Joint Atlantic and Gulf States Marine Fisheries Commission

Crustacean Workgroup Meeting

November 3rd 2015, 8am-12pm
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 and introductions *(S. VanderKooy/L. DeLancey)* 8:30 am
2. Approval of agenda
3. Blue crab regional stock assessment (GSMFC)
4. Atlantic horseshoe crab fishery overview (*L. DeLancey*)
5. Derelict trap and gear issues
6. Crustacean bait availability issues
7. Terrapin status report
    a. Current South Carolina research brief (*A. Fowler*)
8. Other Business
9. Public Comment
10. Adjourn 12:00 pm

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

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from March 1 through August 31, 3) prohibited baiting peeler pots except with live legal male blue crabs, 4) repealed the exemption for culling peelers before reaching shore in the hard crab fishery, 5) prohibiting the possession of white line peelers from June 1 through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 hall 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.

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

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

ISSUE	MANAGEMENT STRATEGY	OBJECTIVES	OUTCOME
Stock Protection			
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 **Completed**
	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. **Completed**
User Conflicts			
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. **Completed**
Clarification of Rules			
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. **Completed**
11.5 Clarify crab dredging restrictions	Amend the rule to match harvest management for crab dredging.	2	Rule change to 03L .0203. **Completed**

ISSUE	MANAGEMENT STRATEGY	OBJECTIVES	OUTCOME
Clarification of Rules			
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 **Completed**
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. **Completed**
	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. **Completed**
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. **Completed**
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. **Completed**
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. **Completed**
Harvest Practices			
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
Harvest Practices			
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. **Completed**
	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.
Environmental Factors			
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
Environmental Factors			
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
Environmental Factors			
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.

MANAGEMENT STRATEGY	OBJECTIVES	OUTCOME
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

MANAGEMENT STRATEGY	OBJECTIVES	OUTCOME
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

MANAGEMENT STRATEGY	OBJECTIVES	OUTCOME
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

MANAGEMENT STRATEGY	OBJECTIVES	OUTCOME
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

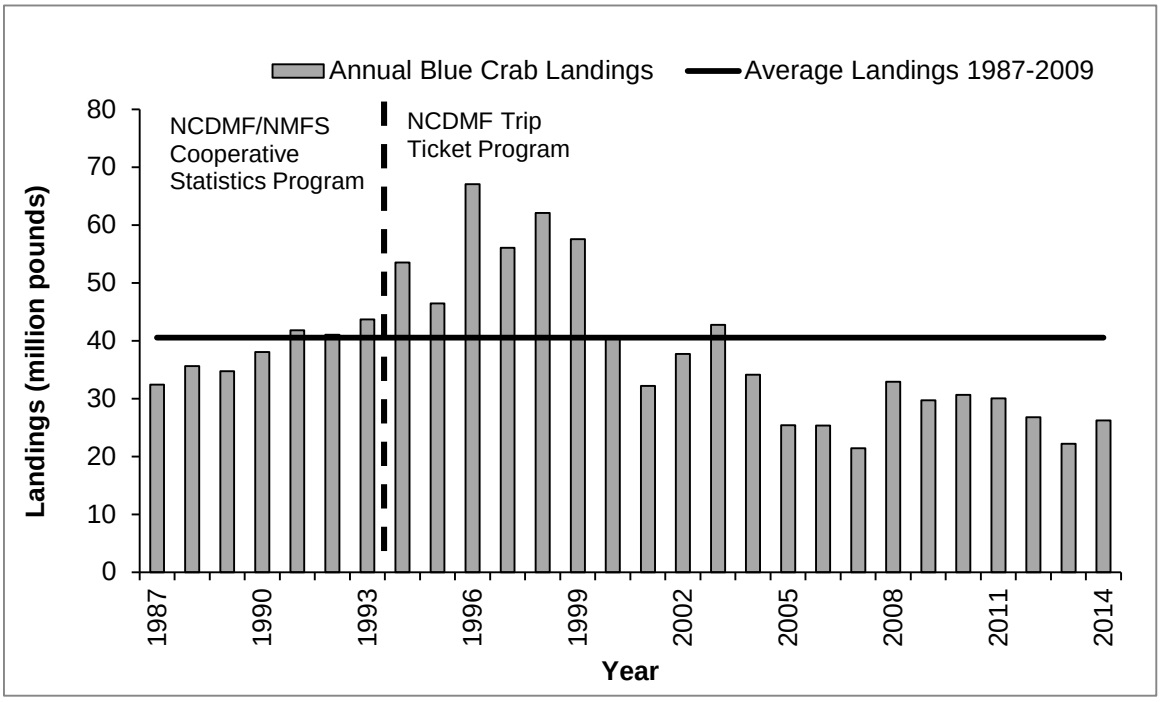


Figure 1. Annual blue crab commercial landings, 2004-2014. Landings include hard, soft, and peeler crabs. The vertical dashed line denotes the change from a voluntary to a mandatory commercial landings reporting program.

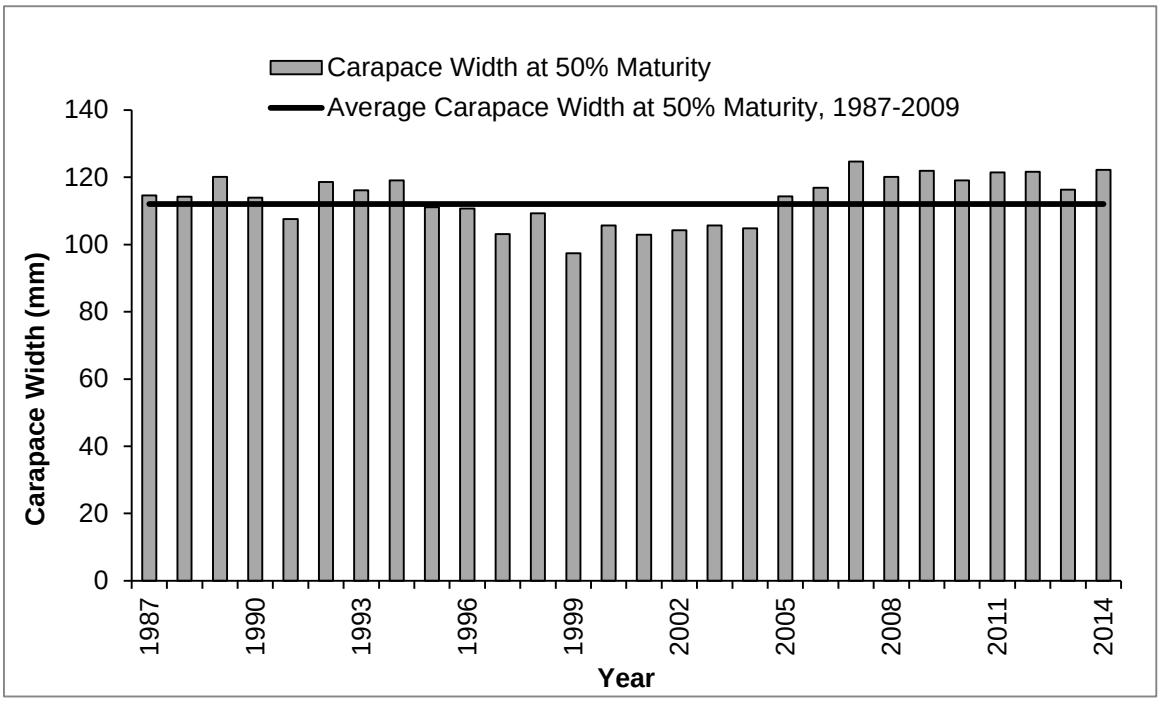


Figure 2. Length at 50% maturity for female blue crabs used in the production characteristic of the Blue Crab Traffic Light, 1987-2014. Fishery-dependent and independent data were included in the analysis.

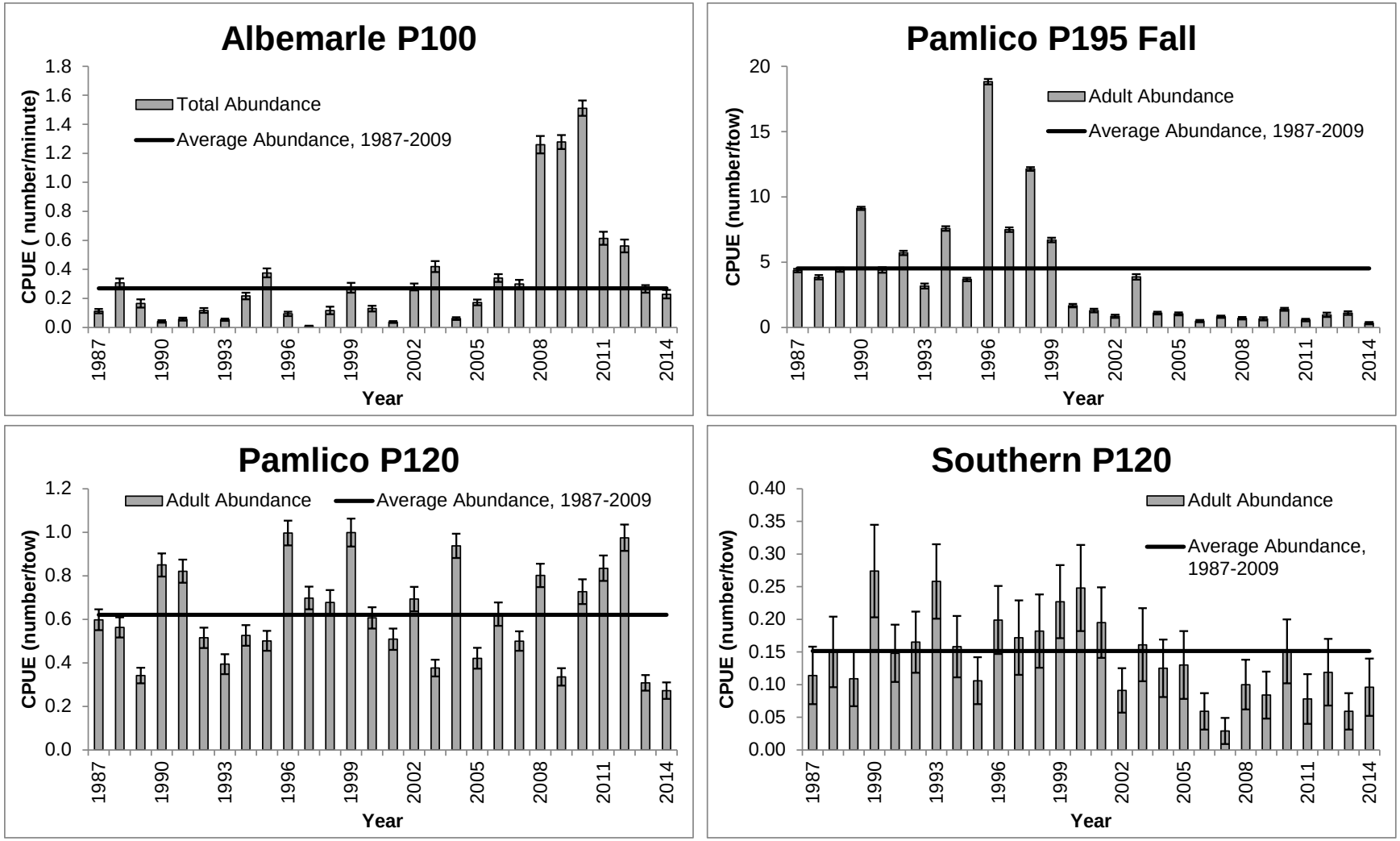


Figure 3. Indices from NCDMF programs P100, P120, and P195 used for the adult abundance characteristic of the Blue Crab Traffic Light, 1987-2014. Error bars represent one standard error of the mean.

