

# Atlantic States Marine Fisheries Commission

## SEAMAP-South Atlantic Crustacean Workgroup

*November 2, 2015, 2 – 6 pm*

*St. Augustine, Florida*

### 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 (*L. DeLancey*) 2:00 pm
2. Approval of Agenda
3. Membership updates/announcements 2:10 pm
4. SEAMAP 2016-2020 Management Plan draft language (*L. DeLancey*)
5. SAFMC Fishery Ecosystem Plan Amendment II (*L. DeLancey*)
6. Black gill shrimp research 3:00 pm
7. “Offshore spawning of blue crabs in the Southeast U.S.” (*M. Ogburn*) 3:30 pm
8. Regional Blue Crab Stock Assessment Discussion 4:00 pm
  - a. Data needs
  - b. Methods
    - i. Potential modeling approaches
  - c. Staff/committee support
9. Elect New Chair/Vice-Chair **ACTION**
10. Other Business
11. Public Comment
12. Adjourn 6:00 pm

The meeting will be held at the World Golf Village Renaissance Resort, 500 S. Legacy Trail, St. Augustine, FL

# Atlantic States Marine Fisheries Commission

## SEAMAP-South Atlantic Crustacean Workgroup

*April 10th 2014  
Charleston, South Carolina*

### Draft Minutes

SEAMAP-SA Crustacean Workgroup- Larry DeLancey, Ryan Gandy, Jim Page, Trish Murphey, Shanna Madsen

Others: Pat Geer, Todd Mathes, Stephen Taylor, Lindsay Parker, Amy Fowler, Jeff Brunson

1. Welcome (*L. DeLancey*) 1:00 pm
2. Approval of Agenda
3. Membership updates/announcements 1:10 pm
4. State Highlights (landings trends, fishery issues, research, regional efforts)
  - a. North Carolina (*T. Murphey/S. Taylor*) 1:25 pm
  - b. South Carolina (*L. DeLancey*) 1:40 pm
  - c. Georgia (*P. Geer/J. Page/T. Mathes*) 1:55 pm
  - d. Florida (*R. Gandy*) 2:10 pm

Pat G gave an update on the Estuarine Mapping Work Session (Feb 24<sup>th</sup> 2014) from the Governors' South Atlantic Alliance. The base data sets came from the state data points for blue crab and the workshop was to decide how best to present this data. If the system was stratified they used the strata as a zone. They used the state data to come up with blue crab densities for each zone. The data they were working with was just the last 5 years of data. There is talk of creating a slider of animated data to look at the density changes over time. Pat noted that he used SEAMAP/ Pamlico Sound Survey database to extract the NC data and it worked well.

Larry D commented that this is a good starting point for a regional stock assessment and would like the workgroup to stay involved. If anyone needs landings data, or fishery independent data, we are a great resource for that.

Ryan G offered to talk about stone crabs in FL. The interesting point is that it's hard to do a stock assessment but they are working on that. They are trying to get at least population estimates. He was encouraged by the work going on in SC, so it would be good to collaborate there. They will be putting in east coast sampling stations, probably in Melbourne.

Pat G commented that GA had a crab observer study from 2003-09 and there were 4000 traps they were observing. For stone crabs, they saw a higher rate that they were observing than anyone else was reporting. People are now targeting them, they are not just bycatch in the blue crab fishery.

Ryan G said a big area for research is side scanning within 30 miles of the coast and IDing the hard habitats and where they might be utilizing. Marketing wise, if SC gets into seeing how FL markets stone crabs, it might drive up prices to SC fisherman. One issue to consider is there are a lot of traps left behind or lost. When creating a fishery, it might be best to make them use wooden traps as opposed to plastic, or use standard wire mesh blue crab traps. Tom Matthews is working on the problems with the trap fisheries. Traps will walk even if they're 60-80lbs and they're mowing over coral. If trap gets stuck in reef saddle, you might have issues ripping up the bottom community. As the other states go into the trap fishery, Ryan can provide insight.

Ryan G said currently they are trying to regulate effort in FL more than focusing on MSY. If people pay for trap certifications, it really gives a good idea of the real effort. It also helps with the derelict trap issue.

Jim P gave the Georgia update. They continue to monitor monthly shrimp and blue crab trawl indices. Fall was low on white shrimp, and they forth a fisheries disaster declaration. This was approved through the Governor's level. Black gill disease is part of what led to that decline, they believe. Todd M is working with Skidaway to provide them with samples to get more info. Black gill showed up in the late 1990s and appears to be getting worse. By working with researchers at SKIO, they are hoping to increase their knowledge of the disease. Pat G commented that the combination of excessive rain and black gill may have crashed the fall stock. The industry there said they would like to see more money going into research for the black gill. It would be good to find some lobbyists. GA could not get political support for additional funding.

Todd M gave the update for tiger shrimp. GA is monitoring them and has made a big effort to get feedback and get some samples. Todd is working with fisherman to get samples and they are added into a genetic repository. They are contributing to the USGS non indigenous species data web based reporting efforts. He was able to process 195 shrimp this past year. By looking at the maturity of samples, they can tell that they are sexually developing. Prior to 2012, tiger shrimp were all reported off shore, but commercial bait guys now are finding juvenile tiger shrimp way inland for the last two years running. They are now thinking about going some tagging. They are looking at if tiger shrimp have black gill and did see some that showed signs. In Oct. took gill tissue samples to be processed. People do seem to be eating them more, so they tested them for mercury analysis and they found they were well under any advisory.

Stephen T gave the NC update for blue crabs. Pamlico Sound is large producer for blue crabs in the state. According to the fisherman, 2013 was a bad year and 2014 is even worse than that in the southern part of the state. They had a lot of rainfall coming down the Cape Fear River. Some fisherman have been finding dead crabs in the pots. 2012 hard crab landings were at 25 million lb, 2013 was at 21 million lb, which is a 4 million pound drop in state landings. Crabbers in the northern part of state are saying that it's even worse out there this year so the landings may decrease even more. NC updated their traffic light assessment, and they added a few new triggers, dropped a few triggers. Pat G asked if Stephen considered the traffic light approach a stock assessment. Stephen T initially responded that he was not sure but after thinking about it and discussing it, he did consider it a type of stock assessment and that it was the best approach NC had to assess blue crabs in NC. Pat G said he thought they were useful as they're easy to tell what is happening with the stocks. Ryan G commented that "stock assessment" is becoming a broad term since many species are data poor or do not fit the model.

Trish M updated the group on NC shrimp. NC is working on an amendment to the shrimp plan. During their 5 year review for the FMP, the public was concerned about bycatch in the shrimp trawl fishery. Because of these concerns, NC is amending the plan, but only to address bycatch. There are recommendations that involve gear modification work, and convening an industry workgroup to advise and initiate different gear testing of bycatch reduction gears that are out there. There is a pre-proposal in the works by Kevin Brown for BREP, to work with Sea Grant to develop this workgroup and test different gear designs. In inshore, estuarine waters they currently have 90 ft maximum headrope length but still unlimited in Pamlico Sound. Another recommendation is to set a maximum headrope length of 220 ft within the Pamlico Sound and other areas inside that do not have a maximum headrope size. In May the NC Marine Fisheries Commission will make final recommendations on management strategies and any rule changes that are required. The approved regulations will go in place 2015. This bycatch reduction discussion was a big issue because one recommendation that was taken to the public was to reduce bycatch by 40%. This recommendation was changed to a “practical level with a goal of 40%”. Another recommendation was to add an additional BRD to shrimp trawl gear but fisherman would have the ability to select whatever certified BRD they want.

Amy F said they received a Grant for tiger shrimp through FWS. The grant is being used for stable isotope analysis. The concern is they don't know what tiger shrimp are eating or if they're competing or trying to eat the native shrimp. They've decided it might be good to pay for the tiger shrimp to be able to get them for the analysis. They do not want to waste money and time trying to collect them. Ryan G commented that they are seeing juveniles everywhere, some right off shore. Larry Connor in the invasive branch, is collecting the samples for USGS for genetics. They collect them from the public. Todd M noted that they just started catching them at fixed stations this year. Amy F would also like look at gut contents to see if they could ID anything, perhaps also look at genetic markers.

Larry D commented that it could be worthwhile to discuss those “weird” species, like whelk or jellyfish. Pat G commented that having some information on whelk would be nice. Some ASMFC Board members were pushing that idea. Todd M said they are thinking about coming up with a whelk plan. They are currently trying to collect more data and information. Jim P noted that in the 80s-mid 90s, whelk was the 3rd biggest fishery in GA. For whatever reason the population has crashed. It would prove useful to collect more data to understand the population status.

5. Discussion of Colton et al. 2013 2:25 pm

6. Future of workgroup and meetings 2:40 pm

Pat G commented that SEAMAP-SA Crustacean WG would be a good starting point for the conversation we had earlier in regards to a blue crab regional effort. He thought we could get Sea Grant money to be able to bring people together to discuss regional blue crab data collection. Ryan G agreed that it would be good to look at them from a population side, we would need to leave out the management but we talk about the research recommendations. This would be economically efficient. The group agreed that SEAMAP-SA Crustacean WG would be a good starting point for approaching blue crab regional management.

Sadly, Larry will be retiring in the next year. The Crustacean WG will need a new fearless leader!

7. Other Business

8. Adjourn

3:00 pm

**SEAMAP SOUTH ATLANTIC  
CRUSTACEAN REPORT  
November 2015**

# **NORTH CAROLINA CRUSTACEAN REPORT**

**FISHERY MANAGEMENT PLAN UPDATE  
BLUE CRAB  
AUGUST 2015**

**STATUS OF THE FISHERY MANAGEMENT PLAN**

**Fishery Management Plan History**

Original FMP Adoption:	December 1998
Amendments:	December 2004, November 2013
Revisions:	None
Supplements:	None
Information Updates:	None
Schedule Changes:	None
Next Benchmark Review:	November 2018

The original Blue Crab Fishery Management Plan (FMP) was adopted in December 1998. The plan adopted several management changes including: 1) requiring sinking lines to be used on all crab pot buoys, 2) prohibited commercial gears (except attended gill nets) in crab spawning sanctuaries from March 1 through August 31, 3) prohibited baiting peeler pots except with live legal male blue crabs, 4) repealed the exemption for culling peelers before reaching shore in the hard crab fishery, 5) prohibiting the possession of white line peelers from June 1 through September 30, 6) changed the unattended pot rule from 10 days to 7 days, 7) prohibiting setting pots in any navigation channel marked by State or Federal agencies, 8) modified crab pot area regulations to use depth instead of distance from shore, 9) implemented marking requirements for recreational pots, 10) defined collapsible traps as non-commercial gear, and 11) established a permit for shedding operations (NCDMF 1998).

Amendment 1 was adopted in December 2004. The amendment implemented several management changes including: 1) establishing a 6.75-inch maximum size limit for mature females from September 1 through April 30 if the spawner index fell below the threshold for two consecutive years, 2) establishing a 5.25-inch maximum size limit for female peeler crabs from September 1 through April 30 if the spawner index fell below the threshold for two consecutive years, 3) prohibiting the sale of white-line peelers but allow possession by licensed peeler operations and requiring white-line peelers to be kept separate from pink and red-line peelers, 4) extending the pot cleanup period by nine days, 5) change the unattended pot rule from 7 days to 5 days, 6) requiring a 4-inch stretch mesh tail bag for crab trawls in western Pamlico Sound (including the Pamlico, Pungo, Bay, and Neuse rivers), 7) separate hard and peeler crab trawl landings on trip ticket, 8) modifying channel net rule to incorporate limited blue crab bycatch provisions identical to those for shrimp trawls, 9) modifying user conflict rule to resolve user conflicts on a regional basis, 10) rule change to allow crab pots in all designated long haul areas in the Hyde, Beaufort, and Pamlico counties, 11) modifying the dates for designated crab pot areas from May 1 through October 31 to June 1 through November 30, 12) change



designated pot area boundary description to a standardized 6 foot depth contour in many areas, and 13) prohibit the use of trawls in designated pot areas (NCDMF 2004).

Amendment 2 was adopted in November 2013. The amendment implemented several management changes including: 1) repealing the spawner index trigger and replacing it with adaptive management framework based on the Traffic Light Stock Assessment, 2) open long haul areas in the Pungo River to pots, 3) add Lower Broad Creek to non-pot areas in rule, 4) modify crab dredging rule to conform to current harvest management, 5) incorporate Pamlico Sound four-inch crab trawl line into rule, 6) redefine criteria for exempting escape rings in crab pots from the 1½-inch pot mesh size to unbaited pots and pots baited with a male crab, 7) repeal proclamation authority that allowed for the exemption of escape ring requirement to allow harvest of peeler crabs, 8) adopt no trawl line in Pamlico Sound and Newport River boundary in rule as new boundary for areas where closure of escape rings to take small mature female crabs is allowed, 9) modify trawl nets rule to identify Pamlico, Back, and Core sounds as areas that can open to peeler trawling by proclamation, 10) modify rule to clearly state the intent of the exceptions, culling tolerance, and separation requirements for various crab categories, and 11) establish proclamation authority to require terrapin excluders in crab pots and establish a framework for developing criteria and terrapin excluder specifications (NCDMF 2013).

### **Management Unit**

The management unit includes the blue crab (*Callinectes sapidus*) and its fisheries in all coastal fishing waters of North Carolina.

### **Goal and Objectives**

The goal of the North Carolina Blue Crab FMP is to manage the blue crab fishery in a manner that promotes its ecological and economic value, and the long-term viability of the resource through sustainable harvest. The following objectives will be utilized to achieve this goal.

1. Utilize a management strategy that provides resource protection and sustainable harvest, promotes blue crab ecological and economic value, provides opportunity for resource utilization, and considers the needs of all users.
2. Promote harvesting practices that minimize waste of the resource and environmental damage.
3. Promote the protection, restoration, and enhancement of habitats and environmental quality necessary for the perpetuation of the blue crab resource.
4. Maintain a clear distinction between conservation goals and allocation issues.
5. Minimize conflicts among and within user groups, including non-crabbing user groups.
6. Identify and promote research to improve the understanding and management of the blue crab resource.
7. Promote education and public information to help users understand the causes and nature of problems for blue crabs in North Carolina, its habitats and fisheries, and the rationale for efforts to address resource management.

