BLUE CRAB, *Callinectes sapidus*

Life History

In the United States the blue crab (*Callinectes sapidus*) ranges from Maine to the Gulf of Mexico and are most common from Cape Cod, Massachusetts to the most southern end of Texas. Blue crabs occur regularly in waters where peak temperatures reach at least 68 degrees Fahrenheit. The blue crab is common to all North Carolina coastal waters, but most reside in the Albemarle and Pamlico sounds and their tributaries. Blue crabs mature at approximately 12 to 18 months of age and have an average lifespan of three years with some living as long as eight years. Mating occurs in brackish areas of the estuary and lower portions of the rivers from late spring to early fall, and spawning occurs in high-salinity waters near the ocean inlets from early summer to fall. The first larval stage is carried offshore by ocean currents where they undergo several stages of development. Settlement of larval blue crabs occurs in the estuaries after winds and tides transport them through the inlets from the ocean. Once within the estuary, larval blue crabs settle in beds of submerged aquatic vegetation and other complex habitats, like salt marsh and oyster shell, where they become juvenile blue crabs. Juvenile blue crabs gradually migrate to lower salinity waters in the upper estuaries and rivers to grow (molt) and mature. Molting is a process of growth in blue crabs that requires shedding the hard exoskeleton (shell). Following each molt the shell is soft for several hours until it hardens, during this time the crab is

more vulnerable to predators. Juvenile and adult blue crabs typically eat what is available to them such as dead and live fish, crabs, shrimp, and shellfish and serve as food for predator species such as striped bass and red drum.

Male and female blue crabs are easily identified by the shape of the apron (flap) on their abdomen. A mature male crab is called a "jimmy" and is easily recognized by the blue shading on his shell and claws and T-shaped apron on its underside. Female crabs are either called "sooks" as adults or "she-crabs" when immature. The immature female apron is triangular-shaped and held tightly against the abdomen. The mature female's apron becomes rounded and can be easily pulled away from the body after the final molt. The "sponge crab" is a female that has an egg mass on her abdomen. To see drawings of these differences, click here.

Fisheries

Blue crabs support North Carolina's most valuable commercial fishery, which harvested, on average, over 27 million pounds valued at over $26 million annually from 2007-2016 (Figure 1). Blue crabs are harvested and sold in three main market categories: hard, peeler, and soft crabs. Hard crabs account for over 95 percent of the annual blue crab harvest (Figure 2). The Albemarle and Pamlico sounds (and their tributaries) are the two largest producers of blue crabs, accounting for over 90 percent of the total landings and dockside value since 2007. Blue crabs are harvested every month of the year; however, roughly 88 percent of all blue crabs are harvested from May through October. The crab pot, crab trawl, and peeler pot are the major gears used in the fishery. Over time, crab pots have become the preferred gear to catch hard crabs.

