were caught, 543,618 (81.8 %) were released alive (B2 disposition) and 121,068 (18.2 %) were harvested (A+B1 dispositions) (**Fig. 2A**). These values were calculated using the new MRIP method[1].

The National Marine Fisheries Service estimated that 2.2 million marine recreational angler fishing trips occurred in South Carolina during 2012, which is higher than the 1.8 million trips estimated for 2011 (**Fig. 2B**). Most of the trips occurred in inland waters (1.2 million trips, or ~55%), followed by coastal waters (≤ 3 miles from shore; 0.9 million trips, or ~41%) and then offshore waters (> 3 miles from shore; 0.1 million trips, or ~5 %).

Charter Vessel Trip Reporting – Since 1993, the Statistics Section of the Office of Fisheries Management at SCDNR has implemented a mandatory trip reporting system for participants in the charter boat fishery. The main target species of the inshore component of the charters is red drum. There has been a general growing trend in the number of captains that carry patrons to fish for red drum, with a total of 425 active vessels licensed in 2012. The fishery is conducted throughout the year, and more charter boat activity occurs in the central and southern parts of the state (from Winyah Bay south) because there are many more large bays and sounds that provide appropriate habitat for red drum. The fishery targets a wide range of sizes, with the majority of the catch being sub-adult red drum (< 5 years old). Most captains either require, or strongly suggest, the practice of catch and release, even for legal-size fish.

Based on mandatory logbook reports, a total of 4,883 targeted charter boat trips took place during 2012 (out of a total of 12,195 charter boat trips). The targeted trips caught 33,473 red drum (mean of 6.8 red drum per targeted trip), of which 31,242 (93.4%) were released alive, 30 (<0.1%) were released dead and 2,201 (6.9%) were harvested. Among all 12,195 trip (targeted or not), a total of 43,086 red drum were caught, of which 40,069 were released alive (93.0%), 37 were released dead (< 0.1%) and 2,980 were harvested (6.9%).

Prior to 1999, only the total release rate was recorded (i.e. alive + dead releases). However, over the last decade the release rate of live red drum by charter boats has remained fairly steady (mean = 93.9%), as has the release rate of dead red drum (mean = 0.1%).

South Carolina Marine Game Fish Tagging Program – Since 1974, the SC Marine Resources Division's Office of Fisheries Management has operated a tagging program that trains volunteer anglers to deploy external tags in marine game fish. The program serves as useful tool for promoting the conservation of marine game fish, and partnering with the public has proved an efficient and cost-effective way of collecting data that incorporates anglers into the data acquisition process. In 1993, anglers tagging red drum were asked to concentrate their efforts on fish over 18 inches and to not place tags in smaller fish. Before this request,

[1] See http://www.countmyfish.noaa.gov/aboutus/downloads/MRIP_Catch_Estimation_Presentation_(Jan_26).pdf

red drum of all sizes were routinely tagged. In 2012, volunteer taggers were asked to tag red drum of all sizes once again.

Historically, red drum has accounted for most of the tagging activity by volunteer anglers. During 2012 the species accounted for 60% of all fish tagged, with tags being applied to 722 red drum ranging from 12-48 inches total length (mean = 21.8 inches). There were 71 reported recaptures of red drum during 2012, of which 66 (93%) were released alive.

B. Fishery Independent Monitoring:

SCDNR uses three fishery independent surveys to monitor the abundance of red drum in South Carolina waters. These include an electrofishing survey, which catches juvenile and sub-adult red drum in upper estuary nursery habitats; a trammel net survey, which catches larger sub-adults in lower estuary habitats; and a longline survey, which catches large adult fish in deeper sounds and outside the estuaries. Nearly all of the captured red drum are released alive, with those ≥ 350 mm receiving an external tag. Scales are removed from some of the red drum caught in the electrofishing and trammel net surveys for ageing purposes, and some red drum are sacrificed for other biological sampling purposes (otolith ageing, reproductive assessment, mercury analysis, parasite studies, etc). A small fin clip (< 1 cm^2) is also taken from every captured red drum and archived by the SCDNR Genetics Laboratory. The data from the surveys are used for examining aspects such as abundance indices, age and sex composition, age and size at maturity, movement patterns and genetic structure of the population.

Data from all of the SCDNR fishery independent surveys, describe below, were incorporated into the most recent stock assessment of red drum[1].

Inshore Fisheries Program – Electrofishing Survey

In 2001, SCDNR began operating a stratified random electrofishing survey of upper estuarine habitats. The survey uses a dedicated Smith-Root electrofisher boat, and currently covers five strata each month (the Combahee and Edisto Rivers, entering the ACE Basin in St. Helena Sound; the Ashley and Cooper Rivers, entering Charleston Harbor; and the Waccamaw River, entering Winyah Bay). From May 2001 through December 2012, a total of 3,388 random electrofishing sets were made in these five strata, with 290 occurring in 2012.

The mean catch per unit effort (CPUE) of red drum pooled across all electrofishing strata was the same in 2012 as 2011 (2.43 red drum per set in both years), with decreases occurring in three of the strata (Cooper, Ashley and Edisto) and increases occurring in the remaining two strata (Winyah and Combahee) (**Fig. 3**).

[1] SEDAR 18.

Inshore Fisheries Program – Trammel Net Survey

The SCDNR trammel net survey began in late 1990. It uses a stratified random sampling design and initially covered two strata (Charleston Harbor and the lower Wando River). Since then, it has expanded and presently covers seven monthly strata and two quarterly strata. The monthly strata include ACE Basin, lower Ashley River, lower Wando River, Charleston Harbor, Muddy/Bulls Bay, Cape Romain and Winyah Bay. The quarterly strata include Colleton River and Broad River, both located within Port Royal Sound in the southern part of the state. A total of 15,600 random trammel sets were made in these nine strata from January 1991 through December 2012, with 970 occurring in 2012.

Compared with 2011, the mean CPUE of red drum declined in seven of the nine trammel net strata during 2011, but increased slightly in Broad River and Winyah Bay (**Fig. 4**).

Previous analyses have shown that annual changes in red drum CPUE fluctuate in a relatively synchronous manner across estuaries along the South Carolina coastline[1]. Based on this assumption, and after standardizing CPUE from each stratum onto a common scale of z-scores (**Fig. 5**), it is evident that red drum in South Carolina has undergone several multi-year oscillations. A general decline occurred during the mid- to late-1990s before a general increase from 2000-2004 (**Fig. 5A**) due to a series of strong year classes. Since then, the population has gone through a smaller oscillation, peaking again in 2010, before declining to its relatively low present level. These trends are evident in both the trammel (**Fig. 5A**) and electrofishing (**Fig. 5B**) surveys, although the electrofishing trend tends to precede the trammel net trend by one year because it targets younger fish (electro vs trammel 1yr lagged cross-correlation; $r = 0.85$, $p < 0.001$; **Fig. 5C**).

Inshore Fisheries Program - Ocean Bottom Longline Survey

The longline survey began in 1994. At that time, it used one-mile, 120 hook sets and visited a relatively small number of fixed stations. The data were used for determining preliminary estimates of adult red drum abundance, as well as size and (partial) age composition.

In July 2007, the longline survey was redesigned. It now uses shorter gear (third-mile, 40 hook sets) and covers many more stations (>340) spread over a larger extent of the South Carolina coastline. Stations are sampled using a stratified random design to give more rigorous estimates of fish abundance. Sampling occurs in August – December in four strata located off Winyah Bay, Charleston Harbor, St Helena Sound and Port Royal Sound. A total of 2,347 random sets have been deployed by the new longline survey since July 2007, with 361 of these sets performed in 2012.

[1] Arnott et al. (2010) *Mar Ecol Prog Ser*. 415: 221-236.

In general the longline survey catches red drum in post-spawning condition (based on gross and histological assessments of sacrificed fish), with CPUE tending to increase from August through October before declining again through December. The distribution of red drum also tends to shift from near-shore stations (presumed spawning habitat) towards offshore stations as the sampling season progresses (**Fig. 6**).

Due to the relatively short duration of the survey (only five years of information), it is too soon to explore any meaningful long-term trends in the adult red drum population. However, a portion of adult red drum caught by the longline surveys has been sacrificed to determine age composition of the adult stock. Prior to 2007, only small size classes of red drum were selectively sacrificed, but since then, all size classes have been taken (as requested by the Atlantic States Marine Fisheries Commission). Under the new system, a total of 427 fish have been randomly sacrificed or collected as a result of mortality during the survey (98 in 2012). The year class composition of these fish (n = 427 aged, to date) is shown in **Fig. 7**, and further analysis has shown that a significant correlation exists between these adult year class data and the corresponding juvenile recruitment indices determined from the electrofishing and trammel net surveys[1].

Inshore Fisheries Program – Tagging Studies

The trammel net, electrofishing and longline surveys each have a tag-recapture component. The tagging data have been used for a variety of purposes, such as estimating angler tag-reporting rates[2], calculating mortality[3] and examining movement patterns.

By the end of 2012, the trammel net survey had tagged a total of 46,680 red drum, including 1,624 that were tagged during 2012. The electrofishing survey has tagged far less red drum because it was initiated more recently and catches fewer red drum per year, especially in the range big enough to tag (i.e. ≥ 350 mm). From 2001 – 2012, the electrofishing survey tagged a total of 6,416 red drum, including 572 in 2012.

Historically, the sub-adult, shallow water component of the red drum population was also tagged by some other (now discontinued) surveys. These included a stop net survey, which tagged a total of 4,608 red drum between 1986 and 1998, and a separate trammel net survey (different net dimensions), which tagged a total of 3,665 red drum between 1994 and 1997.

By the end of 2012, the above-mentioned sub-adult tagging programs, together, resulted in a total of 27,114 reported tag recapture events, including 12,815 recaptures by recreational anglers and 14,299 recaptures by SCDNR surveys.

[1] Arnott et al. (2010) *Mar Ecol Prog Ser*. 415: 221-236.
[2] Denson et al. (2002) *Fish Bull*. 100: 35-41.
[3] Latour et al. (2001) *N Am J Fish Manag*. 21: 733-744.

During 2012 alone, 314 reported tag recapture events occurred, with 218 by anglers and 96 by SCDNR surveys.

The SCDNR tag recapture data indicate that there has been a notable long-term increase in the proportion of fish released alive, rising from < 10% in the mid-1980s to ~80% in recent years. This trend closely reflects those seen from other data sources, including MRFSS, the SCDNR State Finfish Survey and the Charter Vessel Trip Reporting program (**Fig 8**). The release rate from chartered trip tends to be higher than other sectors, which is not surprising since the charter captains encourage their customers to release fish. Nevertheless, the general increase in release rates over time is probably due to a combination of regulatory changes (**Table 1**), as well as a shift in fishing ethic among the angling public. This shift is evident from the fact that there has also been an increase in the percent of legal-sized fish released alive, despite more stringent harvest regulations. The observed change in angler behavior over time implies that inadvertent mortality caused by hook injuries[1] may be of increasing importance in managing and assessing the population.

The old and new longline surveys have also tagged adult red drum since 1994. Many of the tagged fish have been multiple-tagged using a combination of two types of plastic darts, a stainless steel dart tag and a PIT tag (passive integrated transponder tag). The purpose of the multiple tag study was to examine tag retention[2]. A number of tagged fish have also been injected with tetracycline to validate annulus formation in the adult otoliths.

The old long-line survey that ran from 1994-2006 (1 mile, 120 hook sets) tagged 2,703 adult red drum. Since the inception of the randomly stratified longline survey in 2007 (third mile, 40 hook sets), 1,578 red drum have been tagged, including 535 in 2012. During 2012, 14 of the longline-tagged red drum were recaptured by the longline survey itself, and a further 15 were recaptured by recreational anglers. All (100%) of these angler recaptures were released alive.

Data from all these surveys have been archived in electronic databases and have been made available to biologists during assessments.

C. Red Drum Regulations in Effect:

South Carolina's current red drum-related fisheries regulations meet all management plan compliance criteria listed in Section 5.1.1.1 of Amendment 2 to the ASMFC Interstate Fishery Management Plan for Red Drum (June 2002).

Harvest controls – Recreational anglers are limited to three fish per person per day in state waters and no harvest in federal waters. Red drum must be between 15 and 23 inches total length to be retained. Fish may be taken by rod and reel

[1] Vecchio & Wenner, 2007. *N Am J Fish Manag*. 27: 891–899.
[2] Hendrix, C. (2010). Master's Thesis, College of Charleston, Charleston, SC.

year-round, or by gigging November through March. The state's combination of bag limit and size limits are within the recommended range.

Maximum size limit – Retained red drum must be no greater than twenty-three inches total length, which is below the ASMFC-required a maximum of twenty-seven inches or less.

Commercial restrictions – Commercial harvest of red drum is prohibited in South Carolina, as is the sale of native caught fish.

D. Red Drum Harvest:

Recreational harvest data - The National Marine Fisheries Service's Fisheries Statics Division estimated that the recreational harvest of red drum during 2012 was 121,068 fish, which was lower than the 161,503 estimated for 2011 (see section A, above, and **Fig. 2**).

Commercial harvest data – Not applicable.

Non-harvest losses – Non-harvest-related losses undoubtedly occur in red drum stocks, whether from by-catch associated with other legitimate fisheries, or losses related to dramatic weather events. No specific program currently exists to track such losses.

E. Progress Related to Habitat Recommendations:

Through about three decades of experience, monitoring and research, SCDNR scientific and fisheries management staff has amassed a significant amount of general and specific knowledge pertaining to the different habitats of importance to the success of red drum in the state's estuarine and nearshore coastal waters. Much of this knowledge has been acquired through the significant efforts of the various on-going fishery independent and fishery dependent programs previously described. However, no specific section, program or project within the SCDNR has been assigned responsibility for oversight or implementation of the specific red drum-related habitat conservation and restoration recommendations listed in Section 4.4 of Amendment 2 to the Red Drum Plan. Current habitat development-focused projects, such as those responsible for the restoration of estuarine oyster reefs[1], may provide some benefit to juvenile and sub-adult red drum in some areas, but evaluation of any potential benefit is needed before this can be fully substantiated.

IV. PLANNED RED DRUM MANAGEMENT PROGRAM FOR 2013

A. Summary of Regulations:

[1]South Carolina Oyster Reef Restoration Program, http://score.dnr.sc.gov/

No changes foreseen

B. Planned Monitoring Activities:

Fishery dependent and fishery independent red drum-related monitoring activities described for 2012 will continue in 2013 without significant change.

C. Changes from 2012

No changes in South Carolina's current overall red drum management program or strategy are anticipated to occur in 2013.

V. PLAN SPECIFIC REQUIREMENTS

Not applicable.

Table 1. History of changes in red drum size and bag limits in the South Carolina recreational fishery.

Year	Action
1986	No creel limit; Minimum size 14 inches TL, June 1- Sept. 1; May keep one fish per day greater than 32 inches TL
1987	Game fish status (no commercial harvest); Creel limit set at 20 fish per day; May keep one fish per day greater than 32 inches TL
1988	14-inch TL minimum, June 1 to October 1; 20 fish creel, one fish greater than 32 inches
1990	Creel limit is 20 fish per day; Slot limit of 14 to 32 inches TL established; May keep one fish greater than 32 inches TL in State Waters; So. At. Fish. Mgt Council prohibits retention of red drum in Federal Waters
1991	Creel limit reduced to 5 fish per day; Slot limit remains at 14-32 inches TL; May keep one fish greater than 32 inches TL
1993	Creel limit remains at 5 fish per day; Slot limit is changed to 14 to 27 inches TL; No larger fish may be retained.
2001	Creel limit is reduced to 2 fish per day; Slot limit slot is modified to 15 to 24 inches TL.
2007	Creel limit is raised to 3 fish per day; slot limit is modified to 15 to 23 inches TL

Fig. 1 Size composition of red drum sampled by the SCDNR recreational freezer and tournament programs. Dash lines indicate the most recent slot limit of 15”-23”, which was implemented during 2007.