## **STATUS OF THE STOCK**

### **Stock Status**

Results of the current stock assessment suggest the North Carolina blue crab stock is not overfished. The stock status of blue crabs is still considered to be of "Concern" because of declining landings and evidence of reduced adult and recruit abundance in the traffic light. Even though there is now a more robust assessment of the stock condition, overfishing status cannot be determined at this time.

### **Stock Assessment**

The Traffic Light method was used to assess the blue crab stock in 2011. The Traffic Light Stock Assessment method is capable of synthesizing a variety of information to provide a description of the stock condition. The nature of the Traffic Light method does not allow for a quantitative assessment of sustainable harvest for the North Carolina blue crab stock since overfishing cannot be calculated.

The blue crab stock is considered overfished when the proportion of red in the production characteristic of the Traffic Light method is greater than or equal to the third quartile ( $>0.75$ ) for three consecutive years. Based on this definition, the results of the Traffic Light through 2014 suggest the North Carolina blue crab stock is not overfished.

Though the overfished definition is based only on the production characteristic, the adult abundance and recruit abundance characteristics are evaluated annually for warning signs that the stock may be approaching an unfavorable state. If a series of negative trends is evident in the adult abundance and production characteristics for three consecutive years, management action may be taken to reduce the unfavorable condition of the stock. Only the adult abundance and production characteristics will be utilized to trigger management actions; the recruit abundance characteristic will be used as a supplement to further direct conservation management actions, if deemed necessary. A review by the Crustacean Advisory Committee would be maintained to consider management options, evaluate their merits, and gain approval by the North Carolina Marine Fisheries Commission (NCMFC) before the Director's proclamation authority (expanded under the adaptive management framework) would be used to implement any changes to the fisheries.

The NCMFC preferred adaptive management strategy for blue crabs (Table 1) relies on the Traffic Light Stock Assessment as the tool to provide information on the relative condition of the stock. The base years (1987 to 2009) for assigning the signals in the Traffic Light Stock Assessment will remain constant until the next amendment of the FMP. The Traffic Light Stock Assessment will be updated annually by July of each year.

## **STATUS OF THE FISHERY**

### **Current Regulations**

#### **General Statutes**

All management authority for North Carolina's blue crab fishery is vested in the State of North Carolina. Statutes that have been applied to the blue crab fishery include:

- Definitions relating to resources. G.S.113-129.
- Definitions relating to activities of public. G.S.113-130.
- Jurisdiction of fisheries agencies. G.S.113-132.
- It is unlawful for any person without the authority of the owner of the equipment to take fish from said equipment. G.S. 113-268 (a).
- It is unlawful for any vessel in the navigable waters of the State to willfully, wantonly, and unnecessarily do injury to any seine, net or pot. G.S. 113-268 (b).
- It is unlawful for any person to willfully destroy or injure any buoys, markers, stakes, nets, pots, or other devices or property lawfully set out in the open waters of the state in connection with any fishing or fishery. G.S. 113-268 (c).

#### **Marine Fisheries Commission Rules**

The North Carolina Marine Fisheries Commission has established several rules that directly govern the harvest of blue crabs. Below are rules and excerpts from rules that directly affect the blue crab fishery. The rules below do not cover any gear, area, or other rules which may impact the blue crab fishery. As regulations may change, please contact the North Carolina Division of Marine Fisheries (NCDMF) for the most current regulations.

#### **Definitions**

**Blue Crab Shedding:** The process whereby a blue crab emerges soft from its former hard exoskeleton. A shedding operation is any operation that holds peeler crabs in a controlled environment. A controlled environment provides and maintains throughout the shedding process one or more of the following: (i) food, (ii) predator protection, (iii) salinity, (iv) temperature controls, or (v) water circulation, utilizing technology not found in the natural environment. A shedding operation does not include transporting pink or red-line peeler crabs to a permitted shedding operation. 15A NCAC 03I .0101 (2) (c).

**Peeler Crab:** A blue crab that has a soft shell developing under a hard shell and having a white, pink, or red-line or rim on the outer edge of the back fin or flipper. 15A NCAC 03I .0101 (2) (f).

**Commercial Fishing Equipment or Gear:** All fishing equipment used in coastal fishing waters except: (i) Cast nets; (ii) Collapsible crab traps, a trap used for taking crabs with the largest open dimension no larger than 18 inches and that by design is collapsed at all times when in the water, except when it is being retrieved from or lowered to the bottom; (iii) Dip nets or scoops having a handle not more than eight feet in length and a hoop or frame to which the net is attached not exceeding 60 inches along the perimeter; (iv) Gigs or other pointed implements which are propelled by hand, whether or not the implement remains in the hand; (v) Hand operated rakes no more than 12 inches wide and weighing no more than six pounds and hand operated tongs; (vi) Hook and line and bait and line equipment other than multiple hook or

multiple bait trotline; (vii) Landing nets used to assist in taking fish when the initial and primary method of taking is by the use of hook and line; (viii) Minnow traps when no more than two are in use; (ix) Seines less than 30 feet in length; (x) Spears, Hawaiian slings or similar devices, which propel pointed implements by mechanical means, including elastic tubing or bands, pressurized gas or similar means. 15A NCAC 03I .0101 (3) (c).

Mesh Length: The diagonal distance from the inside of one knot to the outside of the other knot, when the net is stretched hand-tight. 15A NCAC 03I .0101 (3) (k).

### **Crab Harvest Restrictions**

Hard crab minimum size limit of 5 inches measured from tip of spike to tip of spike for male and immature female hard blue crabs. Soft crabs shall be separated where taken and placed in a separate container. Peeler crabs shall be separated where taken and placed in a separate container. White-line peeler crabs shall be separated from pink and red-line peeler crabs where taken and placed in a separate container. Male crabs to be used as peeler bait are exempt from the 5 inch size limit from March 1 through October 31 and shall be placed in a separate container. A culling tolerance of not more than five percent by number shall be allowed for white-line peelers in the pink and red-line peeler container. It is unlawful to: sell white-line peelers, possess white-line peelers unless they are to be used by the harvester in the harvester's permitted blue crab shedding operation, possess male white line peelers from June 1 through September 1. It is unlawful to possess more than 50 crabs per person per day not to exceed 100 blue crabs per vessel per day for recreational purposes. To comply with management measures I the N.C. Blue Crab Fishery Management Plan, the Director, may by proclamation, close the harvest of blue crabs and may impose any or all of the following restrictions on the commercial and recreational blue crab harvest: specify, areas, season; time periods, means and methods, culling tolerance, and limit harvest based on size, quantity, sex, reproductive stage, or peeler stage. 15A NCAC 03L .0201 (a) (b) (1) (2) (3) (4) (c) (d) (1) (2) (3) (e) (f).

### **Spawning Sanctuaries**

It is unlawful to set or use trawls, pots, and mechanical methods for oysters or clams or take crabs with the use of commercial fishing equipment from crab spawning sanctuaries [3R .0110 (1) (2) (3) (4) (5)] from March 1 through August 31. During the remainder of the year the Director may, by proclamation, close these areas and may impose any or all of the following restrictions: areas, time periods, means and methods, and limit harvest based on size, quantity, sex, reproductive stage, or peeler stage. 15A NCAC 03L .0205 (a) (b) (1) (2) (3) (4).

### **Peeler and Soft Crabs**

It is unlawful to possess more than 50 blue crabs in a shedding operation without first obtaining a Blue Crab Shedding Permit from the Division of Marine Fisheries. 15A NCAC 03O .0503 (c).

### **Recreational Harvest**

- Blue crabs may be taken without a commercial license if the following gears are used; cast nets, collapsible crab traps with the largest open dimension no larger than 18 inches, a dip net having a handle not more than 8 feet in length and a hoop or frame to which the net is attached not exceeding 60 inches along the perimeter; single bait-and-line equipment, or seines less than 30 feet. 15A NCAC 03I .0101 (3) (c) (i) (ii) (iii) (vi) (ix)

- Recreational crab pot buoys must be any shade of hot pink in color, and be no less than 5 inches in diameter and length and be engraved with the owner's last name and initials. If a vessel is used the buoy must also be engraved with the gear owners current motorboat registration number or owner's U.S. vessel documentation name. 15A NCAC 03J .0302 (a) (1) (2).
- It is unlawful for a person to use more than one crab pot attached to the shore along privately owned land or to a privately owned pier without possessing a valid Recreational Commercial Gear License. 15A NCAC 03J .0302 (b).
- Up to five crab pots may be used by holders of the Recreational Commercial Gear License. 15A NCAC 03O .0302 (a) (3).
- Peeler pots are not permitted to be used by holders of the Recreational Commercial Gear License. 15A NCAC 03O .0302 (a) (3).
- One multiple hook or multiple bait trotline up to 100 feet in length may be used to harvest blue crabs. 15A NCAC 03O .0302 (a) (4).
- Trotlines must be marked at both ends with any shade of hot pink in color, and be no less than 5 inches in diameter and length and be engraved with the owner's last name and initials. If a vessel is used the buoy must also be engraved with the gear owners current motorboat registration number or owner's U.S. vessel documentation name. 15A NCAC 03J .0302.

### **Trawls**

- It is unlawful to use trawl nets in designated pot areas opened to the use of pots and within an area bound by the shoreline to the depth of six feet. 15A NCAC 03J .0104 (b) (6).
- It is unlawful to use shrimp trawls for the taking of blue crabs in internal waters, except that it shall be permissible to take or possess blue crabs incidental to commercial shrimp trawling provided that the weight of the crabs shall not exceed; 50 percent of the total weight of the combined crab and shrimp catch; or 300 pounds, whichever is greater. For individuals using shrimp trawls authorized by a Recreational Commercial Gear License, 50 blue crabs, not to exceed 100 blue crabs if two or more Recreational Commercial Gear License holders are on board. The Fisheries Director may, by proclamation, close any area to trawling for specific time periods in order to secure compliance with this rule. 15A NCAC 03J .0104 (f) (1) (2) (A) (B) (g).
- From December 1 through March 31 it is unlawful to possess finfish caught incidental to shrimp and crab trawling in the Atlantic Ocean unless the weight of the combined catch of shrimp and crabs exceeds the weight of finfish; except that trawlers working south of Bogue Inlet may keep up to 300 pounds of kingfish, regardless of their shrimp or crab catch weight. 15A NCAC 03J .0202 (5).
- It is unlawful to take or possess crabs aboard a vessel in internal waters except in areas and during such times as the Fisheries Director may specify by proclamation. 15A NCAC 03L .0202 (a).
- It is unlawful to take crabs with crab trawls with a mesh less than three inches, except in areas of western Pamlico Sound the minimum mesh length is four inches; the Director may, by proclamation, specify other areas for trawl mesh length and increase the minimum mesh length to no more than four inches. 15A NCAC 3L .0202 (b) (1) (2).
- It is unlawful to use trawls with a mesh length less than two inches or with a combined total headrope length exceeding 25 feet for taking soft or peeler crabs. 15A NCAC 03L .0202 (c).
- It is unlawful to use trawl nets for any purpose in any of the special secondary nursery areas, except that the Fisheries Director, may, by proclamation, open any or all of the special secondary nursery areas, or any portion thereof to crab trawling from August 16

through May 14. 15A NCAC 03N .0105 (b), 15A NCAC 03R .0105, 15A NCAC 03L .0100 and .0200.

- It is unlawful to use trawl nets in areas listed in 15A NCAC 3R .0106, except that certain areas may be opened to peeler trawling for single-rigged peeler trawls or double-rigged boats whose combined total headrope length does not exceed 25 feet. 15A NCAC 3J .0104 (b) (4); 15A NCAC 03R .0106 (1).

### **Crab pots**

- It is unlawful to leave pots in any coastal fishing waters for more than five consecutive days, when such pots are not being employed in fishing operations, except upon a timely and sufficient showing of hardship. 15A NCAC 03I .0105 (b) (1) (2) (A) (B) (3) (c).
- All pots shall be removed from internal waters from January 15 through February 7. Areas may be reopened, by proclamation, to the use of pots after January 19 if it is determined that such areas are free of pots. 15A NCAC 03J .0301 (a) (1).
- From June 1 through November 30 the use of crab pots is restricted in certain areas north and east of the Highway 58 Bridge at Emerald Isle. These areas are describe in 15A NCAC 03R .0107 (a). To allow for the variable spatial distribution of crustacea and finfish, the Fisheries Director may, by proclamation, specify time periods for or designate the areas described in 15A NCAC 03R .0107(b); or any part thereof, for the use of pots. From May 1 through November 30 in the Atlantic Ocean and west and south of the Highway 58 Bridge at Emerald Isle in areas and during time periods designated by the Fisheries Director by proclamation.15A NCAC 03J .0301 (a) (2) (A) (B) (3) and 03R .0107 (a) (b).
- It is unlawful to use pots in any navigation channel maintained and marked by State or Federal agencies. 15A NCAC 03J .0301 (b) (1).
- It is unlawful to use pots in any turning basin maintained and marked by the North Carolina Ferry Division. 15A NCAC 03J .0301 (b) (2).
- It is unlawful to use pots in a commercial fishing operation unless each pot is marked by attaching a floating buoy which shall be of solid foam or other solid buoyant material no less than five inches in diameter and no less than five inches in length. Buoys may be any color except yellow or hot pink or any combination of colors that include yellow or hot pink. The pot owner's N.C. motorboat registration number, or U.S. vessel documentation name, or last name and initials shall be engraved in the buoy, or on a metal or plastic tag attached to the buoy. 15A NCAC 03J .0301(c) (1) (2) (3).
- It is unlawful to use crab pots in coastal fishing waters unless each pot contains no less than two unobstructed escape rings that are at least 2 5/16 inches inside diameter and located in the opposite outside panels of the upper chamber of the pot except: unbaited pots, pots baited with a male crab, and pots set in areas described in 15A NCAC 03R .0118. 15A NCAC 03J .0301 (g).
- The Fisheries Director may, by proclamation, exempt the escape ring requirement describe in paragraph (g) in order to allow the harvest of mature female crabs and may impose any or all of the following restrictions: specify time, areas, means and methods, seasons, and quantity. 15A NCAC 03J .0301 (h).
- It is unlawful to use more than 150 pots per vessel in the Newport River.15A NCAC 03J .0301(i).
- It is unlawful to remove crab pots from the water or remove crabs from pots between one hour after sunset and one hour before sunrise. 15A NCAC 03J .0301(j).
- It is unlawful to use pots to take crabs unless the line connecting the pot to the buoy is non-floating. 15A NCAC 03J .0301(k).