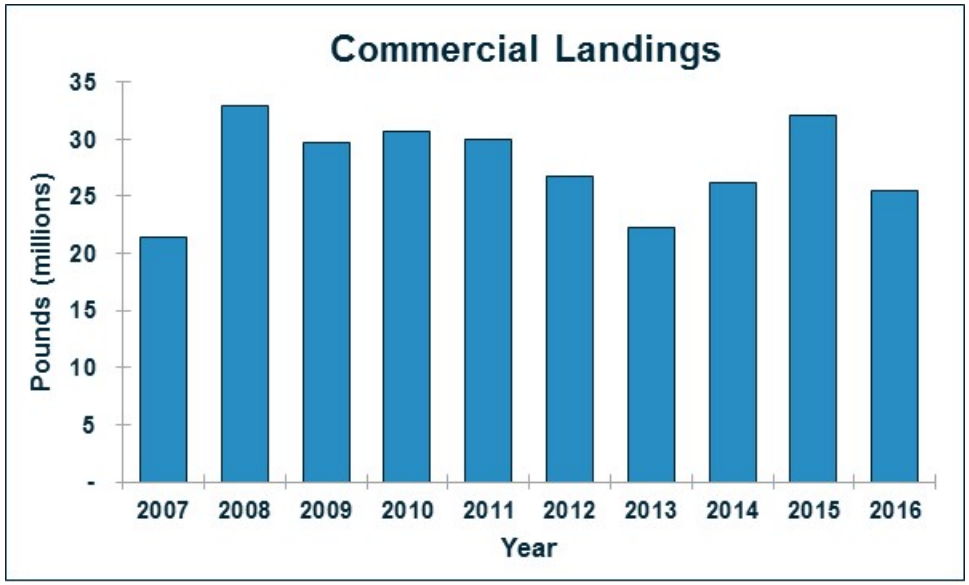

Figure 1. Annual commercial landings of blue crab in North Carolina, 2007-2016.

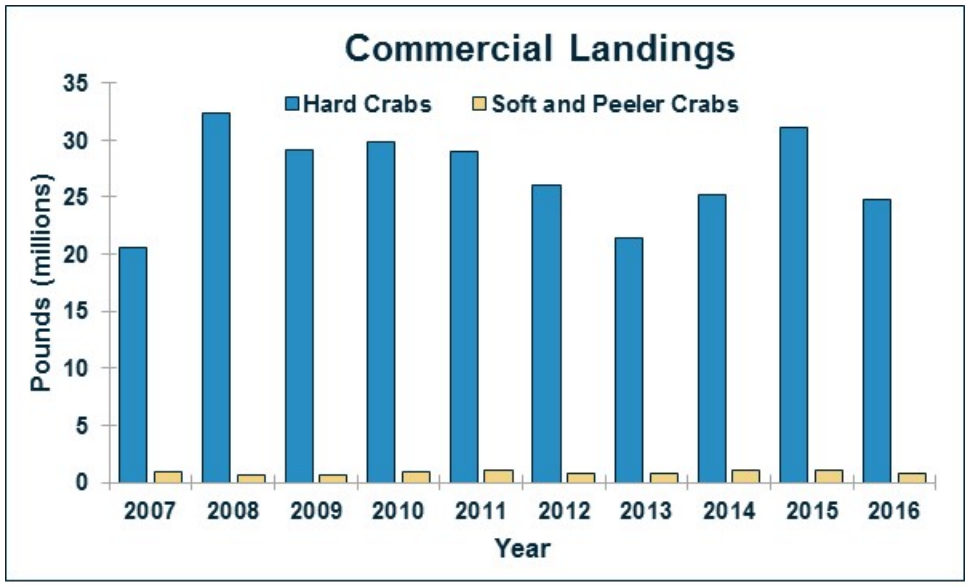

Figure 2. Annual commercial landings of blue crab in North Carolina by market category, 2007-2016.

The Marine Recreational Information Program is primarily designed to sample anglers who use rod and reel as the mode of capture. Since blue crab are also harvested recreationally throughout coastal North Carolina, primarily by pots, this program does not provide precise estimates of recreational harvest. To address this, the division began surveying Coastal Recreational Fishing License holders in the fall of 2010 to estimate recreational blue crab harvest. Since 2011, annual blue crab recreational harvest has averaged 97,774 crabs (approximately 32,591 pounds). Release numbers have been slightly lower, averaging 72,103 crabs (approximately 24,034 pounds) annually (Figure 3).