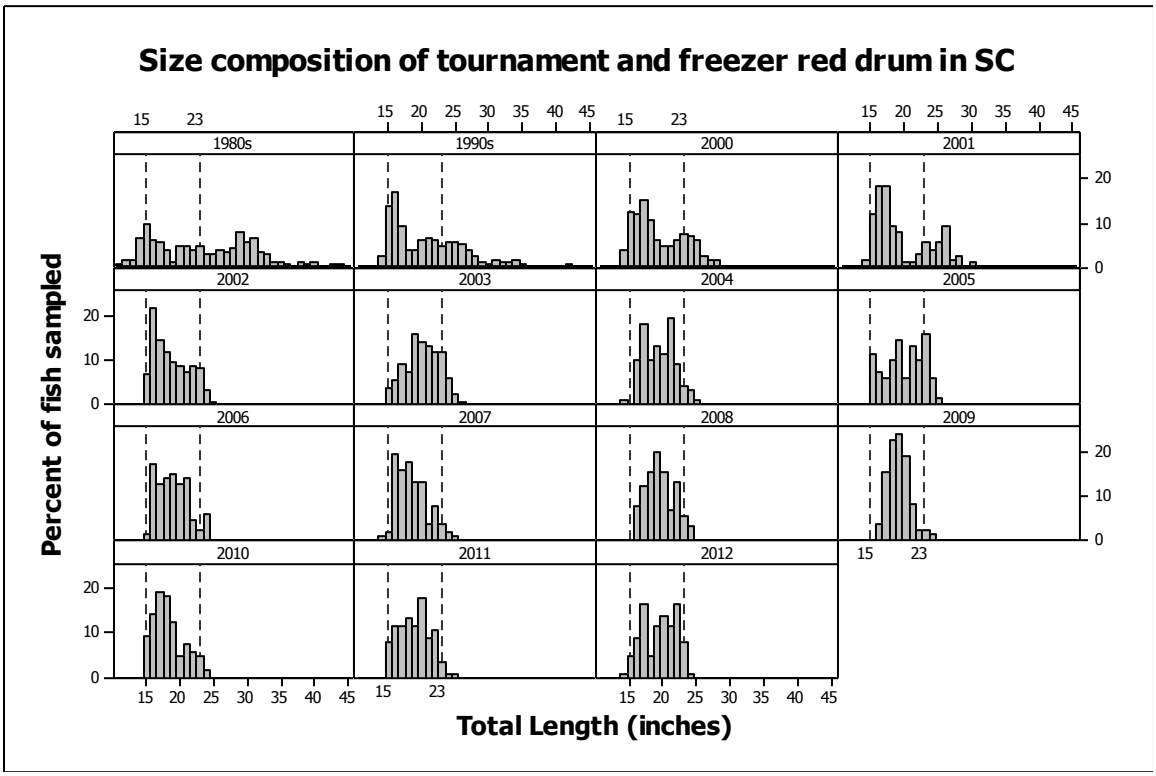
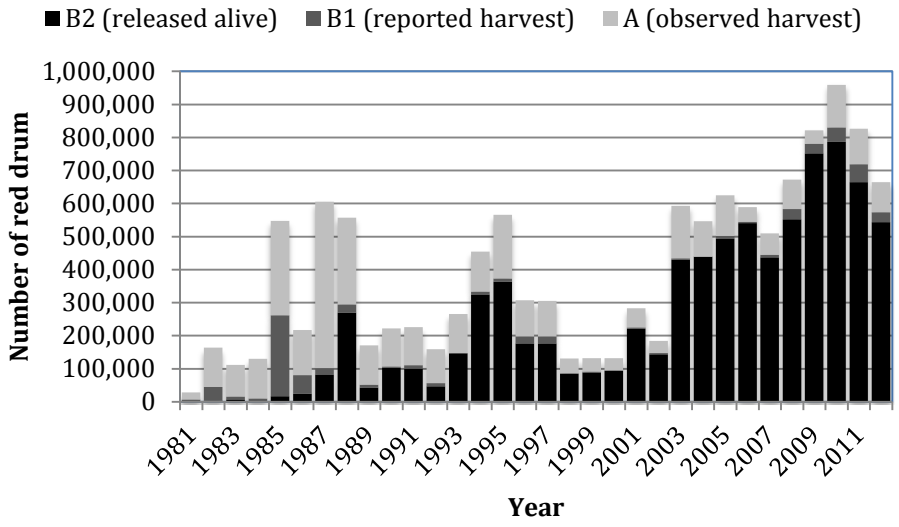
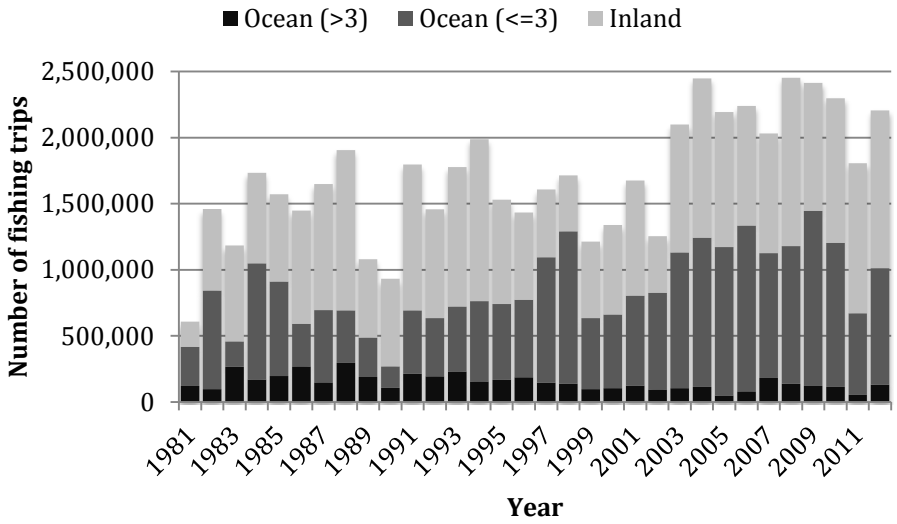


Fig. 2 (**A**) Annual estimates of the number of red drum caught in South Carolina since 1981, by disposition. (**B**) Annual estimates of the number of fishing trips per year in South Carolina, by area. (Note: "Inland" refers to brackish creeks, estuaries, bays, sounds, etc.). Data are from the National Marine Fisheries Service, Fisheries Statistics Division[1].

A



B



[1] http://www.st.nmfs.noaa.gov/st1/recreational/index.html, accessed June 25, 2012.

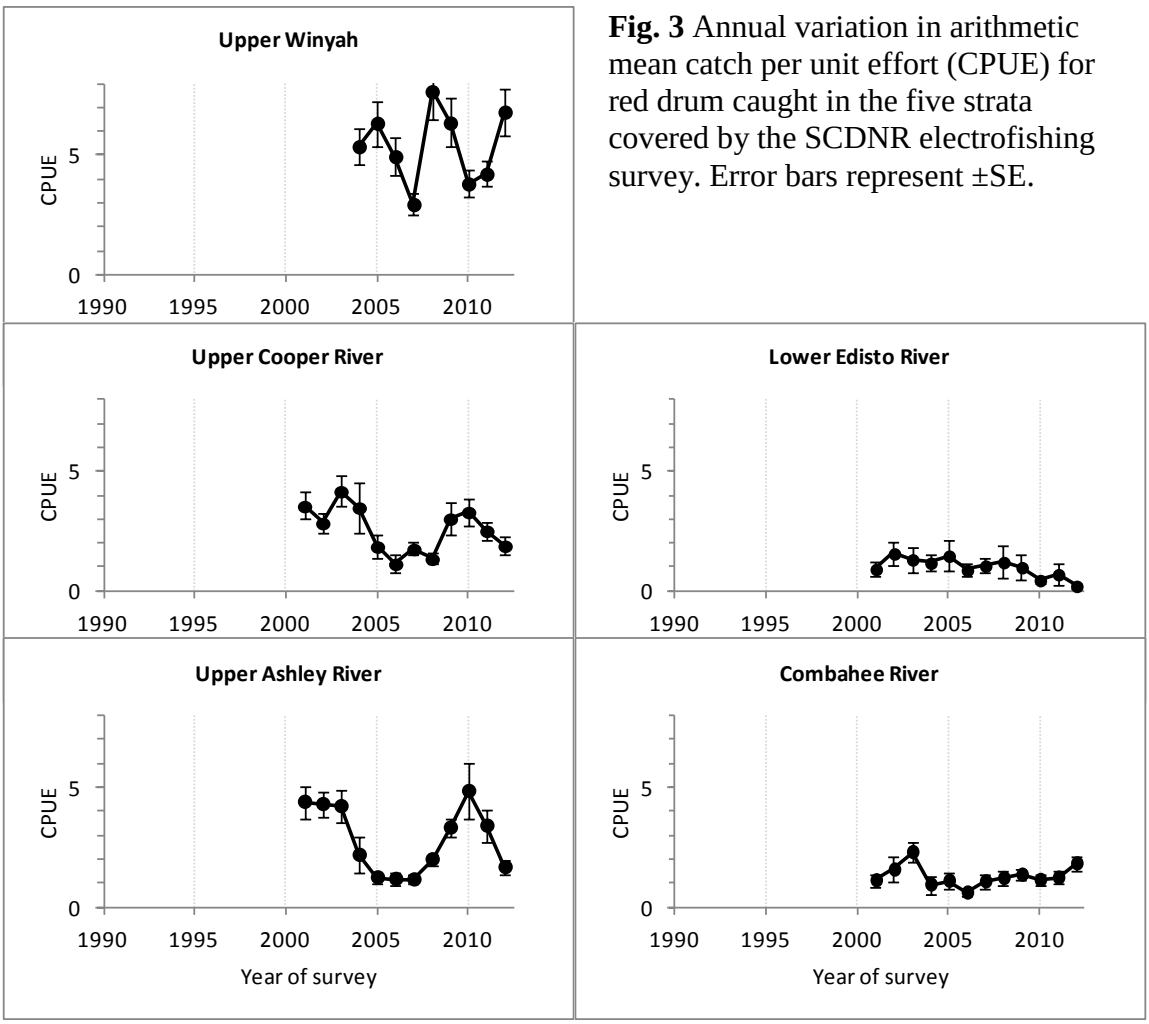


Fig. 3 Annual variation in arithmetic mean catch per unit effort (CPUE) for red drum caught in the five strata covered by the SCDNR electrofishing survey. Error bars represent ±SE.

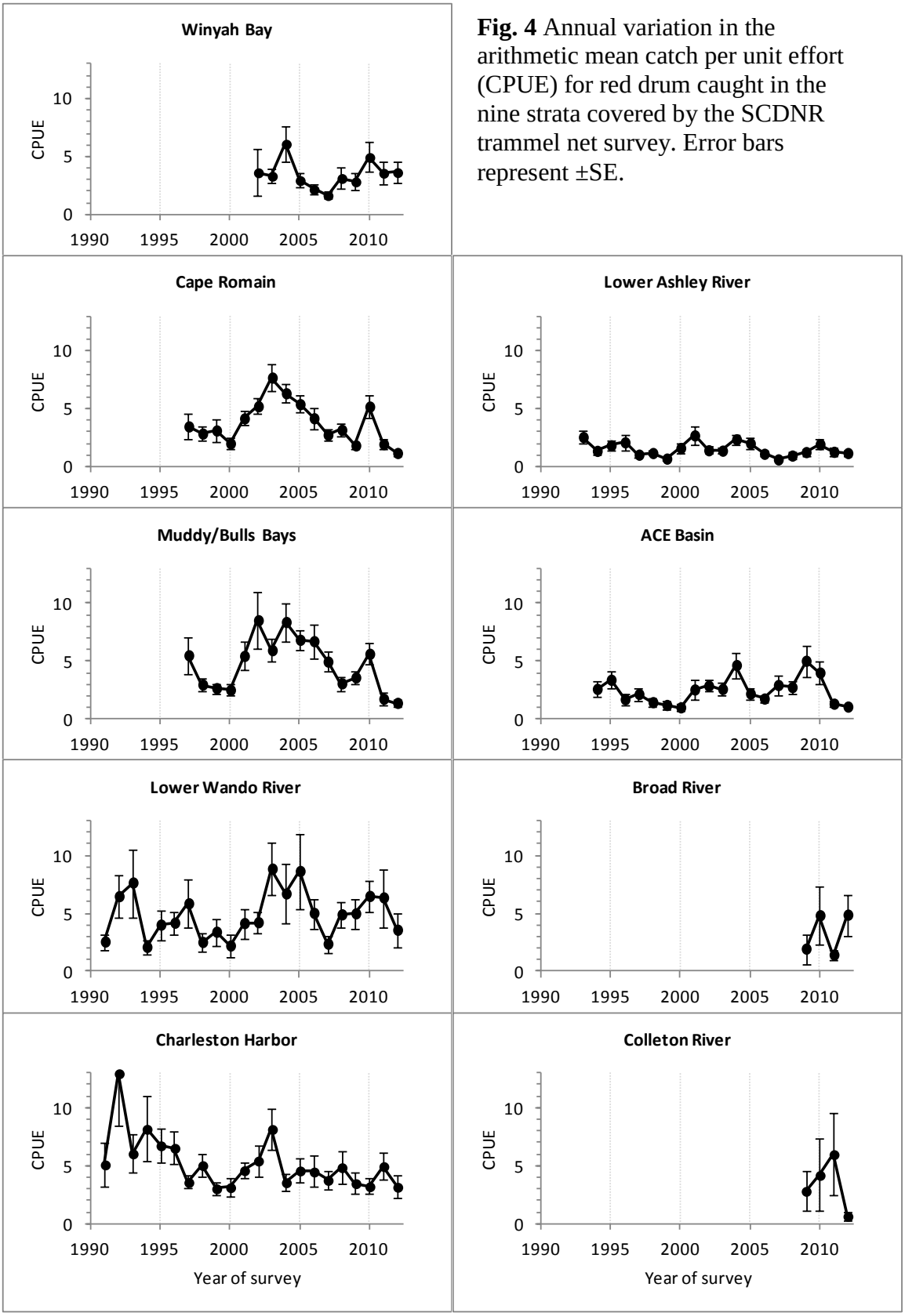


Fig. 4 Annual variation in the arithmetic mean catch per unit effort (CPUE) for red drum caught in the nine strata covered by the SCDNR trammel net survey. Error bars represent ±SE.

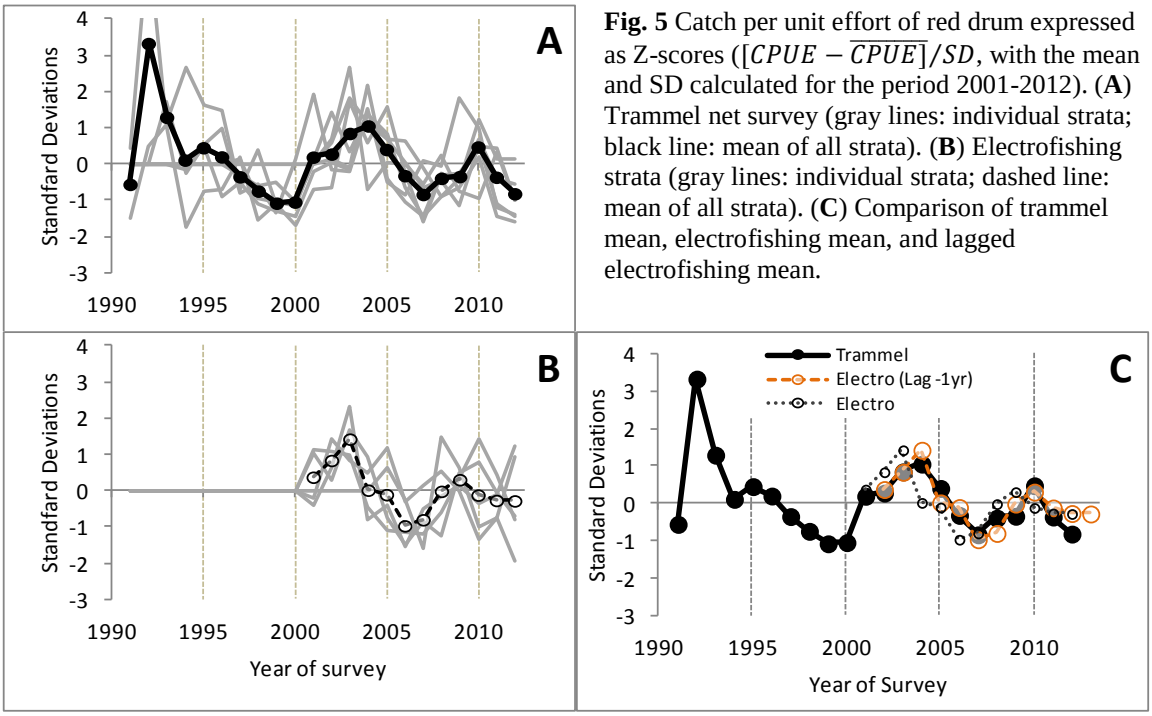


Fig. 5 Catch per unit effort of red drum expressed as Z-scores ($[CPUE - \overline{CPUE}]/SD$, with the mean and SD calculated for the period 2001-2012). (**A**) Trammel net survey (gray lines: individual strata; black line: mean of all strata). (**B**) Electrofishing strata (gray lines: individual strata; dashed line: mean of all strata). (**C**) Comparison of trammel mean, electrofishing mean, and lagged electrofishing mean.

Fig. 6 Arithmetic mean CPUE (±SE) of adult red drum caught by the SCDNR longline survey during the months August-December. Data are shown for random sets (third-mile, 40 hook sets) in the inner (nearshore) and outer (offshore) stations, pooled from 2007-2012.

