

Draft Addendum for Public comment

Atlantic States Marine Fisheries Commission

**DRAFT ADDENDUM VI TO THE HORSESHOE CRAB
FISHERY MANAGEMENT PLAN**

Delaware Bay Region Management Program



ASMFC Vision Statement:

Healthy, self-sustaining populations for all Atlantic coast fish species or successful restoration well in progress by the year 2015

May 2010

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Public Comment Process and Proposed Timeline

At its February 2010 meeting, the Horseshoe Crab Management Board passed a motion to initiate development of an addendum to the Interstate Fishery Management Plan (FMP) for Horseshoe Crab. The addendum will address management in the Delaware Bay region. This draft document presents background on the Atlantic States Marine Fisheries Commission's (ASMFC) management of horseshoe crab, the addendum process and timeline, and a statement of the problem. This document also provides proposed management options for public consideration and comment.

The public is encouraged to submit comments regarding this document at any time during the addendum process. The final date that comments will be accepted is July 29, 2010. Comments may be submitted by mail, email, or fax, as well as at public hearings. Dates, times, and locations for the public hearings are as follows:

New Jersey Division of Fish and Wildlife

July 1, 2010; 6:30 PM

Assunpink Wildlife Management Area
Conservation Center (several hundred yards
up from Central Region Office)
1 Eldgridge Road
Upper Freehold Township, Monmouth
County, New Jersey
Contact: Amanda Dey (609) 259-6967

Dover, Delaware

Contact: Stew Michels (302) 735-2970

Maryland Dept. of Natural Resources

July 21, 2010; 6:30 PM

Ocean Pines Library
11107 Cathell Road
Berlin, Maryland

Contact: Steve Doctor (410) 213-1531

Delaware Dept. of Natural Resources and Environmental Control

July 28, 2010; 7:00 PM

Richardson and Robbins Building
Auditorium
89 Kings Highway

Virginia Marine Resources Commission

July 7, 2010; 6:00 PM

2600 Washington Avenue
4th Floor
Newport News, Virginia

Contact: Jack Travelstead (757) 247-2247

If you would like to submit comment in writing, please use the contact information below.

Mail: Braddock Spear
Atlantic States Marine Fisheries Commission
1444 'Eye' Street, Northwest, 6th Floor
Washington, D.C. 20005

Email: bspear@asmfc.org
(Subject line: HSC Draft Addendum VI)
Fax: (202) 289-6051

If you would like more information, please call Braddock Spear at (202) 289-6400.

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ASMFC's Addendum Process and Timeline

The development of Addendum VI to the Horseshoe Crab Fishery Management Plan will follow the general process outlined in Figure 1. Tentative dates are included to illustrate the timeline of the addendum process.

