ATLANTIC STATES MARINE FISHERIES COMMISSION

REVIEW OF THE INTERSTATE FISHERY MANAGEMENT PLAN

FOR HORSESHOE CRAB
(Limulus polyphemus)

2015 FISHING YEAR

Prepared by the Plan Review Team

Approved by the Horseshoe Crab Management Board
October 2016

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I. Status of the Fishery Management Plan

Date of FMP Approval:	December 1998
Amendments	None
Addenda	Addendum I (April 2000) Addendum II (May 2001) Addendum III (May 2004) Addendum IV (June 2006) Addendum V (September 2008) Addendum VI (August 2010) Addendum VII (February 2012)
Management Unit:	Entire coastwide distribution of the resource from the estuaries eastward to the inshore boundary of the EEZ
States With Declared Interest:	Massachusetts - Florida
Active Boards/Committees:	Horseshoe Crab Management Board, Advisory Panel, Technical Committee, and Plan Review Team; Delaware Bay Ecosystem Technical Committee

a) Goals and Objectives

The Interstate Fishery Management Plan for Horseshoe Crabs (FMP) established the following goals and objectives.

2.0. Goals and Objectives

The goal of this Plan is to conserve and protect the horseshoe crab resource to maintain sustainable levels of spawning stock biomass to ensure its continued role in the ecology of the coastal ecosystem, while providing for continued use over time. Specifically, the goal includes management of horseshoe crab populations for continued use by:

1) *Current and future generations of the fishing and non-fishing public (including the biomedical industry, scientific and educational research)*
2) *Migrating shorebirds*
3) *Other dependent fish and wildlife, including federally listed (threatened) sea turtles*

To achieve this goal, the following objectives must be met:

(a) Prevent overfishing and establish a sustainable population

(b) Achieve compatible and equitable management measures among jurisdictions throughout the fishery management unit

(c) Establish the appropriate target mortality rates that prevent overfishing and maintain adequate spawning stocks to supply the needs of migratory shorebirds

(d) Coordinate and promote cooperative interstate research, monitoring, and law enforcement
(e) Identify and protect, to the extent practicable, critical habitats and environmental factors that limit long-term productivity of horseshoe crabs
(f) Adopt and promote standards of environmental quality necessary for the long-term maintenance and productivity of horseshoe crabs throughout their range
(g) Establish standards and procedures for implementing the Plan and criteria for determining compliance with Plan provisions

b) Fishery Management Plan Summary

The framework for managing horseshoe crabs along the Atlantic coast was approved in October 1998 with the adoption of the Interstate Fishery Management Plan for Horseshoe Crabs (FMP). The goal of this plan is to conserve and protect the horseshoe crab resource to maintain sustainable levels of spawning stock biomass to ensure its continued role in the ecology of coastal ecosystems, while providing for continued use over time.

In 2000, the Horseshoe Crab Management Board approved Addendum I to the FMP. Addendum I established a state-by-state cap on horseshoe crab bait landings at 25 percent below the reference period landings (RPL's), and *de minimis* criteria for those states with a limited horseshoe crab fishery. Those states with more restrictive harvest levels (Maryland and New Jersey) were encouraged to maintain those restrictions to provide further protection to the Delaware Bay horseshoe crab population, recognizing its importance to migratory shorebirds. Addendum I also recommended that the National Marine Fisheries Service (NMFS) prohibit the harvest of horseshoe crabs in federal waters (3-200 miles offshore) within a 30 nautical mile radius of the mouth of Delaware Bay, as well as prohibit the transfer of horseshoe crabs in federal waters. A horseshoe crab reserve was established on March 7, 2001 by NMFS in the area recommended by ASMFC. This area is now known as the Carl N. Shuster Jr. Horseshoe Crab Reserve.

In 2001, the Horseshoe Crab Management Board approved Addendum II to the FMP. The purpose of Addendum II was to provide for the voluntary transfer of harvest quotas between states to alleviate concerns over potential bait shortages on a biologically responsible basis. Voluntary quota transfers require Technical Committee review and Management Board approval.

In 2004, the Board approved Addendum III to the FMP. The addendum sought to further the conservation of horseshoe crab and migratory shorebird populations in and around the Delaware Bay. It reduced harvest quotas and implemented seasonal bait harvest closures in New Jersey, Delaware, and Maryland, and revised monitoring components for all jurisdictions.

Addendum IV was approved in 2006. It further limited bait harvest in New Jersey and Delaware to 100,000 crabs (male only) and required a delayed harvest in Maryland and Virginia. Addendum V, adopted in 2008, extends the provisions of Addendum IV through October 31, 2010. In early 2010, the Board initiated Draft Addendum VI to consider management options

that would follow expiration of Addendum V. The Board voted in August 2010 to extend the Addendum V provisions, via Addendum VI, through April 30, 2013. The Board also chose to include language, allowing them to replace Addendum VI with another Addendum during that time, in anticipation of implementing an adaptive resource management (ARM) framework.

The Board approved Addendum VII in February 2012. This addendum implemented an ARM framework for use during the 2013 fishing season. The framework considers the abundance levels of horseshoe crabs and shorebirds in determining the optimized harvest level for the Delaware Bay states of New Jersey, Delaware, Maryland, and Virginia (east of the COLREGS).

II. Status of the Stock and Assessment Advice

No definitions for overfishing or overfished status have been adopted by the Management Board. However, the majority of evidence in the most recent stock assessment, the 2013 Stock Assessment Update (available at http://www.asmfc.org/species/horseshoe-crab#stock), indicates abundance has increased in the Southeast region. In the Delaware Bay Region, increasing trends were most evident in juvenile indices, followed by indices of adult males. Over the time series of the survey, no trend in the abundance of female crabs is evident.