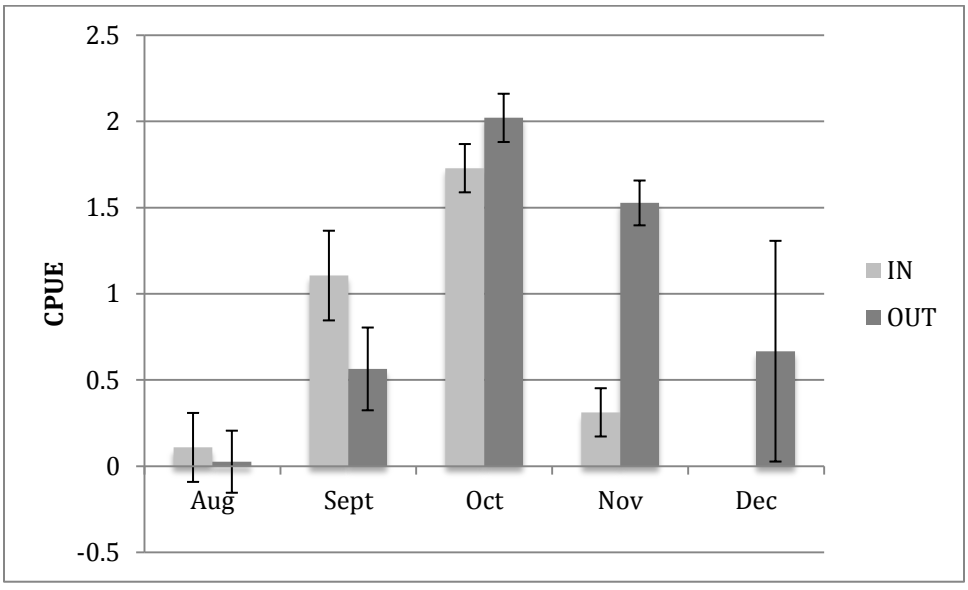


Fig. 7 Year class composition of sacrificed adult red drum caught by the SCDNR longline survey between 2007 and 2012 (n=427).

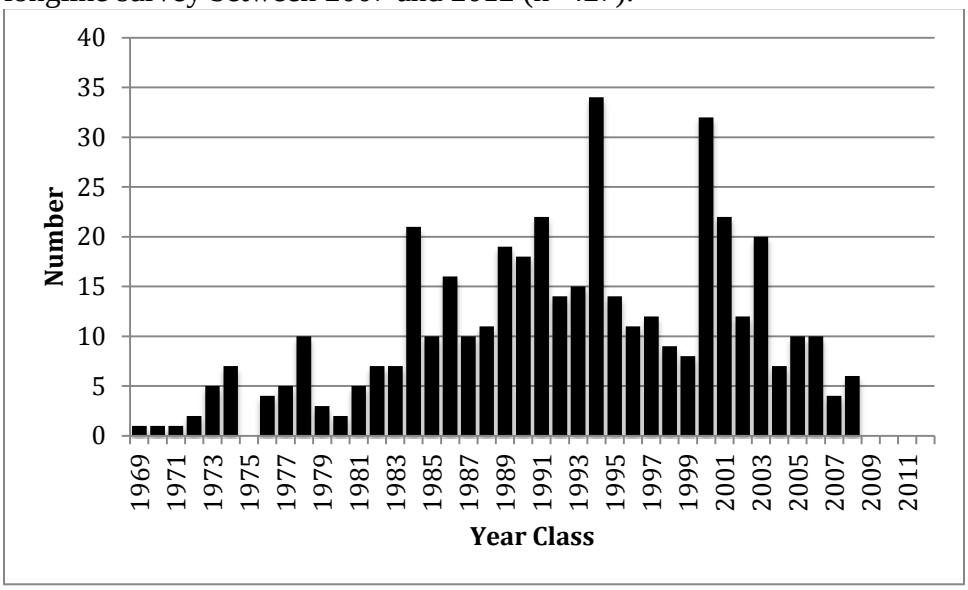
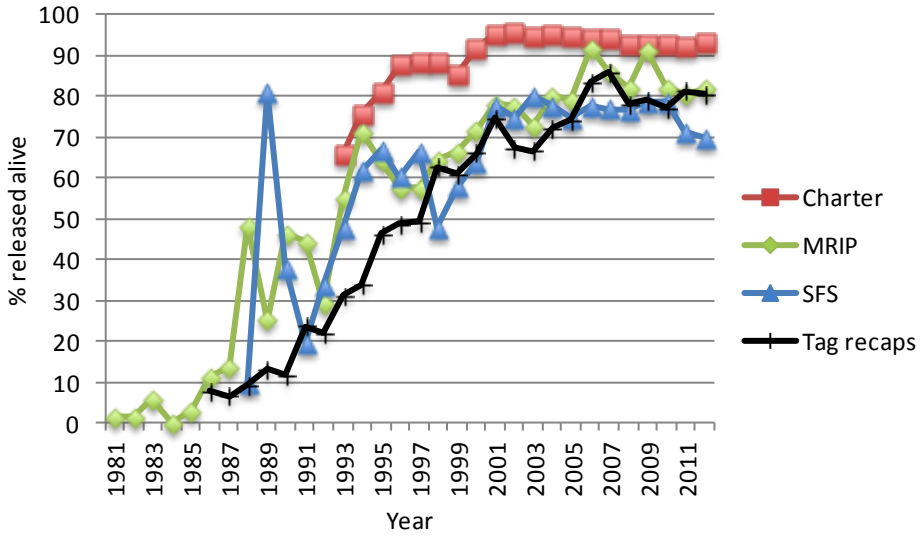


Fig. 8 Estimated annual percentage of B2 red drum (released alive) based on data from MRIP, tag return information from the SCDNR Inshore Fisheries tagging program, SCDNR charter boat logs, and the SCDNR State Fishery Survey.



Note: Prior to 1999, charter boat data includes releases of both dead and alive red drum. Since 1999, when records of separate release dispositions have been recorded, the dead component has only accounted for ~0.1% of all releases).

GEORGIA
DEPARTMENT OF NATURAL RESOURCES
COASTAL RESOURCES DIVISION

MARK WILLIAMS
COMMISSIONER

A.G. 'SPUD' WOODWARD
DIRECTOR

July 1, 2013

Kirby Rootes-Murdy
FMP Coordinator
Atlantic States Marine Fisheries Commission
1050 N. Highland St., Suite 200 A-N
Arlington VA, 22201

Kirby:

Please find enclosed Georgia's 2012 Red Drum Compliance Report. Please let me know if you require additional information.

Sincerely,

Chris Kalinowsky

Chris Kalinowsky
Marine Fisheries Section

cc: Pat Geer, Spud Woodward

1. **Introduction: Summary of the year: highlight any significant changes in monitoring, regulations, or harvest.**

Georgia currently has a size slot limit of 14 to 23 inches, total length. The daily bag/creel limit is five fish per person.

Commercial harvest of red drum in Georgia was limited to sales of fish caught within the recreational slot size and bag limit. During 2012, less than three dealers reported landings thereby making that information confidential. Pursuant to the requirement in Section 4.2.6, the Georgia Department of Natural Resources, Coastal Resources Division (CRD) has a trip ticket system for commercial fisheries that conforms to ACCSP standard data element requirements. Through this program, commercial harvest will be continuously monitored.

The red drum is typically ranked among the top three species targeted by recreational anglers in Georgia. As such, recreational harvest will continue to be monitored through the National Marine Fisheries Service's (NMFS) Marine Recreational Information Program (MRIP). CRD has been the contractor for the intercept survey since 2000.

A variety of sampling gear including trammel nets, gill nets, and hook and line are used in the Marine Sportfish Population Health Survey (MSPHS) to collect red drum and other fishes of recreational importance from two Georgia estuaries. During 2012, 373 trammel and gill net sets resulted in the capture of 205 red drum.

2. **Request for *de minimis*, where applicable.**

Georgia is not seeking *de minimis* status at this time.

3. **Previous calendar year's fishery and management program**

a. Activity and results of fishery dependent monitoring.

Finfish Carcass Recovery

The Marine Sportfish Carcass Recovery Project, a partnership with recreational anglers along the Georgia coast, is used to collect biological data from finfish such as red drum, spotted seatrout, southern flounder, sheepshead, and southern kingfish. Chest freezers were located at public access points along the Georgia coast. Each freezer is clearly marked and contains a supply of plastic bags, pencils, and data card. Anglers place their filleted fish carcasses in plastic bags along with completed data in the freezer. CRD personnel collect the carcasses and process them to determine species, length, and sex. Sagittal otoliths are removed and processed to determine the age of the fish.

In 2012, a total of 4,411 fish carcasses were donated through this program. Of that 6.6 % (293) were red drum with an average length of 399 mm CL (330 mm CL min, 570 mm CL max), which were reported from at least 12 recovery locations.

b. Activity and results of fishery independent monitoring.

The MSPHS is a multi-faceted ongoing process used to collect information on the biology and population dynamics of recreationally important finfish. Currently two Georgia estuaries are sampled on a seasonal basis using entanglement gear. Specific information collected includes: 1) age composition of the stock; 2) size and age at first spawning; 3) ratio of males to females in the stock; 4) movement and/or migration; 5) fishing mortality; 6) growth; and 7) spawning season. To provide age information, otoliths are removed from a size-stratified subsample of the catch from select sampling events.

Gill Nets and Trammel

Between June and August young-of-the-year red drum in the Altamaha river delta and Wassaw estuary are collected using gillnets to gather data on relative abundance and location of occurrence. Centerline lengths are measured in millimeters and total numbers recorded by species. All fish are then released (Table 1).

Between September and November, fish populations in the Altamaha River Delta and Wassaw estuary are sampled using trammel nets to gather data on relative abundance and size composition. Centerline lengths are measured in millimeters and total numbers recorded by species. During fall trammel net sampling, size-stratified sub-samples of red drum are used to produce age-specific fishery-independent indices of relative abundance**.** Each fish is measured, weighed, and sex determined. Sagittal otoliths are removed. Whole ovaries are removed from each female, weighed and assigned a level of development based on macroscopic evaluation. All fish not sub-sampled are released (Table 1).

Table 1. Preliminary annual trammel net and gill net data summarized by estuary, including effort, catch-per-unit-effort and length statistics for red drum, 2012.

Gear	Sound	Effort	Geo. Mean	Arith. Mean	Total N	CL Mean (mm)	CL Min (mm)	CL Max (mm)
Trammel	Wassaw	75	0.10	0.03	5	513.8	402	650
	Altamaha	83	0.09	0.02	6	360.5	334	399
Gill	Wassaw	108	0.54	0.57	33	288.1	236	530
	Altamaha	107	0.27	0.25	23	299.8	247	477

Evaluation of Spawning Stock

The Coastal Resources Division fishery management plan for red drum recommends a periodic (every 5 years) collection of adult red drum to determine the age structure of spawning stock. The ASFMC Red Drum Technical Committee has validated the collection of adult red drum as a source of supplemental information for the regional red drum assessment. Collections of adult red drum (1988-1991, 2002 and 2007) have been limited to a geographic area extending from Cabretta Inlet on Sapelo Island to Pelican Spit at the ocean terminus of the Hampton River.

Each sampling year, fieldwork is conducted in the same locations and with identical gear. Each specimen is measured and weighed. Sagittal otoliths are removed and used to assign an age and birth-year to the specimen. In addition, tissue samples are removed for evaluation of the presence of contaminants and genetic samples collected to help identify stock structure, movement patterns, and the degree of mixing.

The information collected from red drum sacrificed during the autumn of 2007 was used in combination with other data to conduct a regional red drum assessment during 2009. Collection of adult red drum was initiated during the fall of 2012; however, staffing limitations resulted in a small sample of sacrificed fish (<15 animals). Sampling will be conducted again during the autumn of 2013.

Adult Red Drum Index of Abundance

During this report period, sampling occurred using a bottom long-line from May through December. Two hundred fourteen (214) sets consisting of 12,838 hooks and 107 hours of soak time produced 18 red drum.

c. Copy of regulations that were in effect, including a reference to the specific compliance criteria as mandated in the FMP.

4.1 Recreational Fisheries Management Measures

4.1.1 Recreational Bag and Size Limits

4.1.2 Maximum Size Limit

During 2012, Georgia's size slot limit for red drum was 14 to 23 inches total length with a daily five fish bag limit. (O.C.G.C. 27-4-130.1 and DNR Rule 391-2-4-.04 previously submitted) Based on Amendment 2 to the Interstate Fishery Management Plan these harvest regulations result in an escapement rate that achieves a 40% SPR. (O.C.G.C. 27-4-130.1 and DNR Rule 391-2-4-.04 previously submitted)

4.2 Commercial Fisheries Management Measures

Commercial harvest of red drum was limited to the recreational slot size and bag limits. A commercial fishing license was required to sell (O.C.G.A. 27-4-110 previously submitted).

4.2.4 Commercial Gear Restrictions

Hook and line was the only feasible method for harvesting red drum in Georgia. Although the law allowed harvest with beach seines, purse seines, and cast nets, the recreational bag limit made it impractical to target red drum with these gears. (O.C.G.A. 27-4-113 and 114 previously submitted).

4.2.6 Data Collection and Reporting Requirements
Georgia is in full compliance with the ACCSP data collection and reporting requirements. Seafood dealers are required to maintain a record and report seafood purchased for commercial harvests in Georgia. Records must be submitted to the Department by the 10th day of the month subsequent to fishing. (O.C.G.A. 27-4-110 and 136 and DNR Rule 391-2-4-.09 previously submitted). Harvesters are required to maintain a logbook of fishing activity but at this time, are not required to report that activity (O.C.G.A. 27-4-118 previously submitted).

4.2.6.1 Vessel Registration System
Every commercial vessel fishing in Georgia waters is required to purchase either a trawler or non-trawler boat license, dependent on fishing practices (27-2-8 previously submitted).

4.3 For-Hire Fisheries Management Measures
4.3.1 Bag and Size Limits
4.3.2 Maximum Size Limit
Georgia for-hire and charter boats are limited to the recreational bag limits previously listed.

4.3.3 Data Collection and Reporting Requirements
If a for-hire captain sells his catch in Georgia, he is subject to the same reporting requirements as dealers and harvesters as noted above.

d. Harvest broken down by commercial (by gear type where applicable) and recreational, and non-harvest losses (when available).

Commercial

Georgia's commercial landings continue to be minimal. Less than 1,000 pounds with a value of less than $2,000 were reported sold in 2012. Since the number of dealers involved was less than three, exact landings are considered confidential and cannot be reported. All red drum were harvested by hook and line.

Recreational

Since 2000, CRD has been the contractor for the intercept survey within the NMFS's Marine Recreational Information Program (MRIP). In 2012, survey clerks interviewed 1,826 anglers. It is estimated that 299,605 anglers (8.4% PSE) completed 892,417 trips (PSE 10.5). Coastal Georgia residents accounted for 44.2% (132,508 PSE 12.1) of the total anglers. Non-coastal residents accounted for 31.6% (94,660 PSE 14.4) and out of

state anglers accounted for the remaining 24.2% (72,437 PSE 19.1). Expanded data are presented in tabular format below.

Table 2. Red Drum (# fish) expanded NMFS data for Georgia, 2012.

		Number of Angler Trips		A +B1 + B2 Released + Harvest		B2 Released Alive		A+B1 Harvest	
FISHING AREA	MODE	Total	PSE	Total	PSE	Total	PSE	Total	PSE
INLAND	CHARTER	15,663	10.8	7,588	25.9	5,970	31.3	1,618	37.8
	PRIVATE	469,527	13.8	116,358	18.4	72,210	22.4	44,148	31.6
	SHORE	228,634	23.9	4,267	61.6	4,267	61.6	0	
INLAND Total		**713,824**	11.9	**128,214**	16.9	**82,447**	20.0	**45,766**	30.5
OCEAN (<= 3 MI)	CHARTER	1,144	23.6	415	38.9	415	38.9	0	
	PRIVATE	14,793	32.6	1,718	109.3	1,718	109.3	0	
	SHORE	147,617	26.7	4,433	82.4	4,433	82.4	0	
OCEAN (<= 3 MI) Total		**163,554**	24.3	**6,566**	62.6	**6,566**	62.6	**0**	
OCEAN (> 3 MI)	CHARTER	3,112	18.7	238	67.2	238	67.2	0	
	PRIVATE	11,926	36.1	986	103.5	986	103.5	0	
OCEAN (> 3 MI) Total		**15,038**	28.9	**1,223**	84.4	**1,223**	84.4	**0**	
Grand Total		**892,417**	10.5	**136,003**	16.2	**90,237**	18.9	**45,766**	30.5

e. Review of progress in implementing habitat recommendations.

With over 2,344 linear miles of coastline and tidal marsh covering 378,000 acres, the entirety of Georgia's coast provides habitat for red drum. CRD is involved in activities related to many of the recommendations in Section 4.4, but without a specific focus on red drum. The Georgia Coastal Management Program (GCMP) provides an overarching entity under which many activities related to habitat protection are conducted both by CRD staff and others who are funded with Coastal Incentive Grants.

Habitat conservation and restoration has been addressed in previous compliance reports. Included in the following are only additions or changes within the reporting year.

CRD entered into an oyster reef restoration & enhancement partnership with the University of Georgia's Marine Extension Service. Oyster reefs are considered essential fish habitat and their enhancement has numerous benefits. During this report period, oyster cultch material and oak limb bundles have been deployed in the inter-tidal zone to restore/enhance one Recreational Shellfish Harvest Area in Glynn County Georgia.

Georgia's "Marshland Protection Act" requires permits from the Coastal Marshlands Protection Committee and the U.S. Corps of Engineers for all activities that alter the marsh. This includes oyster restoration / enhancement projects. Thus, the appropriate federal and state regulatory agencies are informed of all restoration / enhancement sites. This minimizes the potential of negative impacts to critical habitats from other permitted activities.

During 2012, the Coastal Marshlands Protection Committee issued 11 new

CMPC permits. CRD also issued 26 bank stabilization permits and 118 revocable licenses for private docks.