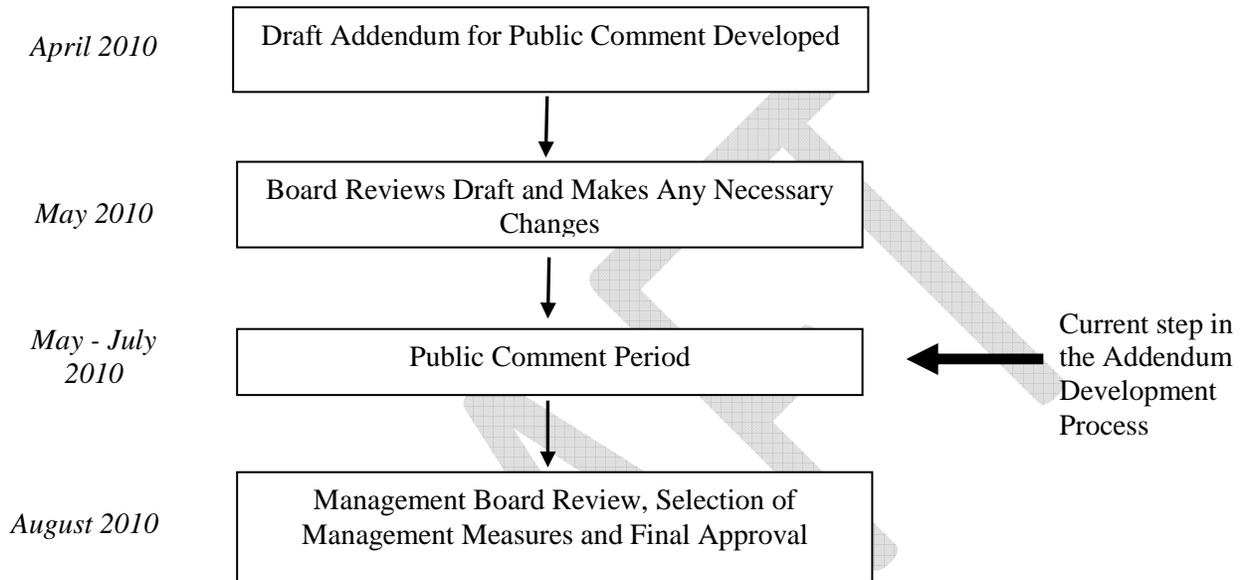


Figure 1. Addendum VI process and tentative timeline

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1.0 Introduction

The Horseshoe Crab Management Board approved the Interstate Fishery Management Plan for Horseshoe Crab (FMP) in October 1998. The goal of the FMP includes management of horseshoe crab populations for continued use by: current and future generations of the fishing and non-fishing public, including the biomedical industry, scientific and educational researchers; migratory shorebirds; and, other dependent fish and wildlife, including federally listed sea turtles. The Atlantic States Marine Fisheries Commission maintains primary management authority for horseshoe crabs in state and federal waters. The management unit for horseshoe crabs extends from Maine through the east coast of Florida.

Additions and changes to the FMP have been adopted by the Horseshoe Crab Management Board through various addenda. The Board approved Addendum I (2000) establishing a coastwide, state-by-state annual quota system to reduce horseshoe crab landings. Through Addendum I the Board recommended to the federal government the creation of the Carl N. Schuster Jr. Horseshoe Crab Reserve, an area of nearly 1,500 square miles in federal waters off the mouth of Delaware Bay that is closed to horseshoe crab harvest. The Reserve was established in 2000 and remains in effect to this day. The Board approved Addendum II (2001) establishing criteria for voluntary quota transfers between states.

Addenda III (2004), IV (2006), and V (2008) required additional restrictions on the harvest of horseshoe crabs of Delaware Bay origin. The provisions of Addendum V are set to expire after October 31, 2010.

The Board initiated Draft Addendum VI to develop and establish a management program for the Delaware Bay Region (i.e., coastal and bay waters of New Jersey and Delaware, and coastal waters only of Maryland and Virginia) to follow Addendum V after it expires. The purpose of this document is to provide context for the Board's decisions and solicit public comment on the management options therein.

2.0 Management Program

2.1 Statement of the Problem

This Addendum responds to the ongoing public concern regarding the horseshoe crab population and its ecological role in the Delaware Bay, specifically its connection to the red knot population. The 2009 Horseshoe Crab Stock Assessment concluded that crab abundance in the Southeast and Delaware Bay Regions has increased and in the New York and New England Regions has decreased, over the respective time series. Since the 2008 fishing season, New York and Massachusetts adjusted their state regulations to provide further protection to the horseshoe crab resource and maintain a sustainable fishery.

While horseshoe crab abundance in the Delaware Bay Region continues rebuilding, the red knot (*rufa* subspecies), one of many shorebird species that feed on horseshoe crab eggs, is at low population levels. Red knots have shown no sign of recovery (Niles et al. 2008), despite a nearly 80% reduction in horseshoe crab landings since 1998 (Figure 2). Technical advisors recommend continued precautionary management.