In contrast, continued declines in abundance were evident in the New York and New England regions. Decreased harvest quotas in Delaware Bay have potentially redirected harvest to nearby regions. Current harvest within the New England and New York Regions may not be sustainable. Continued precautionary management is therefore recommended coastwide to anticipate effects of redirecting harvest from Delaware Bay to outlying populations.

III. Status of the Fishery

Bait Fishery

For most states, the bait fishery is open year round. However, because of seasonal horseshoe crab movements (to the beaches in the spring; deeper waters and offshore in the winter), the fishery operates at different times. State waters of New Jersey and Delaware are closed to horseshoe crab harvest and landing from January 1st through June 7th each year, and other state horseshoe crab fisheries are regulated with various seasonal/area closures.

Reported coastwide bait landings in 2015 remained well below the coastwide quota (Table 1, Figure 1). Bait landings decreased 23% from the previous year, due to decreased landings in Rhode Island, Delaware, Maryland, Virginia, Georgia, and Florida. North Carolina harvested 912 crabs over their 24,036 quota, and received a quota transfer from Georgia. North Carolina is also seeking a quota transfer for the 2016 fishery pending Board approval.

Table 1 Reported commercial horseshoe crab bait landings by jurisdiction.

Jurisdiction	ASMFC Quota 2015	State Quota 2015	2010	2011	2012	2013	2014	2015
MA	330,377	165,000	54,782	67,087	106,821	128,774	106,645	108,054
RI	26,053	12,545	12,502	12,632	19,306	18,030	13,319	6,255
CT	48,689	48,689	30,036	24,466	18,958	19,645	20,634	19,632
NY	366,272	150,000	124,808	146,995	167,723	161,623	133,887	145,324
NJ*	162,136	0	0	0	0	0	0	0
DE*	162,136	154,527	61,751	95,663	100,255	163,582	168,044	151,262
MD*	255,980	255,980	165,344	167,053	169,087	240,688	148,269	27,494
PRFC	0	-	0	0	0	0	0	0
DC	0	-	0	0	0	0	0	0
VA**	172,828	172,828	146,857	121,650	151,887	156,761	145,266	99,975
NC***	24,036	25,036	9,938	27,076	22,902	26,559	21,196	24,948
SC	0	0	0	0	0	0	0	0
GA***	29,312	28,312	0	0	0	5,745	0	0
FL	9,455	9,455	993	0	0	0	2,046	264
TOTAL	1,587,274	1,028,280	607,011	662,622	756,939	921,407	759,306	583,208

***Male-only harvest**

****Virginia harvest east of the COLREGS line is limited to 81,331 male-only crabs under the ARM harvest package #3. Virginia harvest east of the COLREGS in 2013, 2014 and 2015 were 32,307, 52,638, and 24,460 respectively. The total above represents harvest on both sides of the COLREGS line.**

*****Note there was quota transfer of 1,000 crabs from Georgia to North Carolina to cover their quota overage of 912 horseshoe crabs in 2015.**