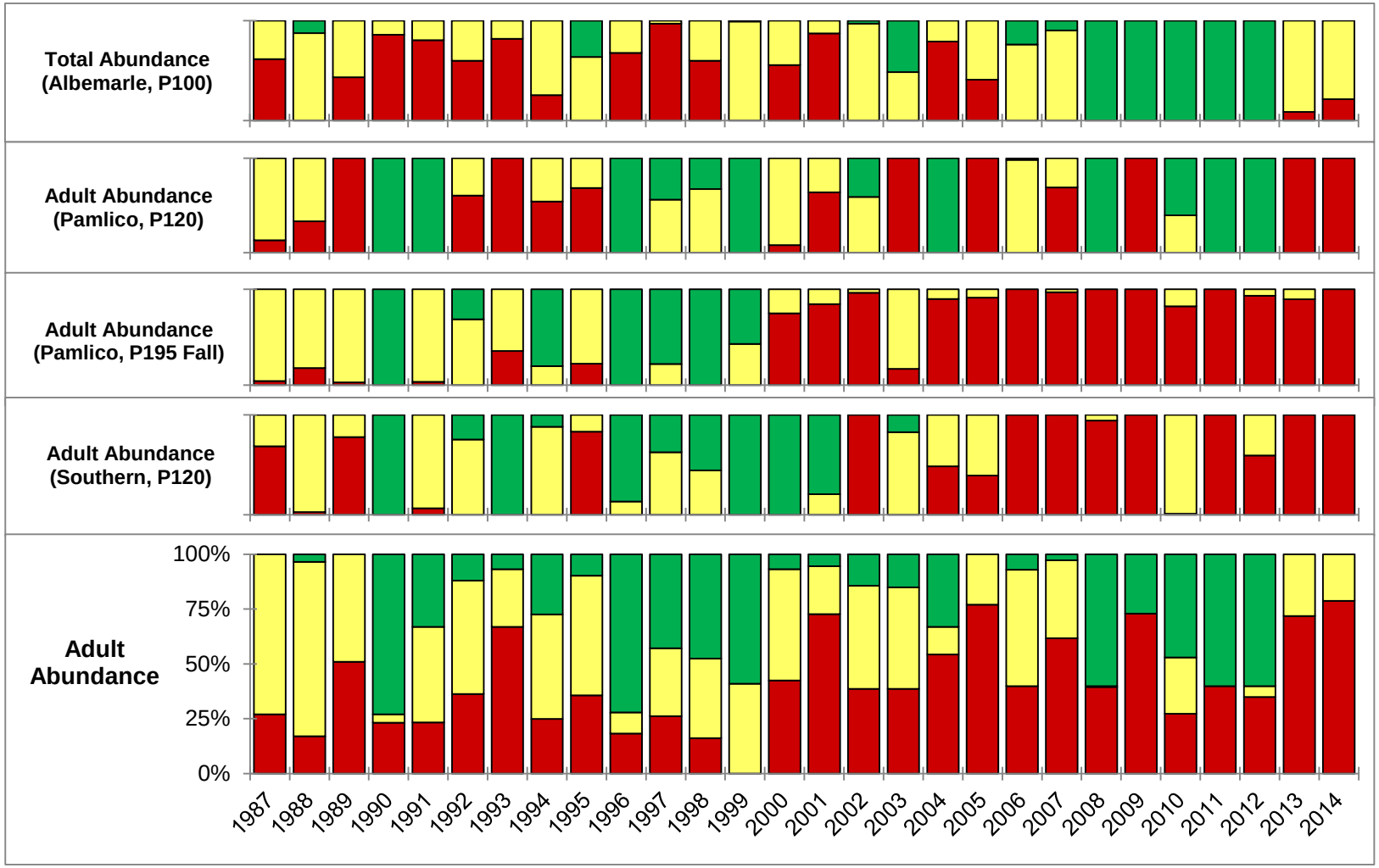


Figure 4. Blue Crab Traffic Light individual adult abundance indicators and the integrated summary (bottom figure), 1987-2014.

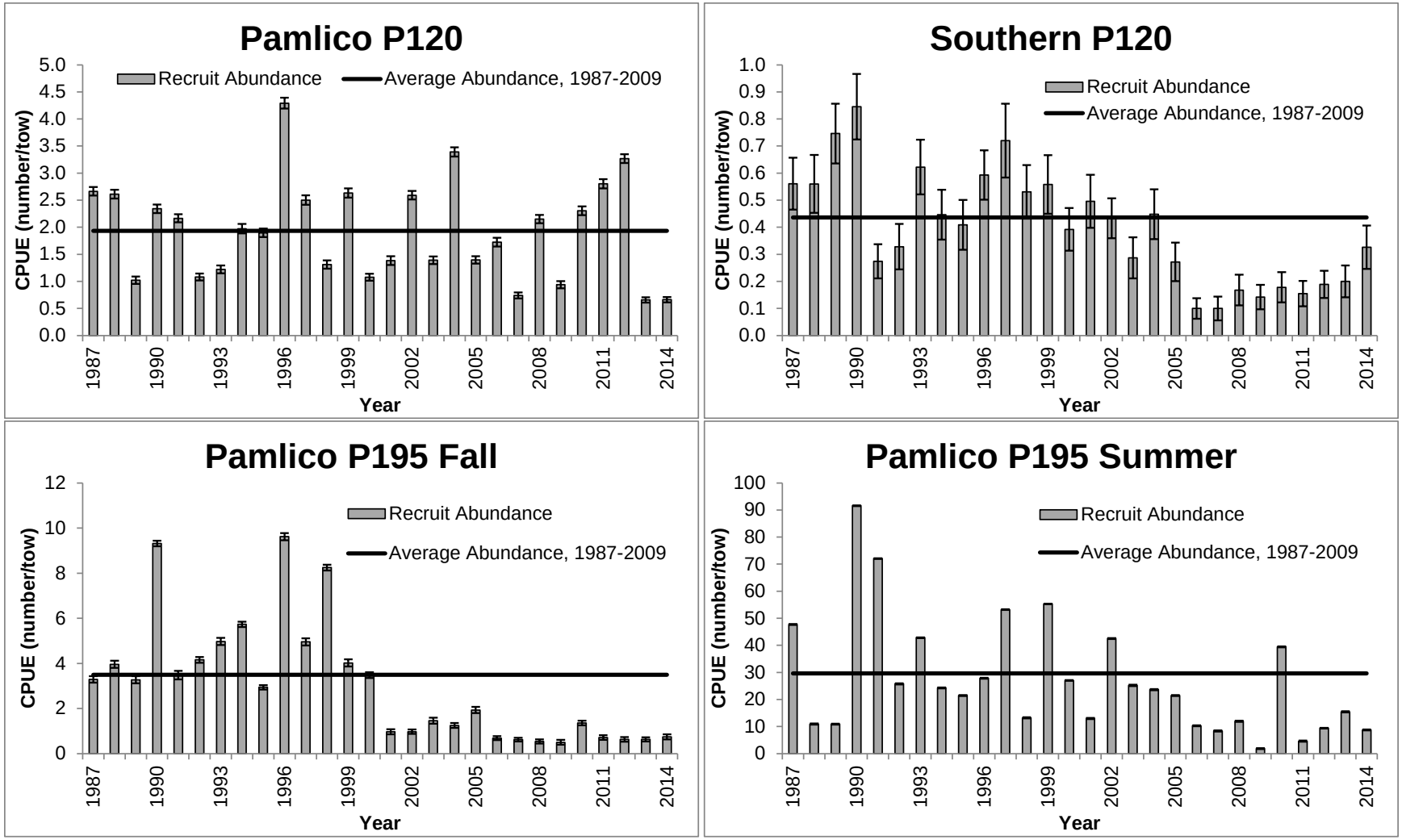


Figure 5. Indices from NCDMF programs P120 and P195 used for the recruit abundance characteristic of the Blue Crab Traffic Light, 1987-2014. Error bars represent one standard error of the mean.