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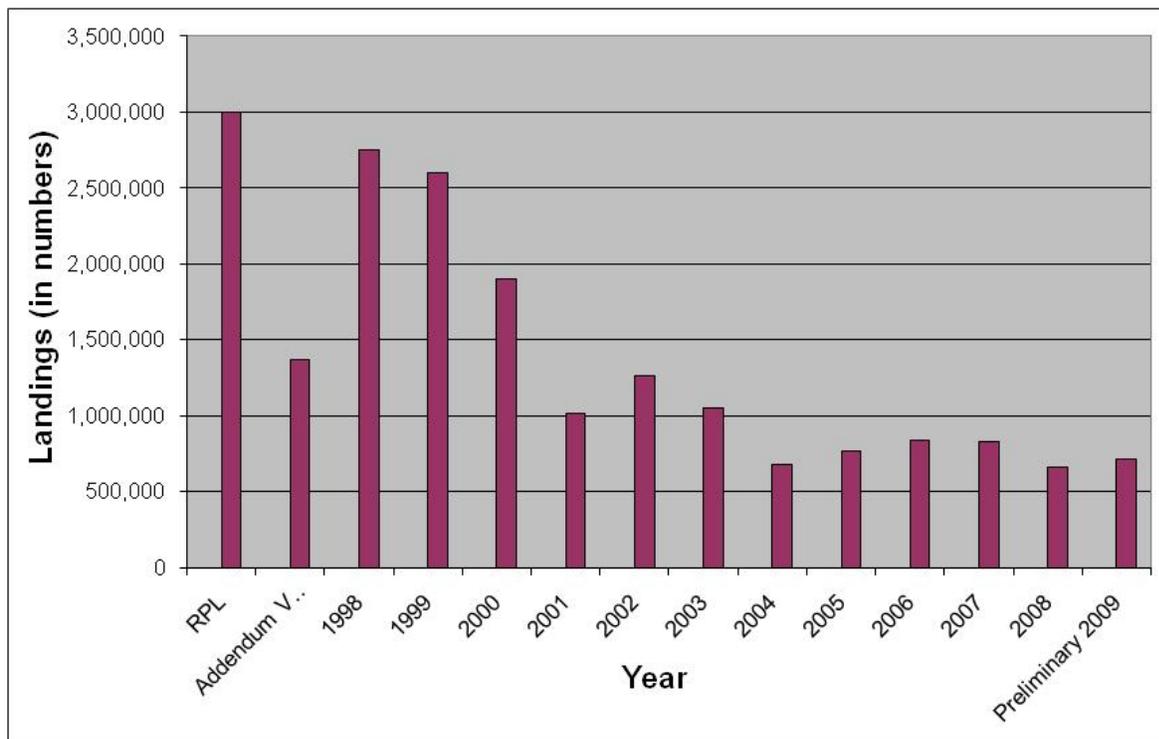


Figure 2. Atlantic Coastwide Landings of Horseshoe Crabs for Bait. [RPL = Reference Period Landings, used as a basis to setting reduced state quotas in Addendum I; Addendum V = Coastwide horseshoe crab harvest quota established by that addendum.]

2.2 Background

Provisions of the current Addendum V expire after October 31, 2010. In order to adopt provisions through the addendum process and avoid a reversion of management to Addendum III, the Board initiated the development of Draft Addendum VI at its February 2010 meeting. The 2009 Horseshoe Crab Stock Assessment and Peer Review Reports provide managers information and recommendations to guide their decision making. In addition, an Adaptive Resource Management (ARM) Framework was completed and accepted by the peer reviewers and Board. The ARM Framework can help give managers guidance as they set future horseshoe crab harvest regulations with multispecies objectives, particularly red knot rebuilding, in the Delaware Bay Region (i.e., coastal and bay waters of New Jersey and Delaware, and coastal waters only of Maryland and Virginia).

2.2.1 ARM Framework

A goal of the ARM Framework is to transparently incorporate views of stakeholders and utilize predictive modeling to assess the potential consequences of multiple, alternative management actions in the Delaware Bay Region (i.e., coastal and bay waters of New Jersey and Delaware, and coastal waters only of Maryland and Virginia).

The ARM process involves several steps: 1) identifying management objectives and potential actions to be considered, 2) building a set of alternative models that make predictions about how a system will respond to the management actions and establishing confidence values in those

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models, 3) implementing management actions based on those predictions, 4) monitoring to evaluate how the populations respond to the management actions and assess the accuracy of model predictions to update model confidence values and improve future decision making, 5) as necessary incorporating new data into the models to generate updated, improved predictions, and 6) revising management actions as necessary to reflect the latest state of knowledge about the ecosystem. ARM is an iterative process that adapts as new information is gathered and the effects of management actions are evaluated (Figure 3).