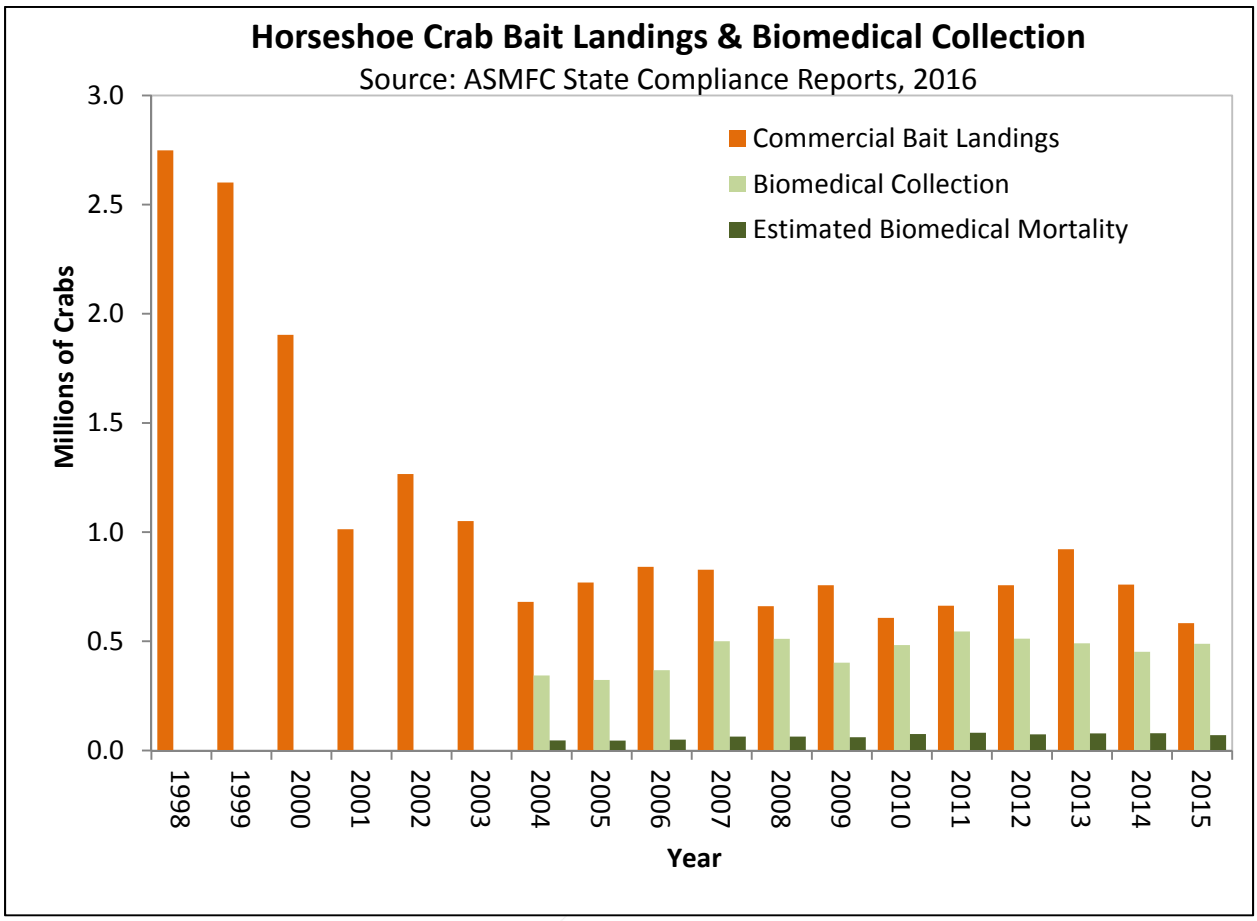

Figure 1: Number of horseshoe crabs harvested for bait and biomedical purposes, 1998 -2015. Please note the following details regarding biomedical harvest numbers:

* Biomedical collection numbers, which are annually reported to the Commission, include all horseshoe crabs brought to bleeding facilities except those that were harvested as bait and counted against state quotas.

* Most of the biomedical crabs collected are returned to the water after bleeding; a 15% mortality rate is estimated for all bled crabs. This is noted in the above graph as 'Estimated Biomedical Mortality.'

Reported coastwide landings since 1998 show more male than female horseshoe crabs were harvested annually. Several states presently have sex-specific restrictions in place to limit the harvest of females. The American eel pot fishery prefers egg-laden female horseshoe crabs as bait, while the whelk (conch) pot fishery is less dependent on females. Unclassified landings have generally accounted for around 10% of the reported landings since 2000.

The hand, trawl, and dredge fisheries typically account for over 85% of the reported commercial horseshoe crab bait landings. In 2015, these gears accounted for slightly more with 88.7% of commercial landings. Other methods that account for the remainder of the harvest include gill nets, pound nets, and traps.

Biomedical Fishery

The horseshoe crab is an important resource for research and manufacture of materials used for human health. There are five companies along the Atlantic Coast that process horseshoe crab blood for use in manufacturing Limulus Amebocyte Lysate (LAL): Associates of Cape Cod, Massachusetts; Lonza (formerly Cambrex Bioscience), Limuli Laboratories, New Jersey; Wako Chemicals, Virginia; and Charles River Endosafe, South Carolina. Addendum III requires states where horseshoe crabs are collected for biomedical bleeding to collect and report total collection numbers, crabs rejected, crabs bled (by sex) and to characterize mortality.

The Plan Review Team annually calculates total coastwide harvest and estimates mortality. It was reported that 559,903 crabs (including crabs harvested as bait) coastwide were brought to biomedical companies for bleeding in 2015 (Table 2). This represents a slight decrease from the average of the previous five years (575,019 crabs). Of this total, 56,517 crabs were reported as harvested for bait and counted against state quotas, representing a marked decrease over the average of the previous five years (Table 2: row B). These crabs were not included in the mortality estimates (Rows D, F, and G) below. It was reported for 2015 that 488,521 crabs were harvested for biomedical purposes only. Males accounted for 38% of total biomedical harvest; females comprised 26%; 34% of the harvest was unknown. Crabs were rejected prior to bleeding due to mortality, injuries, slow movement, and size (known mortality prior to bleeding is included in Row D below). Approximately 0.2% of crabs, collected solely for biomedical purposes, reportedly suffered mortality from harvest up to the point of release. Total estimated mortality of biomedical crabs for 2015 was 70,223 crabs (at 15% post-release estimated mortality), with a range of 23,383 to 140,444 crabs (5-30% post-release estimated mortality).

Table 2. Numbers of horseshoe crabs harvested, bled and estimated mortality for the biomedical industry.

	2008	***2009***	***2010***	***2011***	***2012***	***2013***	***2014***	***2015***
A. Number of crabs brought to biomedical facilities (bait and biomedical crabs)	511,478	512,552	548,751	628,476	627,790	545,191	530,778	559,903
B. Number of bait crabs bled	87,864	110,350	66,047	83,312	75,184	62,396	62,643	56,517
C. Number of biomedical-only crabs harvested (not counted against state bait quotas)	423,614	402,202	482,704	545,164	512,237	279,061	450,859	488,521
D. Reported mortality of biomedical-only from harvest to release	2,973	6,298	9,665	6,917	6,891	15,383	11,151	798
E. Number of biomedical-only crabs bled	402,080	362,291	438,417	492,734	492,859	428,614	429,951	462,832
F. Estimated mortality of bled biomedical-only crabs post-release (15% est. mortality)	60,312	54,344	65,763	73,910	73,929	64,292	64,493	69,425
G. Total estimated mortality on biomedical crabs not counted against state bait quotas (15% est. mortality)	63,285	60,642	75,428	80,827	80,820	79,675	75,644	70,223

The 1998 FMP establishes a mortality threshold of 57,500 crabs, where if exceeded the Board is required to consider action. Based on an estimated total mortality of 70,223 crabs for 2015, this threshold has been exceeded. The PRT notes that estimated mortality from biomedical use is approximately 11% of the total horseshoe crab mortality (bait and biomedical) coastwide for

2015, up from approximately 9% in 2014 year. As the combined average of the last two years represents 10% of coastwide mortality and the PRT continues to recommend including biomedical mortality in the next benchmark stock assessment.