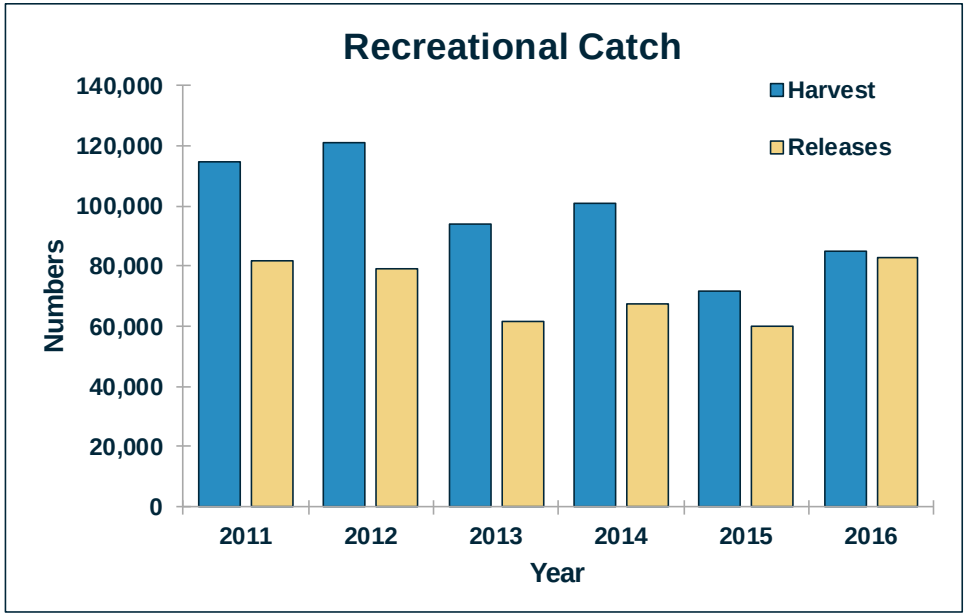

Figure 3. Annual recreational catch of blue crab in North Carolina, 2011-2016.

Management

The N.C. Marine Fisheries Commission adopted a Blue Crab Fishery Management Plan in 1998. Amendment 1 to the Blue Crab Fishery Management Plan, adopted in 2004, implemented several management changes including establishing a 6.75-inch maximum size limit for mature females and a 5 ¼-inch maximum size limit for female peeler crabs from Sept. 1 through April 30 if the spawner index fell below the threshold for two consecutive years. Amendment 2, adopted in 2013, modified management by repealing the spawner index trigger and replacing it with an adaptive management framework based on annual updates of the Traffic Light stock assessment. The May 2016 Revision to Amendment 2 to the Blue Crab Fishery Management Plan implemented additional management measures in response to the 2016 update of the Traffic Light stock assessment. These measures included: 1) requiring a third escape ring with specific placement requirements in crab pots, 2) eliminating the harvest of immature female hard crabs, 3) eliminating the harvest of brown and black sponge crabs during the month of April, 4) lowering the cull tolerance from 10 to 5 percent, and 5) eliminating the directed harvest of crabs with dredges.

Stock Status Overview

An adaptive management framework is used to manage blue crab in North Carolina that requires annual evaluation of the Traffic Light stock assessment, which consists of three biological indicators: adult abundance, recruit abundance, and production (reflects the status of the stock with respect to growth, survival, maturity, and reproductive potential). If the adult abundance or production indicators meet pre-determined thresholds, management changes are required. The annual update combines a variety of information to provide a description of the stock condition. Results of the annual Traffic Light updated with 2016 data indicate the North Carolina blue crab stock is not overfished (the number of blue crabs in the population is not too low). The overfishing status (rate of blue crabs being removed from the population from fishing) cannot be determined because data are insufficient for estimating reliable fishing mortality rates (measures the rate of removal of blue crabs from the population). The annual evaluation in 2016 found that a management threshold was exceeded for the adult abundance indicator and stricter management measures were enacted in June 2016 and will continue based on the 2017 update. North Carolina's blue crab stock continues to be listed as "Concern" because results of the annual Traffic Light update continue to show decreased adult abundance in the blue crab stock for the fourth year in a row.

Division staff conduct sampling of juvenile and adult blue crabs using several surveys throughout the state. Each of these surveys provide input into the annual Traffic Light update. The Pamlico Sound Survey is a trawl survey that provides both juvenile and adult abundance indices for blue crab. One juvenile index comes from the June cruise and is highly variable with both high and low abundance occurring in recent years, of note is the large peak in 2010 (Figure 4). The adult abundance index comes from the September cruise. As in the juvenile index, the adult index varies annually (Figure 5).