## **Crab dredging**

- It is unlawful to use any dredge weighing more than 100 lb except in the Atlantic Ocean. 15A NCAC 03J .0303 (a).
- It is unlawful to use more than one dredge per vessel to take crabs or to use any dredges between sunset and sunrise. 15A NCAC 03J .0303 (b).
- It is unlawful to take crabs with dredges except from January 1 through March 1 in portions of Pamlico Sound. 15A NCAC 03L .0203 (a) (1) and 15A NCAC 03R .0109.
- Crabs may be taken incidental to lawful oyster dredging provided the weight of the crabs shall not exceed 50% of the total weight of the combined oyster and crab catch; or 500 lb, whichever is less. 15A NCAC 03L .0203 (a) (2) (A) (B).
- It is unlawful to take crabs with dredges between sunset and sunrise and between sunset on any Saturday and sunrise on the following Monday, except in the Atlantic Ocean. 15A NCAC 03L .0203 (b).

## **Miscellaneous**

- It is unlawful to possess, sell, or purchase fish under four inches in length except for use as bait in the crab pot fishery in North Carolina with the following provision: such crab pot bait shall not be transported west of U.S. Interstate 95 and when transported, shall be accompanied by documentation showing the name and address of the shipper, the name and address of the consignee, and the total weight of the shipment. 15A NCAC 03M .0103 (1).

## **Wildlife Resources Commission Rules**

### **Manner of Taking Nongame Fish Purchase and Sale**

- Blue crabs shall have a minimum carapace width of five inches (point to point) and it is unlawful to possess more than 50 crabs per person per day or to exceed 100 crabs per vessel per day. 15A NCAC 10C .0401 (a) (1).
- Blue crab taken by hook and line, grabbling or by licensed special devices may not be sold. 15A NCAC 10C .0401 (c).

### **Taking Nongame Fish, Crustaceans, and Mollusks for Bait or Personal Consumption**

- A single, multiple bait line for taking crabs not to exceed 100 feet in length that is under the immediate control and attendance of the user and is limited to one line per person and no more than one line per vessel. The line is required to be marked on each end with a solid float no less than five inches in diameter and bearing legible and indelible identification of the user's name and address. 15A NCAC 10C .0402 (a) (6).
- A collapsible crab trap with the largest opening not greater than 18 inches and which, by design, collapses at all times when in the water, except when being retrieved or lowered to the bottom. 15A NCAC 10C .0402 (a) (7).
- Nongame fishes, crustaceans (crayfish and blue crabs), and mollusks taken for bait or personal consumption may not be sold. 15A NCAC 10C .0402 (b).
- No more than 50 crabs per person, per day or 100 per vessel, per day with a minimum carapace width of five inches (point to point) from inland fishing waters or in designated waterfowl impoundments located on game lands. 15A NCAC 10C .0402 (d) (3).

## **Special Device Fishing**

- It is unlawful to use crab pots in inland fishing waters, except by persons owning property adjacent to the inland fishing waters of coastal rivers and their tributaries who are permitted to set two crab pots to be attached to their property and not subject to special device license requirements. 15A NCAC 10C .0404 (e).

## **Commercial Landings**

Commercial blue crab landings (hard, soft, and peeler crabs) averaged 40.5 million pounds from 1987 – 2009 (base years used in the traffic light; Figure 1). The majority of blue crab landings are hard blue crabs. Landings for 2014 were 26.2 million pounds, under the base year average. Generally landings have been declining since 2003, although landings for 2014 were 18 percent higher than 2013. Landings have been below the base year average since 2004. Landings data from 1987 – 1994 were collected under the NCDMF/National Marine Fisheries Service Cooperative Statistics Program which was based on voluntary dealer reporting. Since 1994, landings data have been collected under the NCDMF Trip Ticket Program which instituted mandatory dealer reporting. Landings data should be viewed only as a general indicator of fishing trends since they are influenced by market demand, price, fishing effort, weather, availability of alternate species, regulations, and data collection techniques as well as stock abundance.

## **Recreational Landings**

A survey of Recreational Commercial Gear License (RCGL) holders conducted from 2002 – 2008 by the NCDMF indicated blue crabs were the most abundant species landed (by weight) by RCGL participants. During this time, on average, blue crabs accounted for 20% (116,797 pounds) of the total poundage (587,172 pounds) landed by RCGL holders. This survey was discontinued in 2009 so more recent estimates of RCGL harvest are unavailable. The harvest of RCGL exempted shore and pier based pots, as well as other non-commercial gear, is unknown. While current data is not available, NCDMF has recently started a new program to survey and estimate recreational blue crab landings from RCGL exempt gear (NCDMF 2013)

## **MONITORING PROGRAM DATA**

### **Fishery-Dependent Monitoring**

The traffic light, used to monitor the health of the blue crab stock, uses commercial crab sampling data (combined with fishery-independent data) to determine the annual length of fifty percent maturity for female blue crabs. This index is used in the Production characteristic of the traffic light. The annual length of fifty percent maturity is compared to the mean length of fifty percent maturity for the base years of 1987 – 2009 (112.1mm carapace width; CW). In 2014, the length of fifty percent maturity was 122.2mm CW and was above the mean for the base years. The length of fifty percent maturity has been above the base year mean since 2005 (Figure 2).



## **Fishery-Independent Monitoring**

The traffic light, used to monitor, the health of the blue crab stock, uses several fishery-independent indices for the Adult Abundance, Recruit Abundance, and Production characteristics. The status of each indicator is compared to the mean of that indicator over a set of base years. The base years used for the blue crab traffic light were 1987 – 2009.

### **Adult Abundance**

The adult abundance characteristic uses data from the Juvenile Anadromous Trawl Survey (P100), the Estuarine Trawl Survey (P120), and the Pamlico Sound Survey (P195) to monitor adult blue crab abundance. Indices from P120 and P195 consist of blue crabs greater than or equal to 100mm CW; an index of total abundance (no size restrictions) is derived from P100. Two indices are derived from P120, a Pamlico index using data from tributaries in and around Pamlico Sound and a Southern index using data collected from Core Sound and south (Figure 3).

Adult abundance for P100 was above the mean for the base years (0.27 crabs/minute) from 2006 – 2012, both 2013 (0.266 crabs/minute) and 2014 (0.23 crabs/minute) adult abundance estimates were below the base year mean. Adult abundance for P120 in the Pamlico region was below the base year mean (0.62 crabs/tow) in 2013 (0.31 crabs/tow) and 2014 (0.27 crabs/tow). In the Southern region, adult abundance has been below the base year mean (0.15 crabs/tow) since 2011. In 2014, adult abundance was 0.096 crabs/tow in the Southern region. Adult abundance for P195 has been below the base year mean (4.52 crabs/tow) since 2000. Adult abundance in 2014 was 0.33 crabs/tow and was the lowest in the 28 year time series. Figure 4 shows the individual traffic lights for each index as well as the composite adult abundance traffic light.

### **Recruit Abundance**

The recruit abundance characteristic uses data from the Estuarine Trawl Survey (P120) and the Pamlico Sound Survey (P195) to monitor blue crab recruit abundance. Each index consists of blue crabs less than 100mm CW and greater than or equal to 30mm CW. Two indices are derived from P120, a Pamlico index using data from tributaries in and around Pamlico Sound and a Southern index using data collected from Core Sound and south. Two indices are also derived from P195, a summer (June) and a fall (September) index (Figure 5).

Recruit abundance for P120 in the Pamlico region was below the base year mean (1.93 crabs/tow) in 2013 (0.66 crabs/tow) and 2014 (0.66 crabs/tow). In the Southern region, recruit abundance has been below the base year mean (0.44 crabs/tow) since 2005. In 2014, recruit abundance was 0.33 crabs/tow in the Southern region. Recruit abundance for P195 in the summer has been below the base year mean (29.66 crabs/tow) since 2011. In the fall, recruit abundance has been below the base year mean (3.49 crabs/tow) since 1998. In 2014, recruit abundance was 0.74 crabs/tow in the fall. Figure 6 shows the individual traffic lights for each index as well as the composite recruit abundance traffic light.

### **Production**

The production characteristic uses data from the Juvenile Anadromous Trawl Survey (P100), the Estuarine Trawl Survey (P120), and the Pamlico Sound Survey (P195) to monitor the blue crab stock's production potential. The production indicators include measures of median

carapace width, pre-recruit abundance (blue crabs less than 30mm CW), length at fifty percent maturity (see fishery-dependent monitoring section), spawning stock (mature female mm/minute), and frequency of occurrence of mature females (percent of samples with mature female blue crabs).

Three indices are derived from P100 including median carapace width, spawning stock, and frequency of occurrence of mature females (Figure 7). Median carapace width has been below the base year mean (114.2mm) since 2009. In 2014, the median carapace width was 98mm in P100. The spawning stock index has been below the base year mean (19.54 mm/minute) since 2012. In 2014, the spawning stock index was 1.67 mm/minute in P100. The frequency of occurrence of mature females was above the base year mean (23.4 percent) from 2005 – 2013; in 2014 the frequency of occurrence of mature females was 7.9 percent, below the base year mean.

Three indices are derived from P120 including Pamlico and Southern region median carapace width and a statewide pre-recruit abundance index (Figure 8). Median carapace width was below the base year mean (34.3mm) in 2013 (19mm) and 2014 (22mm) in the Pamlico region. In the Southern region, median carapace width was below the base year mean (32.7mm) in 2013 (29mm) and 2014 (32mm). The statewide pre-recruit index has been below the base year mean (1.09 crabs/tow) since 2010; in 2014 the pre-recruit index was 0.71 crabs/tow.

Four indices are derived from P195 including summer and fall median carapace width, fall spawning stock, and fall frequency of occurrence of mature female indices (Figure 9). The summer median carapace width index was below the base year mean (72.1mm) in 2013 (54mm) and 2014 (58mm). The fall median carapace width index was above the base year mean (107.7mm) from 2010 - 2013; in 2014 the fall median carapace width was 56mm, below the base year mean. The fall spawning stock index has been below the base year mean (741.7 mm/tow) since 2004; in 2014 the fall spawning index was 49.4 mm/tow. The frequency of occurrence of mature females has been below the base year mean (55.9 percent) since 2004; in 2014 the frequency of occurrence of mature females was 18.5 percent and was the lowest in the 28 year time series. Figure 10 shows the individual traffic lights for each index as well as the composite production traffic light.

## **MANAGEMENT STRATEGY**

### **Traffic Light**

The NCMFC preferred management strategy for blue crabs relies on the Traffic Light Stock Assessment approach to provide information on the relative condition of the stock. The base years (1987 to 2009) for assigning the signals in the Traffic Light Stock Assessment will remain constant until the next amendment of the FMP. The Traffic Light Stock Assessment is updated annually by July of each year to gauge the current status of the stock. To trigger management actions, either the adult abundance or production characteristic of the assessment must be above the 50 percent red threshold for three consecutive years to trigger the moderate management actions and must be above the 75 percent red threshold for two of three consecutive years to trigger the elevated management actions established in the plan (Table 1). The recruit abundance indicator, while not used to trigger initial management action, may be used to supplement any management actions taken if the adult abundance or production triggers are activated.

The current assessment update indicates the adult abundance characteristic has exceeded the moderate threshold for the second consecutive year and has exceeded the elevated threshold for the first year. Currently the adult abundance characteristic is at 79 percent red. The production characteristic has exceeded the moderate threshold for the second consecutive year. Currently the production characteristic is at 71 percent red. The recruit abundance characteristic has exceeded the moderate threshold for the fourth consecutive year and has exceeded the elevated threshold for the second consecutive year. Currently the recruit abundance characteristic is at 96 percent red (Figure 11).

This serves as the second of the three consecutive years above the moderate threshold, for both the adult and production characteristics, that is required before moderate management action must be taken. This also serves as the first of two years in a three year period above the elevated threshold for the adult abundance characteristic that is required before elevated management action must be taken.

### **Principal Issues**

Several management issues were explored in Amendment 2; Table 2 outlines the specific issue explored and the implementation status of each management strategy.

### **MANAGEMENT AND RESEARCH NEEDS**

Several management and research needs were identified in N.C. Blue Crab Fishery Management Plan Amendment 2; Table 3 outlines the specific needs and highlights the progress made towards each management and research need.

### **FISHERY MANAGEMENT PLAN RECOMMENDATION**

The NCDMF recommendation is to maintain the timing of the Benchmark Review “as is” on the current FMP schedule. Currently the review is scheduled to begin in November 2018.

### **LITERATURE CITED**

- NCDMF. 1998. North Carolina Blue Crab Fishery Management Plan. North Carolina Department of Environment and Natural Resources. North Carolina Division of Marine Fisheries. Morehead City, NC. 178 pp.
- NCDMF. 2004. North Carolina Blue Crab Fishery Management Plan Amendment 1. North Carolina Department of Environment and Natural Resources. North Carolina Division of Marine Fisheries. Morehead City, NC. 411 pp.
- NCDMF. 2013. North Carolina Blue Crab Fishery Management Plan Amendment 2. North Carolina Department of Environment and Natural Resources. North Carolina Division of Marine Fisheries. Morehead City, NC. 528 pp.

## TABLES

Table 1. Management measures in N.C. Blue Crab Fishery Management Plan Amendment 2 that may be implemented by proclamation as described in the blue crab adaptive management framework when a stock characteristic exceeds a designated management threshold.

<b>Characteristic</b>	<b>Moderate management level</b>	<b>Elevated management level</b>
Adult abundance	<p>A1. Increase in minimum size limit for male and immature female crabs</p> <p>A2. Reduction in tolerance of sub-legal size blue crabs (to a minimum of 5%) and/or implement gear modifications to reduce sublegal catch</p> <p>A3. Eliminate harvest of v-apron immature hard crab females</p>	<p>A4. Closure of the fishery (season and/or gear)</p> <p>A5. Reduction in tolerance of sub-legal size blue crabs (to a minimum of 1%) and/or implement gear modifications to reduce sublegal catch</p> <p>A6. Time restrictions</p>
Recruit abundance	<p>R1. Establish a seasonal size limit on peeler crabs</p> <p>R2. Restrict trip level harvest of sponge crabs (tolerance, quantity, sponge color)</p> <p>R3. Close the crab spawning sanctuaries from September 1 to February 28 and may impose further restrictions</p>	<p>R4. Prohibit harvest of sponge crabs (all) and/or require sponge crab excluders in pots in specific areas</p> <p>R5. Expand existing and/or designate new crab spawning sanctuaries</p> <p>R6. Closure of the fishery (season and/or gear)</p> <p>R7. Gear modifications in the crab trawl fishery</p>
Production	<p>P1. Restrict trip level harvest of sponge crabs (tolerance, quantity, sponge color)</p> <p>P2. Minimum and/or maximum size limit for mature female crabs</p> <p>P3. Close the crab spawning sanctuaries from September 1 to February 28 and may impose further restrictions</p>	<p>P4. Prohibit harvest of sponge crabs (all) and/or require sponge crab excluders in pots for specific areas</p> <p>P5. Reduce peeler harvest (no white line peelers and/or peeler size limit)</p> <p>P6. Expand existing and/or designate new crab spawning sanctuaries</p> <p>P7. Closure of the fishery (season and/or gear)</p>

Table 2. Summary of management strategies and outcomes from N.C. Blue Crab Fishery Management Plan Amendment 2.