IV. Status of Research and Monitoring

The Horseshoe Crab FMP set forth an ambitious research and monitoring strategy in 1999 and again in 2004 to facilitate future management decisions. Despite limited time and funding there are many accomplishments since 1999. These accomplishments were largely made possible by forming partnerships between state, federal and private organizations, and the support of hundreds of public volunteers.

Addendum III Monitoring Program

Addendum III requires affected states to carry out three monitoring components. All states who do not qualify for *de minimis* status report monthly harvest numbers and subsample of portion of the catch for gender and harvest method. In addition, those states with annual landings above 5% of the coastwide harvest report all landings by sex and harvest method. Although states with annual landings less than 5% of annual coastwide harvest are not required to report landings by gender, the PRT recommends all states require gender reporting for horseshoe crab harvest.

States with biomedical fisheries landings are required to monitor and report harvest numbers and mortality associated with the transportation and bleeding of the crabs.

States must identify spawning and nursery habitat along their coasts. All states have completed this requirement and a few continue active monitoring programs.

Virginia Tech Research Projects

The VT benthic survey was not conducted in 2013 - 2015, due to a lack of funding. The Adaptive Resource Management (ARM) Working Group has used a composite index from current Delaware Bay region state trawl surveys to estimate horseshoe crab abundance for the ARM model. The survey has been funded for 2016 and is in progress. Funding sources beyond 2016 as well as alternative data sources are being explored

Spawning Surveys

The redesigned Delaware Bay spawning survey was completed for the 17th year in 2015. No trend was detected in the baywide indices of spawning activity (both male and female) for the time series. A slightly negative, but significant decline was noted in the Delaware female spawning activity. No trends were detected in the Delaware male spawning activity and no trends were detected in the New Jersey male or female spawning activity. Most spawning activity was observed in May in 2015, coinciding with a period especially important for migratory shorebirds. The annual baywide sex ratio was 4.2:1, (Male: Female). The range of

annual observed sex ratios on the Delaware Bay spawning beaches over the time series has varied from 3.1:1 to 5.2:1.

Tagging Studies

The USFWS continues to maintain a toll-free telephone number as well as a website for reporting horseshoe crab tag returns and assists interested parties in obtaining tags. Tagging work continues to be conducted by biomedical companies, research organizations, and other parties involved in outreach and spawning surveys. Beginning with the 2013 tagging season, additional efforts were implemented to ensure that current tagging programs are providing data that benefits the management of the coast-wide horseshoe crab population. All existing and new tagging programs are required to submit an annual application to be considered for the tagging program and all participants must submit an annual report along with their tagging and resight data to indicate how their tagging program addresses at least one of the following objectives: determine horseshoe crab sub-population structure, estimate horseshoe crab movement and migration rates, and/or estimate survival and mortality of horseshoe crabs. The PRT recommends all tagging programs, approved by the state, coordinate with the USFWS tagging program, in order to ensure a consistent coastwide program for providing management input.

Since 1999, over 282,387 crabs have been tagged and released through the USFWS tagging program along the Atlantic coast. Approximately 12% of tagged crabs have been recaptured and reported. Crabs have been tagged and released from every state on the Atlantic Coast from Florida to New Hampshire. In the early years of the program, tagging was centered around Delaware Bay; however, in recent years, more tagging has occurred in the Long Island Sound and in the Southeast. The Technical Committee noted that recapture rates inside and outside Delaware Bay are likely not directly comparable due to increased re-sighting effort and spawning concentration in Delaware Bay compared to other areas along the coast. There may be data in the USFWS tagging database to determine differences in effort and recapture rates.

V. Status of Management Measures and Issues

ASMFC

Initial state-by-state harvest quotas were established through Addendum I. Addendum III outlined the monitoring requirements and recommendations for the states. Addendum IV set harvest closures and quotas, and other restrictions for New Jersey, Delaware, Maryland, and Virginia, which were continued in Addendums V and VI.

The Board approved Addendum VII, implementation of the ARM Framework, in February 2012 for implementation in 2013. Addendum VII includes an allocation mechanism to divide the Delaware Bay optimized harvest output from the ARM Framework among the four Delaware Bay states (New Jersey, Delaware, Maryland, and Virginia east of the COLREGS). Season closures and restrictions, present within Addendum VI, remain in effect as part of Addendum VII.

Included in this report are state-by-state charts outlining compliance and monitoring measures. The PRT recommends all jurisdictions were in compliance with the FMP and subsequent Addenda in 2015.

MASSACHUSETTS		
	2015 Compliance Report	**2016 Management Proposal**
***De minimis* status**	Did not qualify for *de miminis*	Does not qualify for *de miminis*
Bait Harvest Restrictions and Landings		
- ASMFC Quota (Voluntary State Quota)	330,377 (165,000)	330,377 (165,000)
- Other Restrictions	Bait: 300 crab daily limit year round; limited entry; Biomedical: 1,000 crab daily limit; Conch pot and eel fishermen: no possession limit All: May and June 5-day lunar closures; No mobile gear harvest Fri-Sat during summer flounder season; 7" PW minimum size; Pleasant Bay Closed Area	Bait: 300 crab daily limit year round; Biomedical: 1,000 crab daily limit; Conch pot and eel fishermen: no possession limit All: May and June 5-day lunar closures; No mobile gear harvest Fri-Sat during summer flounder season; 7" PW minimum size; Pleasant Bay Closed Area
- Landings	108,054	--
Monitoring Component A_1		
- Mandatory monthly reporting	Yes, plus weekly dealer reporting through SAFIS	Yes, plus weekly dealer reporting through SAFIS
- Characterize commercial bait fishery	Yes	Yes
Monitoring Component A_2		
- Biomedical harvest reporting	Yes	Yes
- Required information for biomedical use of crabs	Yes	Yes
Monitoring Component A_3 Identify spawning and nursery habitat	Yes	Yes
Monitoring Component B_1 Coastwide benthic trawl survey	No	VT Trawl Survey will in continue for 2016; future years and spatial scope unknown at this time
Monitoring Component B_2 Continue existing benthic sampling programs	Yes	Yes
Monitoring Component B_3 Implement spawning survey	Yes	Yes
Monitoring Component B_4 Tagging program	Yes – w/NPS and USFWS; Pleasant Bay, Monomy NWR, Waquoit Bay	Yes – w/NPS and USFWS; Pleasant Bay, Monomy NWR, Waquoit Bay

Note: The daily crab possession limit in the mobile gear fishery was changed to 300 crabs in 2014. This was continued in 2015, and will continue in 2016.

