# South Carolina
# Horseshoe Crab Fishery and Management Program
# Compliance Report for the Year 2011

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## I. Introduction

South Carolina's management program to conserve and protect horseshoe crabs (HSC), *Limulus polyphemus,* began in the late 1980s. In 1991 state law (Code of Laws of South Carolina, Title 50, Chapter 5, Article and Section 1330) stopped the commercial harvest for any bait use in South Carolina. The South Carolina Department of Natural Resource's Marine Resources Division (MRD) issues permits which are required to collect or possess even parts for commercial, educational, and private purposes. All HSC landed in South Carolina waters by licensed commercial saltwater fishermen are hand harvested and utilized exclusively for Limulus Amebocyte Lysate (LAL) production. Not only are those used returned promptly to state waters, any taken incidentally during other commercial fishing operations must be released immediately without further harm. By law, only five HSC per permit can be taken for research and science instruction; consequently, extremely small numbers have been sacrificed for these purposes since 1991.

The MRD's Office of Fisheries Management (OFM) monitors annual processing of horseshoe crabs by the sole biomedical facility presently operating in state, Charles River Endosafe (CRE) of Charleston. This facility has only three contracted permitted suppliers who coordinate, receive and deliver the crabs harvested by the individuals permitted to hand harvest from the wild; consequently, constraints in both Federal and South Carolina law prohibit the harvest information provided below from being made public except when required by order of a court of competent jurisdiction.

## II. Request for *de minimis*

According to Addendum 1 to the Horseshoe Crab Fishery Management Plan, a state may apply for *de minimis* status if for the last two years their combined average commercial landings (by numbers) constitute less than one percent of coastwise commercial landings for the same two-year period. Since South Carolina has no commercial harvest of HSC for purposes other than the biomedical use in LAL production, *de minimis* status is requested for the South Carolina HSC fishery.

## III. 2011 Fishery and Management Program

The ASMFC management plan requires that HSC used commercially be characterized yearly. OFM sampled at CRE eleven times, April through June, in 2011. After cleaning and preparation for bleeding, randomly selected individuals were measured and weighed. Females averaged 300.4 mm prosoma width and 3.37 kg total weight (N=210) (Table 1). Males averaged 233.1 mm prosoma width and 1.38 kg total weight (N=260) (Table 1). These averages are similar to previous years'. The SCDNR/MRD's Crustacean Monitoring Section (CMS) continues to collect fishery independent data on HSC in year-round trawl surveys. Females in 2011 averaged 258.6 ( $\pm$ 42.69) mm prosoma width and 2.53 ( $\pm$ 1.24) kg total weight (N=34), while males averaged 232.7 ( $\pm$16.91) mm prosoma width and 1.48 ( $\pm$.32) kg total weight (N=25). Juveniles averaged 157.5 ( $\pm$31.82) mm prosoma width and 0.61 ( $\pm$ 0.38) kg. total weight (N=2).

Catch per tow in the trawl survey was the lowest value since 1998 (Figure 1). This is the second consecutive year of relatively low catch rates. The sampling schedule was modified in 2011 to document cold winter effects on white shrimp, while still operating under budget constraints, as a result 20 fewer samples were collected during March-April 2011than in previous years. This time period is generally when the largest catches of HSC are made. Also lower than normal water temperatures early in 2011 could have contributed to our low catch rates. The ASMFC stock assessment completed in 2009 concluded that most surveys indicated an increasing trend in HSC abundance along the southeast coast, while no clear trend was observed for South Carolina. Given the increase in numbers of HSC being bled, the recent decline in sampling catches is worrisome, and warrants continued close monitoring.

The commercial hand harvest to supply the three business entities who supply CRE had 26 permitted participants in 2011 but only 18 were active. As before, no commercial trawl permits were issued because CRE refuses to accept animals caught by trawls due to the overall extent of injury. This year 12 permits were issued for educational purposes to the following primary and secondary schools and two public aquariums: Hilton Head Prep School, Bluffton Middle School, Hilton Head Island Elementary School, Hilton Head Island High School, Pritchardville Elementary School, Bluffton Middle School, Daufuskie Island Elementary School, St. Helena Elementary School, HE McCraken Middle School, Red Cedar Elementary School and The Charleston Aquarium and Ripley Aquarium.

## IV. Planned Management Programs

There are no plans to modify the existing state law as it pertains to horseshoe crabs. Permitting will continue to be necessary for any collecting and reporting requirements for those commercial fishermen permitted are mandatory. MRD will continue to collect prosomal width, weight, and sex data on horseshoe crabs caught in both the CMS trawl survey of estuaries and the OFM fishery dependent survey. Trawl data has been collected in five estuaries since 1995 and biomedical facility data from over 6,070 crabs since 2000.