<b>ISSUE</b>	<b>MANAGEMENT STRATEGY</b>	<b>OBJECTIVES</b>	<b>OUTCOME</b>
<b>Stock Protection</b>			
11.1 Adaptive management framework for the North Carolina blue crab stock	1. Repeal the current female stock conservation management trigger.	1	Rule change to 03L .0201  <b>Completed</b>
	2. Continue existing sampling programs to maintain baseline information for the Traffic Light Stock Assessment method.	1 and 6	No action required.
	3. Adopt the adaptive management framework based on the Traffic Light Stock Assessment and the proposed moderate and elevated management levels for recruit abundance, adult abundance, and production characteristics. Initial management action will only be implemented when either the adult abundance or production characteristic reach the management trigger of 50% red or greater for three consecutive years. The recruit abundance characteristic will be used as a supplement to further direct conservation management actions, if deemed necessary.	1 and 6	Rule change to 03L .0201, 03L .0203, 03L .0204, 03L .0205, 03L .0206, 03L .0209, and 03J .0301.  <b>Completed</b>
<b>User Conflicts</b>			
11.2 Crab pot limit for southern Bogue Sound	Status quo, continue with no crab pot limit in southern Bogue Sound.	1, 4, and 5	No action required.
11.3 Consider allowing non-pot areas in the Pungo River area to be re-designated as open to pots	Open the non-pot (long haul net) areas all the time by rule in the Pungo River and keep status quo in the Long Point area on the Pamlico River.	1, 4, and 5	Rule change to 03R .0107.  <b>Completed</b>
<b>Clarification of Rules</b>			
11.4 Incorporate the lower Broad Creek closure of pot area into rule	Modify the rule to include the lower Broad Creek area that is closed to crab pots from June 1 through November 30.	1, 4, and 5	Rule change to 03R .0107.  <b>Completed</b>
11.5 Clarify crab dredging restrictions	Amend the rule to match harvest management for crab dredging.	2	Rule change to 03L .0203.  <b>Completed</b>

ISSUE	MANAGEMENT STRATEGY	OBJECTIVES	OUTCOME
<b>Clarification of Rules</b>			
11.6 Incorporate the Pamlico Sound crab trawling proclamation into rule 15A NCAC 03L .0202	Modify Rule 15A NCAC 03L .0202 to incorporate the long-standing provisions of Proclamation SH-5-2007 (Pamlico Sound four inch mesh crab trawl line), and retain the Director's proclamation authority to restrict crab trawl mesh size.	1 and 2	Rule change to 03L .0202  <b>Completed</b>
11.7 Explore options for escape ring exemptions in hard crab pots to harvest peeler crabs	1. Amend the current rule to redefine criteria for exempting escape rings in crab pots from the 1½-inch pot mesh size to unbaited pots and pots baited with a male crab.	1, 2, and 5	Rule change to 03J .0301 and 03L .0301.  <b>Completed</b>
	2. Repeal the proclamation authority that allows for exempting the escape ring requirement in order to allow the harvest of peeler crabs.	1 and 5	Rule change to 03J .0301.  <b>Completed</b>
11.8 Convert crab pot escape ring proclamation exemptions for mature females into rule	Adopt the no trawl line along the Outer Banks in Pamlico Sound as the new boundary in Pamlico Sound, and the Newport River boundaries as delineated in the proposed rule as new boundaries for the area where closure of escape rings to take small mature females is allowed.	1 and 4	Rule change to 03J .0301.  Add new rule 03R .0118.  <b>Completed</b>
11.9 Correction of peeler trawl exception rule	Modify Rule 15A NCAC 03J .0104 (b)(4) TRAWL NETS to correctly reference the Pamlico, Back and Core sounds as the areas in which the Director can open peeler trawling by proclamation.	1 and 2	Rule change to 03J .0104.  <b>Completed</b>
11.10 Blue crab size limit and culling tolerance	Modify rule to clearly state the intent of the exceptions, culling tolerance, and separation requirements for the various categories of crabs.	1	Rule change to 03L .0201.  <b>Completed</b>
<b>Harvest Practices</b>			
11.11 Allow floating crab pot lines in areas where obstructions exist	Status quo, continue with non-floating line on crab pots.	1, 2, and 5	No action required.

ISSUE	MANAGEMENT STRATEGY	OBJECTIVES	OUTCOME
<b>Harvest Practices</b>			
11.12 Diamondback terrapins interactions with the blue crab fishery in North Carolina	1. Establish proclamation authority for requiring terrapin excluder devices in crab pots.	2 and 5	Rule change to 03L .0204.  <b>Completed</b>
	2. Establish a framework for developing proclamation use criteria and terrapin excluder specifications which may extend until after adoption of the amendment.  The strategy is contingent on: a. Consultation with the Crustacean Advisory Committee on developing criteria; and b. No use of the proclamation authority until criteria is approved by the Marine Fisheries Commission.	2 and 5	Staff is developing an issue paper to be presented later this year.
11.13 Multiple pots to a single buoy	Status quo, do not allow multiple pots to a single buoy.	1 and 5	No action required.
11.14 Pot loss and ghost pot bycatch mortality	1. Encourage crab potters in areas of high pot loss to incorporate methods to reduce pot loss. Develop and provide information on potential methods to reduce pot loss.	6 and 7	Develop and provide information on potential methods to reduce pot loss.
	2. Encourage crab potters in areas of high pot loss to incorporate escape panel designs in pots to reduce potential ghost fishing impacts. Develop and provide information on potential methods and materials to reduce ghost fishing impacts.	6 and 7	Develop and provide information on potential methods and materials to reduce ghost fishing impacts.
<b>Environmental Factors</b>			
10.4 Habitat	1. Identify and designate Strategic Habitat Areas that will enhance protection of the blue crab.	1, 3, and 6	Existing authority through the Coastal Habitat Protection Plan (CHPP).

ISSUE	MANAGEMENT STRATEGY	OBJECTIVES	OUTCOME
<b>Environmental Factors</b>			
10.4 Habitat	2. Identify, research, and designate additional areas as Primary Nursery Areas that may be important to blue crabs as well as other fisheries.	1, 3, and 6	Existing authority through the CHPP.
	3. Continue to map blue crab spawning areas and evaluate any that need to adjust or expand the boundaries or restrictions of the crab spawning sanctuaries based on recent research.	1, 3, and 6	Existing authority through the CHPP.
	4. Remap and monitor submerged aquatic vegetation in North Carolina to assess distribution and change over time.	3 and 6	Existing authority through the CHPP.
	5. Restore coastal wetlands to compensate for previous losses and enhance habitat and water quality conditions for the blue crab.	3 and 6	Existing authority through the CHPP.
	6. Work with Coastal Resource Commission to revise shoreline stabilization rules to adequately protect riparian wetlands and shallow water habitat and significantly reduce the rate of shoreline hardening.	3	Existing authority through the CHPP.
	7. Develop and implement a comprehensive coastal marina and dock management plan and policy to minimize impacts to submerged aquatic vegetation, wetland edge, and other habitat important to blue crab.	3	Existing authority through the CHPP.
	8. Assess the distribution, concentration, and threat of heavy metals and other toxic contaminants in freshwater and estuarine sediments and identify the areas of greatest concern to focus water quality improvement efforts.	3 and 6	Existing authority through the CHPP.
	9. Support oyster shell recycling and oyster sanctuary programs to provide areas of enhanced or restored shell bottom habitat.	3	Existing authority through the CHPP.



ISSUE	MANAGEMENT STRATEGY	OBJECTIVES	OUTCOME
<b>Environmental Factors</b>			
10.4 Habitat	10. Consider if prohibition of crab dredging is advisable.	2	Existing authority through the CHPP.
	11. Protect “recruitment bottlenecks”, like inlets for the blue crab, from trawling or other impacts including natural channel modification using hardened structures like groins and jetties.	2 and 3	Existing authority through the CHPP.
	12. Shallow areas where trawling is currently allowed should be re-examined to determine if additional restrictions are necessary.	2	Existing authority through the CHPP.
10.4 Water Quality	1. Improve methods to reduce sediment and nutrient pollution from construction sites, agriculture, and forestry.	3	Existing authority through the CHPP.
	2. Increase on-site infiltration of storm water through voluntary or regulatory measures.	3	Existing authority through the CHPP.
	3. Provide more incentives for low-impact development.	3	Existing authority through the CHPP.
	4. Aggressively reduce point source pollution from wastewater through improved inspections of wastewater treatment facilities, improved maintenance of collection infrastructure, and establishment of additional incentives to local governments for wastewater treatment plant upgrading.	3	Existing authority through the CHPP.
	5. Provide proper disposal of unwanted drugs, prevent the use of harmful JHA insecticides near-surface waters or in livestock feed, and develop technologies to treat wastewater for antibiotics and hormones.	3, 6, and 7	Existing authority through the CHPP.

Table 3. Summary of research needs and outcomes from N.C. Blue Crab Fishery Management Plan Amendment 2.

<b><u>MANAGEMENT STRATEGY</u></b>	<b><u>OBJECTIVES</u></b>	<b><u>OUTCOME</u></b>
Continue to support research to determine the status of protected species (e.g., migration patterns, habitat utilization) along the North Carolina coast to better anticipate and prevent interactions.	2 and 5	No Action
Support research on blue crab fishery interactions with protected species (e.g., identifying any seasonal or spatial peaks in potential for interactions).	2 and 5	Ongoing; Began an observer program for Pamlico Sound in 2000, and expanded into other areas of state. Recently began using observers on alternative platforms which may reduce the type of finfish bycatch data collected. Currently monitoring set gill net fisheries statewide.
Support gear modification research and testing that could reduce protected species interactions.	2 and 5	No Action
Continue socioeconomic surveys of blue crab harvesters and include wholesale and retail benefits, the entire support industry for this fishery including suppliers, picking houses, and restaurants..	1, 6, and 7	Ongoing
Update Recreational Commercial Gear License (RCGL) survey.	6	No Action
Continue survey and compile data of recreational crabbers not possessing a RCGL license.	6	Ongoing
Determine the economic effects of imported crabmeat, including the mixture of imported meat with local crabmeat, on processing and demand.	1 and 6	No Action
Determine the costs associated with crab processing. Identify the factors and their relative importance in predicting processor closures.	1 and 6	No Action
Research the changing demographics of the commercial blue crab fishery.	1 and 6	No Action
Continue research on the impacts of endocrine disrupting chemicals (EDCs) on the various life stages of the blue crabs and way to reduce introduction of EDCs into estuarine waters.	1, 3, 6, and 7	No Action

<b><u>MANAGEMENT STRATEGY</u></b>	<b><u>OBJECTIVES</u></b>	<b><u>OUTCOME</u></b>
Assess the impact of winter inlet deepening dredge activities on the overwintering female blue crabs and their habitat.	1, 3, and 6	No Action
Determine the spatial and biological characteristics of SAV beds that maximize their ecological value to the blue crab for restoration or conservation purposes.	1, 3, and 6	Ongoing CHPP and SHA work group
Identify, research, and map shallow detrital areas important to blue crabs.	1, 3, and 6	Ongoing CHPP and SHA work group
Additional research is needed on the extent, causes, and impacts of hypoxia and anoxia on blue crab behavior and population abundance in North Carolina's estuarine waters.	1, 3, and 6	Ongoing CHPP
Conduct research on the water quality impacts of crab pot zincs, bait discard, and alternative crab baits in the pot fishery.	1, 3, and 6	No Action
Develop methods to expand sampling effort to more accurately assess the status of the blue crab stock and its fisheries.	1 and 6	Ongoing
Continue research on blue crab discards in the shrimp trawl fishery.	1, 2, and 6	Ongoing
Expand research state wide on the use of terrapin excluder devices in crab pots	1, 3, and 5	Ongoing
Implement outreach programs to inform state agencies, the public, and the commercial and recreational fishing industries about issues relating to protected species and fishery management.	1, 2, and 7	Ongoing
Continue gear development research to minimize species interactions.	1, 2, and 6	Ongoing
Continue existing programs that have been used to monitor North Carolina's blue crab stock to maintain baseline data	1 and 6	Ongoing
Identify key environmental factors that significantly impact North Carolina's blue crab stock and investigate assessment methods that can account for these environmental factors	1 and 6	Ongoing

<b><u>MANAGEMENT STRATEGY</u></b>	<b><u>OBJECTIVES</u></b>	<b><u>OUTCOME</u></b>
Conduct a study of the selectivity of the gear used in the Juvenile Anadromous Trawl Survey (Program 100) to evaluate the size at which blue crabs are fully-selected to the survey gear; the results of such a study could help determine whether the survey data could be used to develop a reliable index of blue crab recruitment for the Albemarle region; no such index is currently available	1 and 6	No Action
Expand spatial coverage of the Estuarine Trawl Survey (Program 120) to include shallow-water habitat in Albemarle Sound; sampling in shallow-water habitat is intended to target juvenile blue crabs so that a recruitment index for the Albemarle Sound could be developed	1 and 6	No Action
Expand temporal coverage of the Estuarine Trawl Survey (Program 120) beyond May and June sampling; additional sampling later in the blue crab's growing season would provide more information on within-year changes in growth, mortality, and abundance; at a minimum, recommend addition of September sampling in order to capture the fall settlement peak	1 and 6	No Action
Expand spatial coverage of Pamlico Sound Survey (Program 195) to include deep water habitat in Albemarle Sound and the Southern Region; expanding the sampling region of adult blue crab habitat would allow for a more spatially-comprehensive adult index; additionally, there would be increased confidence in comparison of adult abundance trends among regions since all would derive from the same sampling methodology	1 and 6	No Action
Implement a statewide survey with the primary goal of monitoring the abundance of blue crabs in the entire state; such a survey would need to be stratified by water depth to ensure capture of all stages of the blue crabs life cycle and standardized among North Carolina waters	1 and 6	No Action