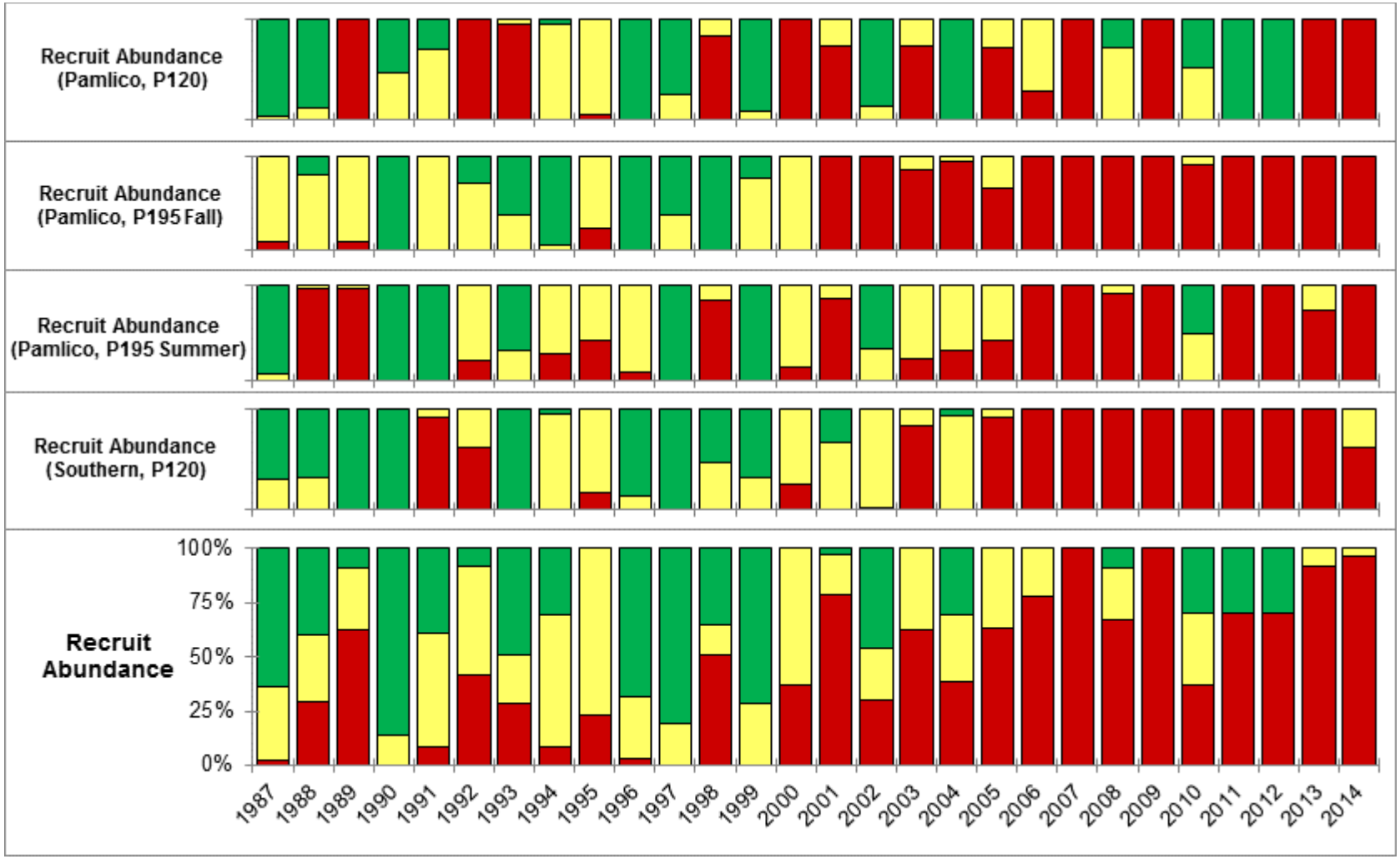
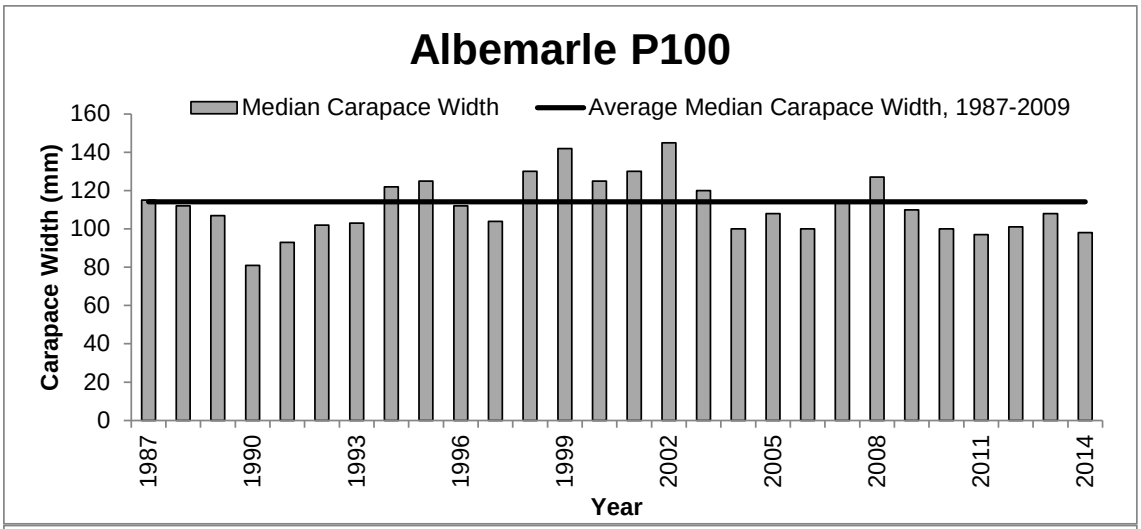
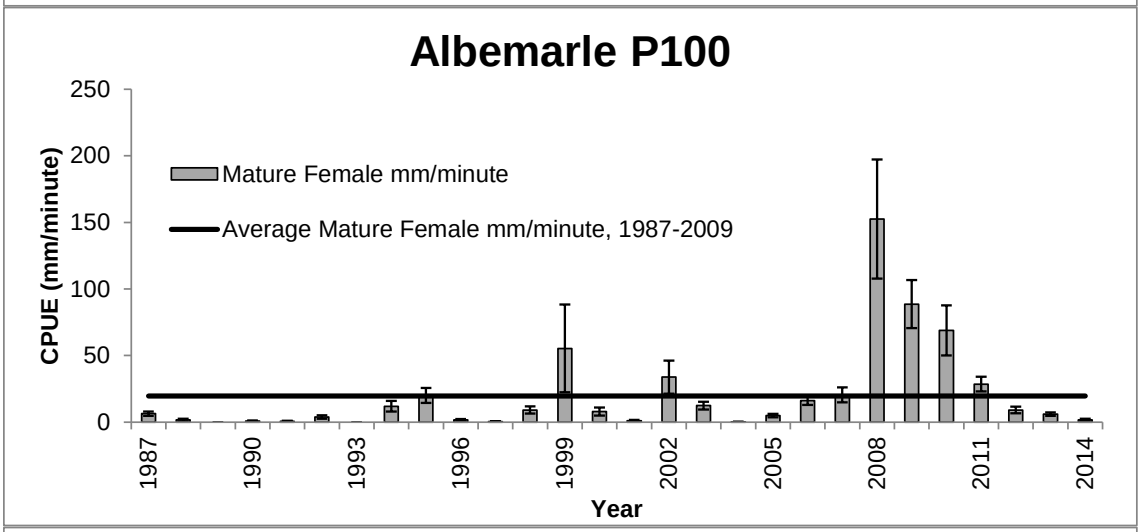


Figure 6. Blue Crab Traffic Light individual recruit abundance indicators and the integrated summary (bottom figure) 1987-2014.





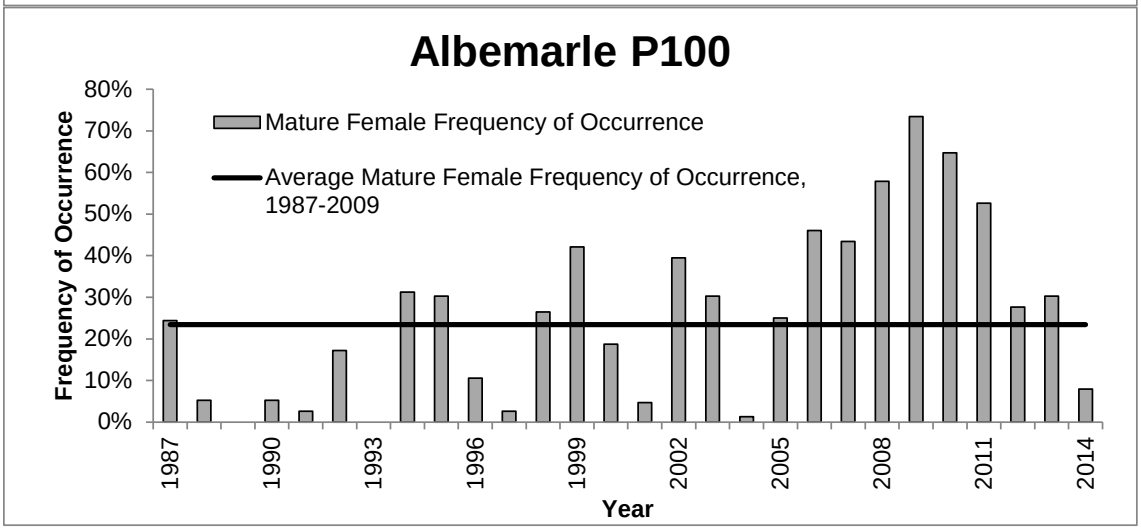


Figure 7. Indices from NCDMF program P100 used for the production characteristic of the Blue Crab Traffic Light, 1987-2014. Error bars represent one standard error of the mean.

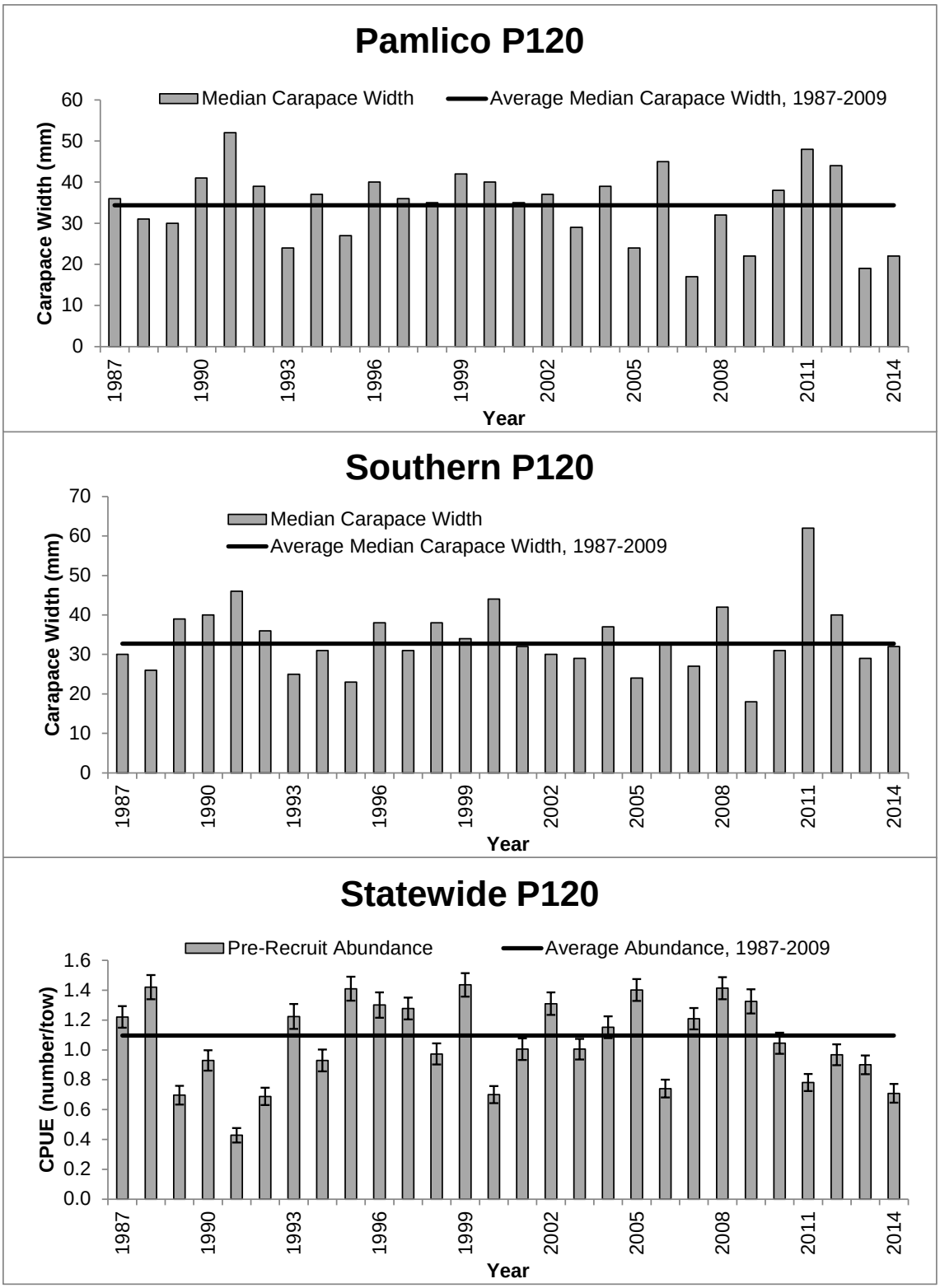


Figure 8. Indices from NCDMF program P120 used for the production characteristic of the Blue Crab Traffic Light, 1987-2014. Error bars represent one standard error of the mean.