RHODE ISLAND		
	2015 Compliance Report	**2016 Management Proposal**
***De minimis* status**	Did not qualify for *de minimis*	Does not qualify for *de minimis*
Bait Harvest Restrictions and Landings		
- ASMFC Quota (Voluntary State Quota)	26,053 (12,345)	26,053 (12,545)
- Other Restrictions	None	None
- Landings	6,255	--
Monitoring Component A_1		
- Mandatory monthly reporting	Yes, though exempt, with weekly call in and monthly on paper.	Yes, though exempt, with weekly call in and monthly on paper.
- Characterize commercial bait fishery	Yes	Yes
Monitoring Component A_2		
- Biomedical harvest reporting	Yes	Yes
- Required information for biomedical use of crabs	Yes, details within Massachusetts' reports	Captured in Massachusetts' reports
Monitoring Component A_3 Identify spawning and nursery habitat	Yes	Yes
Monitoring Component B_1 Coastwide benthic trawl survey	No	VT Trawl Survey will in continue for 2016; future years and spatial scope unknown at this time
Monitoring Component B_2 Continue existing benthic sampling programs	Yes	Yes
Monitoring Component B_3 Implement spawning survey	Yes, since 2000 (methods unspecified)	Yes
Monitoring Component B_4 Tagging program	RI DEM 2001-2004 only Outside, independent groups currently	No

Note: Rhode Island is proposing to implement a daily possession limit during the open harvest period for the bait fishery in 2016.

CONNECTICUT		
	2015 Compliance Report	**2016 Management Proposal**
***De minimis* status**	Did not qualify for *de miminis*	Does not qualify for *de miminis*
Bait Harvest Restrictions and Landings		
- ASMFC Quota	48,689	48,689
- Other Restrictions	Limited entry program, possession limits, and seasonal and areas closures	Limited entry program, possession limits, and seasonal and area closures
- Landings	19,632	--
Monitoring Component A_1		
- Mandatory monthly reporting	Yes	Yes
- Characterize commercial bait fishery	No – exempt under Addendum III because landings are < 5% of coastwide total	No – exempt under Addendum III because landings are < 5% of coastwide total
Monitoring Component A_2		
- Biomedical harvest reporting	Not Applicable	Not Applicable
- Required information for biomedical use of crabs	Not Applicable	Not Applicable
Monitoring Component A_3 Identify spawning and nursery habitat	Yes	Yes
Monitoring Component B_1 Coastwide benthic trawl survey	No	VT Trawl Survey will in continue for 2016; future years and spatial scope unknown at this time
Monitoring Component B_2 Continue existing benthic sampling programs	Yes	Yes
Monitoring Component B_3 Implement spawning survey	Yes, since 1999 (methods differ from DE Bay survey)	Yes
Monitoring Component B_4 Tagging program	Yes, in collaboration with local universities (Sacred Heart University in 2015)	Yes

NEW YORK		
	2015 Compliance Report	**2016 Management Proposal**
***De minimis* status**	Did not qualify for *de miminis*	Does not qualify for *de miminis*
Bait Harvest Restrictions and Landings		
- ASMFC Quota (Voluntary State Quota)	366,272 (150,000)	366,272 (150,000)
- Other Restrictions	Ability to close areas to harvest; seasonal quotas and trip limits; 200 crab/harvester daily quota- reduced to 100 crab on 5/29 then 30 crabs on 6/10 and then increased to 250 from 9/6-12/1; W. Meadow Beach, Cedar Beach, and Fire Island National Seashore harvest closures	Ability to close areas to harvest; seasonal quotas and trip limits; 200 crab/harvester daily quota; W. Meadow Beach, Cedar Beach, and Fire Island National Seashore harvest closures
- Landings	145,324	--
Monitoring Component A_1		
- Mandatory monthly reporting	Yes (weekly April – July)	Yes
- Characterize commercial bait fishery	Yes	Yes
Monitoring Component A_2		
- Biomedical harvest reporting	Not Applicable	Not Applicable
- Required information for biomedical use of crabs	Not Applicable	Not Applicable
Monitoring Component A_3 Identify spawning and nursery habitat	Yes	Yes
Monitoring Component B_1 Coastwide benthic trawl survey	No	VT Trawl Survey will in continue for 2016; future years and spatial scope unknown at this time
Monitoring Component B_2 Continue existing benthic sampling programs	Yes	Yes
Monitoring Component B_3 Implement spawning survey	Yes – adapted from DE Bay survey	Yes
Monitoring Component B_4 Tagging program	Yes, since 2007	Yes

Note: The Quota periods were reduced from 5 to 4 to help streamline quota management in 2015; quota in period 4 will be TBD depending on harvest in previous 3 periods. This will continue in 2016.