<b><u>MANAGEMENT STRATEGY</u></b>	<b><u>OBJECTIVES</u></b>	<b><u>OUTCOME</u></b>
Implement monitoring of megalopal settlement near the ocean inlets could potentially add a predictive function to the blue crab stock assessments in the future; Forward et al. (2004) detected a positive, linear relationship between megalopal abundance and commercial landings of hard blue crabs for both the local estuarine area and the entire state of North Carolina when a two-year time lag was implemented (Forward et al. 2004); such monitoring is critical to track larval ingress peaks and the effect of natural forces, such as tropical storms and prevailing winds, on ingress.	1 and 6	No Action
Continue surveys of recreational harvest and effort to improve characterization of the recreational fishery for blue crabs	1 and 6	Ongoing
Identify programs outside the NCDMF that collect data of potential use to the stock assessment of North Carolina's blue crabs	1 and 6	Ongoing
Perform in-depth analysis of available data; consider standardization techniques to account for gear and other effects in development of indices; explore utility of spatial analysis in assessing the blue crab stock	1, 6	Ongoing

## FIGURES

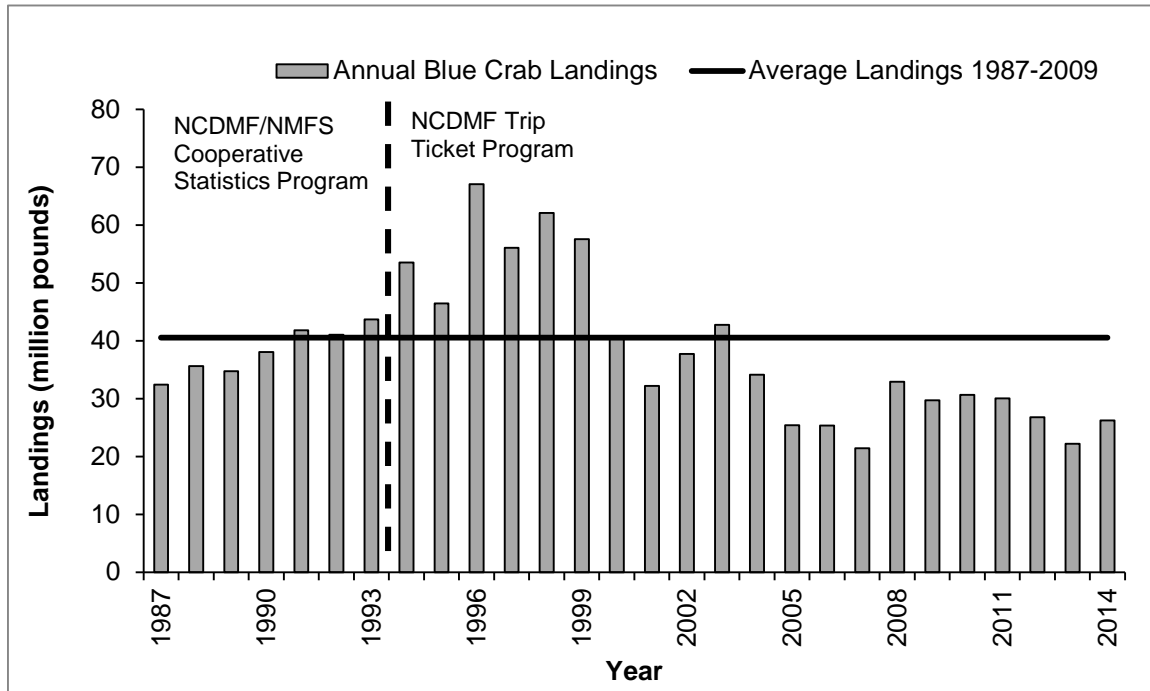


Figure 1. Annual blue crab commercial landings, 2004-2014. Landings include hard, soft, and peeler crabs. The vertical dashed line denotes the change from a voluntary to a mandatory commercial landings reporting program.

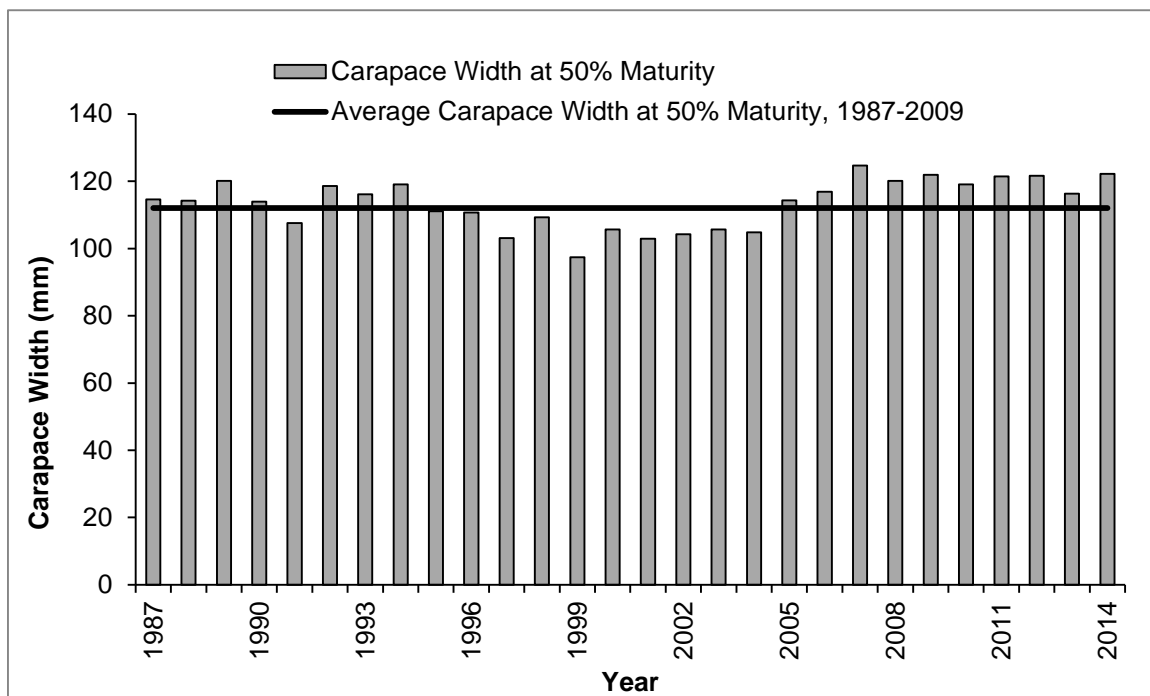


Figure 2. Length at 50% maturity for female blue crabs used in the production characteristic of the Blue Crab Traffic Light, 1987-2014. Fishery-dependent and independent data were included in the analysis.

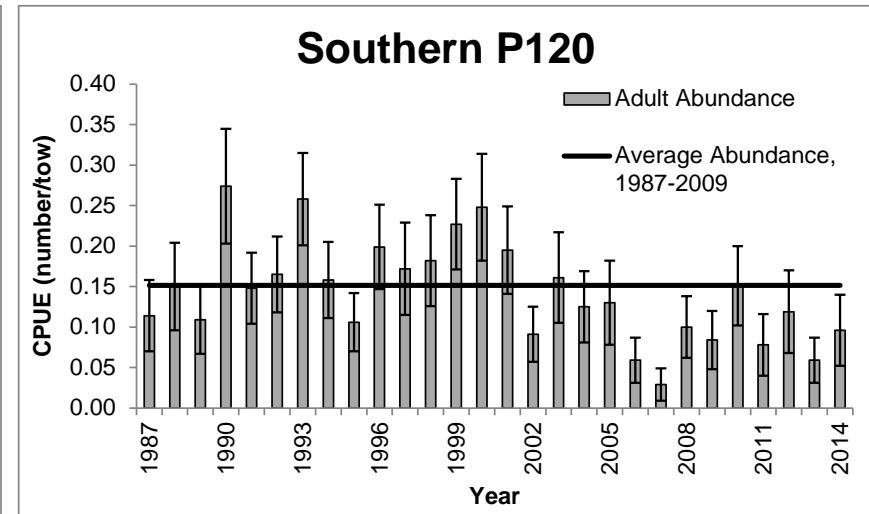
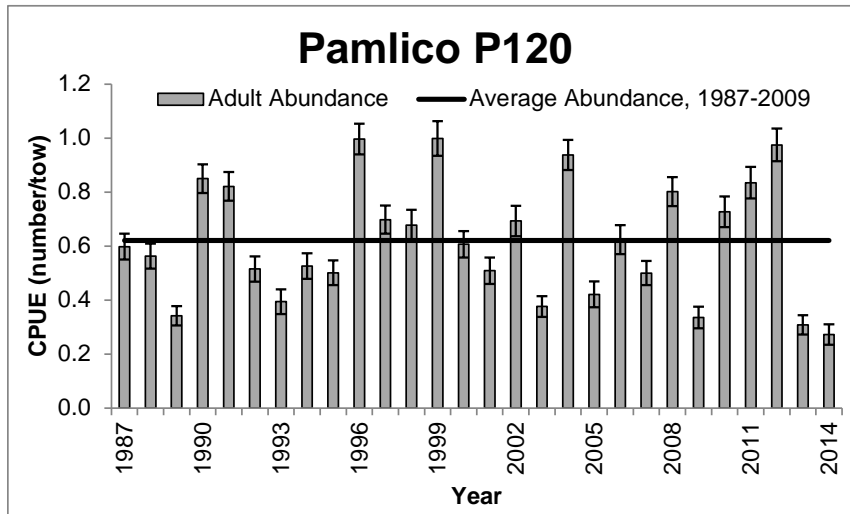
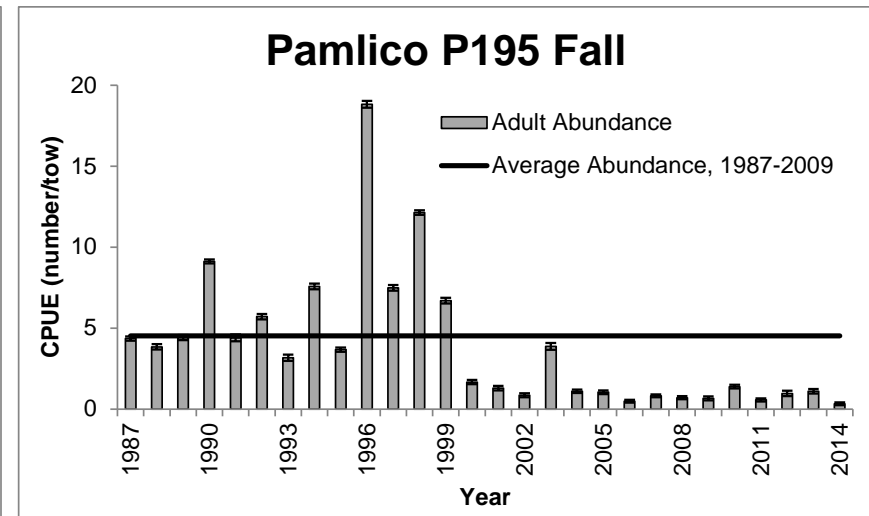
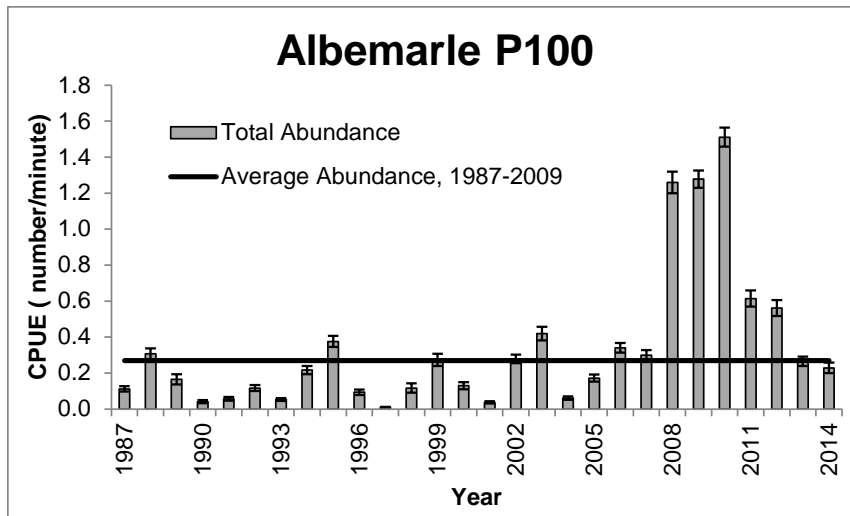


Figure 3. Indices from NCDMF programs P100, P120, and P195 used for the adult abundance characteristic of the Blue Crab Traffic Light, 1987-2014. Error bars represent one standard error of the mean.