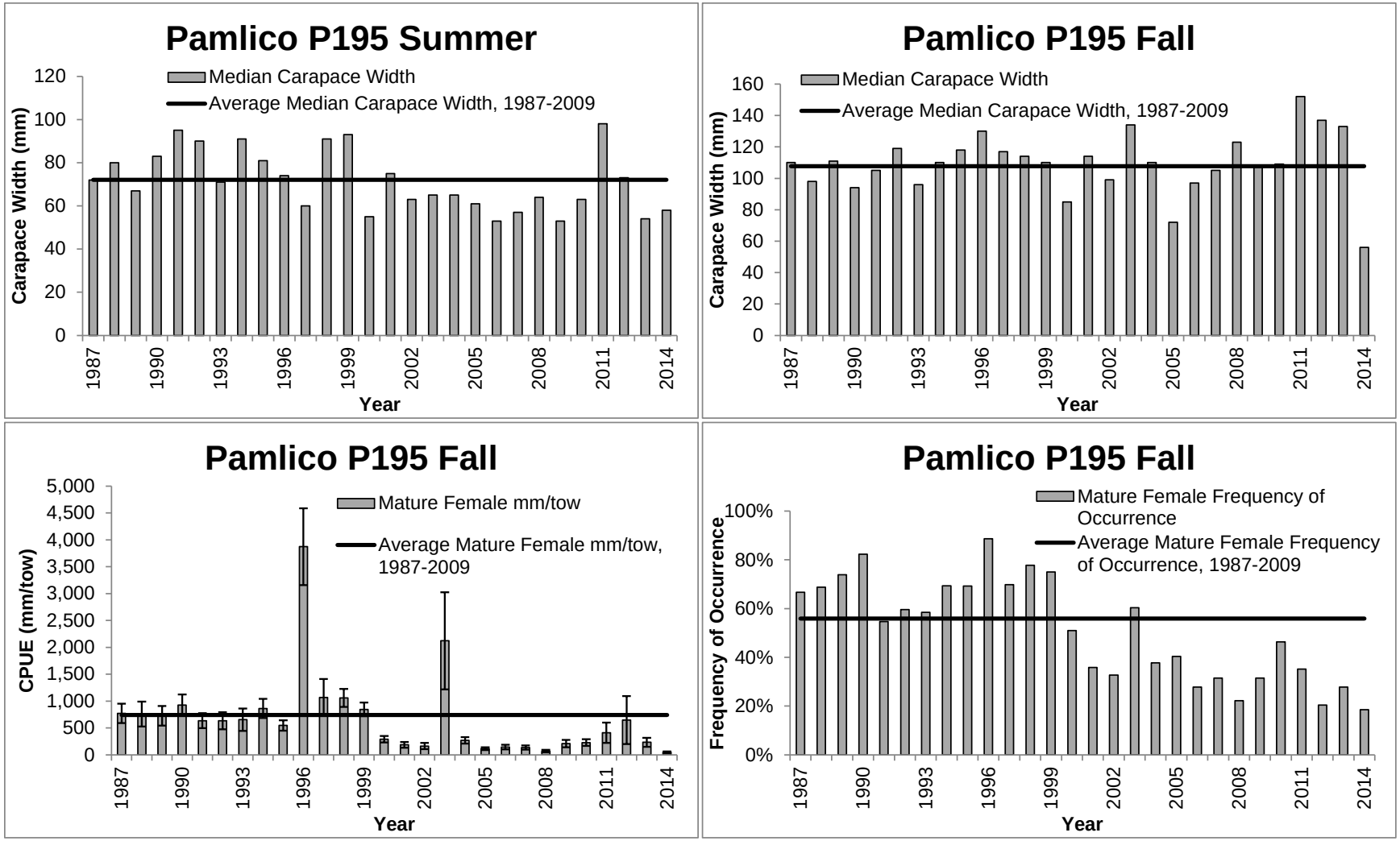


Figure 9. Indices from NCDMF program P195 used for the production characteristic of the Blue Crab Traffic Light, 1987-2014. Error bars represent one standard error of the mean.

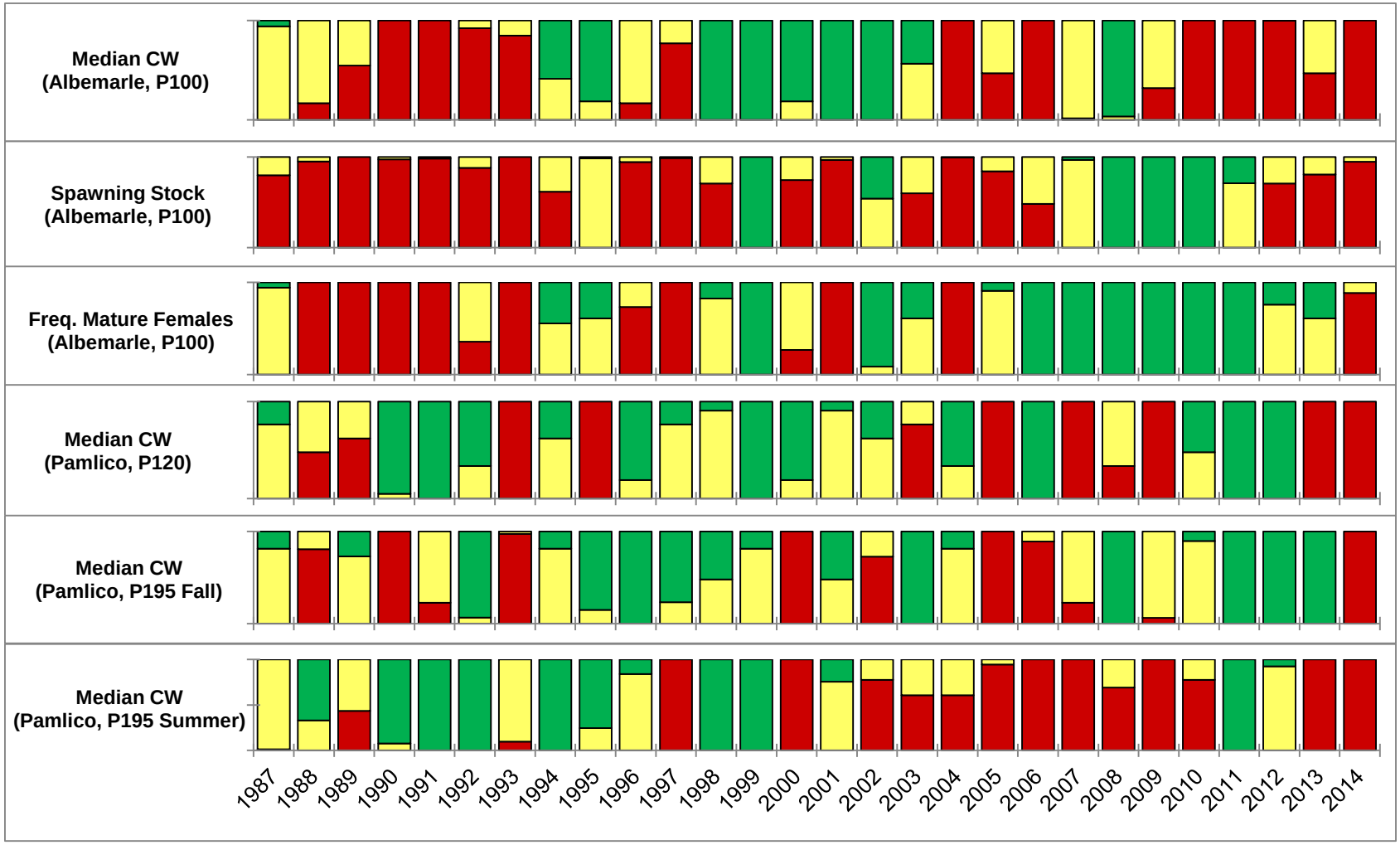


Figure 10. Blue Crab Traffic Light individual production indicators and integrated summary (bottom figure, next page), 1987-2014.

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

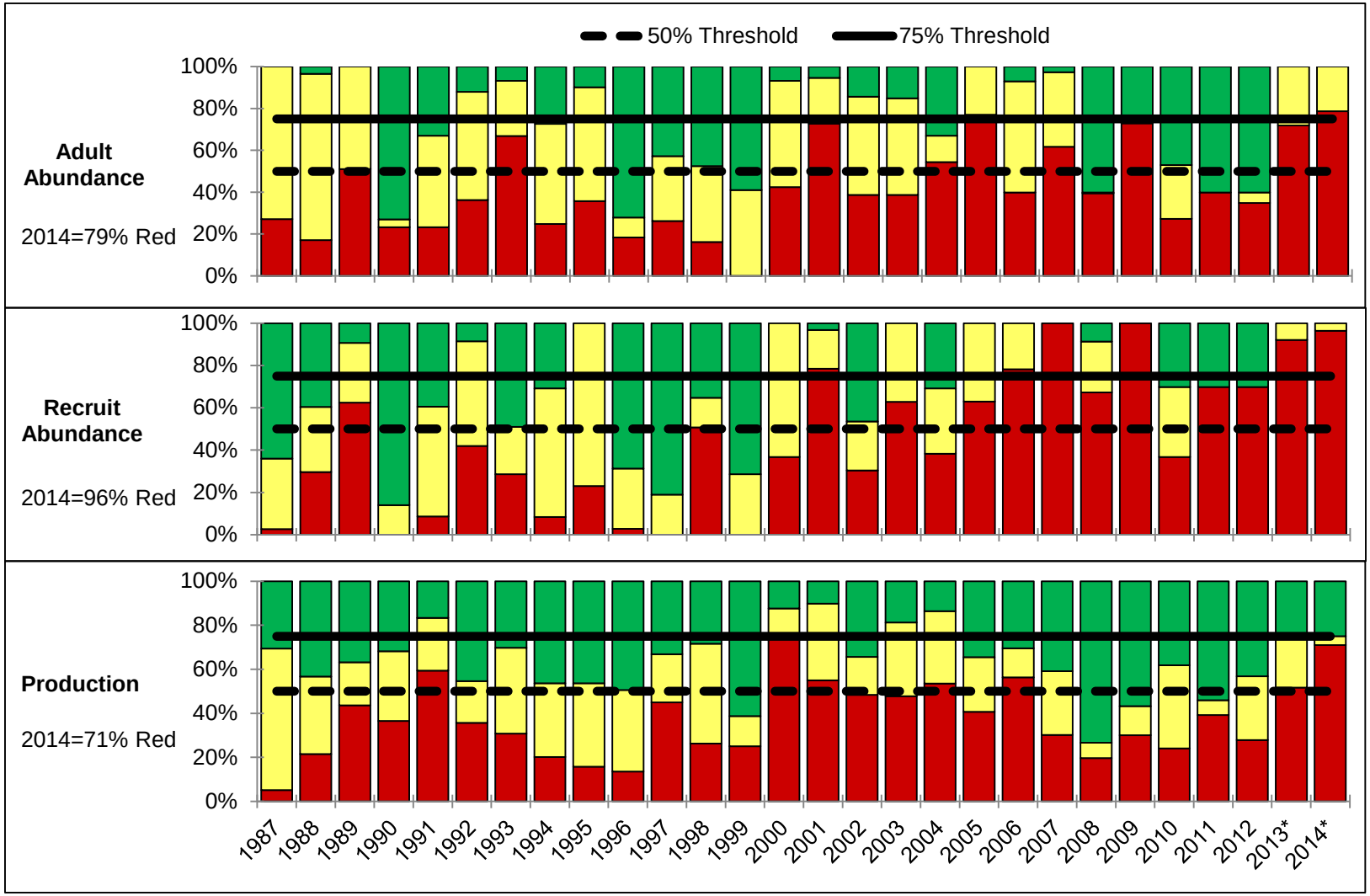


Figure 11. Blue Crab Traffic Light indicators for the adult abundance, recruit abundance, and production characteristics, 1987-2014. The dashed line represents the second quartile (50%) moderate management trigger and the solid line represents the third quartile (75%) elevated management trigger relative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