NEW JERSEY		
	2015 Compliance Report	**2016 Management Proposal**
***De minimis* status**	Qualified for *de miminis*	Qualifies but not requesting *de miminis*
Bait Harvest Restrictions and Landings		
- ASMFC Quota (Voluntary state quota)	162,136 [male only] (0)	162,136 [male only] (0)
- Other Restrictions	Bait harvest moratorium	Bait harvest moratorium
- Landings	0	--
Monitoring Component A_1		
- Mandatory monthly reporting	N/A	N/A
- Characterize commercial bait fishery	N/A	N/A
Monitoring Component A_2		
- Biomedical harvest reporting	Yes	Yes
- Required information for biomedical use of crabs	Yes	Yes
Monitoring Component A_3 Identify spawning and nursery habitat	Yes	Yes
Monitoring Component B_1 Coastwide benthic trawl survey	No	VT Trawl Survey will in continue for 2016; future years and spatial scope unknown at this time
Monitoring Component B_2 Continue existing benthic sampling programs	Yes –surf clam survey was funded through 2012- was an indicator of HSC abundance. Continued again in 2015	Yes
Monitoring Component B_3 Implement spawning survey	Yes – since 1999	Yes
Monitoring Component B_4 Tagging program	Outside, independent groups currently	No
Monitoring Component B_5 Egg abundance survey	Yes, but removed as a mandatory component	Yes
Monitoring Component B_6 Shorebird monitoring program	Yes	Yes

Note: the Surf Clam Dredge survey continued in 2015, after hiatus in 2013 and 2014. The survey was continued with a new vessel and new survey gear. NJ Staff is still working through conversion factors between the previous gear type and one used in 2015- no new information available yet.

DELAWARE		
	2015 Compliance Report	**2016 Management Proposal**
***De minimis* status**	Did not qualify for *de miminis*	Does not qualify for *de miminis*
Bait Harvest Restrictions and Landings		
- ASMFC Quota (State-reduced quota for overage)	162,136 [male only] (154,527)	162,136 [male only] (162,136)
- Other Restrictions	Closed season (January 1 – June 7)	Closed season (January 1 – June 7)
- Landings	151,262 males	--
Monitoring Component A_1		
- Mandatory monthly reporting	Yes (daily call-in reports & monthly logbooks)	Yes
- Characterize commercial bait fishery	Yes	Yes
Monitoring Component A_2		
- Biomedical harvest reporting	Not Applicable	Not Applicable
- Required information for biomedical use of crabs	Not Applicable	Not Applicable
Monitoring Component A_3 Identify spawning and nursery habitat	Yes – updates once every 5 years or as needed	Yes – updates once every 5 years or as needed
Monitoring Component B_1 Coastwide benthic trawl survey	No	VT Trawl Survey will in continue for 2016; future years and spatial scope unknown at this time
Monitoring Component B_2 Continue existing benthic sampling programs	Yes	Yes
Monitoring Component B_3 Implement spawning survey	Yes	Yes
Monitoring Component B_4 Tagging program	No state program but has assisted in the past with various Delaware Bay horseshoe crab tagging initiatives	No
Monitoring Component B_5 Egg abundance survey	Removed as component	Removed as component
Monitoring Component B_6 Shorebird monitoring program	Yes	Yes

Note: The egg abundance survey has been discontinued as a mandatory monitoring element. Delaware will include information on the survey if it continues, but is no longer required to perform the survey.

MARYLAND		
	2015 Compliance Report	**2016 Management Proposal**
***De minimis* status**	Did not qualify for *de miminis*	Does not qualify for *de miminis*
Bait Harvest Restrictions and Landings		
- ASMFC Quota	255,980 (male only)	255,980 (male only)
- Other Restrictions	Delayed harvest and closed season/area combinations	Delayed harvest and closed season/area combinations
- Landings	27,494	--
Monitoring Component A_1		
- Mandatory monthly reporting	Yes (weekly reports for permit holders; monthly for non-permit holders)	Yes (weekly reports for permit holders; monthly for non-permit holders)
- Characterize commercial bait fishery	Yes	Yes
Monitoring Component A_2		
- Biomedical harvest reporting	Yes	Yes
- Required information for biomedical use of crabs	Yes	Yes
Monitoring Component A_3 Identify spawning and nursery habitat	Yes	Yes
Monitoring Component B_1 Coastwide benthic trawl survey	No	VT Trawl Survey will in continue for 2016; future years and spatial scope unknown at this time
Monitoring Component B_2 Continue existing benthic sampling programs	Yes	Yes
Monitoring Component B_3 Implement spawning survey	Yes (Counts)	Yes
Monitoring Component B_4 Tagging program	Yes – through biomedical harvest	Yes – through biomedical harvest

POTOMAC RIVER FISHERIES COMMISSION		
	2015 Compliance Report	**2016 Management Proposal**
***De minimis* status**	*De minimis* status granted.	*De minimis* requested and meets criteria.
- Ability to close fishery if *de minimis*threshold is reached	No horseshoe crab fishery	No horseshoe crab fishery
- Daily possession limit <25 for *de minimis* state		
- HSC landing permit		
Bait Harvest Restrictions and Landings		
- ASMFC Quota	0	0
- Other Restrictions	None	None
- Landings	0	0
Monitoring Component A_1		
- Mandatory monthly reporting	Yes - weekly	Yes - weekly
- Characterize commercial bait fishery	Not Applicable	Not Applicable
Monitoring Component A_2		
- Biomedical harvest reporting	Not Applicable	Not Applicable
- Required information for biomedical use of crabs	Not Applicable	Not Applicable
Monitoring Component A_3 Identify spawning and nursery habitat	Not Applicable	Not Applicable
Monitoring Component B_1 Coastwide benthic trawl survey	No	No
Monitoring Component B_2 Continue existing benthic sampling programs	Not Applicable	Not Applicable
Monitoring Component B_3 Implement spawning survey	Not Applicable	Not Applicable
Monitoring Component B_4 Tagging program	Not Applicable	Not Applicable