An important function of the Georgia Coastal Management Program (GCMP) is to ensure that federal projects affecting coastal resources are consistent with the enforceable policies of the Program. The GCMP also works to maintain and to improve customer service regarding consolidation, coordination, and timeliness of processing revocable licenses for private recreational docks and shoreline stabilization.

GCMP also provides a process by which permit applications relative to the Coastal Marshlands Protection Act and Shore Protection Act are processed and reviewed for compliance.

CRD has built 22 offshore artificial reefs over the past 30 years. These reefs are known habitat for adult red drum during winter months. CRD continuously adds material to these reefs thereby increasing the available habitat. No new reefs were established during 2012.

4. Planned management programs for the current calendar year

a. Summarize regulations that will be in effect.

During the 2012 General Assembly the Georgia legislature granted the Board of Natural Resources and the Commissioner of the Department of Natural Resources greater authority over the management of saltwater fishing, effective January 1, 2013,. Attached hereto are the rewritten code sections from Title 27 of the Official Code of Georgia, Annotated (O.C.G.A 27-4-10 and 27-4-130) and the resulting rewritten regulations (Board Rule 391-2-4-.04), as they pertain to red drum. Ultimately, no changes to recreational (5 fish, 14 to 23” TL) or commercial fishing were made due to this change.

For 2013, harvest regulations for red drum will be five fish per person per day with a 14 to 23 inch, total length slot size limit.

b. Summarize monitoring programs that will be performed.

Monitoring described in Section III will continue throughout 2013.

c. Highlight any changes from the previous year.

During the 2013 session, the Georgia General Assembly passed House Bill 36 which designates red drum as a game fish. Unless otherwise provided for in law, game fish cannot be sold. In the case of red drum, the legislature did not provide for an exception. Therefore, effective July 1, 2013, it will be illegal to sell red drum caught from Georgia

waters. Import of commercially-harvested red drum from states where such harvest is legal or from states where red drum are produced through mariculture will be legal. At the time of this report, updated Code sections were not available and will be included in the 2013 compliance report.

Florida's Compliance Report Under Amendment 2 to the Interstate Fishery Management Plan for Red Drum

Michael D. Murphy
Florida Fish and Wildlife Conservation Commission
Fish and Wildlife Research Institute
100 Eighth Ave SE, St. Petersburg, FL 33701-5095
Tel. 727/896-8626 X4126, e-mail: mike.murphy@myfwc.com

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I. Introduction

While there have been only minor changes in Florida's Atlantic coast monitoring programs, the fishing regulations were changed in February 2012 to incorporate regional management and a higher bag allowance in Northeast Florida. The fishery-dependent monitoring programs continued and made 12,661 Marine Recreational Fisheries Statistics Survey (MRFSS) intercepts during 2012. Fishery-independent monitoring of Red Drum continued for young-of-the-year in the northern Indian River Lagoon and lower St Johns River area and for larger Red Drum in the lower St. Johns River and the northern and southern Indian River Lagoon areas. Biostatistical data were collected through both the fishery-independent and fishery-dependent monitoring programs during 2012. Recreational harvest (including 8% release mortality) of red drum on Florida's Atlantic coast during 2012 was estimated at about 277,990 fish, representing a 39% increase over the 2009-2011 mean harvest of about 201,000 Red Drum.

II. Request for *de minimis*, where applicable.

Florida does not request *de minimis* status at this time.

III. Previous calendar year's fishery and management program

a. Activity and results of fishery dependent monitoring (provide general results and references to technical documentation).

Fishery-dependent monitoring of Red Drum in Florida consists solely of sampling from the recreational fishery. There has been no commercial fishery for Red Drum in Florida since 1988. During 2012, MRFSS samplers conducted 12,661 trip interviews at Florida's Atlantic coast boat ramps, bridges, and other fishing sites, the lowest number of interviews made since 1997. Since 1999, the number of intercepts made has ranged from about 12,700 to 22,200 (Table 1). Data collected during these intercepts are used to identify patterns in average observed total-catch rates and to describe the sizes of Red Drum landed by anglers. Though Florida changed to regional management of Red Drum in 2012, recreational fisheries data from Florida were analyzed as a single coast wide dataset since the ASMFC manages this species on a wide geographic scale. Standardized total-catch (MRFSS Type A+B1+B2) rates for anglers targeting Red Drum declined through 2000 before fluctuating around a lower mean catch rate through 2012 (Fig. 1). A small FWC program was used during 2002-2009 to

conduct a random survey of Florida's licensed anglers and collect information on the sizes of Red Drum that were kept or released alive. This program met with very limited success on the Atlantic coast and has been modified to include voluntary, self-reported data using postcards left at fishing spots during MRIP interviews. Also, a recent on-line application developed for reporting fishing trip information has been expanded to include fishing trips capturing Red Drum.

b. Activity and results of fishery independent monitoring (provide general results and references to technical documentation).

The Florida Fish and Wildlife Conservation Commission's Fish and Wildlife Research Institute (FWC-FWRI) has three field laboratories on the Atlantic coast whose staff conducts random, stratified sampling using 183-m haul seines. Two of these laboratories also utilize a 21.3-m, 3.2-mm mesh seine for young-of-the-year monitoring. Stratified random sampling for subadult abundance has been carried out in the northern Indian River Lagoon since 1990 and in the lower reaches of the St. Johns River since 2001. In these areas and in the Tequesta/southern Indian River Lagoon (since 1997), 183-m, 5-cm-stretched-mesh haul seines are used to monitor the abundance of larger fish (FWC-FWRI 2013). The survey design for sampling newly recruited Red Drum (<40 mm standard length) during a September-March recruitment 'window' in the Southeast region is considered comparable over time since September 1995. Note that the index based on this 'window' is labeled the January year, e.g., September 1999 - March 2000 data are used to develop the 2000 recruitment index. In the Southeast region, the relative abundance indices have shown peaks for 1999, 2003-2005, and 2009 (Fig. 2). After 2010, relative abundance declined to a fairly constant but lower level during 2011 and 2012. In the Northeast region (St. Johns River/Nassau Sound), juvenile abundance increased to a peak in 2003 and 2004 but declined markedly in 2005 and 2006 before rebounding in 2007 (Fig. 2). After 2007, relative abundance remained fairly constant at a moderate level before dropping sharply in 2011. Calendar-year catch rates for larger Red Drum captured in the 183-m haul seine follow an increasing trend during 2003-2008 in the Southeast region before settling at lower relative abundance levels in 2009 and 2010 (Fig. 3). In the Northeast region, catch rates have fluctuated with a slow long-term declining trend since 2004. Random samples of Red Drum lengths and otoliths (only from fish larger than 300 mm SL) are taken under all of these programs. During 2012, 912 lengths were measured and 173 otolith pairs collected during these Fishery-Independent Monitoring programs.

c. Copy of regulations that were in effect, including a reference to the specific compliance criteria as mandated in the FMP.

Appendix A contains the current regulations for managing red drum (Chapter 68B-22, Florida Administrative Code).

Current, Red Drum regulations call for an 18-inch minimum size, 27-inch maximum size in both management regions designated along the Atlantic coast of Florida (Northeast: Nassau County through Flager County; Southeast Volusia

through Miami-Dade County). There is a one-fish-per-person-per-day bag limit in the Southeast and a 2-fish-per-preson-per-day limit in the Northeast. Florida's current regulations in the Southeast region meet the management measures included in Amendment 2 (ASMFC 2002). Florida's 18" minimum size limit, 27" maximum size limit, and one-fish bag limit correspond to a 40.7 percent SPR in Table 20 of the Amendment 2 document. In the Northeast region where the bag limit was relaxed in February 2012, a regional stock assessment estimated that the static SPR averaged 76% during 2008-2010 (FWC-FWRI unpublished data). The same analysis gave estimates of the 2008-2010 sSPR that averaged 30% in the Southeast region .These estimates, weighted by the annual recruitment estimated for each region, give an overall average sSPR of about 62% for the Atlantic coast of Florida during 2008-2010 (Murphy 2012).

d. Harvest broken down by commercial (by gear type where applicable) and recreational, and non-harvest losses (when available).

Harvest (including 8% of fish released alive that are thought to subsequently die) of Red Drum on the Atlantic coast of Florida has shown a generally increasing trend since 1989 when the fishery opened under management regulations quite similar to those in place today. From a low of 80,000 Red Drum harvested in 1989 the harvest increased to nearly 280,000 fish by 2005. Harvest fluctuated around an average of about 189,000 fish during 2000-2011. The 2012 harvest was estimated at 277,990 fish (Table 1).

e. Review of progress in implementing habitat recommendations.

No mandatory measures related to habitat or habitat protection has been implemented through this amendment (Amendment 2 of the Red Drum FMP, Section 4.4). However, habitat areas of particular concern range over the entire estuarine system, from lower reaches of rivers to the inlets. Numerous government entities, including municipal, county, state, and federal, and numerous agencies, including water management districts, aquatic preserves, and national estuary programs, strive to protect and rehabilitate habitat utilized by Red Drum. There are no specific habitat recommendations in Amendment 2 for Red Drum but progress made in restoring and conserving habitat is available from reports from many agencies charged with the stewardship of Florida's Atlantic coast estuaries (ASMFC 2002).

IV. Planned management programs for the current calendar year

a. Summarize regulations that will be in effect (copy of current regulations if different from 3c).

Regulations have changed from those in force during the last compliance report submission. The Florida Fish and Wildlife Conservation Commission is using a regional management (northern zone -- Nassau south through Flagler County; southern zone -- Volusia south through Miami-Dade County) scheme for Red Drum found in coastal waters adjacent to Florida. The only difference in

management across regions is the bag limit: one fish per day in the southern region and two fish per day in the north.

b. Summarize monitoring programs that will be performed.

Monitoring will remain the same during 2013 as it was in 2012 (see III b.), though we are still evaluating ways to increased the collection of angler-volunteered catch information (many more angler logbooks using a shortened 'card' system or on-line application expansion).

c. Highlight any changes from the previous year.

In February 2012, the management of Red Drum in Florida was geographically subdivided into northern and southern regions. The only difference in management across regions is the bag limit: one fish per day in the southern region and two fish per day in the north.

Literature

Anonymous. 2010. Regional analysis of Florida's gulf and Atlantic stocks of red drum. Report from the Florida Fish and Wildlife Research Institute Stock Assessment Sub-group to the Division of Marine Fisheries Management, Florida Fish and Wildlife Conservation Commission, Tallahassee.

Atlantic States Marine Fisheries Commission. 2002. Amendment 2 to the Interstate Fishery Management Plan for Red Drum. ASMFC Fishery Management Report 38:142pp.

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Murphy, M.D. 2005. A stock assessment of red drum, *Sciaenops ocellatus*, in Florida: status of the stocks through 2003. Fish and Wildlife Research Institute, Florida Fish and Wildlife Conservation Commission, St. Petersburg. FWRI In-House Report 2005-006.

Murphy, M.D. 2012. Compliance evaluation for the regional management of red drum in Florida and recent increase in bag limit in Florida's northern region along the Atlantic coast. Report to the ASMFC Red Drum Technical Committee, 20 January 2012.

Table 1. Reported fishing effort and estimated number of Red Drum reported landed by the commercial fishery, total number of trip interviews made by the FWC-Marine Recreational Information Program's samplers, estimated number of recreational fishing trips directed at catching Red Drum, estimated number of Red Drum landed, released alive, and overall kill (which includes landings and 8% release mortality of fish released alive) for the recreational fishery, and total numbers of Red Drum deaths attributed to the fisheries operating on the Atlantic coast of Florida during 1982-2012. For a description of the data and estimation methods for the commercial trips and landings and recreational trips see Murphy (2005). All numbers for recreational catch were derived from recently derived methods recommended for the new MRIP program.

	Commercial Trips	Commercial landings	Total trips sampled	Directed Recreational Trips	Recreational landings	Recreational released alive	Total recreational kill	Total number killed
1982		32,749	4,496		115,168	2,509	115,369	144,172
1983		28,803	4,884		147,800	26,059	149,885	179,848
1984		29,963	5,820		270,707	20,588	272,354	293,534
1985	2,575	21,180	4,733		160,834	91,936	168,189	184,583
1986	1,705	16,394	4,907		128,743	70,584	134,390	143,560
1987	595	9,170	4,659		217,638	313,685	242,733	242,840
1988	29	107	6,082		150,340	287,761	173,361	173,361
1989	0	0	5,381		69,880	125,541	79,923	79,923
1990	0	0	5,057		76,006	147,329	87,792	87,792
1991	0	0	6,018	157,210	112,214	287,152	135,186	135,186
1992	0	0	11,434	117,114	82,166	203,601	98,454	98,454
1993	0	0	13,395	155,390	87,617	319,474	113,175	113,175
1994	0	0	15,144	230,309	105,925	491,674	145,259	145,259
1995	0	0	14,039	279,063	111,103	582,312	157,688	157,688
1996	0	0	11,753	165,234	96,051	316,836	121,398	121,398
1997	0	0	12,225	163,961	63,110	332,811	89,735	89,735
1998	0	0	13,680	166,434	75,251	289,439	98,406	98,406
1999	0	0	18,029	223,103	80,703	343,056	108,148	108,148
2000	0	0	17,058	320,042	103,587	445,864	139,256	139,256
2001	0	0	19,728	369,655	107,540	643,564	159,025	159,025
2002	0	0	22,191	319,884	84,997	494,639	124,568	124,568
2003	0	0	19,833	370,738	138,901	627,378	189,092	189,092
2004	0	0	16,218	472,266	110,627	936,531	185,549	185,549
2005	0	0	16,697	720,044	174,884	1,288,561	277,969	277,969
2006	0	0	18,916	453,546	126,459	731,226	184,957	184,957
2007	0	0	17,817	437,654	140,080	611,054	188,964	188,964
2008	0	0	15,152	570,230	148,289	851,950	216,445	216,445
2009	0	0	14,665	282,365	67,975	470,048	105,579	105,579
2010	0	0	15,043	601,075	164,207	1,257,360	264,796	264,796
2011	0	0	13,255	550,891	154,603	960,101	231,411	231,411
2012	0	0	12,661	539,644	217,850	751,739	277,990	277,990

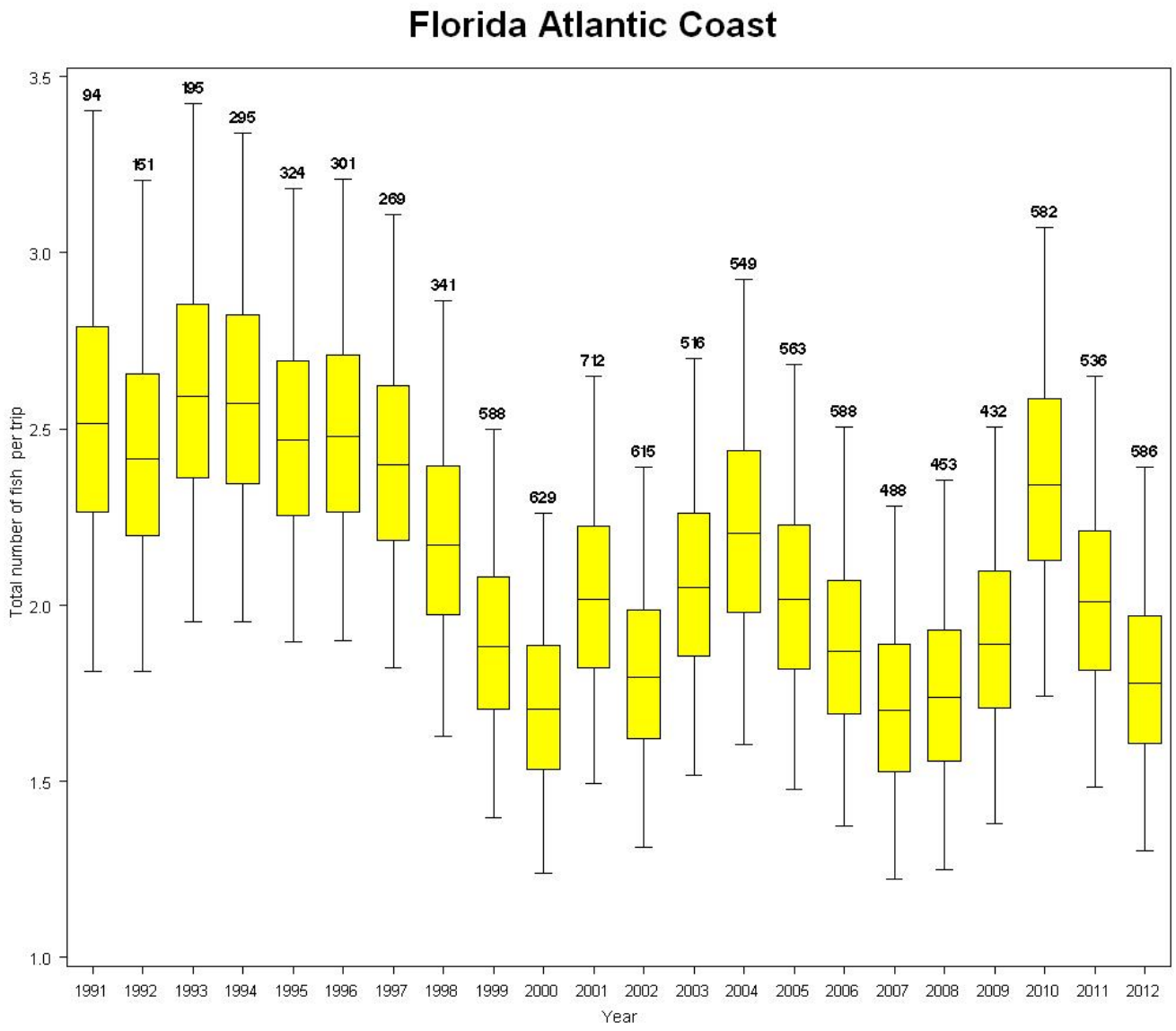
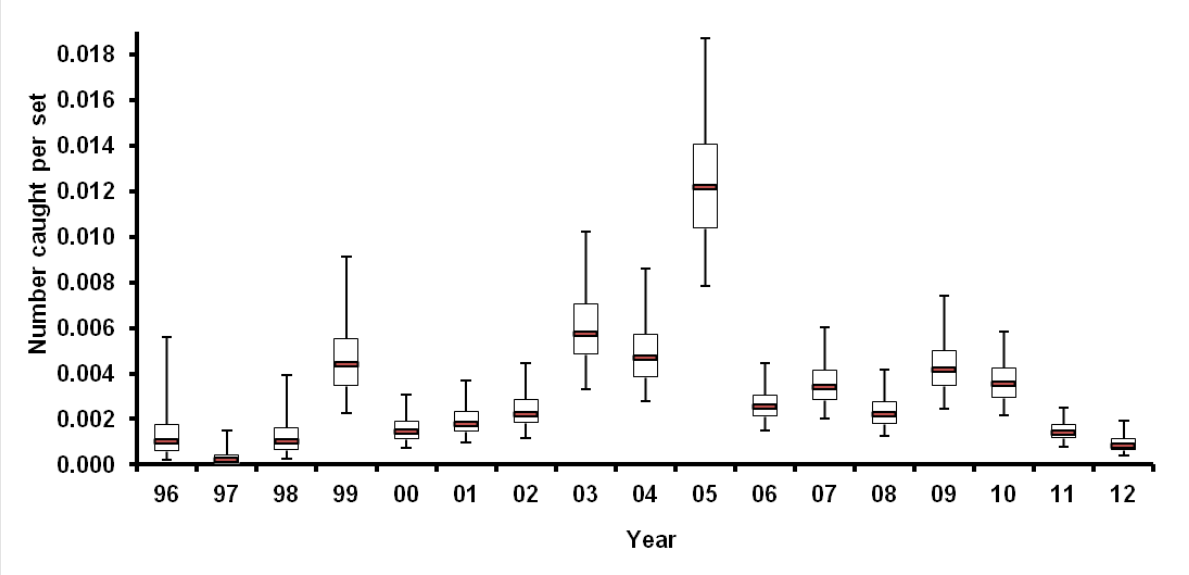


