

Public comment on the Atlantic States Marine Fisheries Commission's "Draft Addendum VII to the Interstate Fishery Management Plan for Horseshoe Crabs: Adaptive Resource Management Framework."

The Wetlands Institute
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Introduction

The Wetlands Institute is a 501(c) (3) organization located on the Cape May peninsula (southernmost point in New Jersey). Our Board members, staff, members, and volunteers are dedicated to promoting stewardship, understanding, and appreciation of coastal and wetlands ecosystems through our programs in research, conservation, and education. Horseshoe crabs (*Limulus polyphemus*) have long been a focus of our activities. Since 1991, the Wetlands Institute has brought scientists and volunteer citizens together to help conduct censuses of the breeding horseshoe crab population of the Delaware Bay, under a 1990 Delaware Sea Grant Program. These census are central to our understanding and responsible management of this ancient marine organism.

Context of the Problem

As the Commission recognizes, the status of Delaware Bay-origin horseshoe crab populations has repercussions reaching well beyond the abundance of one species. For example, gastrointestinal analyses of federally-endangered loggerhead sea turtles indicate that horseshoe crabs are an important food source for turtles inhabiting Delaware Bay, as well as Chesapeake Bay (Keinath and Musick, 1991).

In addition, the Delaware Bayshore region was recently recognized by the National Audubon Society as a Globally Significant Important Bird Area (IBA) (New Jersey Audubon, 2011). This designation is due, in part, to the region's importance as a stopover for migratory shore birds, some of which are imperiled. These birds rely on an abundance of horseshoe crab eggs as a primary food source during their northward migrations each spring. The flagship species for this ecological link, the Red Knot (*Calidris canutus rufa*), was added to the list of Federal candidate species in 2006. It is expected that a "Proposed Rule / Proposed Critical Habitat will be published in the Federal Register by late 2012 for public comment" (<http://www.fws.gov/northeast/njfieldoffice/Endangered/redknot.html>).

Task 1.9 in the Atlantic States Marine Fisheries Commission (ASMFC) 2011 Action Plan states that the Commission will "evaluate interactions and minimize impacts on protected species." The ASMFC should consider the Red Knot a federally protected species since it is likely that it will become federally protected during the later phases of applying Addendum VII to the Interstate Fishery Management Plan for Horseshoe Crabs.

Although the relationship between Red Knots and horseshoe crabs is "imperfectly known," Niles et al, 2007, suggest that reduced availability of horseshoe crab eggs directly impacts the ability for Red Knots to gain the mass necessary to successfully reproduce in their Arctic nesting grounds (Niles et al., 2007). Unfortunately, horseshoe crab egg density estimates on Delaware Bay beaches indicate that there are much fewer eggs available each spring than are necessary to begin recovering the Red Knot population. This is largely due to the fact that horseshoe crab numbers remain historically low (Niles et al., 2009).

McGowan et al., 2011, also suggest that there is a link between red knot mass and annual survival; and that “managing horseshoe crab resources in Delaware Bay has the potential to improve red knot populations”. It is the ASMFC’s responsibility to make management decisions that will improve horseshoe crab populations and, subsequently, begin to rebuild Red Knot populations.

Despite the ecological and economic importance of horseshoe crabs, scientists did not know much about its population status until relatively recently. Even in the August 2011 ASMFC Stock Status Overview, horseshoe crab populations were defined as being in “unknown” condition. ASMFC 2011 Action Plan *Task 1.5* states that the Commission will “manage responsibly when facing uncertainty.”

Wetlands Institute’s Position

Due to the uncertainty concerning the fate of ecologically linked, and at-risk, species like horseshoe crabs, marine sea turtles, Red Knots and other migratory shorebirds, we implore the Commission to implement an Addendum VII to the Interstate Fisheries Management Plan for Horseshoe Crabs that is responsible, risk-averse, and focuses on the long-term sustainable recovery of horseshoe crab populations within their entire range.

Such an approach requires that there should not be an allowable harvest of Delaware Bay-origin horseshoe crabs under any circumstances until their populations rebound to historic levels. Horseshoe crabs occupy a critical niche in both the ecology of Delaware Bay and human pharmacology. They provide incalculable services and their population decline has catastrophic implications. Every feasible action to protect this at-risk species should be taken.

Responses to questions for public comment:

1) Should the Board take no action and have management measures revert back to Addendum III?

Addendum III does not limit Virginia harvest east of the COLREGS line, resulting in over 91,000 more crabs being harvested each year (ASMFC, 2011). In addition, Addendum III allows for a longer harvest season which would make enforcement of regulations more difficult. Reverting back to Addendum III is a relatively risk-inclined option, and should not be supported by the ASMFC according to the ASMFC’s 2011 Action Plan which encourages responsible management “when facing uncertainty”. (Uncertainty regarding the status of horseshoe crab populations was established by the ASMFC 2011 Stock Status Overview, which defines the status of horseshoe crab populations as “unknown”.)

2) Should the Board take action and extend the status quo management measures under Addendum VI?