VIRGINIA		
	2015 Compliance Report	**2016 Management Proposal**
***De minimis* status**	Did not qualify for *de miminis*	Does not qualify for *de miminis*
Bait Harvest Restrictions and Landings		
- ASMFC Quota (State-reduced quota for overage)	172,828 (81,331 male-only east of COLREGS line)	172,828 (81,331 male-only east of COLREGS line)
- Other Restrictions	Closed season (January 1 – June 7) for federal waters. Effective January 1, 2013 harvest of horseshoe crabs, from east of the COLREGS line, is limited to trawl gear and dredge gear only.	Closed season (January 1 – June 7) for federal waters. Effective January 1, 2013 harvest of horseshoe crabs, from east of the COLREGS line, is limited to trawl gear and dredge gear only.
- Landings	99,975 (24,460)	--
Monitoring Component A_1		
- Mandatory monthly reporting	Yes – new permit system; limited entry to fishery and individual quotas established	Yes
- Characterize commercial bait fishery	Yes	Yes
Monitoring Component A_2		
- Biomedical harvest reporting	Yes	Yes
- Required information for biomedical use of crabs	Yes	Yes
Monitoring Component A_3 Identify spawning and nursery habitat	Yes – completed	No
Monitoring Component B_1 Coastwide benthic trawl survey	No	VT Trawl Survey will in continue for 2016; future years and spatial scope unknown at this time
Monitoring Component B_2 Continue existing benthic sampling programs	No	No
Monitoring Component B_3 Implement spawning survey	No	No
Monitoring Component B_4 Tagging program	No	No

NORTH CAROLINA		
	2015 Compliance Report	**2016 Management Proposal**
***De minimis* status**	Did not qualify for *de miminis*	Does not qualify for *de minimis*
Bait Harvest Restrictions and Landings		
- ASMFC Quota	24,036	24,036
- Adjusted Quota	25,036*	25,236**
- Other Restrictions	Trip limit of 50 crabs; Proclamation authority to adjust trip limits, seasons, etc.	Trip limit of 50 crabs; Proclamation authority to adjust trip limits, seasons, etc.
- Landings	24,948	--
Monitoring Component A_1		
- Mandatory monthly reporting	Yes – trip level reporting each month	Yes – trip level reporting each month
- Characterize commercial bait fishery	Yes	Yes
Monitoring Component A_2		
- Biomedical harvest reporting	Not Applicable	Not Applicable
- Required information for biomedical use of crabs	Not Applicable	Not Applicable
Monitoring Component A_3 Identify spawning and nursery habitat	Little information available Survey discontinued after 2002 and 2003 due to low levels of crabs recorded	Not specified
Monitoring Component B_1 Coastwide benthic trawl survey	No	VT Trawl Survey will in continue for 2016; future years and spatial scope unknown at this time
Monitoring Component B_2 Continue existing benthic sampling programs	Yes	Yes
Monitoring Component B_3 Implement spawning survey	No	No
Monitoring Component B_4 Tagging program	No	No

*Note: there was quota transfer of 1,000 lbs from Georgia to North Carolina to cover their quota overage of 912 horseshoe crabs in 2015.

**North Carolina has requested a quota transfer from Georgia for 2016 as well. Both states have agreed to the transfers.

SOUTH CAROLINA		
	2015 Compliance Report	**2016 Management Proposal**
***De minimis* status**	*De minimis* status granted.	*De minimis* requested and meets criteria.
- Ability to close fishery if *de minimis*threshold is reached	No horseshoe crab bait fishery	No horseshoe crab bait fishery
- Daily possession limit <25 for *de minimis* state		
- HSC landing permit		
Bait Harvest Restrictions and Landings		
- ASMFC Quota	0	0
- Other Restrictions	None	None
- Landings	0	--
Monitoring Component A_1		
- Mandatory monthly reporting	Yes (Biomedical)	Yes (Biomedical)
- Characterize commercial bait fishery	Yes (Biomedical)	Yes (Biomedical)
Monitoring Component A_2		
- Biomedical harvest reporting	Yes	Yes
- Required information for biomedical use of crabs	Yes	Yes
Monitoring Component A_3 Identify spawning and nursery habitat	Completed	No
Monitoring Component B_1 Coastwide benthic trawl survey	No	VT Trawl Survey will in continue for 2016; future years and spatial scope unknown at this time
Monitoring Component B_2 Continue existing benthic sampling programs	Yes	Yes
Monitoring Component B_3 Implement spawning survey	No	No
Monitoring Component B_4 Tagging program	Yes	Yes

GEORGIA		
	2015 Compliance Report	**2016 Management Proposal**
***De minimis* status**	*De minimis* status granted.	*De minimis* requested and meets criteria.
- Ability to close fishery if *de minimis*threshold is reached	Yes	Yes
- Daily possession limit <25 for *de minimis* state	25/person; 75/vessel with 3 licensees	25/person; 75/vessel with 3 licensees
- HSC landing permit	Must have commercial shrimp, crab, or whelk license; LOA permit required	Must have commercial shrimp, crab, or whelk license; LOA permit required
Bait Harvest Restrictions and Landings		
- ASMFC Quota	29,312	29,312
(State Quota)	28,312*	28,062**
- Other Restrictions	None	None
- Landings	0	--
Monitoring Component A_1		
- Mandatory monthly reporting	Yes	Yes
- Characterize commercial bait fishery	No bait landings	Yes
Monitoring Component A_2		
- Biomedical harvest reporting	Not Applicable	Not Applicable
- Required information for biomedical use of crabs	Not Applicable	Not Applicable
Monitoring Component A_3 Identify spawning and nursery habitat	Completed	Not Applicable
Monitoring Component B_1 Coastwide benthic trawl survey	No	VT Trawl Survey will in continue for 2016; future years and spatial scope unknown at this time
Monitoring Component B_2 Continue existing benthic sampling programs	Yes	Yes
Monitoring Component B_3 Implement spawning survey	No	No
Monitoring Component B_4 Tagging program	No	No

*Note there was quota transfer of 1,000 lbs from Georgia to North Carolina to cover their quota overage of 912 horseshoe crabs in 2015.