Figure 1. Standardized catch-per-trip for anglers targeting Red Drum along Florida's Atlantic coast during 1991-2012. A targeted trip is defined as those in which Red Drum were caught or those where the angler indicated that red drum were being sought during the fishing trip. The distribution of the standardized estimates show the median (horizontal bar), the interquartile range (box) and the tails of the distributions to the 2.5th and 97.5th percentiles, and provide the annual number of intercepts used in the analysis.

Southeast Region



Northeast Region

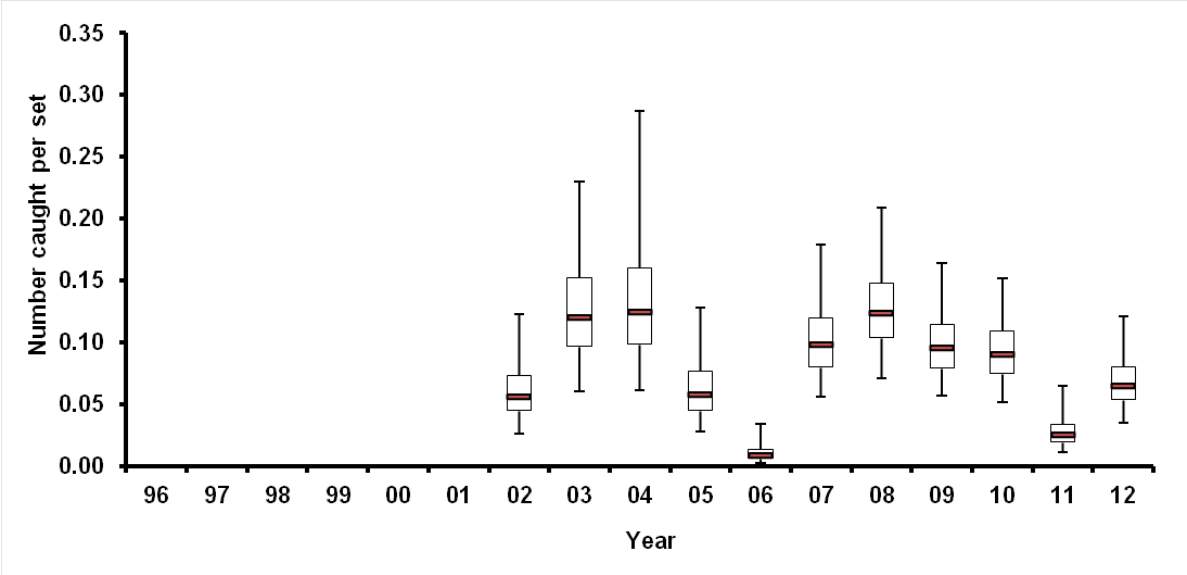
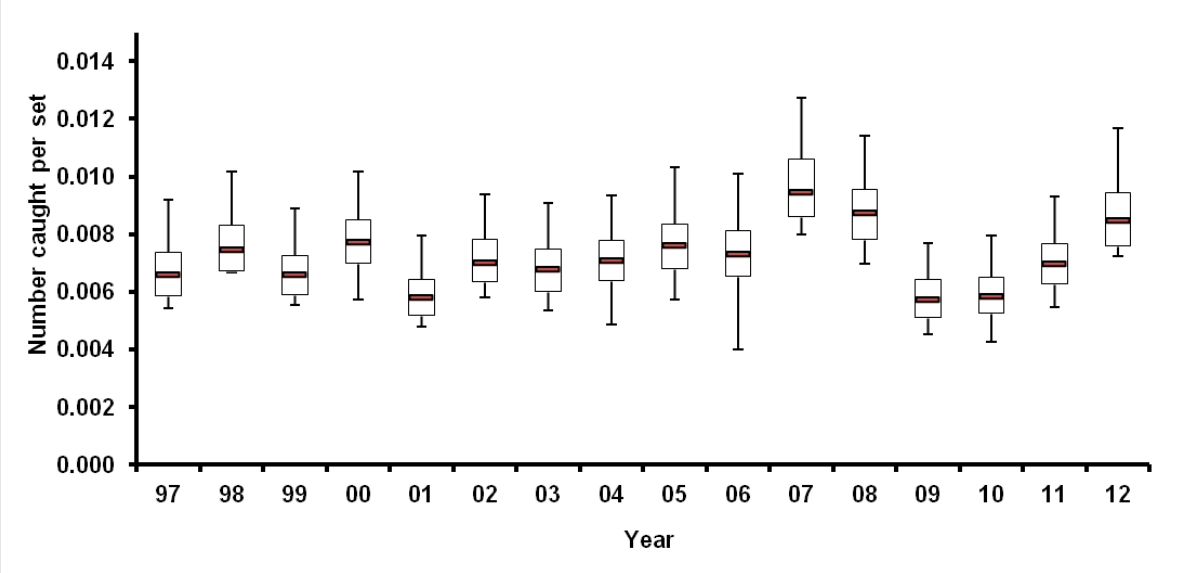


Figure 2. Standardized catch-per-set of Red Drum less than 40 mm SL in the Southeast and Northeast regions along the Florida Atlantic coast during 1996-2012. Data were restricted to that collected during a recruitment 'window' of September through March, with the year label indicating the January year. The January-March 2013 data were not available yet to determine the 2013 index value.

Southeast Region



Northeast Region

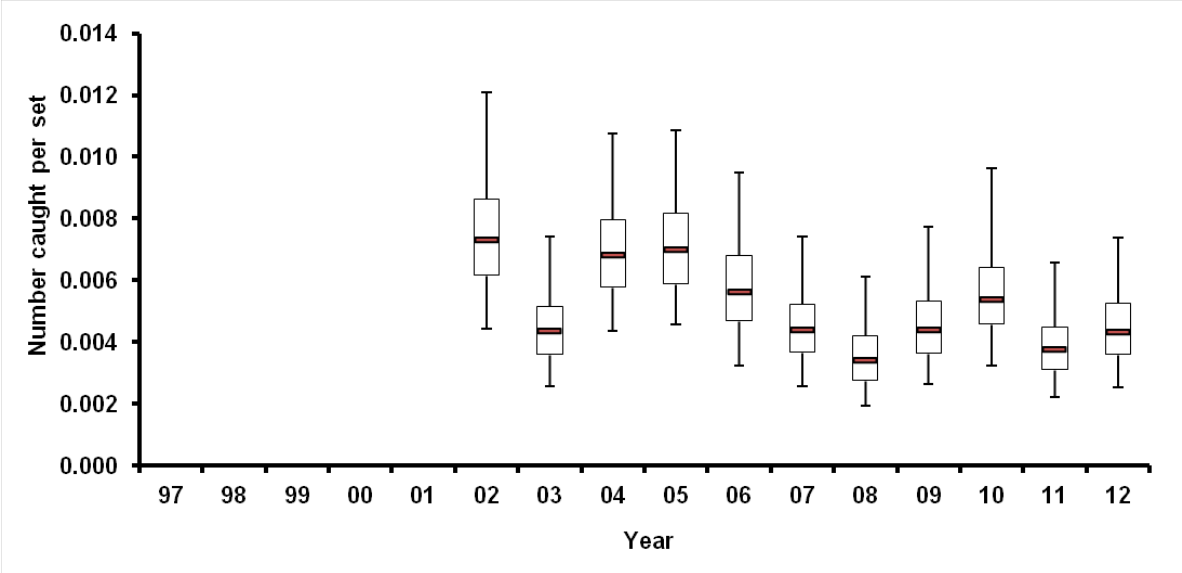


Figure 3. Standardized catch-per-set of Red Drum larger than 300 mm SL in the Southeast and Northeast regions along the Florida Atlantic coast during the 1997-2012 calendar years. Data symbols are explained in the caption for Figure 2.

APPENDIX A.

CHAPTER 68B-22
RED DRUM (REDFISH)

68B-22.001 Purpose and Intent; Repeal of Certain Laws; Designation as Protected Species.

(1) The purpose and intent of this chapter is to protect, manage, conserve and replenish Florida's depleted red drum (redfish) resource, species Sciaenops ocellatus, which has suffered extreme declines in abundance in recent years.

(2) Accordingly, it is the intent of this chapter to repeal and replace those portions of Section 370.11(2)(a)4., F.S. (1985), dealing with redfish. This chapter is not intended, and shall not be construed, to repeal any other portion of Section 370.11(2)(a)4., F.S. (1985); any other subdivision of Section 370.11, F.S. (1985); or any other general or local law directly or indirectly relating to or providing protection for the redfish resource.

(3) Redfish are hereby declared and designated a protected species. The purposes of this designation are to increase public awareness of the need for extensive conservation action in order to prevent this resource from becoming endangered and to encourage voluntary conservation practices, including catch-and-release practices for all redfish caught unless they are needed for food.

Rulemaking Authority Art. IV, Sec. 9, Fla. Const., Chapter 83-134, Laws of Fla., as amended by Chapter 84-121, Laws of Fla. Law Implemented Art. IV, Sec. 9, Fla. Const., Chapter 83-134, Laws of Fla., as amended by Chapter 84-121, Laws of Fla. History–New 9-12-85, Amended 1-1-89, 6-3-91, Formerly 46-22.001.

68B-22.002 Definitions.

(1) "Catch, hold and release", means the intentional release of a live redfish, possessed in a live well or recirculating tank aboard a boat, for the purpose of harvesting another redfish.

(2) "Fishing pier" means a platform extending from shore over water, used primarily to provide a means for persons to harvest or attempt to harvest fish therefrom. The term shall not be construed to include any residential dock, marina, or facility at which vessels are launched or moored, but shall include any abandoned bridge serving the function of a fishing pier.

(3) "Fishing tournament", as used in this chapter, means a fishing competition involving 50 or more participants that has written rules and regulations, requires an entry fee, and awards prizes to competitors.

(4) "FWC" means the Florida Fish and Wildlife Conservation Commission.

(5) "Harvest" means the catching or taking of a fish by any means whatsoever, followed by a reduction of such fish to possession. Fish that are caught but immediately returned to the water free, alive and unharmed are not harvested. In addition, temporary possession of a fish for the purpose of measuring it to determine compliance with the minimum or maximum size requirements of this chapter shall not constitute harvesting such fish, provided that it is measured immediately after taking, and immediately returned to the water free, alive and unharmed if undersize or oversize. A person engaged in catch, hold, and release pursuant to Rule 68B-22.007, F.A.C., shall not be considered to have harvested a redfish if it is released alive.

(6) "Land," when used in conjunction with the harvest of a fish, means the physical act of bringing the harvested fish ashore.

(7) "Northeast Region" means all state waters lying north of the Flagler-Volusia County Line to the Florida-Georgia border, and adjacent federal Exclusive Economic Zone (EEZ) waters.

(8) “Northwest Region” means all state waters north and west of a line running due west from the westernmost point of Fred Howard Park Causeway (28°9.35'N., 82°48.398'W.), which is approximately 1.17 miles south of the Pasco-Pinellas County Line, to the Florida-Alabama border, and adjacent federal Exclusive Economic Zone (EEZ) waters.

(9) “Person” means any natural person, firm, entity or corporation.

(10) “Red drum” or “redfish” means any fish of the species Sciaenops ocellatus, or any part thereof. “Native redfish” means any redfish harvested from waters subject to the jurisdiction of the Fish and Wildlife Conservation Commission and the State of Florida.

(11) “South Region” means state waters lying between the Flagler-Volusia County Line on the Atlantic Ocean and the southern boundary of the Northwest Region on the Gulf of Mexico in Pinellas County, as specified in subsection (8), and adjacent federal Exclusive Economic Zone (EEZ) waters.

(12) “Spearing” means the catching or taking of a fish by bow hunting, gigging, spearfishing, or by any device used to capture a fish by piercing the body. Spearing does not include the catching or taking of a fish by a hook with hook and line gear or by snagging (snatch hooking).

(13) “Total length” means the straight line distance from the most forward point of the head with the mouth closed, to the farthest tip of the tail with the tail compressed or squeezed, while the fish is lying on its side.

(14) “Vessel” means and includes every description of water craft used or capable of being used as a means of transportation on water, including nondisplacement craft and any aircraft designed to maneuver on water.

Rulemaking Authority Art. IV, Sec. 9, Fla. Const. Law Implemented Art. IV, Sec. 9, Fla. Const. History–New 9-12-85, Amended 2-12-87, 1-1-89, 1-1-96, 1-1-98, Formerly 46-22.002, Amended 3-17-04, 7-1-06, 2-1-12.

68B-22.003 Size Limits.

No person shall harvest in or from the waters of the State of Florida at any time, or unnecessarily destroy, any redfish of total length less than 18 inches, nor greater than 27 inches.

Rulemaking Authority Art. IV, Sec. 9, Fla. Const. Law Implemented Art. IV, Sec. 9, Fla. Const. History–New 9-12-85, Amended 2-12-87, 1-1-89, Formerly 46-22.003.

68B-22.005 Bag and Vessel Limits; Sale Prohibited.

(1) Northwest and Northeast Regional Bag Limit – Except as provided for in Rule 68B-22.007, F.A.C., in the northeast and northwest regions, no person shall harvest nor possess more than two native redfish per day while in, on, or above the waters of the state or on any dock, pier, bridge, beach, boat ramp, or other fishing site adjacent to such waters, and any parking location adjacent to said fishing sites.

(2) South Regional Bag Limit – Except as provided for in Rule 68B-22.007, F.A.C., in the south region, no person shall harvest nor possess more than one native redfish per day while in, on, or above the waters of the state or on any dock, pier, bridge, beach, boat ramp, or other fishing site adjacent to such waters, and any parking location adjacent to said fishing sites.

(3) Vessel Limit – Notwithstanding subsections (1) and (2) above, no more than 8 red drum shall be possessed aboard any vessel in or on state waters at any time.

(4) Transport Possession Limit – No person shall possess more than six native red drum while in transit on land.

(5) Sale of Native Redfish Prohibited – The purchase, sale, or exchange of any native redfish is prohibited. This prohibition, however, does not apply to legally harvested non-native redfish that have entered the State of Florida in interstate commerce. The burden shall be upon any person possessing such redfish for sale or exchange to establish the chain of possession from the initial transaction after harvest, by appropriate receipt(s), bill(s) of sale, or bill(s) of lading, and to show that such redfish originated from a point outside the waters of the State of Florida, and entered the state in interstate commerce. Failure to maintain such documentation or to promptly produce same at the request of any duly authorized law enforcement officer shall constitute a violation of this rule.

Rulemaking Authority Art. IV, Sec. 9, Fla. Const. Law Implemented Art. IV, Sec. 9, Fla. Const. History–New 2-12-87, Amended 1-1-89, 6-3-91, 1-1-96, Formerly 46-22.005, Amended 3-17-04, 2-1-12.