Table 1. Summary of prosoma width (PW), weight and sex data recorded from subsamples of horseshoe crabs delivered to Charles River Lab in Charleston, SC between April and June 2011.

| All Data | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| PW | | | | | | | | | |
| Sex | Mean | StDev | SE | Median | Mode | Min | Max | Count | Days Sampled |
| All | 263.2234043 | 37.73297333 | 1.740492273 | 252.5 | 230 | 198 | 347 | 470 | 11 |
| M | 233.15 | 15.18574189 | 0.941779732 | 232 | 230 | 198 | 275 | 260 | 10 |
| F | 300.4571429 | 19.77675818 | 1.364725969 | 302 | 310 | 221 | 347 | 210 | 11 |
| Wt. kg | | | | | | | | | |
| Sex | Mean | StDev | SE | Median | Mode | Min | Max | Count | Days Sampled |
| All | 2.272978723 | 1.088010674 | 0.05018619 | 1.7 | 1.3 | 0.8 | 4.8 | 470 | 11 |
| M | 1.385384615 | 0.239887856 | 0.014877213 | 1.4 | 1.5 | 0.8 | 2 | 260 | 10 |
| F | 3.371904762 | 0.625778895 | 0.043182846 | 3.4 | 3.5 | 1.3 | 4.8 | 210 | 11 |
| April Data | | | | | | | | | |
| PW | | | | | | | | | |
| Sex | Mean | StDev | SE | Median | Mode | Min | Max | Count | Days Sampled |
| All | 243.3578947 | 27.73848843 | 2.845908865 | 238 | 225 | 198 | 340 | 95 | 4 |
| M | 235.3571429 | 16.11976476 | 1.758810528 | 235 | 225 | 198 | 275 | 84 | 4 |
| F | 304.4545455 | 20.78635916 | 6.2673231 | 305 | #N/A | 275 | 340 | 11 | 4 |
| Wt. kg | | | | | | | | | |
| Sex | Mean | StDev | SE | Median | Mode | Min | Max | Count | Days Sampled |
| All | 1.663157895 | 0.78402299 | 0.080439062 | 1.4 | 1.4 | 0.8 | 4.8 | 95 | 4 |
| M | 1.405952381 | 0.251430218 | 0.027433286 | 1.4 | 1.4 | 0.8 | 2 | 84 | 4 |
| F | 3.627272727 | 0.673930129 | 0.203197579 | 3.7 | 3.4 | 2.7 | 4.8 | 11 | 4 |
| May Data | | | | | | | | | |
| PW | | | | | | | | | |
| Sex | Mean | StDev | SE | Median | Mode | Min | Max | Count | Days Sampled |
| All | 278.1894737 | 36.43833516 | 2.643514676 | 290 | 300 | 200 | 340 | 190 | 6 |
| M | 233.2063492 | 16.41022373 | 2.067493855 | 232 | 230 | 200 | 273 | 63 | 5 |
| F | 300.503937 | 18.58736301 | 1.649361756 | 302 | 300 | 252 | 340 | 127 | 6 |
| Wt. kg | | | | | | | | | |
| Sex | Mean | StDev | SE | Median | Mode | Min | Max | Count | Days Sampled |
| All | 2.702105263 | 1.044003177 | 0.075739951 | 2.9 | 2.9 | 0.9 | 4.7 | 190 | 6 |
| M | 1.407936508 | 0.265974524 | 0.03350964 | 1.4 | 1.2 | 0.9 | 2 | 63 | 5 |
| F | 3.344094488 | 0.589276331 | 0.052289819 | 3.4 | 2.9 | 2 | 4.7 | 127 | 6 |
| June Data | | | | | | | | | |
| PW | | | | | | | | | |
| Sex | Mean | StDev | SE | Median | Mode | Min | Max | Count | Days Sampled |
| All | 258.0540541 | 37.55354579 | 2.760991598 | 242 | 232 | 205 | 347 | 185 | 1 |
| M | 231.4778761 | 13.60744107 | 1.280080378 | 232 | 232 | 205 | 267 | 113 | 1 |
| F | 299.7638889 | 21.78026827 | 2.566829232 | 302 | 312 | 221 | 347 | 72 | 1 |
| Wt. kg | | | | | | | | | |
| Sex | Mean | StDev | SE | Median | Mode | Min | Max | Count | Days Sampled |
| All | 2.145405405 | 1.088673391 | 0.08004086 | 1.5 | 1.5 | 0.8 | 4.6 | 185 | 1 |
| M | 1.357522124 | 0.213727676 | 0.020105809 | 1.4 | 1.5 | 0.8 | 1.8 | 113 | 1 |
| F | 3.381944444 | 0.678923421 | 0.080011892 | 3.4 | 3.2 | 1.3 | 4.6 | 72 | 1 |

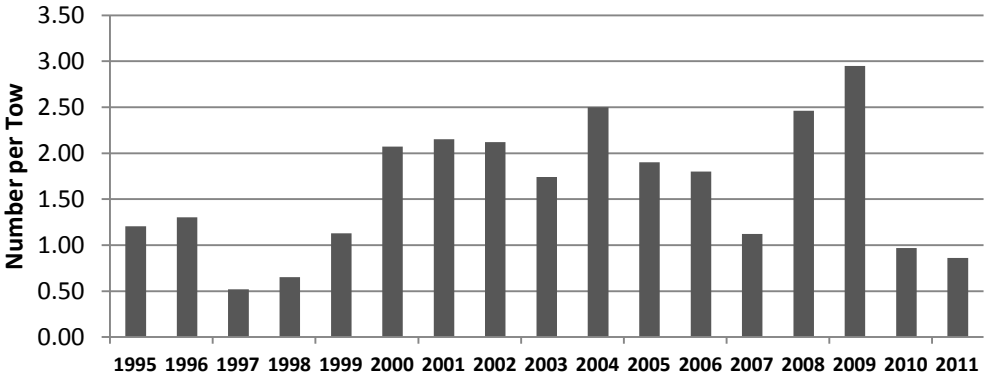


**Figure 1. SCDNR Crustacean Monitoring Section horseshoe crab catch rate from trawl survey 1995-2011. Sampling changes beginning in 2002 have resulted in subsequent data being transformed in order for the results to be comparable.**