Within this ARM Framework, a set of alternative multispecies models have been developed for the Delaware Bay Region to predict the optimal strategy for horseshoe crab bait harvest that would allow enough eggs to be available for red knot population needs. These models incorporate uncertainty in model predictions and will be updated with new information as monitoring progresses.



Figure 3: Double loop learning process of adaptive management (Williams et. al 2007)

The ARM Framework incorporates horseshoe crabs from the Delaware Bay Region as one unit. At this time, the modeling and optimization portions of the Framework do not address distribution and allocation of the harvest among states. However, with further model development, an allocation scheme could be incorporated. The current quota alternatives for horseshoe crab harvest as bait developed through the set-up phase are:

- 1) Full harvest moratorium on both sexes
- 2) Harvest up to 250,000 males and 0 females
- 3) Harvest up to 500,000 males and 0 females
- 4) Harvest up to 280,000 males and 140,000 females
- 5) Harvest up to 420,000 males and 210,000 females

Again, the numbers of horseshoe crabs in the alternatives listed above are totals for the Delaware Bay Region, and not per state. Harvest alternative #4 approximately reflects current bait harvest allowance in the region. Based on tagging (Swan 2005) and genetic analysis (Pierce et al. 2000),

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there is very little exchange between Chesapeake Bay and Delaware Bay populations. However, there is movement of horseshoe crabs between coastal embayments (from New Jersey through Virginia) and Delaware Bay. All horseshoe crabs harvested and landed in New Jersey and Delaware are considered crabs of Delaware Bay origin. ASMFC technical advisors are currently working to estimate the proportion of Maryland and Virginia landings that are crabs of Delaware Bay origin. In addition, they will recommend options for calculating an allocation of crabs among the four states.

2.3 Management Options

The Board may select a management option contained in this draft document or an option that is within the range of options presented below.

Option 1: No Action (Revert to Addendum III provisions)

If the Management Board chooses to not take action on Draft Addendum VI, horseshoe crab management for the Delaware Bay Region would revert to the Commercial Fisheries Management provisions of Addendum III. Addendum III permitted annual bait harvest and landing of up to 150,000 crabs total (male and female) in New Jersey and Delaware, and an annual bait harvest and landing of up to 170,653 crabs total (male and female) in Maryland. In addition, for these three states Addendum III prohibited harvest and landing for bait from May 1 through June 7.

Option 2: Status Quo (Continuation of Addendum V management provisions)

This option prohibits directed bait harvest and landing of all horseshoe crabs in New Jersey and Delaware from January 1 through June 7, and female horseshoe crabs in New Jersey and Delaware from June 8 through December 31. It also limits New Jersey and Delaware's bait harvest to 100,000 horseshoe crabs (male only) per state per year.

It also prohibits directed harvest and landing of horseshoe crabs for bait in Maryland from January 1 through June 7, and the landing of horseshoe crabs in Virginia from federal waters from January 1 through June 7. No more than 40% of Virginia's annual quota may be harvested east of the COLREGS line in ocean waters. It also requires that horseshoe crabs harvested east of the COLREGS line and landed in Virginia must be comprised of a minimum male to female ratio of 2:1.

If the status quo management program is adopted, the Board would also adopt one of the following options:

Option 2a: These provisions are to expire one year after the date of implementation.

Option 2b: These provisions are to expire three years after the date of implementation.

Option 2c: These provisions are to expire five years after the date of implementation.

Option 2d: These provisions are to remain in place until replaced through another addendum process.

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Option 3: Management Using the Adaptive Resource Management (ARM) Framework

At the August 2010 Board meeting, the ARM Subcommittee will present the optimal harvest package (from the list below) as identified by the models.

- 1) Full harvest moratorium on both sexes
- 2) Harvest up to 250,000 males and 0 females
- 3) Harvest up to 500,000 males and 0 females
- 4) Harvest up to 280,000 males and 140,000 females
- 5) Harvest up to 420,000 males and 210,000 females

If the Board adopts the ARM option, then they would decide which of the above harvest package to adopt.