68B-22.006 Other Prohibitions; Applicability.

(1) The harvest of any redfish in or from state waters by or with the use of any multiple hook in conjunction with live or dead natural bait is prohibited. Spearing or snagging (snatch hooking) of redfish in or from state waters is prohibited.

(2) It is unlawful for any person to possess, transport, buy, sell, exchange or attempt to buy, sell or exchange any redfish harvested in violation of this chapter.

(3) No operator of a vessel in or on state waters shall allow the possession aboard the vessel of any redfish not in compliance with established bag limits, size limits, seasons or any prohibited gear as specified in this chapter or in Chapter 68B-4, F.A.C.

(4) All redfish harvested from Florida waters shall be landed in a whole condition. The possession, while in or on state waters, on any public or private fishing pier, or on a bridge or catwalk attached to a bridge from which fishing is allowed, or on any jetty, of any redfish that has been deheaded, sliced, divided, filleted, ground, skinned, scaled or deboned is prohibited. Mere evisceration or "gutting" of redfish, or mere removal of gills from redfish, before landing is not prohibited. Preparation of redfish for immediate consumption on board the vessel from which the fish were caught is not prohibited.

(5) Provisions of this rule chapter shall not apply to redfish artificially spawned and raised in commercial aquaculture facilities. Failure to maintain appropriate receipt(s), bill(s), bill(s) of sale, or bill(s) of lading, that such redfish were artificially spawned and raised in commercial aquaculture facilities, shall constitute a violation of this rule.

(6) The simultaneous possession aboard a vessel of any gill net or entangling net together with any redfish is prohibited.

Rulemaking Authority Art. IV, Sec. 9, Fla. Const. Law Implemented Art. IV, Sec. 9, Fla. Const. History–New 2-12-87, Amended 6-3-91, 1-1-96, 1-1-98, Formerly 46-22.006.

68B-22.007 Catch-Hold-and-Release Tournament Exemption.

(1) Except as provided in this rule, the practice of catching, holding, and releasing redfish is prohibited. The Executive Director of the FWC, or his designee, shall issue a tournament exemption permit to the director of a catch-and-release fishing tournament to allow redfish to be caught, held, and released during the tournament, and to allow the tournament to exceed redfish bag and possession limits pursuant to subsection 68B-22.005(1), F.A.C., after redfish have been weighed-in, provided that each of the following conditions is met:

(a) Tournament anglers and tournament staff agree to attempt to release alive all redfish that are caught, including those fish that are weighed-in.

(b) Each two person team of tournament anglers possesses no more than two live redfish in the boat's live well or recirculating tank at any one time.

(c) All boats used in the tournament contain recirculating or aerated live wells that are at least 2.4 cubic feet or 18 gallons in capacity.

(d) Dead redfish possessed by a two person team of tournament anglers are not discarded. A dead redfish is considered harvested and will count as the daily bag limit for the team of tournament anglers who harvested that fish.

(e) Redfish are maintained in an aerated recovery holding tank prior to release. Recovery holding tank requirements may be specified in the tournament exemption permit at the FWC's discretion in order to increase survival of released redfish.

(f) The tournament provides the FWC with a description of the aerated recovery holding tank(s) used to maintain redfish alive after weigh-in.

(g) The tournament provides the FWC with a description of the location where tournament caught redfish will be released after they are weighed in. In order to increase survival of released redfish, release locations may be specified in the tournament exemption permit at the FWC's discretion.

(h) The tournament permit holder shall submit a post-tournament report to the FWC indicating the number of fish weighed-in each day of the tournament, the number of fish weighed-in dead each day, and the number of fish

that died after being weighed-in, but prior to release each day. The FWC may specify additional tournament reporting requirements as a condition of the tournament exemption permit.

(i) The tournament agrees to allow FWC staff the opportunity to collect research data and conduct research and onboard monitoring during the tournament, as needed.

(2) Application for issuance of a tournament exemption permit shall be made on a form provided by the FWC (Form DMF-SL 5000 (3-04), incorporated herein by reference). Tournament exemption permits will only be issued to catch-and-release redfish tournaments that agree to the permit conditions in subsection (1).

(3) Any anglers participating in a redfish tournament for which a tournament exemption permit has been issued shall have a copy of the permit in his or her possession at all times during tournament operating hours.

(4) Any violation of the conditions and requirements specified within the tournament exemption permit will be considered a violation of this rule.

Rulemaking Authority Art. IV, Sec. 9, Fla. Const. Law Implemented Art. IV, Sec. 9, Fla. Const. History–New 3-17-04.

Atlantic States Marine Fisheries Commission

DRAFT ADDENDUM I TO AMENDMENT 2 TO THE RED DRUM FISHERY MANAGEMENT PLAN: *HABITAT NEEDS & CONCERNS*

ASMFC Vision Statement:
Healthy, self-sustaining populations for all Atlantic coast fish species or successful restoration well in progress by the year 2015

May 2013

Draft Addendum for Public Comment

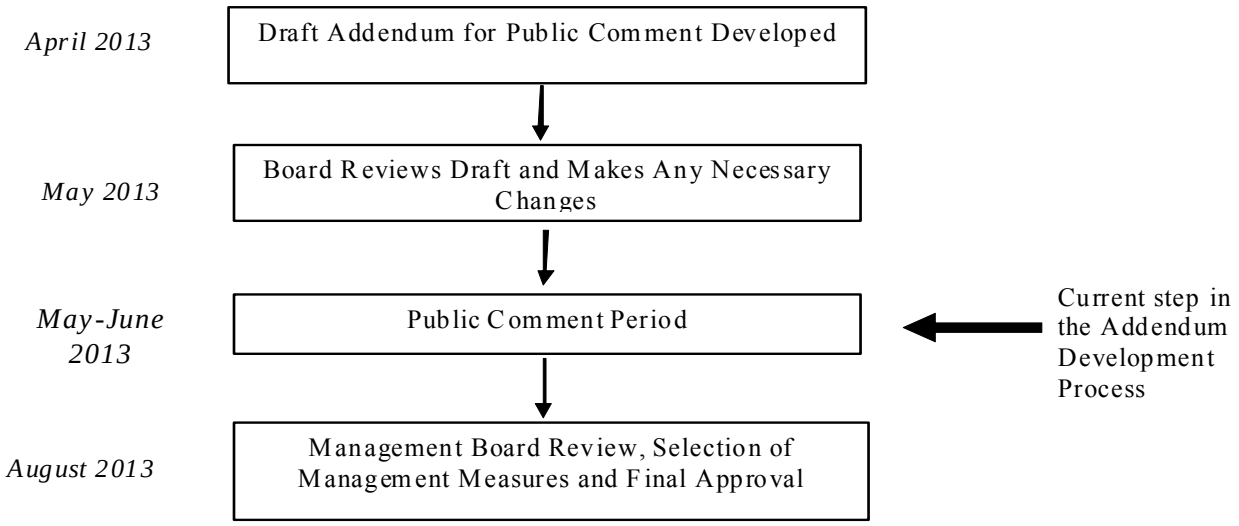
Public Comment Process and Proposed Timeline

This addendum is intended to provide supporting information on red drum habitat needs and concerns and does not impact current regulatory measures.

The public is encouraged to submit comments regarding this document at any time during the addendum process. The final date comments will be accepted until **5:00 PM (EST) on June 30, 2013.** Comments may be submitted by mail, email, or fax. If you have any questions or would like to submit comment, please use the contact information below.

Mail: Kirby Rootes-Murdy
Atlantic States Marine Fisheries Commission
1050 North Highland Street Suite 200A-N
Arlington, VA 22201

Email: krootes-murdy@asmfc.org
(Subject line: Red Drum Habitat Addendum)
Phone: 703.842.0740/Fax: 703.842.0741



Draft Addendum for Public Comment

RED DRUM HABITAT ADDENDUM

1.4 HABITAT CONSIDERATIONS

1.4.1 Description of Habitat Important to the Stocks

1.4.1.1 Spawning Habitat

Red drum (*Sciaenops ocellatus*) spawn from late summer to early fall in a range of habitats, including estuaries, near inlets, passes, and near bay mouths as opposed to further offshore or inland habitats (Peters and McMichael 1987). Earlier studies have illustrated that the spawning often occurred in nearshore areas relative to inlets and passes (Pearson 1929; Miles 1950; Simmons and Breuer 1962; Yokel 1966; Jannke 1971; Setzler 1977; Music and Pafford 1984; Holt *et al.* 1985). More recent evidence, however, suggests that in addition to nearshore vicinity habitats, red drum also utilize high-salinity estuarine areas along the coast (Murphy and Taylor 1990; Johnson and Funicelli 1991; Nicholson and Jordan 1994; Woodward 1994; Luczkovich *et al.* 1999; Beckwith *et al.* 2006). Coastal estuarine areas that have high salinity levels provide optimal conditions for eggs and larval development, as well as circulation patterns beneficial to transporting larvae to suitable nursery areas (Ross and Stevens 1992). Spawning in laboratory studies have also appeared to be temperature dependent, occurring in a range from 22° to 30° C but with optimal conditions between temperatures of 22° to 25° C (Holt *et al.*1981). Renkas (2010) was able to duplicate environmental conditions of naturally spawning red drum from Charleston Harbor, SC in a mariculture setting, and corroborated that active egg release occurred as water temperature dropped from a peak of ~30^{o} C during August. Cessation of successful egg release was found at 25^{o} C, with no spawning effort found at lower temperatures (Renkas 2010). Pelagic eggs, embryos, and larvae are transported by currents into nursery habitats for egg and larval stages, expectedly due to higher productivity levels in those environments (Peters and McMichael 1987; Beck *et al.* 2001).

Part 1.4.1.2 Eggs and Larvae Habitat

Red drum eggs have been commonly encountered in several southeastern estuaries in high salinity, above 25 ppt (Nelson *et al.* 1991). Salinities above 25 ppt allow red drum eggs to float while lower salinities cause eggs to sink (Holt *et al.* 1981). In Texas, laboratory experiments conducted by Neill (1987) and Holt *et al.* (1981) concluded that an optimum temperature and salinity for the hatching and survival of red drum eggs and larvae was 25° C and 30 ppt. Spatial distribution and relative abundance of eggs in estuaries, as expected, mirrors that of spawning adults (Nelson *et al.* 1991); eggs and early larvae utilize high salinity waters inside inlets, passes, and in the estuary proper. Currents transport eggs and pelagic larvae into bays, estuaries and seagrass meadows (when present), where they settle (Levin *et al.* 2001) and remain throughout early and late juvenile stages (Pattillo *et al.* 1997; Holt *et al.* 1983; Rooker and Holt 1997, Rooker *et al.* 1998b; Levin *et al.* 2001). Larval size generally increases as distance from the mouth of the bay increases (Peters and McMichael 1987), possibly due to increased nutrient availability. Research conducted in Mosquito Lagoon, Florida, by Johnson and Funicelli (1991) found viable red drum eggs being collected in average daily water temperatures from 20° C to

25° C and average salinities from 30 to 32 ppt. During the experiment, the highest numbers of eggs were gathered in depths ranging from 1.5 to 2.1 m and the highest concentration of eggs was collected at the edge of the channel.

Upon hatching, red drum larvae are pelagic (Johnson 1978) and laboratory evidence indicates that development is temperature-dependent (Holt *et al.* 1981). Newly hatched red drum spend around twenty days in the water column before becoming demersal (Rooker *et al.* 1999; FWCC 2008). However, Daniel (1988) found much younger larvae already settled in the Charleston Harbor estuary. Transitions are made between pelagic and demersal habitats once settling in the nursery grounds (Pearson 1929; Peters and McMichael 1987; Comyns *et al.* 1991; Rooker and Holt 1997). Tidal currents (Setzler 1977; Holt *et al.* 1989) or density-driven currents (Mansueti 1960) may be utilized in order to reach a lower salinity nursery in upper areas of estuaries (Mansueti 1960; Bass and Avault 1975; Setzler 1977; Weinstein 1979; Holt *et al.* 1983; Holt *et al.* 1989; Peters and McMichael 1987; McGovern 1986; Daniel 1988). Once inhabiting lower salinity nurseries in upper areas of estuaries, red drum larvae grow rapidly, dependent on present environmental conditions (Baltz *et al.* 1998).

Red drum larvae along the Atlantic coast are reportedly common in southeastern estuaries, with the exception of Albemarle Sound, and are abundant in the St. Johns and Indian River estuaries in Florida (Nelson *et al.* 1991). Daniel (1988) and Wenner *et al.* (1990) found newly recruited larvae and juveniles through the Charleston harbor estuary over a wide salintity range. Mercer (1984) has also summarized spatial distribution of red drum larvae in the Gulf of Mexico. More recent studies conducted by Lyczkowski-Shutlz and Steen (1991) reported evidence of diel vertical stratification among red drum larvae found at lower depths less than 25 m at both offshore and nearshore locations. Larvae (ranging between 1.7 to 5.0 mm mean length) were found at lower depths during night and higher in the water column during the day. At the time of the study, water was well mixed and temperature ranged between 26° C to 28° C. There was no consistent relationship between distribution of larvae and tidal stage. Survival during larval (and juvenile) stages in marine fish, such as the red drum, has been identified as a critical bottleneck determining their survival and contribution to adult populations (Cushing 1975; Houde 1987; Rooker *et al.* 1999).

1.4.1.3 Juvenile Habitat

Juvenile red drum utilize a variety of inshore habitats within the estuary, including seagrass meadows, tidal freshwater, low-salinity reaches of estuaries, estuarine emergent wetlands, estuarine scrub/shrub, submerged aquatic vegetation, oyster reefs, shell banks, and unconsolidated bottom (SAFMC 1998; ASMFC 2002). Smaller red drum seek out and inhabit rivers, bays, canals, boat basins, and passes within estuaries (Peters and McMichael 1987; FWCC 2008). Wenner's studies (1992) indicate that red drum juvenile habitats vary slightly seasonally: most often between August and early October, red drum inhabit small creeks that cut into emergent marsh systems and have some water in them at lower tides, while in winter, red drum reside in main channels of rivers ranging in depths from 10 to 50 feet with salinities from one-half to two-thirds that of seawater. In the winter of their first year, 3 to 5 month old juveniles migrate to deeper, more temperature-stable parts of the estuary during colder weather (Pearson 1929). In the spring, they move back into the estuary and shallow water environments. In the following spring, juveniles become more common in the shallow water habitats. Studies show

that red drum inhabiting non-vegetated sand bottoms exhibit the greatest vulnerability to natural predators (Minello and Stunz 2001). Juvenile red drum in their first year generally avoid wave action by living in more protected waters (Simmons and Breuer 1962; Buckley 1984).

In the Chesapeake Bay, juveniles (20-90 mm Total Length, TL) were collected in shallow waters from September to November, but there is no indication as to the characteristics of the habitat (Mansueti 1960). Some southeastern estuaries where juvenile (and subadult) red drum are abundant are Bogue Sound, NC; Winyah Bay, SC; Ossabaw Sound, and St. Catherine/Sapelo Sound, GA; and the St. Johns River, FL (Nelson *et al.* 1991) and throughout SC (Wenner *et al.* 1990; Wenner 1992). They were highly abundant in the Altamaha River and St. Andrews/St. Simon Sound, GA, and the Indian River, FL (Nelson *et al*. 1991).

Peters and McMichael (1987) found in Tampa Bay that juvenile red drum were most abundant in protected backwater areas, such as rivers, tidal creeks, canals, and spillways with freshwater discharge, as well as in areas with sand or mud bottom and vegetated or non-vegetated cover. Juveniles found at stations with seagrass cover were generally smaller in size and fewer in number (Peters and McMichael 1987). Near the mouth of the Neuse River, as well as smaller bays and rivers between Pamilico Sound and the Neuse river, surveys from the North Carolina Division of Marine Fisheries (NCDMF) indicate that juvenile red drum were consistently abundant in shallow waters of less than 5 feet. Generally, habitats identified as supporting juvenile red drum in North Carolina can be characterized as detritus laden or mud-bottom tidal creeks (in Pamlico Sound) and mud or sand bottom habitat in other areas (Ross and Stevens, 1992). In a Texas estuary, young red drum (6-27 mm Standard Length, SL) were never present over non-vegetated muddy-sandy bottom; areas most abundant in red drum occurred in the ecotone between seagrass and non-vegetated sand bottom (Rooker and Holt 1997). In SC, Wenner (1992) indicated that very small red drum occupy small tidal creeks with mud/shell hash and live oyster as common substrates (since sub-aquatic vegetation is absent in SC estuaries).