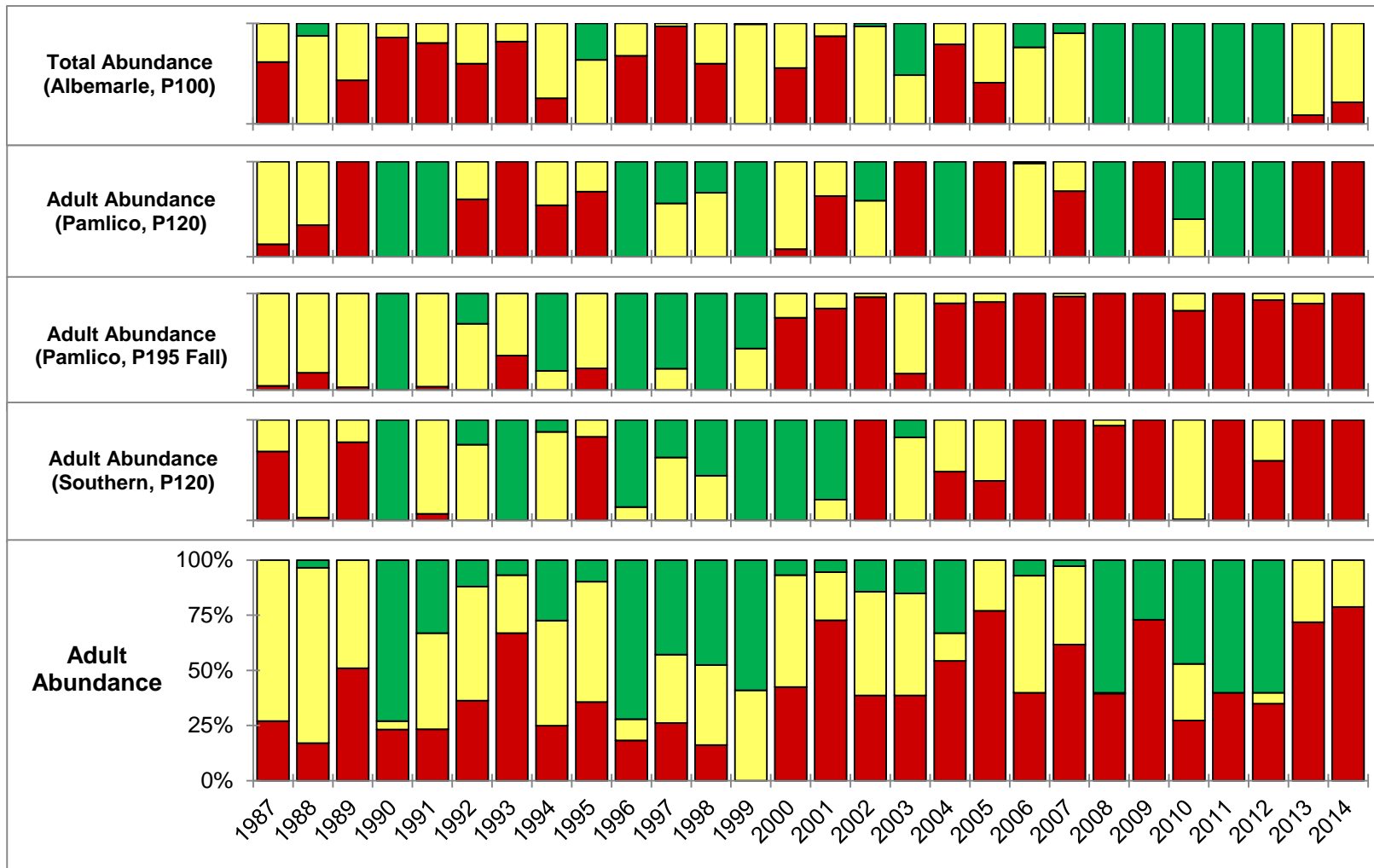


Figure 4. Blue Crab Traffic Light individual adult abundance indicators and the integrated summary (bottom figure), 1987-2014.



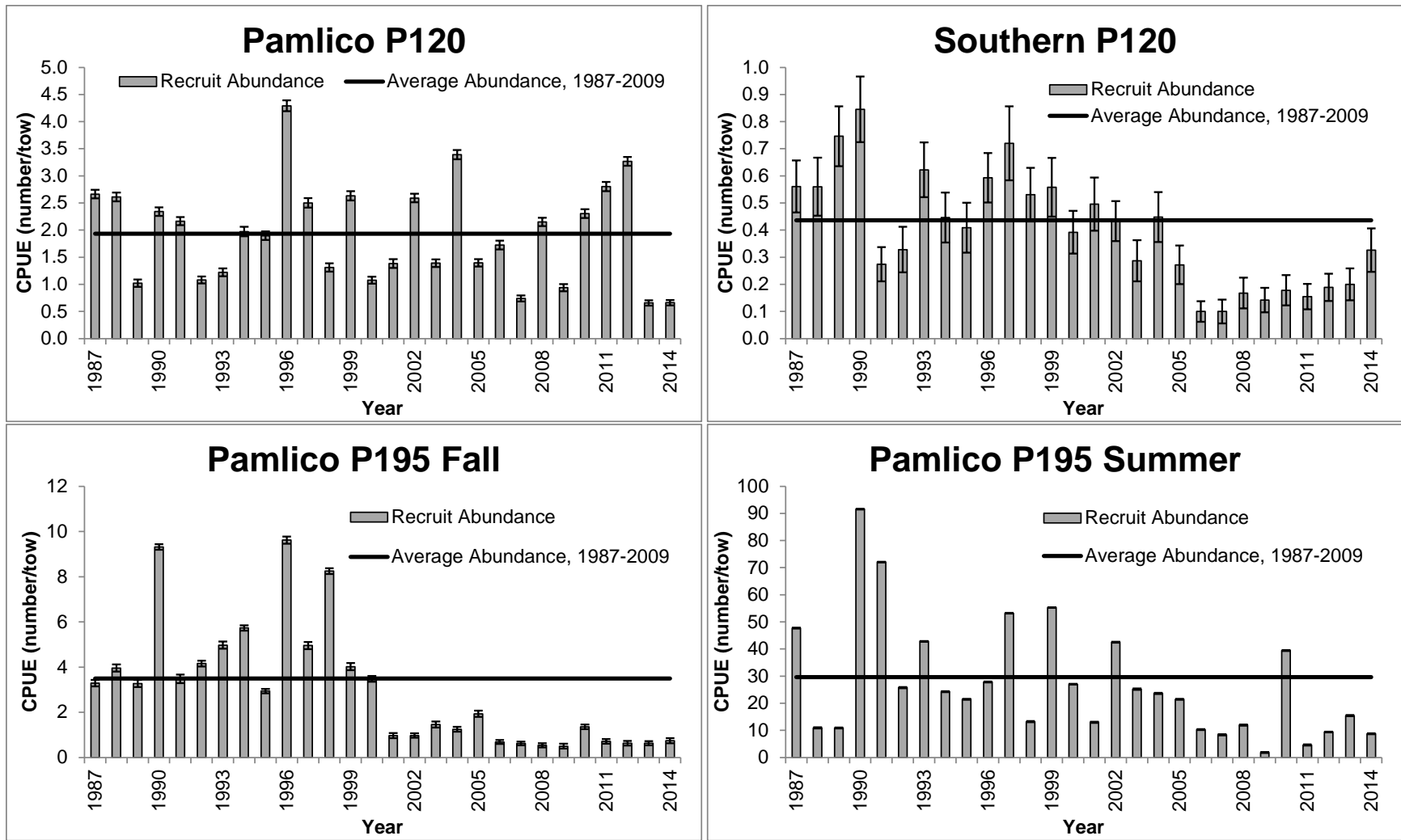


Figure 5. Indices from NCDMF programs P120 and P195 used for the recruit abundance characteristic of the Blue Crab Traffic Light, 1987-2014. Error bars represent one standard error of the mean.



Figure 6. Blue Crab Traffic Light individual recruit abundance indicators and the integrated summary (bottom figure) 1987-2014.

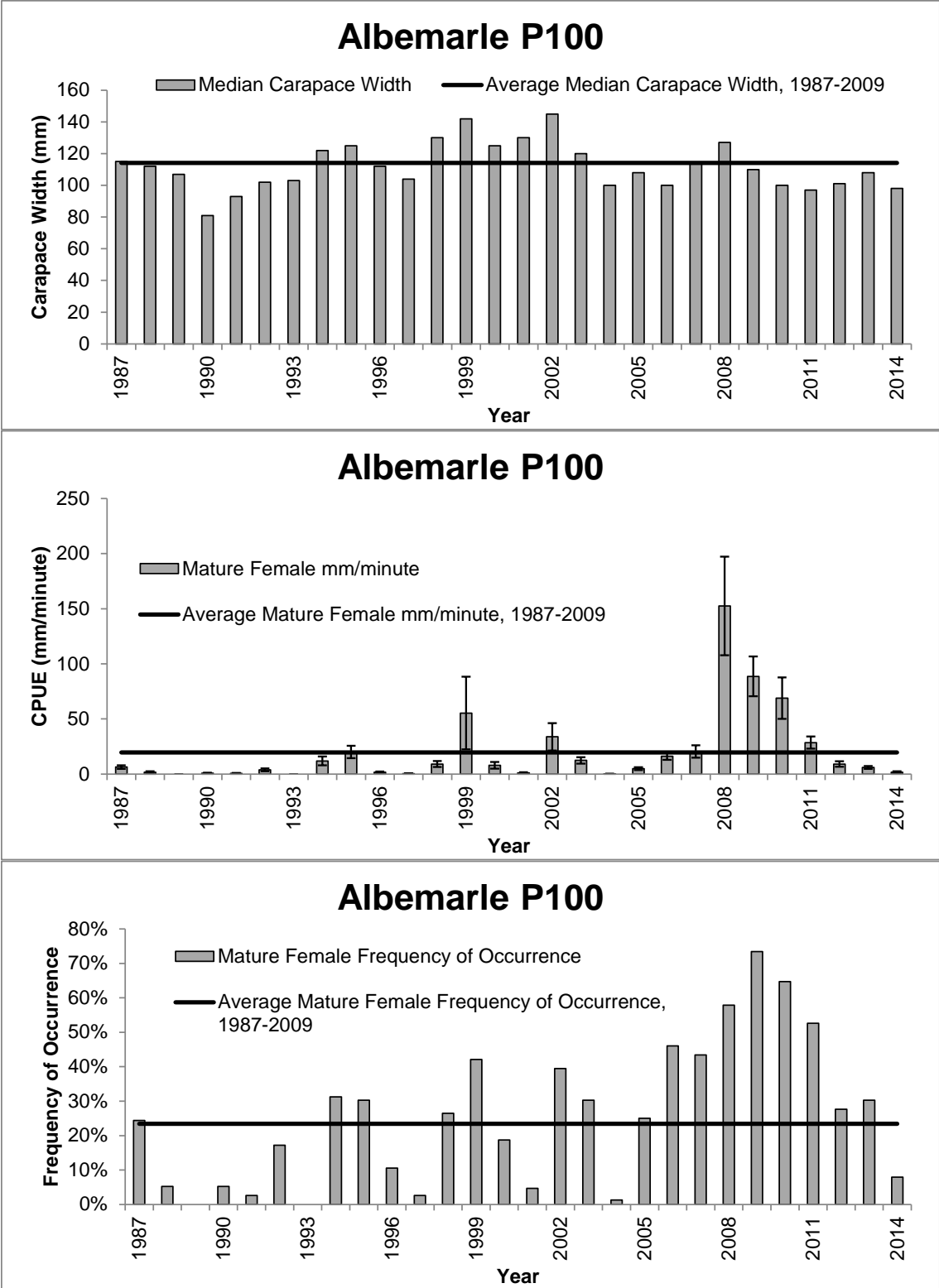


Figure 7. Indices from NCDMF program P100 used for the production characteristic of the Blue Crab Traffic Light, 1987-2014. Error bars represent one standard error of the mean.

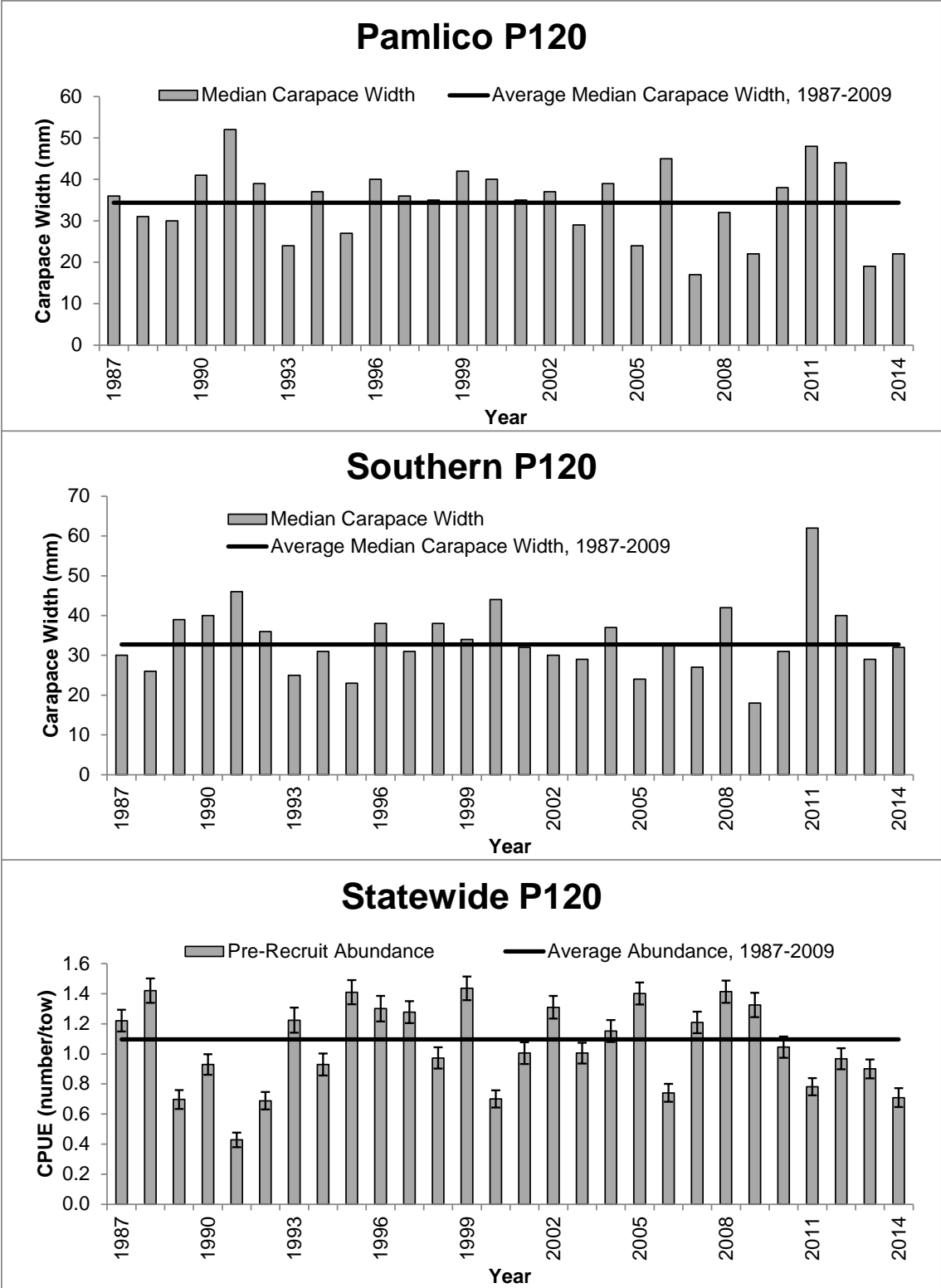


Figure 8. Indices from NCDMF program P120 used for the production characteristic of the Blue Crab Traffic Light, 1987-2014. Error bars represent one standard error of the mean.