**North Carolina has requested a quota transfer from Georgia for 2016 as well. Both states have agreed to the transfers.

FLORIDA		
	2015 Compliance Report	**2016 Management Proposal**
***De minimis* status**	*De minimis* status granted.	*De minimis* requested and meets criteria.
- Ability to close fishery if *de minimis*threshold is reached	Yes	Yes
- Daily possession limit <25 for *de minimis* state	25/person w/ valid saltwater products license; 100/person with marine life endorsement	25/person w/ valid saltwater products license; 100/person with marine life endorsement
- HSC landing permit	See above	See above
Bait Harvest Restrictions and Landings		
- ASMFC Quota	9,455	9,455
- Other Restrictions	None	None
- Landings	264	--
Monitoring Component A_1		
- Mandatory monthly reporting	Yes	Yes
- Characterize commercial bait fishery	No	Yes
Monitoring Component A_2		
- Biomedical harvest reporting	Not Applicable	Not Applicable
- Required information for biomedical use of crabs	Not Applicable	Not Applicable
Monitoring Component A_3 Identify spawning and nursery habitat	Yes	Yes
Monitoring Component B_1 Coastwide benthic trawl survey	No	VT Trawl Survey will in continue for 2016; future years and spatial scope unknown at this time
Monitoring Component B_2 Continue existing benthic sampling programs	No	No
Monitoring Component B_3 Implement spawning survey	No	Yes
Monitoring Component B_4 Tagging program	No	Yes

Note: Florida reported an additional 3,613 crabs harvested along the east coast for 'marine life' use in 2015.

Alternative Baits

Delaware, Connecticut, Rhode Island and Massachusetts attempted to participate in field trials with the Ecobait, available from LaMonica Fine Foods in New Jersey. Massachusetts and Delaware were unable to conduct the trials due to difficulties in securing the Ecobait samples from LaMonica; Connecticut and Rhode Island were able to conduct trials in fall 2014. The results of the study were presented to the Horseshoe Crab Technical Committee and Delaware Bay Ecosystem Technical in October 2015. The results demonstrated that the ecobait produced by LaMonica Fine Foods performed comparable to conventional bait used by conch fishermen in Rhode Island and Connecticut. The results were presented to Board at the 2016 ASMFC Winter Meeting. Subsequently, the Board requested that a cost comparison analysis be conducted (feedback from the Technical Committee and Advisory Panel was presented to the Board in May 2016) and that a draft prospectus for continuing alternative bait trials be developed and presented to the Board at the 2016 Annual Meeting.

Shorebird

The USFWS received petitions in 2004 and 2005 to emergency list the red knot under the Endangered Species Act. In fall 2005, it determined that emergency listing was not warranted at the time. As part of a court settlement, the USFWS agreed to initiate proposed listings of over 200 species, including the red knot. In fall 2013, the USFWS released a proposal for listing the red knot as threatened. In January 2015 the USFWS determined that red knot be designated as threatened under the Endangered Species Act.

The red knot remains listed as an endangered species in the state of New Jersey (since 2012).

VI. Research Needs/PRT Recommendations

De Minimis

States may apply for *de minimis* status if, for the last two years, their combined average horseshoe crab bait landings (by numbers) constitute less than one percent of coastwide horseshoe crab bait landings for the same two-year period. States may petition the Board at any time for *de minimis* status, if their fishery falls below the threshold level. Once *de minimis* status is granted, designated States must submit annual reports to the Board justifying the continuance of *de minimis* status.

States that qualify for *de minimis* status are not required to implement any horseshoe crab harvest restriction measures, but are required to implement components A, B, E and F of the monitoring program (Section 3.5 of the FMP; further modified by Addendum III). Since *de minimis* states are exempt from a harvest cap, there is potential for horseshoe crab landings to shift to *de minimis* states and become substantial, before adequate action can be taken. To control shifts in horseshoe crab landings, *de minimis* states are encouraged to implement one of the following management measures:

1. Close their respective horseshoe crab bait fishery when landings exceed the *de minimis* threshold;

2. Establish a state horseshoe crab landing permit, making it only available to individuals with a history of landing horseshoe crabs in that state; or
3. Establish a maximum daily harvest limit of up to 25 horseshoe crabs per person per day. States which implement this measure can be relieved of mandatory monthly reporting, but must report all horseshoe crabs harvests on an annual basis.

The following states have been removed from the Management Board in recent years: Pennsylvania (2007), Maine (2011), and New Hampshire (2014). The Potomac River Fisheries Commission South Carolina, Georgia, and Florida are requesting *de minimis* status for the 2016 fishing season based on the 2015 season landings and meet the FMP requirements for achieving this status (Table 1). The PRT recommends granting these jurisdictions *de minimis* status with the provision that marine life landings from Florida be considered in determining future *de minimis* status. Regarding the transfer requests from Georgia to North Carolina, the PRT finds that the quota transfer does not pose concerns for the regional horseshoe crab population or migratory shorebirds at this time, due to the size of the transfer.

Funding for Research and Monitoring Activities

The PRT strongly recommends the continuation of the VT benthic trawl survey in order to provide the critical information for stock assessments and the ARM model. The survey is a necessity to continue ARM implementation. This effort provides a statistically reliable estimate of horseshoe crab relative abundance