1.4.1.4 Subadult Habitat

The subadult phase of the red drum's life cycle begins when late-stage juveniles leave shallow nursery habitats at a size of approximately 200 mm TL and 10 months of age. These subadults later attain sexual maturity, at about 3-5 years of age. Subadult red drum are most vulnerable to fishery exploitation (Pafford *et al.* 1990; Wenner 1992). They utilize many habitats within the estuary, including tidal creeks, rivers, inlets, and waters around barrier islands, jetties and sandbars (Pafford *et al.* 1990; Wenner 1992). While subadults are found in habitats similar to that of juvenile red drum, they are also found in large aggregations on seagrass beds, over oyster bars, mud flats, and sand bottoms (FWCC 2008). In a study conducted by Bacheler *et al.* (2009a), age-0 to age-3 red drum are commonly found in upper estuarine environments, but each fall a portion of age-1 and age-2 cohorts move to high-salinity coastal waters, while some red drum remain in upper estuarine habitat until age-3; at this age the last remaining red drum move to coastal environments. Tagging studies conducted throughout the species' range indicate that most subadult red drum generally remain in the vicinity of a given area (Beaumarriage 1969; Osburn *et al.* 1982; Music and Pafford 1984; Wenner *et al.* 1990; Pafford *et al.* 1990; Ross and Stevens 1992; Woodward 1994; Marks and DiDomenico 1996). Movement within estuaries is assumed to be related to temperature changes and food availability (Pafford *et al.* 1990;

Woodward 1994). The following is taken from the Atlantic States Marine Fisheries Commission (ASMFC) Red Drum Fishery Management Plan (2002):

> "During 1994 and 1995, the Inshore Fisheries Section of the South Carolina DNR conducted several aerial surveys to attempt to evaluate abundance and habitat utilization of subadult red drum along the South Carolina coast. Aerial surveys were generally deemed inefficient at estimating the number of fish inhabiting particular areas, especially inlets and beachfront areas because of the visibility of schools from the air depends on the interplay of temporal, climactic, topographic and behavioral factors. On the occasions when red drum schools were reliably located, they were found in flats at the confluence of rivers, inside inlets, creeks, sounds and bays. Aerial surveys proved useful to characterize the general topography of subadult red drum habitat in the intertidal and shallow-subtidal portions of the coast. It appears that typical habitats where subadult red drum are found in South Carolina are of two general types. In the northern portion of the coast, typical subadult habitat consists of broad (up to 200 m or more in width), gently sloping flats often leading to the main channel of a river or sound. Along the southern portion of the coast, subadult red drum habitat consists of more narrow (50 m or less), fairly level flats traversed by numerous small channels, typically 5-10 m wide by less than 2 m deep at low tide."

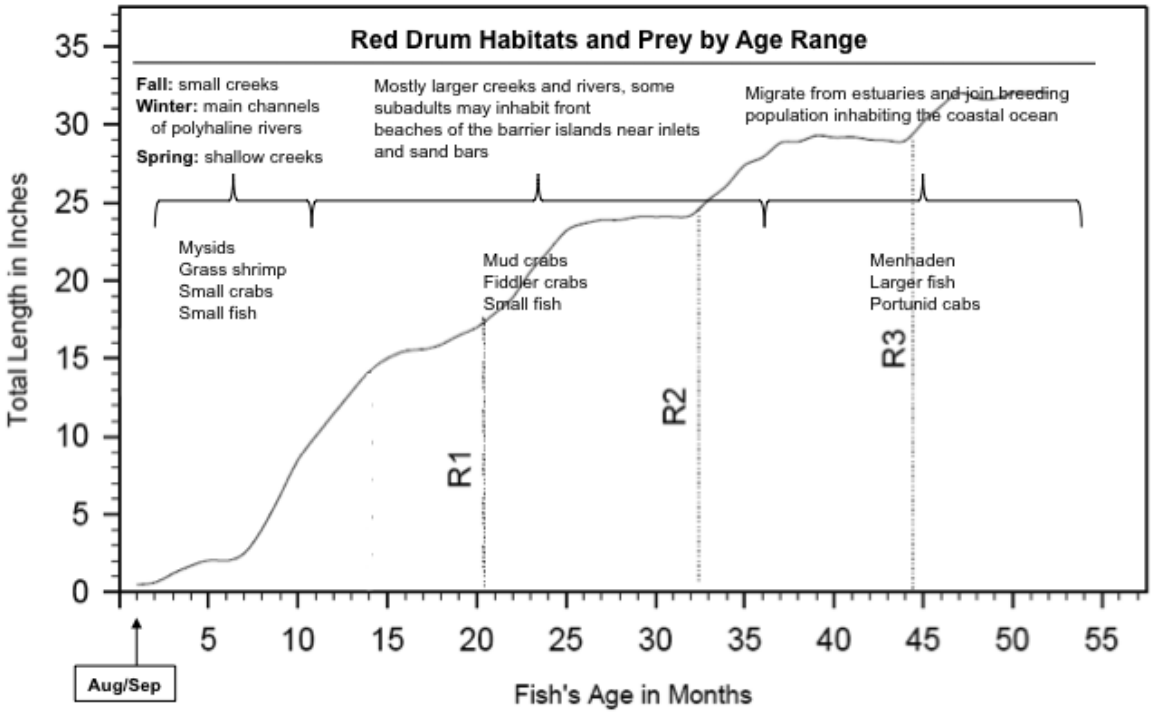


Figure 1. Red drum habitats and primary prey by age and size. Figure adapted from Wenner (2004) and based on research in South Carolina. R1, R2, and R3 are the ages of red drum when they have deposited 1, 2, or 3 rings on their ear bones or scales.

1.4.1.5 Adult Habitat

The adult phase begins when the fish are mature and can spawn regularly (Wenner 1992). Along the Atlantic coast adult red drum migrate north and inshore in the spring. In the fall, they migrate offshore and south (from Virginia to North Carolina). South of Hatteras, movement of adult red drum is typically described as inshore and offshore as opposed to north and south. Adults generally spend more time in coastal waters after they reach sexual maturity, but they do frequent inshore waters on a seasonal basis. Bacheler *et al.* (2009b) collected data that concluded that red drum of age 4+ generally moved furthest north and south, but traveled distances shorter than other life stages when moving east or west, from coastal waters to inshore waters. According to the 2008 Stock Assessment, red drum are found most abundantly in nearshore (coastal) shelf waters, and males reach maturity at an earlier age (1 to 3 years) than females (3 to 6 years) (FWCC 2008). The biology of the adult red drum is less well known than the younger stages, and therefore there is a lack of information regarding habitat utilization by adults. The South Atlantic Fishery Management Council's (SAFMC) Habitat Plan (SAFMC 1998; ASMFC 2002) cited high-salinity surf zones and artificial reefs as Essential Fish Habitat (EFH) for red drum in oceanic waters, which comprise the area from the beachfront seaward. Both nearshore and offshore hard/live bottom areas have been known to attract concentrations (schools) of adult red drum. Tagging studies have shown repeatedly that adult red drum in the Gulf of Mexico move tens and even hundreds of kilometers from original capture locations (Ingle *et al.* 1962; Osburn *et al.* 1982; Overstreet 1983; Julien *et al.* 2004). The following description of these habitats is taken from the SAFMC's Habitat Plan (1998) and ASMFC's Fishery Management Plan (2002):

> "Hard, or live bottom (Struthsaker 1969), consists of aggregations of coral generated habitats that have a thinner layer of live corals (soft and hard), among other biota types, existing among different sediments, older reefs or rock bottom. Often these bottom assemblages of coral provide reef structure for aggregations of red drum. Coral assemblages vary with geographical area. On the South Atlantic coast, coral communities are dominated by ahermatypic species, which are not reef building species. In the South Atlantic Bight (SAB), hard or live bottom habitats are generally small outcropping areas scattered in a patchy distribution over the continental shelf north of Cape Canaveral, FL. These habitats are most numerous off the coast of northeastern Florida and typically occur at depths greater than 27 m. Benthic temperatures in deeper areas range from 11° C to 27° C, while nearshore temperatures are typically cooler (from SEAMAPs South Atlantic Bottom Mapping Work Group effort, beginning in 1992). Data suggest that red drum prefer higher salinities as they age (Neill *et al.* 2004), which could partially provide an explanation as to why red drum move more into coastal areas during their subadult and adult life stages (Bacheler *et al.* 2009b)."

In addition to natural hard/live bottom habitats, adult red drum also use artificial reefs and other natural benthic structures. As of 2002, 120,000 acres of ocean and estuarine bottom along the south Atlantic has been permitted for the development of artificial reefs (ASMFC 2002). In Florida alone, 34 out of 35 coastal counties have been involved in artificial reef development (FWCC 2012). Most Atlantic coast states are in the process of establishing or have already established artificial reef management programs in their coastal waters.

Red drum were found from late November until the following May at both natural and artificial reefs along tide rips or associated with the plume of major rivers in Georgia (Nicholson and Jordan 1994). Data from this study suggests that adult red drum exhibit high seasonal site fidelity to these features. Fish tagged in fall along shoals and beaches were relocated 9 to 22 km offshore during winter and then found back at the original capture site in the spring. In summer, fish moved up the Altamaha River nearly 20 km to what the authors refer to as "pre-spawn staging areas" and then returned to the same shoal or beach again in the fall.

1.4.2 Identification and Distribution of Habitat and Habitats of Concern (HOC)

Red drum populations along the Atlantic coast are managed through the Atlantic Coastal Fisheries Cooperative Management Act (Atlantic Coastal Act). Unlike the Magnuson-Stevens Fishery Conservation and Management Act which addresses fishery management by federal agencies, the Atlantic Coastal Act does not require the Atlantic States Marine Fisheries Commission to identify habitats that warrant special protection because of their value to fishery species. Nonetheless, the Commission believes this is a good practice so that appropriate regulatory, planning, and management agencies can consider this information during their deliberations.

As reviewed in section 1.4.1.1, habitats used by the various life stages of red drum include: tidal freshwater wetlands, estuarine wetlands, tidal creeks, mangrove wetlands, submerged aquatic vegetation (SAV), oyster reefs and shell banks, ocean high-salinity surf zone, hard bottom, and natural and artificial reefs. Spawning occurs within passes and inlets of high salinity estuaries on the southeastern U.S. coast and outer bars within surf zones (Murphy and Taylor 1990; Johnson and Funicelli 1991; Nicholson and Jordan 1994; Woodward 1994). In more recent studies, increased spawning habitat of red drum upriver to Oriental, NC, was due to elevated levels in salinity (Beckwith *et al.* 2006). Specific "hot spots" for red drum spawning include: North Carolina – waters of Pamlico Sound near Hatteras, Ocracoke and Drum Inlets and between the Neuse and Pamlico rivers in the western portion of the sound; South Carolina – main channel leading to Charleston Harbor and estuarine waters of St. Helena Sound; Georgia – the Altamaha River estuary; Florida – Ponce de Leon inlet and the Mosquito Lagoon system (ASMFC 2002). For red drum, nursery areas exist throughout estuarine environments, usually in shallow waters with varying salinities. Areas included are coastal marshes, shallow tidal creeks, bays, tidal flats of varying substrate type, tidal impoundments, and SAV beds. Red drum larvae and juveniles occur within a broad range of estuarine habitats. Similarly, subadult red drum are found throughout tidal creeks and channels of southeastern estuaries, in backwater areas behind barrier islands, and in the front along ocean beaches during certain seasons. Estuarine systems as whole, ranging from lower salinity rivers to the mouths of inlets, are needed to support populations of red drum.

A subset of red drum habitats, which the Commission refers to as Habitats of Concern (HOC), is especially important as spawning and nursery areas for red drum. HOC for red drum include all coastal inlets, SAV beds, the surf zone (including outer bars), and state-designated nursery habitats (e.g., Primary Nursery Areas in North Carolina; Outstanding Resource Waters in South Carolina's coastal counties; Aquatic Preserves along the Atlantic coast of Florida).

Table 1. Summary of red drum life stage dependent physical and temporal habitat characteristics.

Life stage	Optimal Temperature Range	Salinity range	Habitats	Timing
Adults-spawning	22-25°C (up to 30°C)	>25ppt (high salinities)	Estuary, passes/inlets, along open coasts	Late Summer-Early Fall
Eggs	20-30 °C	>25ppt (high salinities)	Estuary, passes/inlets, seagrass meadows	Fall
Larvae	Based on regional temperature regime (10-25 °C)	Low Salinities (10-20 ppt)	Pelagic-20days; then demersal Upper estuary	Late Fall-Spring
Juveniles	Based on regional seasonal temperature regime (10-30 °C)	Low-High Salinities (15-25 ppt)	*Estuary:* seagrass, tidal freshwater, low-salinity reaches, emergent wetlands, estuarine scrub/shrub, submerged aquatic vegetation, oyster reefs, shell banks, unconsolidated bottom Passes/Inlets	*Winter:* Deeper bay and river channels *Spring/Summer:* Shallow creeks and shorelines
Sub-Adults	Based on regional seasonal temperature regime	Low-High Salinities (high estuarine to marine)	*Estuary to Marine:* tidal creeks, rivers, inlets, shallows near barrier islands, jetties and sandbars; large aggregations in seagrass beds, over oyster bars, mud flats, and sand bottoms	Seasonal movement within habitats based on temperature changes and food availability
Adults	Based on regional seasonal temperature regime	High salinities (25-35 ppt)	*Marine*: Frequent inshore shelf waters on a seasonal basis; nearshore and offshore hard/live bottom, high salinity surf zones, artificial reefs *Lower Riverine*: pre-spawning	*Virginia and N.C.:* Seasonal migrations north and inshore in the spring; offshore and south in the fall *South of Cape Hatteras*: Seasonal migration onshore in the spring; offshore in the fall Summer

1.4.3 Present Condition of Habitats and Habitat of Concern

1.4.3.1 Coastal Spawning Habitat: Condition and Threats

The productivity and diversity of coastal spawning habitat can be compromised by the effects of industrial, residential, and recreational coastal development (Vernberg *et al.* 1999). Coastal development continues in all states and coastlines of the nation despite the increased protection afforded by federal and state environmental regulations. Threats to nearshore habitats in the south Atlantic that are documented spawning habitats for red drum or are suitable spawning habitats are described below.

Navigation and boating access development and maintenance activities, such as dredging and hazards from ports and marinas, are a threat to spawning habitats of red drum. According to the SAFMC (1998) and ASMFC (2002), navigation related activities can result in removal or burial of organisms from dredging or disposal of dredged material, effects due to turbidity and siltation, release of contaminants and uptake in nutrients, metals and organics, release of oxygen-consuming substances, noise disturbance, and alteration of hydrodynamic regime and habitat characteristics. All listed effects have potential effects to decrease the quality and quantity of red drum spawning habitat.

Ports also pose the threat of potential spills of hazardous materials. Cargo that arrives and departs from ports can contain highly toxic chemicals and petroleum products. While spills are rare, constant concern exists for extensive spans of estuarine and nearshore habitat being at risk of contamination. Even a small spill could result in a huge exposure of productive habitats. Oil releases such as the MC 282 or Deepwater Horizon oil release (2010) into the Gulf of Mexico has severely affected aquatic life, water quality and habitat posing many threats such as mortality, disease, genetic damage, and immunity issues (Collier *et al.* 2010). Chemicals in crude oil can cause heart failure in developing fish embryos (Incardona *et al.* 2004, 2005, 2009). Chronic exposures for years after the Exxon Valdez oil spill were evident in fish and other marine life, resulting in a higher pattern of mortality (Ballachey *et al.* 2003). Oiling of nearshore high-energy habitat along beaches of the Gulf of Mexico from Louisiana to Florida occurred for prolonged periods of time during the spring of 2010, and weathered oil products were found in offshore benthos where spawning red drum can occur. The discharge of oil may have also altered migration patterns and food availability. Port discharge of marine debris, garbage, and organic waste into coastal waters is also a concern.

Beach nourishment projects and development of wind and tidal energy could also alter red drum spawning and offshore adult habitat dynamics. Beach nourishment can result in removal of offshore sediments resulting in depressions and altering sediment characteristics along the shoreline (Wanless 2009). Sediments eroded from beaches after nourishment projects can also be transported offshore and bury hard bottoms, which can diminish spawning aggregation habitat for red drum. Beach nourishment projects can also alter forage species abundance, distribution and species composition in the high-energy surf zone for a time, but this varies by species and timing of nourishment activities (Irlandi and Arnold 2008). Wind and tidal energy projects can create artificial structure in migration corridors and submarine cables may produce electrical fields that can affect red fish movement patterns and habitat use in affected areas (DONG 2006; OEER 2008; ASMFC-Habitat Committee 2012).

Use of certain types of fishing gear, such as trawls and bivalve dredges can also adversely affect spawning habitat (Northeast Region Essential Fish Habitat Steering Committee 2002). Trawls and dredges remove structure-forming epifauna, alter sediment contours, redistribute reef aggregate materials (e.g. fractured rock outcroppings and boulders) and change infaunal and demersal organism assemblages in areas where fishing gear is operated. These effects can reduce forage species abundance for red drum thereby affecting spawning success. The most significant effect of this type of fishing gear is long-term changes in bottom structure and long-term changes in benthic trophic or ecosystem functions. These effects can be on the order of months to years in low energy environments, so alterations can have a long-term effect on red drum spawning habitat.

Spawning is optimal within a specific range of temperatures. Climate change and resulting temperature regime changes in spawning habitats could alter the timing of spawning and egg development, which may be detrimental in a specific habitat area of concern. Such alterations in phenology are recognized as such a threat to the survival of many species (USFWS 2011). Significant climate change could alter current patterns and significantly change water temperatures, affecting migration and spawning patterns, and larval survival (Hare and Able 2007; USFWS 2011).