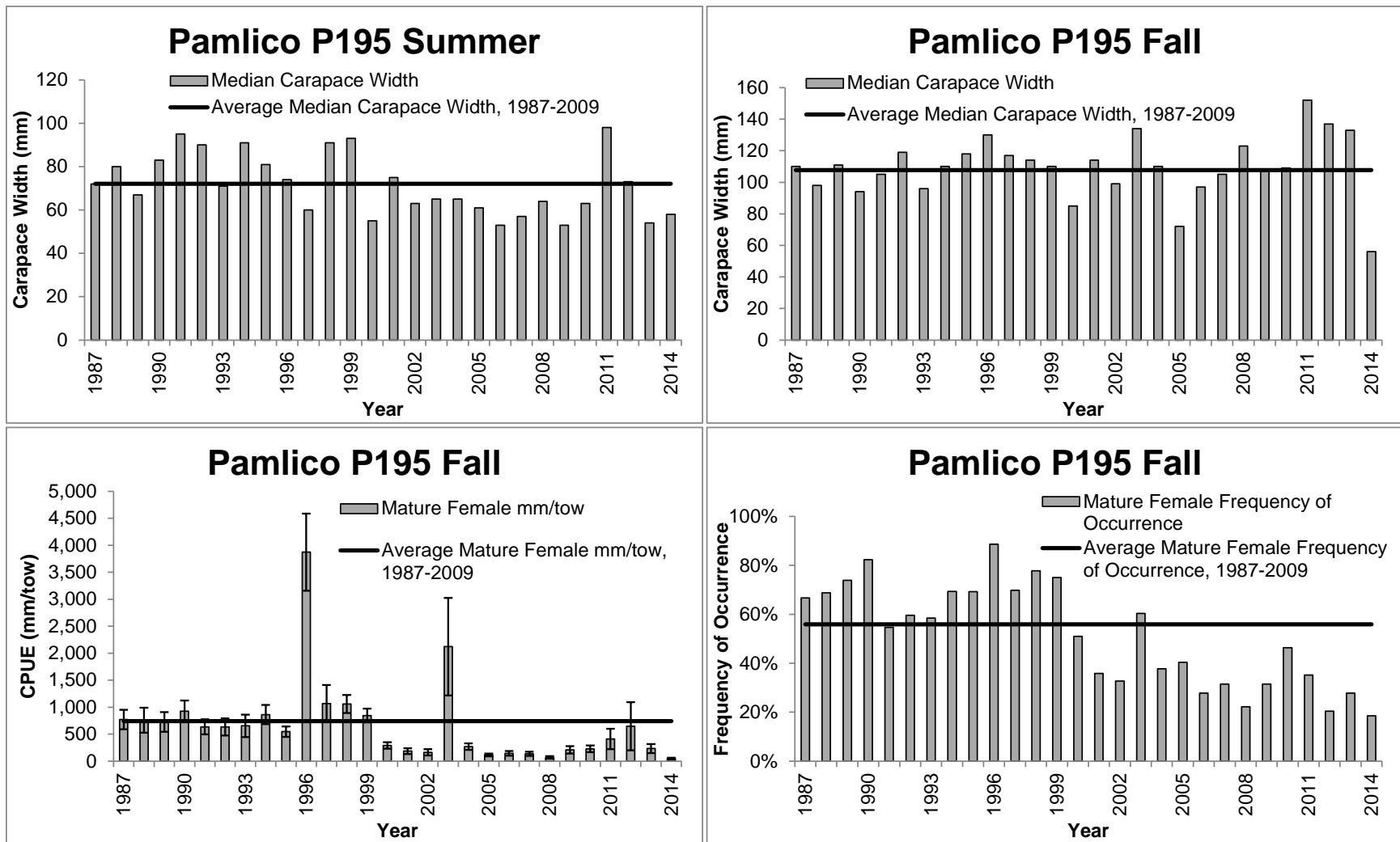


Figure 9. Indices from NCDMF program P195 used for the production characteristic of the Blue Crab Traffic Light, 1987-2014. Error bars represent one standard error of the mean.

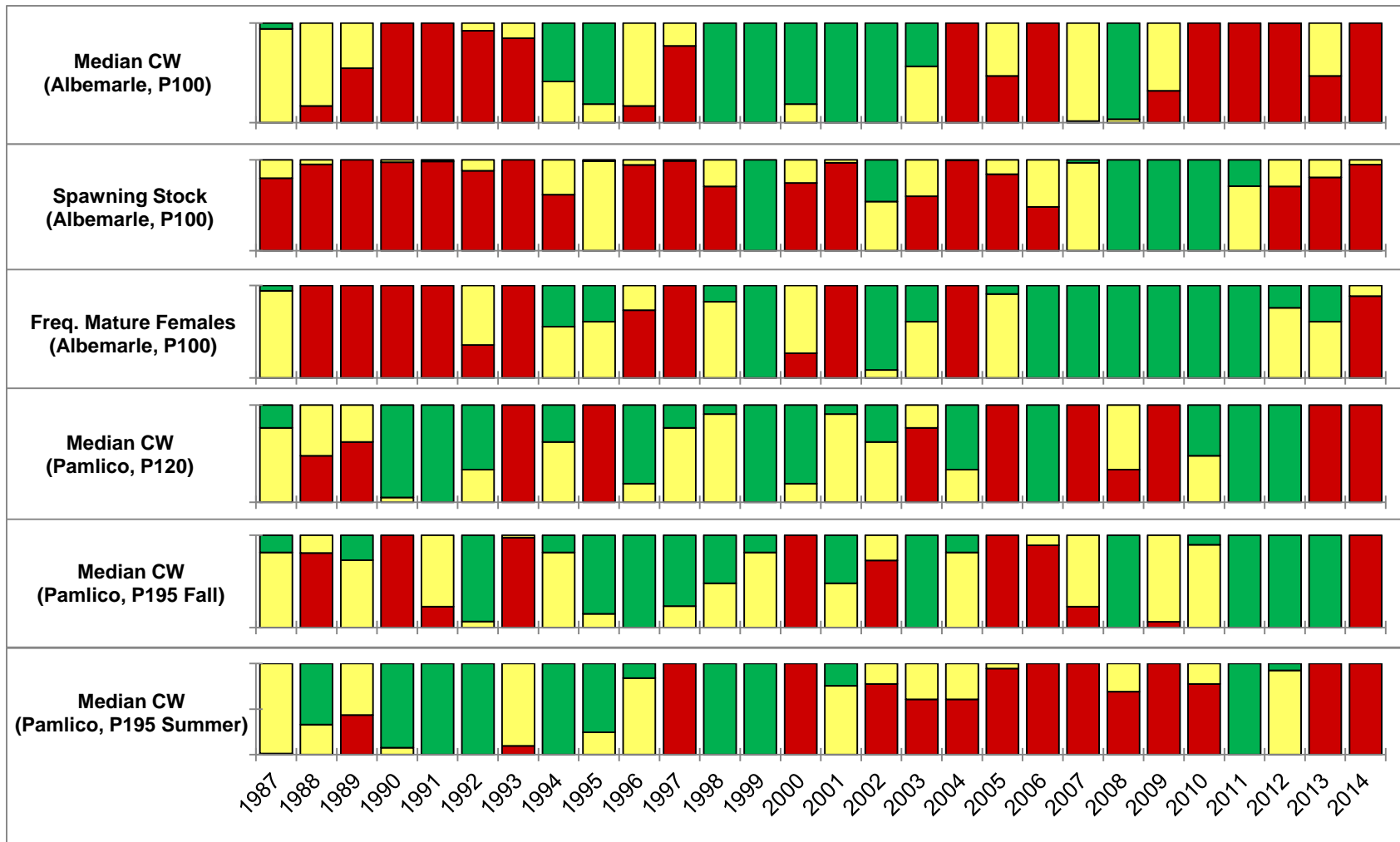


Figure 10. Blue Crab Traffic Light individual production indicators and integrated summary (bottom figure, next page), 1987-2014.



Figure 10 (cont.). Blue Crab Traffic Light individual production indicators and integrated summary (bottom figure), 1987-2014.



Figure 11. Blue Crab Traffic Light indicators for the adult abundance, recruit abundance, and production characteristics, 1987-2014. The dashed line represents the second quartile (50%) moderate management trigger and the solid line represents the third quartile (75%) elevated management trigger relative to the proportion of red.



# **SOUTH CAROLINA CRUSTACEAN REPORT**

## **South Carolina – Blue Crab Landings, Management and Current Research Efforts**

### **ASMFC/SEAMAP Crustacean Workgroup meeting**

Data on commercial crab landings are collected by the South Carolina Department of Natural Resources (SCDNR) Office of Fisheries Management. Landings in 2010 (3,203,521 lb.) were the lowest recorded since 1980. After increasing to near the long-term (1980-2014) landings average (5,423,844 lb.) from 2011-2013, landings again decreased in 2014 to the second lowest since 1980. Recreational landings of blue crab are not currently monitored in South Carolina (SC). A postcard survey, completed in 1998, estimated that recreational crabbers fished about 25% of the combined recreational and commercial landings during 1997. We are replicating this postcard survey effort to estimate current recreational effort in SC.

In SC, management of blue crabs is through minimum size limits (5" carapace width), prohibition of the harvest of ovigerous crabs, and individual recreational effort limits (i.e. two crab pots per licensed recreational crabber). The blue crab fishery is open to new licenses (average number 350-400 total/year), and past attempts by the SCDNR to gain authority to stabilize commercial effort have been unsuccessful. However, managers are currently working with the SCDNR Board in an attempt to gain additional management authority, such as temporary moratoriums on the harvest of females, if the science supports such actions. Currently, SC does not have a stock assessment for the blue crab resource.

Independent fishery monitoring of blue crabs is through 20 foot otter trawl (1 inch mesh) sampling towed for 15 minutes (monthly in the Charleston area and increased spatial coverage to the south during April, March, August, and December), trawling with a 10 foot otter trawl in smaller creeks during the summer months, and commercial crab pot sampling (bimonthly in the Charleston area, with additional spatial coverage during the fall). The Crustacean Research and Monitoring Section is making plans to increase frequency and spatial coverage of sampling.

There are several avenues of current blue crab research within the SCDNR. In one project, a College of Charleston Masters student is focused on correlating movement and abundance of crabs with abiotic factors, primarily salinity, within the Ashley River in Charleston at both shallow and deep water sites. She will build an individual based model based on these data to examine fisheries effort and changing climate. Another project, a collaboration with the Terrapin and Sea Turtle Section at SCDNR, is aiming to reduce diamondback terrapin bycatch associated with crab traps. While bycatch reduction devices (BRDs) have been used in the past to reduce terrapin bycatch, they have been largely ineffective, both in keeping terrapins out and allowing large blue crabs in. Therefore, in 2015 we created a novel BRD that should permit entry by all but the largest 0.1% of blue crabs while also precluding entry by all but the smallest 8% of terrapins. During field tests, the novel BRD performed as well as predicted for terrapins,

but captured 20–26% fewer blue crabs than traps fished without the BRD. Because of superior terrapin exclusion relative to other designs and because mixed results have also been obtained for other BRDs, we remain committed to continued efforts to improve the performance of this novel BRD. Another current area of research is identifying gear and methods for cost effective sampling of juvenile (20-50 mm) crabs. Several methods (e.g. mini crab pots and collapsible crab/shrimp nets) show promise in SC's marsh systems, which are dominated by intertidal and subtidal oyster. Ultimately, the goal is to develop an index of juvenile abundance that could be used to support future management actions. In addition, recently, a suite of 6 microsatellite loci have been isolated for use in research on the genetic characterization of blue crab populations in SC as well as their application as genetic tags for future experimental stock enhancement research. This research suggests that the current Charleston Harbor blue crab population is genetically 'healthy'.

# **GEORGIA CRUSTACEAN REPORT**

## The Blue Crab Fishery in Georgia

The management of the blue crab (*Callinectes sapidus*) fishery in Georgia is overseen and directed by the Georgia Department of Natural Resources' (GADNR), Coastal Resources Division (CRD). Recreationally, the species may be harvested with several gear types, including lift rings, seines, hand-lines, or commercial-style pots/traps (which may not exceed 2ft x 2ft in size). Recreational fishermen opting to use commercial-style pots/traps may fish in any saltwaters opened for the harvest of blue crabs and are limited to no more than 6 pots/traps, each of which must be marked with a green float bearing the contact information of the fishermen. No more than one bushel of crabs per person or two bushels per boat may be harvested recreationally in a 24-hour period, and harvested crabs must be of legal size (males: minimum 5" from spike to spike; peelers: minimum 3" from spike to spike; adult females: no minimum size, though no sponge crabs may be harvested). There is no limit on the number of recreational crabbers in Georgia, though all individuals harvesting crabs recreationally must possess a fishing license and Saltwater Information Program (SIP) permit. Commercially, blue crabs may be harvested in any waters open to the harvest of blue crabs with the aforementioned crab trap/pot (max size of 2ft x 2ft), though commercial traps must be marked with floats bearing the identification number assigned to the fishermen by the (GADNR) and cannot be green in color. Though commercial blue crab fishermen have no harvest quotas, they are restricted to the same size limits as recreational fishermen. Additionally, a cap exists on the number of commercial crabbing licenses available. Currently, 138 commercial crabbers are licensed in Georgia. However, by law any current license not renewed will result in an elimination of that license until no more than 100 commercial crab licenses are available for issuing.

The fishery management plan developed for the species utilizes a "stop-light" approach and requires data from both commercial fishermen and fishery-independent surveys to be used in the formulation of management decisions for the fishery. Essentially, the plan stipulates that different management actions will be taken if data from both commercial fishermen and fishery-independent surveys suggest continued positive or negative fluctuations in the blue crab population occur for a period of at least 6 consecutive months. Under this threshold management strategy, the following 3 different threshold values are considered:

**Threshold Value 1:** In this scenario, continued (>6 months) blue crab catches exceeding the upper confidence interval ( $\geq 81\%$ ) of long-term averages suggest blue crab abundance is very high and thus will may result in relaxed regulations on blue crabs, particularly for sponge crabs. This action would require legislative changes to allow the DNR Commissioner ability to permit sponge crab harvest.