After adopting a harvest package, the Board would then need to decide on allocation of the bait harvest quota among the four states (New Jersey through Virginia) that comprise the Delaware Bay Region as defined in this document. All harvest and landings of horseshoe crabs in New Jersey and Delaware are considered crabs of Delaware Bay origin. Therefore, no quota above what the Board allocates those states will be issues. However, it is believed only a portion of harvest and landings in Maryland and Virginia are considered crabs of Delaware Bay origin. [ASMFC technical advisors are currently working on methodologies for calculating Delaware Bay crab allocations among the four states and as well as any additional quota for Maryland and Virginia that are crabs not from the Delaware Bay population. They will present these options to the Board in August.]

As illustrated in Figure 3, the cycles within the ARM Framework are the *set-up phase* and the *iterative phase*. One full *set-up phase* has already been completed. However, if this option is chosen, another run through the *set-up phase* using a deliberate and inclusive process may be warranted. This process would be carried out during the first year of implementation. Then the *set-up phase* would be carried out on a cycle of every three to four years and will include:

- Solicit formal stakeholder input on ARM Framework to be provided to TCs
- TCs review stakeholder input and technical components of ARM models; make recommendations to the Board
- At the Spring meeting, Board selects final components of the ARM Framework, and tasks TCs to work with ARM Working Group to conduct models runs/optimization
- Merge with the *iterative phase*
 - In July, ARM Working Group runs models/optimization
 - At the Summer Meeting, the Board revisits harvest decision

The *iterative phase* includes:

- Board decides harvest limits through normal ASMFC voting procedures
- Delaware Bay Ecosystem Technical Committee compiles monitoring data for horseshoe crab and red knot populations
- ARM Subcommittee runs models/optimization to assess whether harvest limits should be adjusted
- Board revisits harvest limit decision

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If this ARM Framework option is chosen, the cycle can be initiated at the August Board meeting. It is also possible, and perhaps advisable, to initiate the cycle during the Winter Board meeting. This *iterative phase* can occur at a range of time frequencies:

Option 3a: Through a vote, the Board sets a harvest limit annually for a period of one year.

Option 3b: Through a vote, the Board sets an annual harvest limit once every two years. However, if new information becomes available that may warrant a change in harvest limit, the Board maintains the ability to revisit its decision at any point in time.

Option 3c: Through a vote, the Board sets an annual harvest limit once every three years. However, if new information becomes available that may warrant a change in harvest limit, the Board maintains the ability to revisit its decision at any point in time.

3.0 Compliance

Affected states must implement the measures contained in this Addendum no later than the following dates:

September 1, 2010: States must submit state programs to implement Addendum VI, including management and monitoring programs, for approval by the Management Board.

November 1, 2010: States with approved management and monitoring programs shall begin implementing Addendum VI.

4.0 Literature Cited

Niles, L. J., H. P. Sitters, A. D. Dey, P. W. Atkinson, A. J. Baker, K. A. Bennett, R. Carmona, K. E. Clark, N. A. Clark, C. Esposito, P. M. Gonzalez, B. A. Harrington, D. E. Hernandez, K. S. Kalasz, R. G. Lathrop, Ricardo N. Matus, C. D. T. Minton, R. I. G. Morrison, M. K. Peck, W. Pitts, R. A. Robertson and I. L. Serrano. 2008. Status of the Red Knot in the Western Hemisphere. *Studies in Avian Biology* No. 36.

Pierce, J., G. Tan, and P. Gaffney. 2000. Delaware Bay and Chesapeake Bay populations of the horseshoe crab *Limulus polyphemus* are genetically distinct. *Estuaries* 23: 690-698.

Swan, B. L. 2005. Migrations of adult horseshoe crabs, *Limulus polyphemus*, in the middle Atlantic bight: a 17-year tagging study. *Estuaries* 28: 28-40.

Williams, B. K., R. C. Szaro, and C. D. Shapiro. 2007. Adaptive management: the US Department of the Interior technical guide. Adaptive Management Working Group, U.S. Department of the Interior, Washington, DC.