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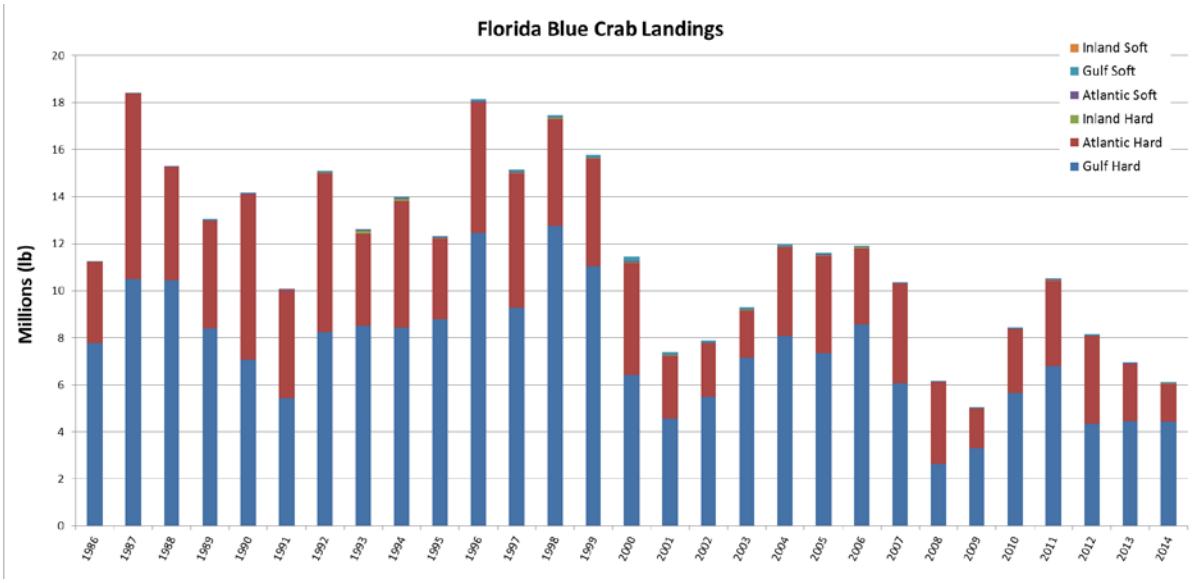
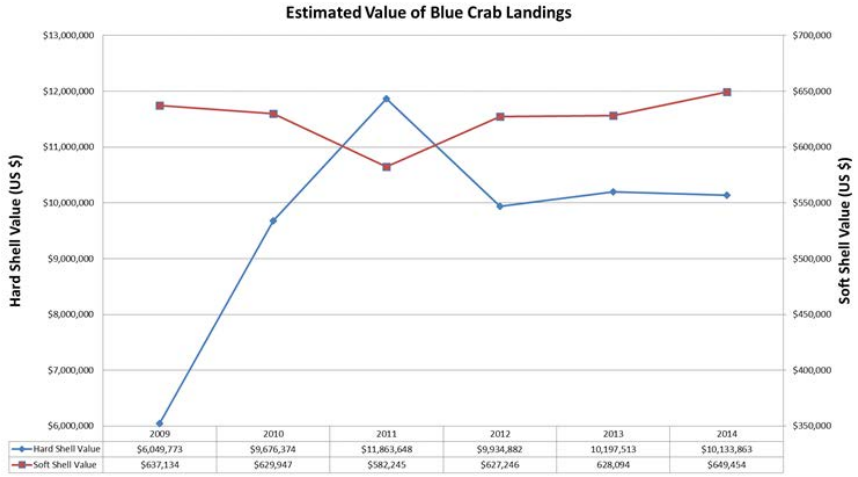


Figure 1. Florida Blue Crab Landings. Data obtained from Florida Fish and Wildlife Marine Fisheries Information System.



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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.

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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.

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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.

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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.
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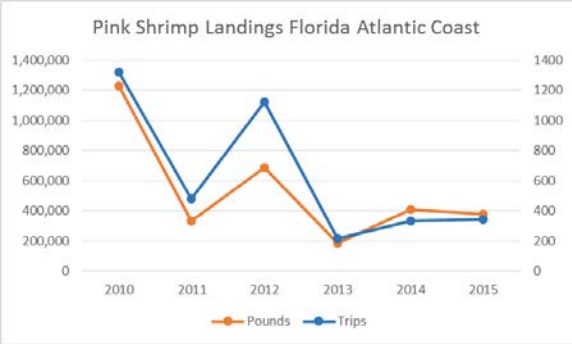

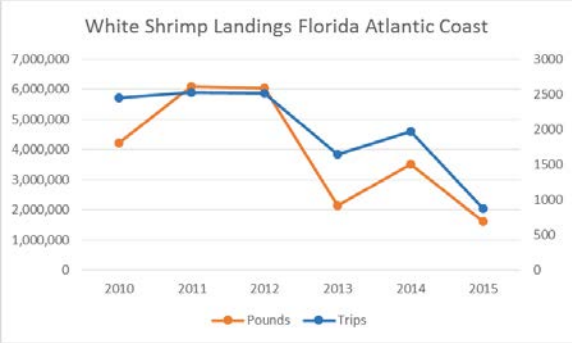

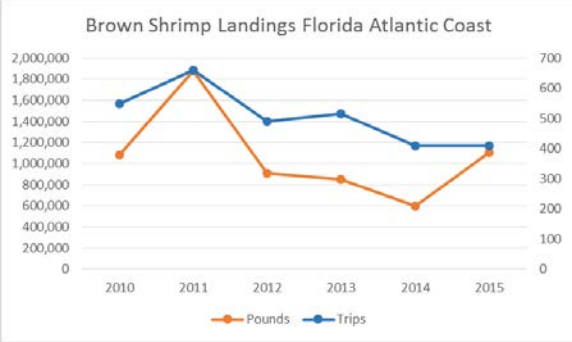

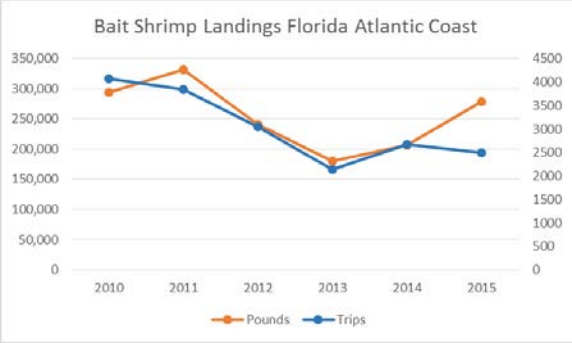

GSMFC CRAB SUBCOMMITTEE REPORT November 2015

Florida Report

SEAMAP-South Atlantic Crustacean Workgroup/ GSMFC Crab Subcommittee November 2015

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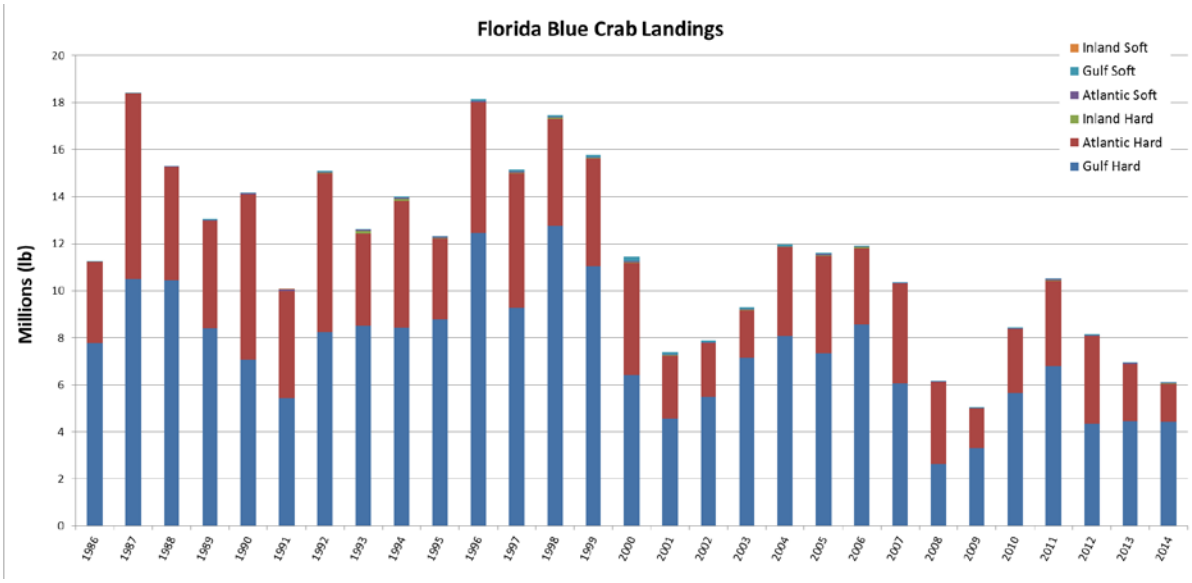

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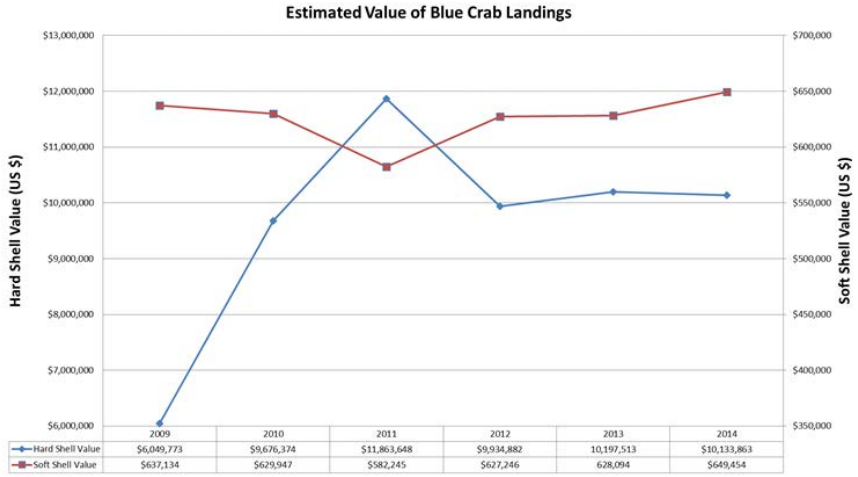

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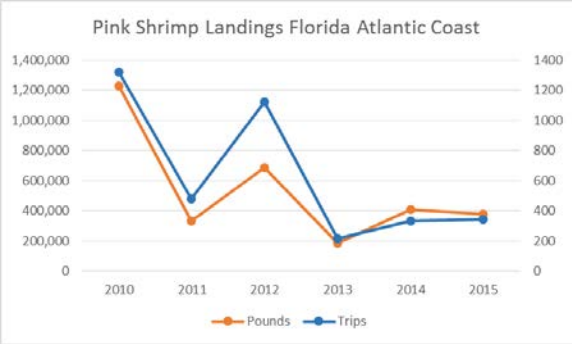