Since 2004, the total annual harvest of horseshoe crabs has not decreased (Niles et al, 2011, as per the National Marine Fisheries Service’s Commercial Fishery Landings Database 2009). As a result, horseshoe crab egg density estimates on Delaware Bay beaches are well under the target density needed to rebuild the Red Knot population, which, over the past fifteen years, has declined dramatically (McGowan et al. 2011, Niles et al 2009). It is likely that the Red Knot will become a Federally-listed species by the end of 2012. According to the ASMFC’s 2011 Action Plan, efforts should be made to “evaluate [species] interactions and minimize impacts on protected species”. A recent study from McGowan et al. 2011 suggests that “managing horseshoe crab resources in Delaware Bay has the

potential to improve Red Knot populations”. While Addendum VI (status quo) was an improvement to Addendum III, stricter regulations are necessary to recover horseshoe crab populations and, subsequently, begin to rebuild migratory shorebird populations. Thus, it seems necessary to increase the status quo harvest restrictions on horseshoe crabs.

3) *Should the Board take action and implement the Adaptive Resource Management Framework?*

We support implementation of the Adaptive Resource Management (ARM) Framework, but using the most cautious criteria. Under the ARM Framework, it is possible to further protect horseshoe crabs and the species directly impacted by their prominence. With advancing technological capabilities, ecological model-based management should become increasingly sophisticated and reliable. However, it is our responsibility to manage natural resources using extreme caution, especially when managing “unknown,” not to mention imperiled, conditions.

In addition, according to the ASMFC 2011 Action Plan *Task 2.1.1*, efforts should be made to “develop quantitative assessments for species of unknown stock status” with the intention of establishing a known stock status condition. If there are insufficient data available to implement the ARM Framework in any year, then extreme caution should be applied to that year’s harvest allowance.

If so,

a. *How much of each state’s harvest is comprised of Delaware Bay-origin crabs, Lambda λ ?*

The ASMFC is tasked with managing responsibly when facing uncertainty. Proposed Lambda values based on tagging data are limited in the amount of information they reliably provide for determining the degree of population mixing along the coast because “much of the tagging and recapture data fall within [the] parameters” that exclude them from being used in analysis (ASMFC, 2011).

We concluded that using genetic markers to determine Lambda may be more reliable than using tagging data because there are fewer restrictive parameters to limit the use of the results. However, the Delaware Bay Ecosystem Technical Committee, who performed the genetic analysis, noted that low levels of genetic mixing can “maintain genetic similarity” (ASMFC, 2011). So, it is fair to assume that the Lambda values based on genetic analysis represent a Lambda value that is still below the actual value.

It would be more responsible to begin the ARM Framework using the risk-averse options for Lambda, which are the Default values of 1.0 for New Jersey, Delaware, Maryland, and Virginia. As the ARM Framework develops and scientists learn more about these populations, Lambda values might be adjusted.

b. *On what basis should the total recommended ARM harvest output be divided among the four states of New Jersey, Delaware, Maryland, and Virginia (weight allocation- w_i)?*

Four weighing systems are being considered for apportioning harvest output, which are based on: 1) the average landings over the past four years; 2) estimated abundance levels; 3) current management quotas; and 4) historic harvest levels (Reference Period Landings, RPLs).

Using the past four years’ average landing to determine harvest output per state would result in a distorted weight allocation because New Jersey has claimed 0 % of harvest output over the past four years, which might result in added pressure on other states’ resources.

Current estimated abundance levels are determined using the Virginia Tech Horseshoe Crab Trawl Survey, which is “not specifically designed” to estimate harvest output per state (ASMFC, 2011). In addition, using this measure might put added pressure on Delaware Bay-origin crabs because the estimate does not take Lambda into account, thereby effectively devaluing Delaware Bay-origin crabs.

Historically, Delaware Bay had a thriving horseshoe crab fishery. Using historical, unregulated levels (RPLs) of horseshoe crab harvest to determine current harvest allocation might put too much pressure on a currently vulnerable and valuable Delaware Bay-origin population.

Current management quotas were established based on an at-risk population and place a greater value on protecting Delaware Bay-origin crabs. This option should be used to apportion harvest output as it takes into consideration the importance of protecting horseshoe crabs and is based on current knowledge. It should be a goal of the ASMFC to restore horseshoe crab populations to their historic levels by responsibly managing the at-risk fishery.

- c. Should there be an overall cap placed on Maryland and Virginia’s harvest to protect non-Delaware Bay-origin horseshoe crabs (harvest cap)?*

As referenced in “Draft Addendum VII to the Interstate Fishery Management Plan for Horseshoe Crabs,” New York and Massachusetts had to adjust their regulations on horseshoe crab harvest in 2008 as a result of increased harvest pressure due to stricter harvest restrictions in Delaware Bay. With stricter regulations placed on harvesting Delaware Bay-origin horseshoe crabs, it is fair to assume that there will be pressure to offset those losses by increasing harvest of horseshoe crabs elsewhere, especially Maryland and Virginia. Preemptive actions should be implemented to protect non-Delaware Bay-origin crabs from exploitation.

- d. Should there be an allowable harvest of Delaware Bay-origin horseshoe crabs for Maryland and Virginia if the ARM-recommended harvest option requires a moratorium on one or both genders (Delaware Bay Stock Allowance)?*

There should not be an allowable harvest of Delaware Bay-origin horseshoe crabs under any circumstances until their populations rebound to historic levels. Horseshoe crabs occupy a critical niche in both the ecology of Delaware Bay and human pharmacology. They provide incalculable services and their population decline has catastrophic implications. Every feasible action to protect this at-risk species should be taken. We hope the ASMFC will implement a fisheries management plan for horseshoe crabs that is responsible, risk-averse, and focuses on the long-term sustainable recovery of horseshoe crab populations within their entire range.

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