**Threshold Value 2:** In this scenario, continued (>6 months) blue crab catches exceeding the lower confidence interval ( $\leq 81\%$ ) of long-term averages suggest the fishery is under stress and will potentially result in seasonal restrictions on female harvest.

**Threshold Value 3:** In this scenario, continued (>6 months) blue crab catches exceeding the lower confidence interval ( $\leq 95\%$ ) of long-term averages suggest the fishery is in threat of crashing, and thus a potential ban on the harvest of all females or a complete closure of the fishery is needed.

Landings data, as provided monthly by commercial blue crab fishermen, indicates that both effort and harvest has declined recently. The commercial harvest of blue crabs has averaged 3.17 million pounds over the last 5 years (2010-14), down from the 3.28 million pounds over the last 15 years (2000-14). Similarly, catch-per-unit-effort (CPUE), defined as the average pounds/trip reported, has declined, with the recent 5-year average of 323 lbs/trip falling below the 15-year average of 333 lbs/trip. In addition to commercial landings data, information from the fishery-independent Ecological Monitoring Trawl Survey (EMTS) is used in fishery management decisions. The EMTS is a trawl survey utilizing a 40ft trawl to assess blue crabs, along with other marine organisms, at 42 fixed sites along the coast of Georgia. This monthly standardized survey has been conducted since 1976, and provides managers with information needed to monitor long-term trends in the blue crab population. The 5-year average of 1.7 crabs/tow observed in the EMTS is well below the 15-year average of 3.7 crabs/tow. Recent declines in crab catches as observed both in commercial landings and fishery-independent surveys are most likely due to climatic conditions, including cooler than normal fall water temperatures and increased spring rains occurring in 2014.

Beyond assessing trends in the blue crab population, fishery managers continue to monitor any current issues affecting the fishery. To assist in this process, GADNR staff work with members of the Blue Crab Advisory Panel, a citizen's advisory group comprised of recreational and commercial blue crab fishermen. Several issues, including terrapin interactions, changes in inland water flowing to the coast, additional areas of blue crab research needed, regulatory changes affecting blue crabs, and other items affecting the blue crab fishery have been discussed in recent years. Personnel with the GADNR continue to solicit input from this group to consider when addressing these and other issues that arise.

# **FLORIDA CRUSTACEAN REPORT**

SEAMAP-South Atlantic Crustacean Workgroup/ GSMFC Crab Subcommittee  
Florida Report  
November 2015  
Ryan L. Gandy Ph. D.

**Abstract:** Six million pounds of blue crabs were landed in Florida in 2014. This volume is a continuation of landings below the historic average of 13 million pounds. The value for hard shell blue crab has recovered from the recession induced drop in price and volume of 2008-2009 and stabilized over the past 3 years whereas the value of softshell crabs has remained relatively stable over the same period. In 2011, Florida completed a statewide stock assessment for blue crabs. The conclusions of the 2011 assessment were the same as the previous 2005 assessment in that blue crabs on the Gulf and Atlantic coasts were not overfished or undergoing overfishing. Blue crab populations are highly resilient and have dramatic swings in year to year abundance that are directly related to freshwater inflow. The Blue Crab Effort Management Program was implemented in 2007 to address problems of seasonal crowding of traps in confined waterways, lost traps, bycatch, overcapitalization, latent endorsements and conflict between hard shell blue crab producers and soft shell blue crab producers. The effort management program was successful in eliminating most of the latent effort (>800,000 unused trap certificates) and has resulted in <270,000 current trap tags purchased. This has resulted in good estimates of the traps used in the fishery. The Derelict Blue Crab Trap Retrieval Program has retrieved 4,399 blue crab traps since 2010 with a composition of 89% commercial and 11% recreational. In August of 2015, FWC issued a horseshoe crab bleeding permit to a commercial entity on the Gulf coast. In response, the International Union for the Conservation of Nature (IUCN) issued a letter to the Florida Fish and Wildlife's Department of Marine Fisheries Management and the Gulf States Marine Fisheries Commission stating their concerns regarding the bleeding and harvest of horseshoe crabs along Florida's Gulf coast. The Florida east coast shrimp landings have declined since 2010. Florida does not perform state stock assessments for shrimp. However, Florida representatives participate in regional fisheries assessment and management.



## Blue Crab Landings

Florida's 2014 blue crab landings suggest a continuation of landings volume below its historic average (pre-2000). Overall, the years with lowest landings appear in 6 to 10 year intervals. The trend of landings for these lowest landing years appears to be declining over time (Figure 1). The value for hard shell blue crab has recovered from the recession induced drop in price and volume of 2008-2009 and stabilized over the past 3 years whereas the value of softshell crabs has remained relatively stable over the same period (Figure 2). Florida does not collect recreational blue crab data.

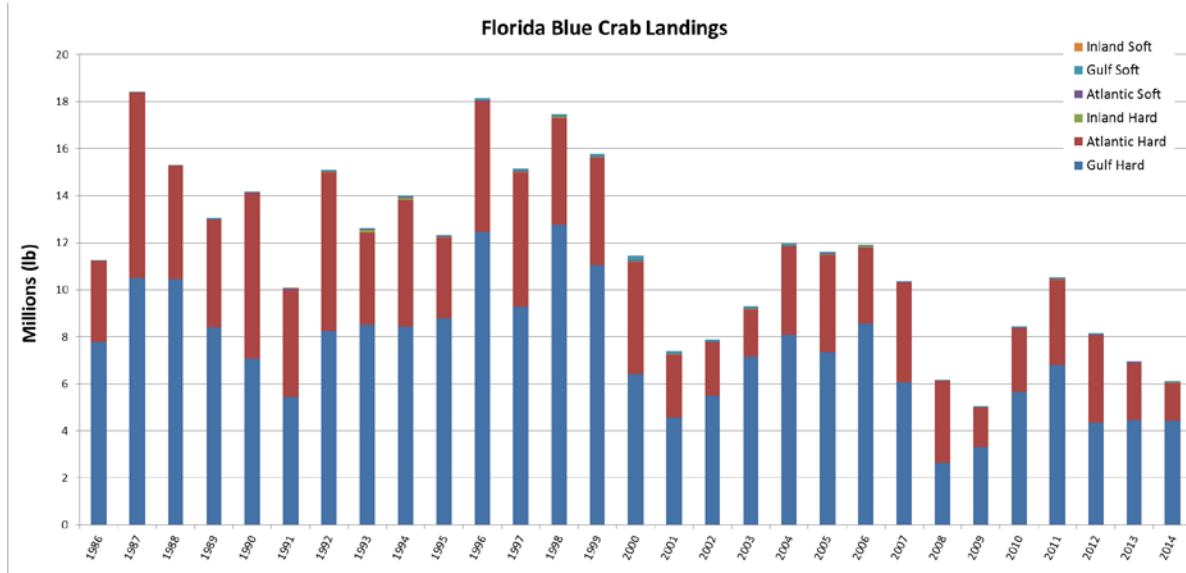


Figure 1. Florida Blue Crab Landings. Data obtained from Florida Fish and Wildlife Marine Fisheries Information System.

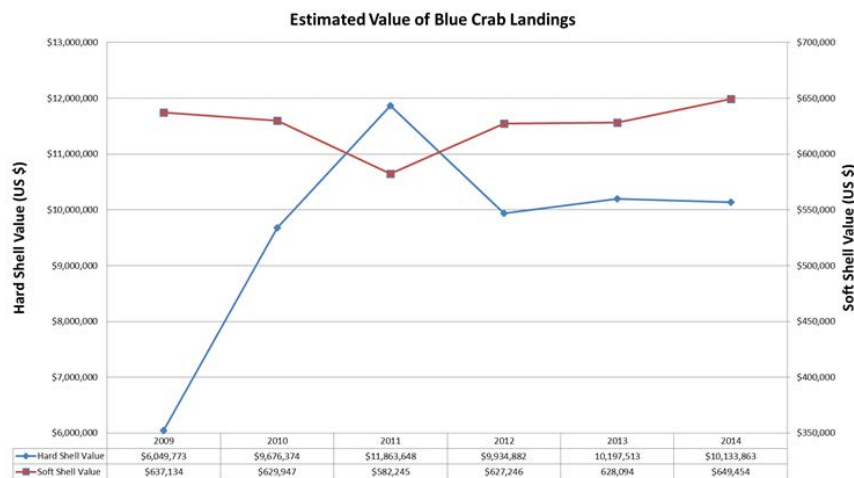


Figure 2. Florida Blue Crab Value. Data obtained from Florida Fish and Wildlife Marine Fisheries Information System.

## Florida (Gulf and Atlantic) Blue Crab Stock Assessment 2011

In 2011, Florida completed a statewide stock assessment for blue crabs. The assessment split the state into two regions west coast (Gulf of Mexico) and east coast (Atlantic) although blue crab management is not split between coasts. Three analysis were used. The primary model, a two-stage catch survey analysis, found that neither coast is overfished or undergoing overfishing, with an estimated MSY of 31.9 and 12.0 million crabs for the west coast and east coast, respectively. The second model, a stochastic stock reduction analysis (SSRA), concluded the stock was not overfished or undergoing overfishing and estimated an MSY of 35.3 million crabs and 23.2 million crabs for the west and east coasts, respectively. The third model, a surplus production model, differed from the other models in that the east coast was found to be overfished and undergoing overfishing while the west coast was not, with an estimated MSY of 22.1 million crabs for the west coast and 15.4 million crabs for the east coast. The conclusions of the 2011 assessment were the same as the previous 2005 assessment. Blue crab populations are highly resilient and have dramatic swings in year to year abundance are directly related to freshwater inflow.

### Blue Crab Effort Management Program

The Blue Crab Effort Management Program (BCEMP) was implemented in 2007 to address problems of seasonal crowding of traps in confined waterways, lost traps, bycatch, overcapitalization, latent endorsements and conflict between hard shell blue crab producers and soft shell blue crab producers in the fishery. On July 1, 2008 the BCEMP assessed a blue crab endorsement fee and trap tag fee for each blue crab trap fished. Non-renewals of endorsements may appeal if there were extenuating circumstances that prevented them from renewing on time. Otherwise, those non-renewal endorsements were lost, permanently decreasing the number of endorsements in the fishery. The per trap fee appears to have had a drastic effect on latent effort for trap tags ordered which provides a better estimate of traps available for fishing.

Year	Total Traps	Trap Endorsements
07/08	822,750	1,171
08/09	290,699	1,021
09/10	257,050	925
10/11	252,209	834
11/12	273,250	821
12/13	266,950	825
13/14	267,725	772

Table 1. Blue Crab Effort Management Plan - Changes in the Blue Crab Endorsements and Traps

## Derelict Blue Crab Trap Retrieval Program

From July 2009 to February 2011, all six regional blue crab trap closures occurred each year. Prior to the closure of a region all the “actively fished” traps are removed from the area by fishery personnel. The fishery closures and removal of “active” traps aid the identification and removal of lost and abandoned traps. In order to reduce disruptions to commercial blue crab activities; the annual Florida closures for blue crab trap retrieval changed on January 26<sup>th</sup> 2011 to an “even/odd year” closure by coast (odd years Gulf and even years Atlantic). The proportion of blue crab traps retrieved since 2010 has been 89% commercial and 11% recreational.

Year	Total Blue Crab Traps Removed	Commercial Traps	Recreational Traps	Blue Crab Trap Equivalents*	Annual Subtotal
2010**	207	195	12	12	219
2011	1,408	1,294	114	93	1,501
2012	408	313	95	12	420
2013	964	858	106	30	994
2014	313	234	79	24	337
2015	891	827	64	37	928
<b>TOTALS</b>	<b>4,191</b>	<b>3,721</b>	<b>470</b>	<b>208</b>	<b>4,399</b>

\* Trap equivalents: occasionally, we remove pieces of trap debris (trap ropes, buoys, or partial traps) that are no longer connected to a fishable trap. For contract purposes, 1 trap equivalent is equal to 3 pieces of trap debris removed.

\*\*Four of the six regional blue crab trap closures in 2010 were waived to relieve potential economic hardships on fishing communities from the April 2010 BP Deepwater Horizon oil spill. These data represent traps removed from the two trap closures that were not waived: Escambia through Franklin County, Jan. 5-14, 2011; and the St. Johns River, Jan. 16-25, 2011.

Table 2. Total Blue Crab Traps Retrieved

## Horseshoe Crab

The majority of Florida horseshoe crab landings are derived from the marine life industry. Horseshoe crabs are also harvested as bait for the eel fishery however the harvest level is low enough for the Atlantic States Marine Fisheries Commission to regard the fishery as “de minimus” in status. Florida has not historically had commercial operations bleeding horseshoe crabs in the state. In August of 2015 we issued a horseshoe crab bleeding permit to a commercial entity on the West coast. In Response to the state issuing a permit, the International Union for the Conservation of Nature (IUNC) issued a letter to the Florida Fish and Wildlife’s Department of Marine Fisheries Management and Gulf States Marine Fisheries Commission stating their concerns over the harvest of horseshoe crabs in Florida.

Their specific concerns about the emergence of a biomedical fishery for horseshoe crabs in the Gulf of Mexico are:

1. The State does not have an overall limit of the number of horseshoe crabs that can be collected in the State.
2. The permit suggests, *but does not require*, that the permit holder follow best practices for biomedical bleeding as detailed in the 2011 Best Management Practices developed by the ASMFC.
3. There is no clear management structure for the West Coast of Florida since the Gulf States Marine Fisheries Commission does not have a horseshoe crab management plan. Fishery managers throughout the Gulf of Mexico should consider their response proactively, *before* the problem becomes serious.
4. The lack of long-term data for the Gulf of Mexico should not preclude management; indeed, following the precautionary principle, caution should be exercised in allowing the exploitation of population(s) of uncertain size.
5. Gulf of Mexico populations are genetically distinct with little interchange with Atlantic Coast populations; moreover, there appear to be some genetic differences between southern and northern Florida Gulf Coast animals

They urge the State of Florida and the GSMFC to enact the necessary rules and regulations to ensure the long-term viability of horseshoe crab populations in the Gulf of Mexico.

## Florida East Coast Shrimp Landings

The Florida East (Atlantic) coast shrimp landings have declined since 2010. Florida does not perform state stock assessments for shrimp. However, Florida representative participate in regional fisheries assessment and management.