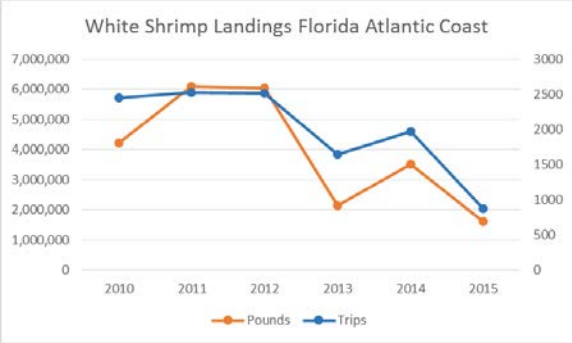

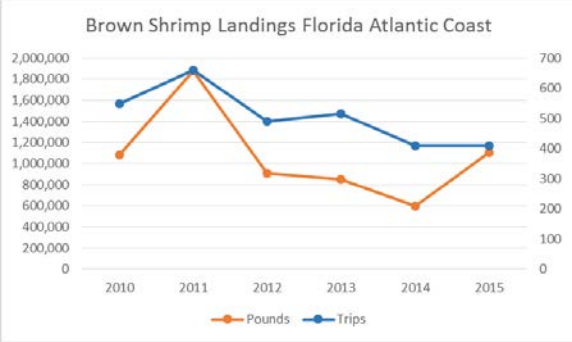

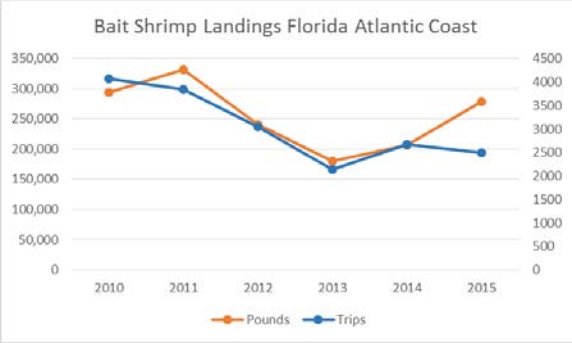

Alabama Blue Crab Report
Update October 2015

Alabama Blue Crab Landings and Values

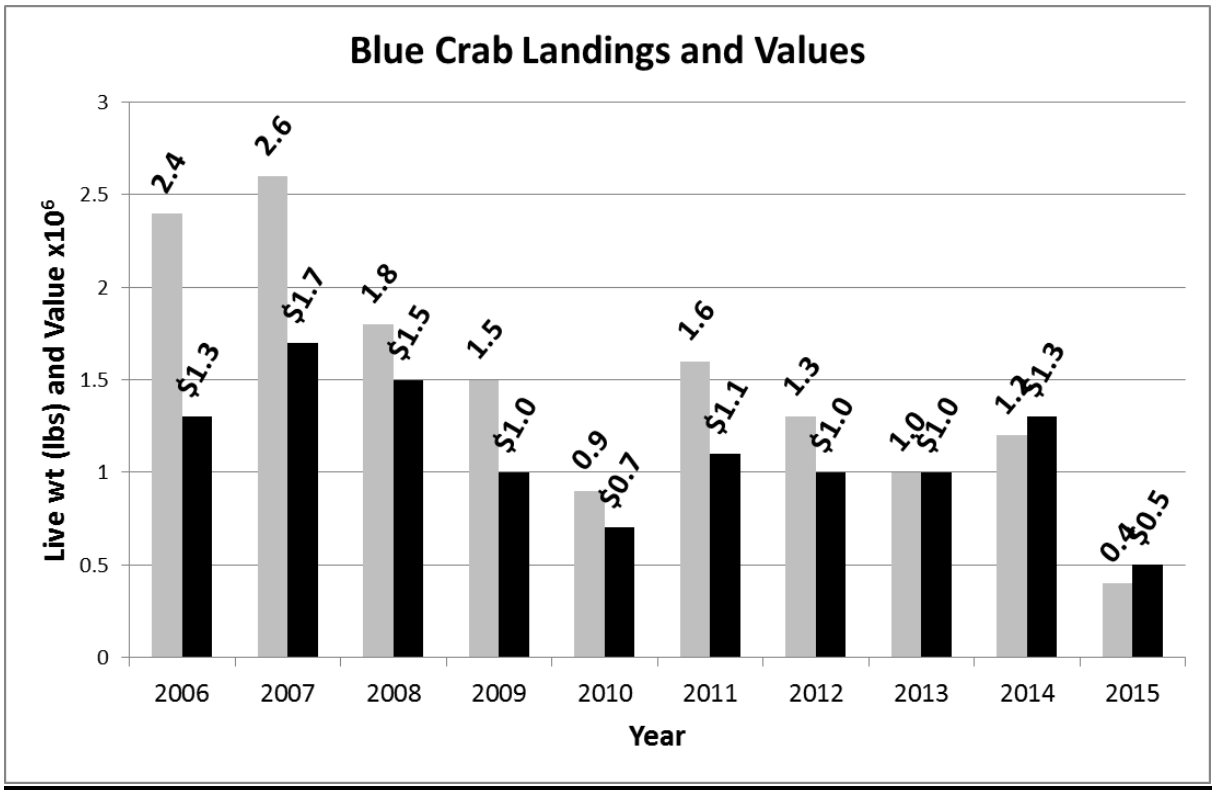

Figure 1. Alabama Commercial Blue Crab Landings from 2006-2015 for all Gear Types Reported via the Alabama Trip Ticket Program
2014 and 2015 Data is Preliminary & Subject to Change

Table 1. Number of Commercial Crabbing Trips made 2006 – 2015 Reported via the Alabama Trip Ticket Program
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Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Number of Trips	3,050	6,459	6,037	4,418	2,265	3,785	3,038	3,263	4,040	1,678

NFWF Fisheries and Ecosystem Monitoring Program: Commercial Blue Crab Surveys

With funding from the National Fish and Wildlife Foundation as part of a multifaceted fisheries and ecosystem monitoring program, the Alabama Marine Resources Division has begun collecting commercial blue crab catch data. AMRD biologists have participated in five observer trips on commercial blue crab harvesting vessels working in upper Mobile Bay and the Perdido and Wolf Bay waterways between June 16, and September 25, 2015.

All trips combined, 545 crab traps were sampled of a total of 1,226 fished and 3,038 individual blue crabs were sexed and measured. Use of escape rings and/or turtle excluder devices was recorded for each trap fished as well as on those sampled. External parasites and any abnormalities were noted. Bycatch was also recorded. Twenty crabs were randomly selected during each trip for a total of 100 and retained frozen for further measurement and analysis. These samples will be maintained frozen until they are processed at Marine Resources Base on Dauphin Island. This data will be used to generate sex ratios, size frequencies, crab maturity ratios, bycatch impact, catch per unit effort, and to determine if different types of fishing gear or gear modifications have a significant impact on blue crab harvest. Blue Crab observer trips will continue through 2019. AMRD biologist, will observe 24 commercial blue crab trips annually beginning in 2016.

Table 2. Blue Crab Observer Trips Summarized

Date	Location	Traps Sampled	Traps Fished	Crabs Sampled
6/16/2015	Upper Mobile Bay	132	345	762
7/15/2015	Perdido/Wolf Bay	95	173	392
8/28/2015	Perdido/Wolf Bay	125	140	425
9/11/2015	Upper Mobile Bay	65	423	900
9/25/2015	Perdido/Wolf Bay	128	145	560

Figure 2: Blue Crab Surveys, Upper Mobile Bay, June 16 and September 11, 2015

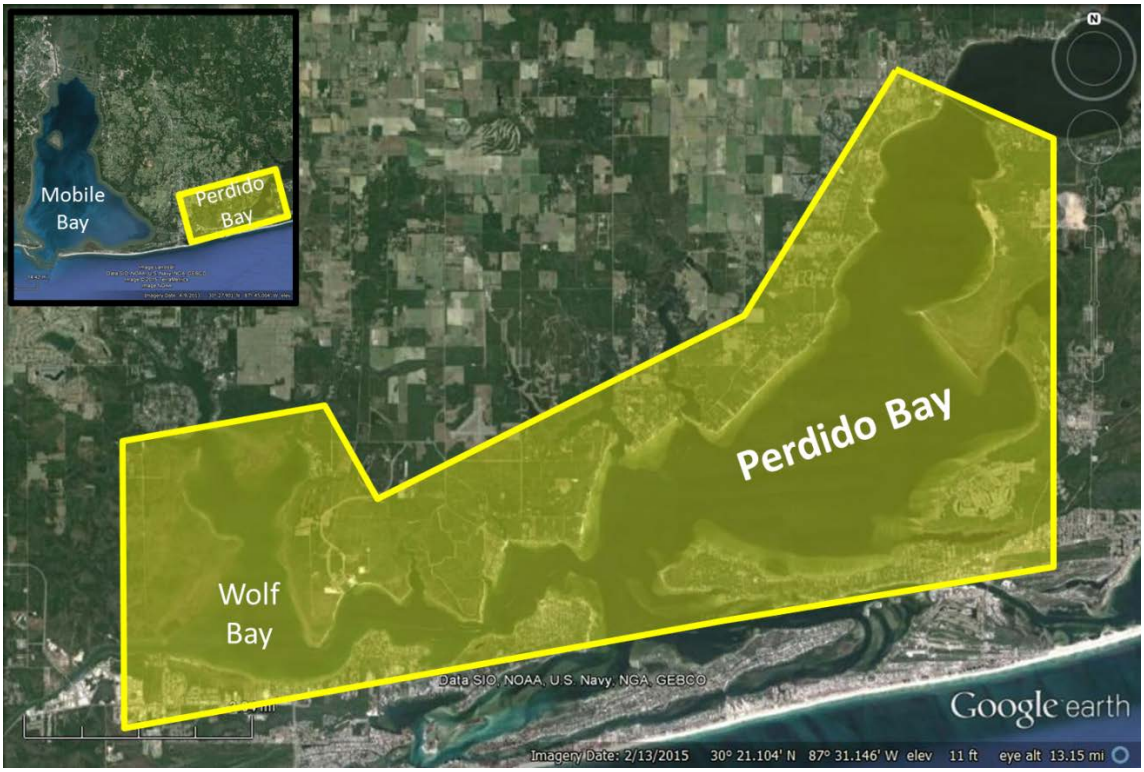

Figure 3. Blue Crab Surveys, Perdido to Wolf Bay, July 15, August 8, and September 25, 2015

Alabama Derelict Crab Trap Recovery

Upon visual inspection of the main derelict crab trap removal sites, initial counts of derelict traps may warrant organizing a volunteer removal program in the Spring of 2016. As of the date of this report, a volunteer removal event has not been finalized. Additional counts will be made to make the final determination. Our last removal occurred in March of 2010.

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Mississippi Report
November 2015

Mississippi Crab Fishery Report - MDMR
GSMFC Crab Subcommittee
November 2015

Abstract

Commercial crab license sales for 2014 were slightly lower than 2013; however recreational license sales greatly exceeded those from previous years. Total Blue Crab landings for Mississippi in 2014 were 580,197 pounds with a dockside value of $954, 977. Landings are still below the 10 year average, but through preliminary data, appear as if they are improving. Average dockside value of Blue Crabs continued to increase through 2014 and is currently at a historic high of $1.83 per pound. The Mississippi Derelict Crab Trap Removal Program has removed over 19,000 traps since its inception in 1999. The MDMR is currently examining the recreational blue crab fishery through a fishery independent catch-per-unit-effort (CPUE) project. Preliminary results from September 2014 – September 2015 show the highest CPUE in the Pascagoula River system and the lowest in the Bay of St. Louis. The Mississippi Department of Marine Resources (MDMR) recently received a NOAA Fisheries Disaster Recovery Grant for the 2011 opening of the Bonnet Carré spillway which caused damage to the state's crab and oyster fisheries. Projects to be funded through this grant will include: Commercial and Recreational Blue Crab CPUE, Recruitment and Habitat Needs, Red Drum Predation on Juvenile Blue Crabs, Shorelines Initiative to Enhance Crab Habitat, and Crab Trap Bycatch Reduction Voluntary Program.