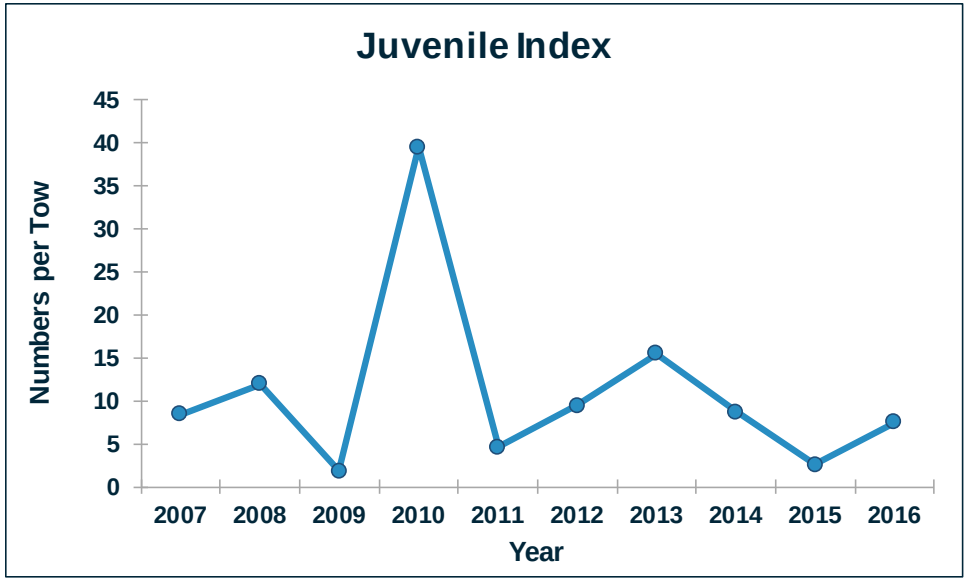

Figure 4. June annual index of relative juvenile abundance of blue crab in the Pamlico Sound Survey, 2007-2016.

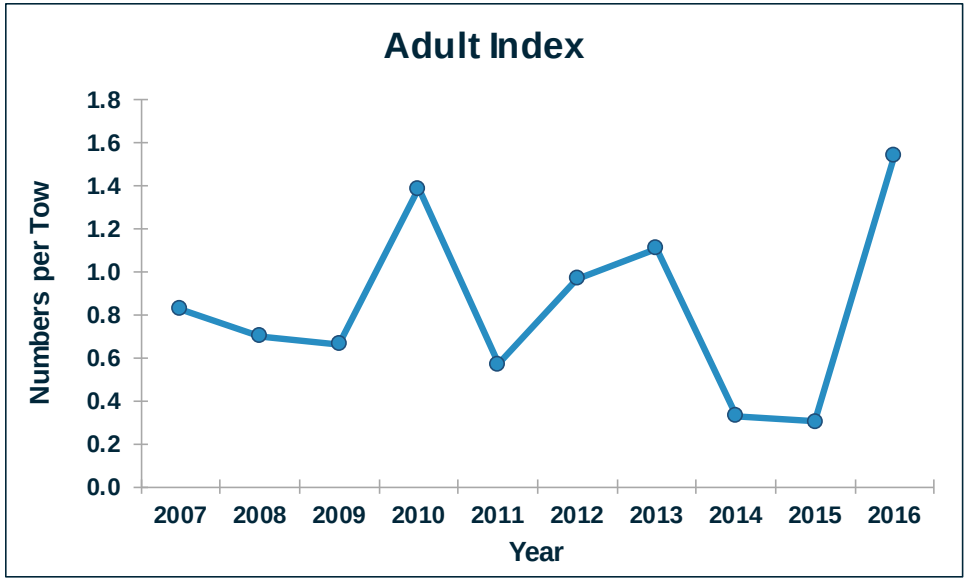

Figure 5. September annual index of relative adult abundance of blue crab in the Pamlico Sound Survey, 2007-2016.

Research Needs

Research needs include expanding the spatial and temporal coverage of division monitoring programs, improving recreational harvest estimates, implementing a statewide monitoring program designed specifically for blue crab, and exploring the utility of spatial analysis methods in assessing the blue crab stock.

Links

Management Agencies
North Carolina Division of Marine Fisheries

Fishery Management Plans, Amendments, Revisions, & Supplements
North Carolina Fishery Management Plan

Contacts
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