1.4.3.2 Estuarine Spawning, Nursery, Juvenile and Subadult Habitat: Condition and threats

Between 1986 and 1997, estuarine and marine wetlands nationwide experienced an estimated net loss of 10,400 acres (Dahl 2000). The majority of this loss was from urban and rural activities and the conversion of wetlands for other uses. Along the south Atlantic coast, Florida experienced the greatest loss due to urban or rural development (Dahl 2000). In Tampa Bay, 3,250 acres of seagrass have been recovered between 2008 and 2010 (EPA 2011b).

Conditions of red drum estuarine habitats vary depending on the level of urbanization. Generally, an estuarine environment closer to a highly developed urban area will exhibit degradation when compared to the quality of estuarine habitat with less development of its surrounding landscape. Runoff, waste, and sewage pollution of sensitive coastal environments and can result in the proliferation of pathogens. Pathogens can result in lesions, developmental issues, disease of major organs, and mortality in red drum and other fishes (Conway *et al.* 1991) Red drum may exhibit a higher tolerance to bacteria with age, and antibody response also increases as water temperature does (Evans *et al.* 1997). Atrazine, a widely used pesticide in the United States, was exposed to red drum in low levels to test its' affect on growth, behavior, and survival of red drum. In laboratory experiments, using realistic doses of atrazine with respect to runoff amounts, red drum larvae exhibited a 7.9% - 9.8% decrease in growth rate (Alvarez & Fuiman 2005).

Nutrient enrichment of estuarine waters is a major threat to water quality and habitat available to the red drum. In the southeast, forestry practices significantly contribute to nutrient enrichment, as does pesticide use, fertilizers, and pollution runoff (ASMFC 2002; NSCEP 1993). Urban and suburban development are the most immediate threat to red drum habitat in the southeast. Port and marina expansion also impact the estuarine habitat important to red drum by pollution contributed from stormwater originating from altered uplands and through alterations to

hydrodynamic flows and tidal currents. Watercraft operation can result in pollutant discharge, contributing to poor water quality conditions. Facilities supporting watercraft operations also result in the alteration and destruction of wetlands, shellfish and other bottom communities through construction activities. Motorized vehicles in Class A (< 16 ft) and Class 1 (16 to 25 feet) have seen major recreational growth in estuarine waterways (NMMA 2004). Operation of watercraft equipped with outboard and inboard engines and propellers over shallow seagrass communities can cause increased seagrass scarring (Sargent *et al.* 1995). Mining activities in nearby areas can also pose a threat with nutrient and contaminant runoff, dredging material deposition, and through alternations of the hydrology of the estuary.

Hydrologic modifications can negatively affect estuarine habitats. Aquaculture, mosquito control, wildlife management, flood control, agriculture, and silviculture activities can result in altered hydrology. Ditching, diking, draining, and impounding activities also qualify as hydrologic modifications that can impact estuarine environments (ASMFC 2011). Alteration of freshwater flows into estuarine areas may change temperature, salinity, and nutrient regimes as well as wetland coverage. Studies have shown that alteration in salinity and temperature can have profound effects in estuarine fishes (Serafy *et al.* 1997) and that salinity can dictate the abundance and distribution of organisms residing in estuaries (Holland *et al.* 1996). Certain areas in the southeast concern the maintenance and stabilization of coastal inlets. Construction of groins and jetties has altered hydrodynamic regimes and in turn, transport of larvae of estuarine dependent organisms through inlets (Miller *et al.* 1984; Miller 1988).

Shoreline erosion patterns can also affect the hydrodynamics and transport of larvae to estuarine environments. Erosion has the potential to alter the freshwater flow into habitats essential for egg, larval, and juvenile survival. Whether erosion is human-induced or naturally occurring, nearshore habitats are consequently affected and eroded sediment is transported and deposited elsewhere (ASFMC 2010). Beach nourishment activities can result in sedimentation in estuaries, covering seagrass beds and other nearshore habitats, and causing water quality to deteriorate (Green 2002; DEP 2011). Along the Atlantic coast, living shorelines are becoming a more popular management strategy to control and minimize erosion (ASFMC 2010).

As with other red drum habitat, trawl fisheries represent a threat to estuarine habitat for this species. In combination with the physical and biological effects identified in the Northeast Region Essential Fish Habitat Steering Committee workshop proceedings (2002), trawling activities and bivalve harvesting activities(oyster tonging, clam raking, clam kicking, etc.) can severely damage seagrass systems (Stephan *et al*. 2000). Such activities can reduce the productivity of estuarine red drum habitat and alter the ecology of this habitat. Forage species abundance can diminish and movement patterns for red drum schools within the estuaries they inhabit can be altered. Effects of these fishing gears can be ameliorated through effective management strategies, such as exclusion of trawl fisheries from seagrass communities, but without such management, the adverse effects of the fishery activities can be long-term.

Climate change has the potential to cause sea level rise, which could result in faster erosion of certain nearshore areas and loss of shallow nursery habitats to inundation. Projections of global sea level rise are from 18-59 cm by the year 2100, with an additional contribution from ice sheets of up to 20 cm (IPCC 2007). In addition to sea level rise, climate change could alter the amount of freshwater delivery and salinity levels in estuarine areas (USFWS 2011). Estuarine

environments are highly vulnerable to changes in climate, so any change in temperature regime is also a concern. As temperature increases, the surface water in estuaries and marshes increases, which makes oxygen solubility more difficult (EPA 2011a) and can stress the environment. This can also minimize saltwater and freshwater mixture, and affect nutrient supply by changing hydrodynamics. Increases in carbon dioxide levels in ocean water, as a result of climate change, causes rises in acidity and pH levels. Estuarine waters are vulnerable to acidification, but seagrasses are particularly susceptible to changes in water column acidity (EPA 2011a).

Increases in temperature can also affect metabolism of seagrass (Evans *et al.* 1986, Marsh *et al.* 1986; Bulthuis 1987; Zimmerman *et al.* 1989b; Neckles and Short 1999), which alter the carbon balance and nutrient cycle. Changes could result in alterations in species distribution and abundance varying both geographically and spatially (McMillan 1984; Walker 1991).

1.4.3.3 Adult Habitat: Condition and Threats

While threats to adult red drum habitat exist, they are not as numerous as those faced by post-larvae, juveniles, and subadults in estuarine and coastal waters. According to the SAFMC (1998) and ASMFC (2002), threats to both nearshore and offshore habitats that adult red drum utilize in the south Atlantic include navigation management and related activities; dredging and dumping of dredged material; mining for sand or minerals; oil and gas drilling and transport; and commercial and industrial activities, and are similar to those for red drum coastal spawning habitat as mentioned in section 1.4.3.1 above.

Currently, mineral mining activities in the South Atlantic are highly limited. Offshore mining has the potential to pose a threat to adult red drum habitat in the future. Mining activities could alter the hydrology, sediment landscape, and water quality of surrounding areas, affecting both fish and their habitat, by causing sediment plumes or releasing metallic substances into the water column (Halfar 2002).

A more immediate threat to red drum adult habitat is the mining of sand for beach nourishment projects. Associated risks include burial of hard bottoms near mining or disposal sites, contamination, and an increase in turbidity and hydrological alterations that could result in a diminished habitat (Green 2002; Peterson and Bishop 2005).

Although adult red drum are euryhaline and eurythermal, drastic or sudden changes in salinity or temperature can result in mortality (Gunter 1941; Buckley 1984). While climate change is not an immediate threat, drastic fluctuations in seasonal temperature regimes and predicted extreme weather events could potentially pose threats the future.

1.4.4 Habitat Bottlenecks

Red drum utilize all available estuarine and nearshore habitats throughout their life history. Although regional habitat types, such as mesohaline SAV communities, might be limited locally, red drum can use multiple habitat types at each stage of their development. There is no supporting evidence that habitat is currently limiting to populations of red drum throughout their range.

For example, oyster reefs are an important habitat to red drum at the juvenile and subadult life stages. In South Carolina, the abundance of red drum is not limited by the availability or health of oyster reef habitat, despite significant reductions of oyster reef habitat throughout the range of the red drum population. Data from Georgia's Marine Sportfish Health Survey (MSPHS) suggests over 80% of all juvenile red drum (< 375mm CL) captured since 2003 are associated with shell/oyster habitat. In comparison, less than half of the stations sampled were associated with shell. Since red drum use multiple habitat types at each stage of their development, limitation of one habitat type does not necessarily reduce survival of that life stage's cohort.

Creeks, tributaries, and estuaries are important habitats for red drum. Larval, juvenile, and subadult red drum are particularly sensitive to pollution contributed by watershed scale human activities. There is currently no evidence that chemical pollution is a limiting factor for juvenile and subadult red drum. However, changes in hydrology due to watershed activities that alter stormwater flow and sedimentation might restrict red drum larval recruitment both locally and regionally. The potential for impact on larval red drum recruitment is dependent upon the scale of stormwater change within the watershed and creek systems. Additionally, sediment accumulation may alter SAV abundance and circulation patterns resulting in lower recruitment into small creeks.

While these sensitive habitats have been identified as important to various life stages of red drum, none of them are believed to currently limit the successful recruitment of red drum individuals to regional stocks.

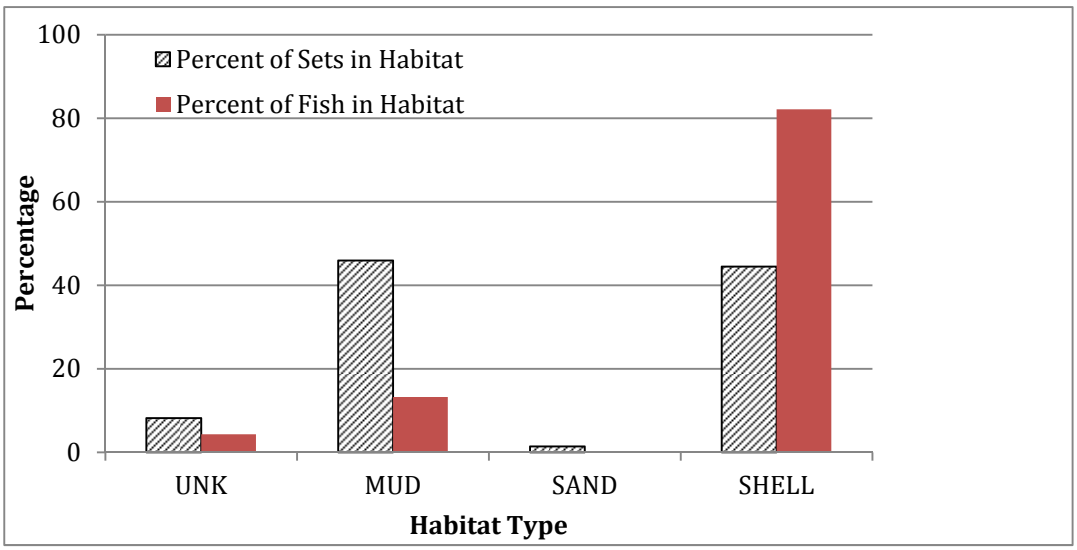


Figure 2. Red drum habitat preference from Georgia DNR MSPHS. Total sets across habitat types from 2003-2012.

1.4.5 Ecosystem Considerations

Ecosystem management considerations for red drum include protection and enhancement of habitat features, which can contribute to fish production, as well as consideration of how

harvesting one species may impact the focus species and the biotic communities both supporting it, and which it supports.

The complexity of available habitat structure determines the ability of juvenile fish to avoid predation (Crowder and Cooper 1982; Salvino and Stein 1982; Nelson and Bonsdorff 1990; Heck *et al.* 1997; Minello and Stunz 2001). When available, seagrass environments serve as primary habitats for eggs and pelagic larvae and are also important to the juvenile stage of red drum. Seagrass habitats provide multiple ecosystem services in addition to their function as nursery systems (Constanza *et al.*1997; Heck *et al.* 2003), are highly productive environments that are nutrient rich from detrital sources, and they produce suitable habitat for prey and predators. Productivity outputs from seagrass habitats include carbon that enters coastal food webs and into other physiochemical structural pathways (Heck *et al.* 2003). Maintenance and restoration of seagrass habitats is beneficial to red drum by increasing nutrient and habitat availability, and in turn, increasing growth and development rates for larvae and juvenile red drum stages which have been previously described as a bottle-neck in determining regional populations and the future survival of the species (Cushing 1975; Houde 1987; Rooker *et al.* 1999).

Marsh environments are also valuable habitats to the larval and juvenile life stages of red drum. Red drum use tidal creeks from post-larval through sub-adult life stages. Seasonally, tidal currents move and guide early life stages of red drum into new environments as they transition from pelagic to juvenile stages. Under certain tidal conditions, water levels in marsh habitats may be lower or remain higher than water levels of open water systems in estuaries, which reduces water exchange and in turn affects physiochemical conditions, such as oxygen levels, salinity, and temperature (Levin *et al.* 2001). In a closed environment, depleted oxygen levels can lead to fish kills, which can either directly affect red drum, or indirectly affect local populations by killing off much of their forage resource. Hypoxia can also lead to avoidance behavior, relative to affected system, in addition to reduced growth and survival rates of local populations of juvenile to sub-adult red drum (Pihl *et al.* 1991; Eby and Crowder 2002; Thornson and Quigg 2008; Bacheler *et al.* 2009a). Red drum are susceptible to harmful algal blooms in estuarine environments, which can be due to elevated nutrient levels and can cause anoxic water column conditions. (Steidinger *et al.* 1998; Adams *et al.* 2011). Because red drum have shown some selectivity in salinity and temperature levels in the waters they inhabit (Neill 1987; Holt *et al.* 1981), reduced water exchange in marsh habitats may affect pelagic life stages.

In estuarine habitats, red drum growth and survival may suffer from sub-lethal effects due to anthropogenic degradation of water quality (Adams *et al.* 2011). Beckwith *et al.* (2006) concluded that, in low-salinity years, poorer water quality has a greater impact and can result in higher egg mortality. Bacheler *et al.* (2009a) collected 5,961 red drum in Pamilco Sound, North Carolina, where age-1 red drum were in greatest abundance at low (0 to 8 psu) or high (20 to 30 psu) salinities while the lowest catches occurred in moderate salinities (10 to 15 psu). Age-1 red drum were also most abundant in bottom habitats where there was algae, detritus, and shell, but lowest in areas with seagrass. Along the Outer Banks, North Carolina, however, higher catches of red drum were made in seagrass areas, suggesting that shallow, nearshore areas may provide subadults with a greater amount of foraging opportunities (Ross and Epperly 1986; Ruiz *et al.*1993; Miltner *et al.* 1995; Craig and Crowder 2000; Bacheler *et al.* 2009a). Inhabiting nearshore areas may also minimize predation, because predators of the red drum, such as

bottlenose dolphins (*Turisops trucatus*), primarily occur in deeper waters (Gannon 2003; Bacheler *et al.* 2009a).

Regarding biotic factors, growth and survival rates of red drum larvae are similar to other marine fishes in that they are associated with prey availability (G.J. Holt, unpublished data; Rooker *et al* 1999). In Minello's *et al.*'s experiment (2001), wild-caught red drum had higher average predation rates in non-vegetated mesocosms than in areas sampled with oyster reefs. Predation rates in seagrass and marsh systems were intermediate when compared to these other habitats and experimental conditions. Hatchery-reared red drum showed little difference in mortality rates among these different habitats when released and subsequently sampled from them. Because of the complex physical structure provided, oyster reefs have the potential to provide better sheltering habitat for red drum, and thereby minimize predation. If oyster reefs provided a substantial enough advantage in protection from predation for red drum living in this habitat, more juveniles would survive the life stage associated with use of this habitat. This could result in an increase in individuals reaching reproductive maturity, which would positively affect the reproductive standing stock of regional populations recruiting individuals from this habitat. Research has concluded that oyster reefs provide more protection from predators to juveniles than seagrasses, marshes, or non-vegetated sand (Levin *et al.* 2001). Recruiting population vulnerability to depredation generally decreases as habitat complexity increases (Heck and Orth 1980; Levin *et al.* 2001).

Oyster reefs can also provide benthic-pelagic coupling (Hare and Maranick, 2007; ASMFC 2007b). Feeding activities by the oysters can cause a reduction in water column turbidity, which generally has a positive impact on submerged aquatic vegetation by allowing a higher degree of ambient light penetration in the water column. In addition to increasing water quality, oyster reefs reduce erosion (ASMFC 2007b), which can threaten estuarine habitats with sediment smothering, and baffle tidal currents that carry pelagic larvae into upper reaches of estuarine rivers.

Invasive species indirectly pose a potential threat to red drum by displacing or minimizing the populations of native species of animals and plants, which can alter the trophic structure of red drum communities, prey availability, and predator behavior dynamics. While red drum are considered a predatory fish, juveniles, eggs, and larvae may be adversely affected if they are directly displaced or if food sources upon which they depend are displaced by an invasive species or suite of species.

In south Texas estuarine habitats, spatial and temporal variation in meiofaunal prey density is common, so seasonal trends in prey abundance may affect early life survival of red drum (Rooker *et al* 1999). Predator suites also vary spatially and temporally, and abundance may be a factor in survival. Post-settlement red drum are often exposed to a large variety of predators with a shifting abundance and distribution in seagrass meadows (Rooker *et al.* unpublished data; Rooker *et al.* 1999). Predators inhabiting seagrass meadows are capable of consuming large numbers of red drum, which can result in prey and predator density fluctuations critical to the survival of red drum in the egg and larval stages (Rooker *et al.* 1998a).

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