Licenses

Through October 2015, resident commercial license sales are down from 149 in 14-15 season to 138 for the 15-16 season. (Figure 1) All other crab licenses are down as well: non-resident commercial at 15, non-resident recreational at 66, and crab trawl license for shrimpers at 68. Resident recreational licenses are also lower down from 705 in 2014 to 607 so far for 2015. These numbers are preliminary as the commercial license season will run through April 30, 2016 and the recreational license is valid one year from date of purchase.

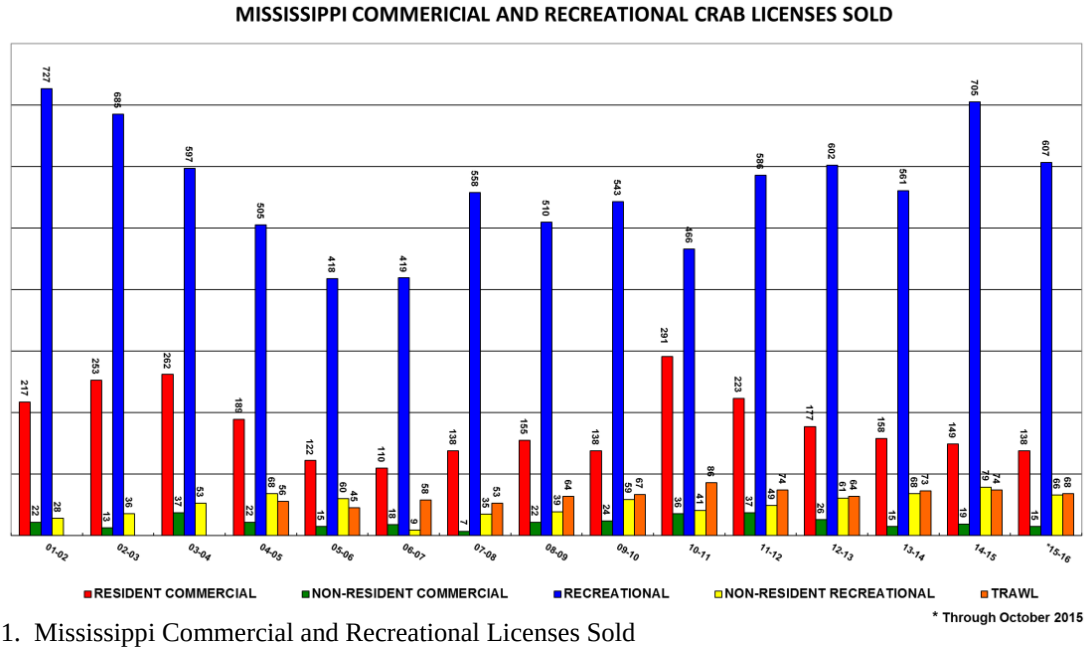

Figure 1. Mississippi Commercial and Recreational Licenses Sold

Landings

Preliminary data through August 2015 show 512,438 pounds of blue crabs landed in Mississippi with a dockside value of $937,087 (Figure 2). Total landings for 2014 were 580,197 pounds with a dockside value of $954, 977. The price of crabs continues to rise with a historically high average of $1.83/lb. through August 2015, up from $1.64/lb. for all of 2014. Since 2004, the average landings and value, excluding 2010 (Deepwater Horizon Oil Spill) are 627,856 pounds and $626.845 respectively.

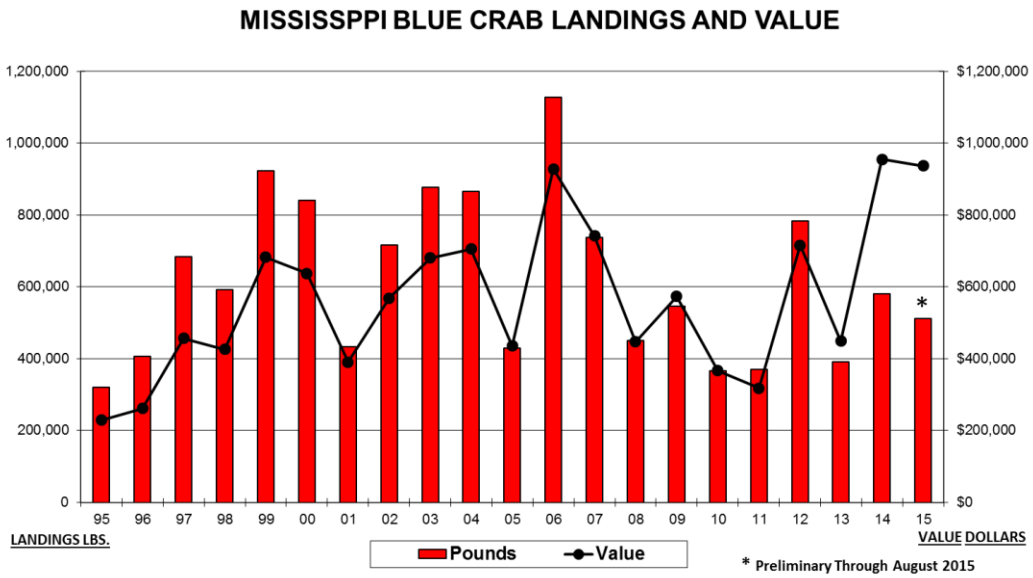

Figure 2. Mississippi Blue Crab Landings and Value

Derelict Crab Traps

MDMR continues to monitor derelict crab traps in coastal areas and utilizing staff effort, has removed 72 derelict traps through 2015. There are plans to have a cleanup involving Mississippi resident commercial crab fishermen in early 2016 applying funds from the NOAA Bonnet Carré Fisheries Disaster Grant. Over 19,000 derelict traps have been removed and recycled through commercial fishermen and volunteers since 1999.

Recreational Fishery Independent CPUE Project

To assess the overall health of the Blue Crab stock in Mississippi, the Office of Marine Fisheries is currently conducting a multi-year fishery independent survey to gather data in the recreational zones of Mississippi's three major bay systems: The Pascagoula River system, the Back Bay of Biloxi, and the Bay of St. Louis.

Preliminary results of the data collected for the period September 2014 to September 2015 were analyzed for harvestable crabs (carapace width > 125mm and not sponged). Total CPUE varied throughout the year with the Pascagoula River systems yielding a higher average CPUE and the Bay of St. Louis producing the lowest average CUPE (Figure 3). As expected, the sexual composition in these lower salinity areas ranged from 64-85% male with very few sponged females noted in the samples.

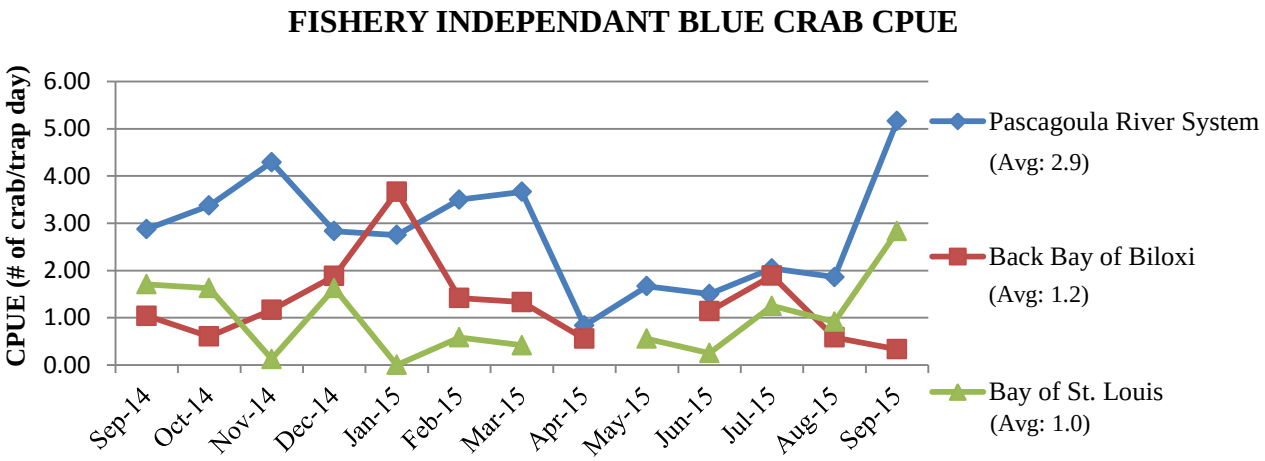

Figure 3. Distribution of CPUE (>125mm) Sept. 2014 - Sept. 2015

Bonnet Carré Disaster Funding

In May of 2015, the MDMR was awarded a $10.9 million NOAA Fishereis Disaster Grant entitiled *Mississippi Bonnet Carré Fisheries Disaster Recovery Program for the Oyster and Blue Crab Fisheries*. The projects desginated for the blue crab fishery will be carried out by the MDMR Office of Marine Fisheries, the Gulf Coast Research Lab (GCRL), and the assistance of Mississpi's commerical crab fishermen.
Projects include:

A) The *Commercial and Recreational Blue Crab CPUE.* These projects will examine the factors influencing Blue Crab production and will provide stock assessment information necessary for evaluation of the overall status of the stocks and management of the Blue Crab fishery in Mississippi.
B) *Red Drum Predation on Juvenile Blue Crabs.* Some past restoration efforts have focused on habitat loss, but in order to fully restore the fishery, all aspects need to be addressed, including emerging predation patterns. It has been well documented that decapod crustaceans are a primary food source for fishes from the drum family, Sciaenadae, including Red Drum (*Scieanops ocellatus*). The project will aim to provide data on the current foraging habits, as related to blue crabs, of these fishes in the Mississippi Sound and associated tributaries.
C) *Blue Crab Life History – Recruitment and Habitat Needs.* Through placing emphasis on early life history stages, this project will provide needed information on recruitment dynamics of this important species and will supply information on habitat requirements through expanded current cooperative transect sampling.
D) *Shorelines Initiative to Enhance Crab Habitat.* This project will coordinate with Mississippi resident commercial crab fishermen to collect marine debris (including derelict crab traps) to enhance crab nursery habitat, evaluate invasive species abundance, and assist in various shoreline enhancement projects.
E) *Crab Trap Bycatch Reduction Voluntary Program*. The MDMR plans to target recreational crabbers by distributing Terrapin Excluder Devices (TEDs) free of charge at the point of contact where licenses are sold. Escape rings and TEDs will also be available to commercial fishermen as needed.

LOUISIANA
FALL 2015

LOUISIANA DEPARTMENT OF WILDLIFE AND FISHERIES
FALL 2015 GSMFC CRAB SUBCOMMITTEE REPORT

Executive Summary:

Louisiana's blue crab fishery is an open access fishery. There is an apprenticeship/sponsorship program that is required for new commercial crabbers in order to receive their gear license. This program was developed to increase the professionalism of commercial crabbers in the industry. Legislation passed in early 2015 increased the resident license fees from $35 to $50. The five year average of crab landings (2010-2014) in Louisiana were 40.7 M pounds worth an average of $46 M. In 2014, landings were just above the five year average at 40.7 M pounds worth $67 M, a record high. There has been a push from the industry to reduce the effort that exists currently. Several options have been discussed including trap limits, license moratoriums, increasing license fees and seasons. Work on a crab trap bycatch study was completed in June of 2015 and data are being analyzed currently.

Derelict Crab Trap Removal Program:

In September, the Louisiana Wildlife and Fisheries Commission adopted a notice of intent that targets three different coastal areas for derelict crab trap cleanups. The first closure will take place in the Lake Pontchartrain Basin from 6:00 a.m. February 12 through 6:00 a.m. February 21, 2016. The second closure will take place in the Barataria Basin from 6 a.m. February 19 through 6 a.m. February 28, 2016. The first two closures will have public cleanups associated with them. The third closure will take place in Sabine Lake from 6 a.m. February 19 through February 28, 2016. A large section of Sabine Lake and surrounding areas were closed during February 2015, however, wind during the public cleanup limited access to Sabine Lake itself. The Louisiana side of Sabine Lake (and only the Lake) will be closed to allow the cleanup taking place in Texas to clean the entire lake.

LDWF was also awarded a NOAA Marine Debris Removal grant in July. The project targets derelict crab traps in two of the state's basins, the Lake Pontchartrain basin and the Barataria-Terrebonne basin. Side-scan sonar is being used to identify derelict crab traps in selected bodies of water. The traps will be retrieved and disposed of, or recycled if possible. After cleaning the derelict traps from the water bodies, areas will be rescanned to find a rate of repopulation. Biological data of bycatch will be collected from the derelict traps as well.

Table 1. Annual derelict crab trap closure areas, dates, and trap totals.

2004	Upper Terrebonne Bay Estuary	2/28-3/14	6,676
	W. Vermilion Bay	5/14-5/22	218
	2004 TOTAL		**6,894**
2005	Sabine Lake	2/18-2/27	4
	Breton Sound Estuary	2/26-3/13	1,941
	Middle Terrebonne Bay Estuary	3/5-3/20	2,437
	E. Vermilion Bay / West Cote Blanche Bay	5/16-5/22	241
	2005 TOTAL		**4,623**
2006	SW Terrebonne Bay Estuary	3/4-3/13	**2,935**
2007	E. Lake Pontchartrain	2/24-3/5	774
	Upper Barataria Bay Estuary	3/3-3/12	724

	2007 TOTAL		**1,498**
2008	Upper Terrebonne Bay Estuary	2/23-3/2	**1,234**
2009	Terrebonne Bay Estuary	N/A	**788**
2010	Upper Barataria Bay Estuary	2/27-3/7	**477**
2011	Western Plaquemines Parish	2/26-3/5	**1,100**
2012	St. Bernard/Plaquemines Parish	2/25-3/5	1,961
	Terrebonne Parish	3/17-3/26	747
	2012 Total		**2,708**
2013	Plaquemines Parish	2/16-2/25	492
	St. Bernard Parish	3/9-3/18	411
	2013 Total		**903**
2014	Western Terrebonne Parish	2/15-2/24	**1,063**
2015	Sabine Lake	2/21-3/1	**422**
2004-2015	**OVERALL**		**24,645**

Crab Legislation:

Act 303 of the 2015 Louisiana legislative session raised the fee of a Commercial Crab Trap Gear License from $35 to $50 for residents and for non-residents, $140 to $200. Of those fees, for resident licenses $5 will go to the crab promotion fund and $5 to the derelict crab trap clean-up fund.

Louisiana Crab Task Force:

The Louisiana Crab Task Force met on July 21, September 22 and October 8 and reviewed information on crab trap and licensing regulations and management options. Discussion items included changes to the fisheries forward commercial crab trap gear requirements, gear license fee increases, trap limits, license moratoriums and harvest of prepubertal female crabs. The Task Force took action and created legislation to impose a moratorium on crab trap gear licenses. Many of the task force members indicate that there is "too much wire in the water" and that the moratorium would be the first step in reducing effort in the crab industry.

Louisiana Blue Crab Fishery Certification:

LDWF in cooperation with the Audubon Nature Institute's Gulf United For Lasting Fisheries Program (G.U.L.F.) is pursuing certification of the blue crab fishery through a third party certification program. The purpose of the G.U.L.F. Certification Program is to provide US Gulf State fisheries with a 'Certification of Responsible Fisheries Management for lasting use" to an internationally recognized standard and based on the FAO' s Ecolabelling Guidelines of fish and fishery products from Marine and Inland capture fisheries and the 1995 UN FAO Code of Conduct for Responsible Fisheries. LDWF continues to work with Global Trust and address some of the nonconformance issues that arose during the site visit in February.

Louisiana Blue Crab Bycatch Study:

Work was completed on a survey designed to collect and analyze data on incidental bycatch in the Louisiana crab trap fishery with special emphasis on diamond back terrapins (*Malaclemys*

terrapin) and to collect and analyze blue crab sex, stage and size frequency distribution. From December 2012 through June 2015, a total of 8,496 trap sets were made. Thirty-seven species of finfish and invertebrates were captured and documented as bycatch in sampling events conducted coastwide, including 12 diamondback terrapins; five in the Barataria basin, three in the Terrebonne basin, three in the Vermilion/Teche River basin and one in the Pontchartrain basin. In comparison of total blue crab catch (16,293) with total bycatch (1,732), an average of 9.4 crabs were captured with each bycatch individual. The Pontchartrain Basin accounted for the highest crab catch among basins, and the Terrebonne Basin led all in blue crab catch rate, averaging 1.44 crabs per trap soak hour. The Terrebonne Basin accounted for highest bycatch number; the percentage of bycatch to total catch (15.6 percent) ranked highest followed by the Barataria Basin (11.7 percent), Vermilion Basin (9.7 percent) and Pontchartrain Basin (6.9 percent). The Sabine River Basin had the lowest bycatch number as well as the lowest percentage of bycatch to blue crab catch (4.4 percent) among all basins.

Louisiana Blue Crab Landings:

Preliminary 2015 LDWF trip ticket data through June indicate that approximately 17.7 million pounds of blue crab have been landed in Louisiana with a dockside value of just under $32 million. Louisiana blue crab landings in 2013 were 38 million and valued at $51 million, an all-time dockside value record at the time. Landings for 2014 soared past 2013 values with 43 million pounds landed worth $67 million.

Texas Report
November 2015

Texas State Report – TCC Crab Subcommittee November 2015

1) **Commercial landings for 2015** (so far this year) equal 2,097,611 pounds. This hasn't exceeded last year's 2,234,447 pounds yet, but we are expecting it to given the large amount of rainfall seen this year. The average ex-vessel price reported by dealers this year was $1.71 per pound, up slightly from last year's all time high of $1.69.
2) **Commercial Crab Fishermen License** buybacks continued, but only one license was bought back during this 2014-15 license year. This leaves 177 active commercial crab licenses available in the fishery, a 38% reduction in licenses since Limited Entry began in 1999.
3) **Fishery Independent Monitoring** bay trawl catch per hour of blue crabs for the months January through July shows an almost doubling of abundance in 2015 over the previous year. Catch rates rose from 4.21 per hour in 2014 to 8.01 in 2015 (Figure 1).
4) **Abandoned Crab Trap Removal Program** is tentatively planned for February 19-28, 2016, during which the fishery will be closed for 10 days.
5) **Blue crab research** (Olsen et al., in press) logistic regression revealed that coastwide size at maturity was negatively impacted by salinity and positively impacted by temperature. More specifically the model revealed that at 25°C, size at 50% maturity was 129 mm at 0 ppt, 118 mm at 10 ppt, 108 mm at 20 ppt, and 97 mm at 30 ppt. At 20 ppt, size at 50 % maturity was 102 mm at 10°C, 106 at 20°C, and 109 at 30°C. Size at maturity was found to vary substantially among bay systems in addition to the relationship between environmental parameters and highly plastic in terms of size at maturity. Coupled with regional decadal declines in Blue Crab populations, these results should justify conservative regulation by state management agencies in terms of spawner protection whether by increased minimum size, spatial and temporal fishery closures, or other means.
6) **Proposed regulation changes** to protect female crabs were again introduced at the Annual Regulation and Coastal Fisheries Biologist meeting this year by Art Morris. However, action to move forward on any proposals was tabled due to there being insufficient data and research to support the viably of these measures. To address this, Coastal Fisheries biologists (Glen Sutton, Tom Wagner, and Zach Olsen) are putting together an Ecopath model to assess the feasibility of various proposed management actions. This type of modeling exercise is well suited for testing management options because it includes predator prey interactions and environmental effects. The proposed regulatory options being analyzed are as follows:

- Prohibit take of mature females seasonally (April – June)
- Increase escape ring size from $2\frac{3}{8}$" to $2\frac{7}{16}$"
- Seasonal Area Closures (April – June/areas to be determined)
- Reduce trap limit to 150
- Increase size limit on females to 5 ½ inches (for females)

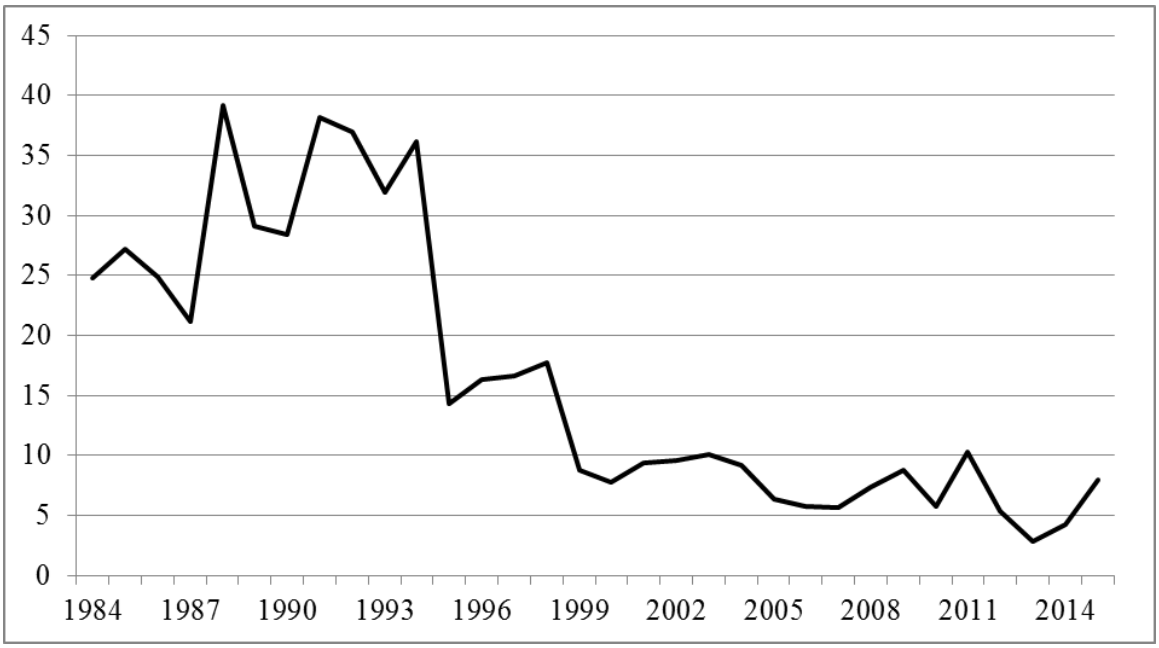

Figure 1: Coastwide trawl catch-per-hour of blue crabs in Texas for the months January through July each year.

Citation:

Regional and Temporal Variation in Size at Maturity of Female Blue Crabs (*Callinectes sapidus*) in Texas Coastal Waters (Olsen, Z, Wagner, T, and Sutton G. In press)