



STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL

OFFICE OF THE
SECRETARY

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Secretary's Order No.: **2013-F-0005**

RE: Approving Amendments to 7 DE Admin. Code 3214:
Horseshoe Crab Annual Harvest Limit

Date of Issuance: March 7, 2013

Effective Date of the Amendment: April 11, 2013

I. Background:

A public hearing was held on Wednesday, January 23, 2013, at 6:00 p.m. at the DNREC Richardson & Robbins Building Auditorium to receive comment on the Department's proposal to amend 7 DE Admin. Code 3214, Horseshoe Crabs – Annual Harvest Limit. The Department is proposing these regulation amendments to establish the basis for setting Delaware's annual sex-specific horseshoe crab allocation(s). Furthermore, this action seeks to establish criteria for closing the fishery in a manner that would minimize the likelihood of exceeding annual quotas.

Horseshoe crabs are managed under an Interstate Fisheries Management Plan ("IFMP") developed and implemented by the Atlantic States Marine Fisheries Commission ("ASMFC"), of which Delaware is fully represented. Addendum VII to the IFMP instituted an Adaptive Resource Management ("ARM") framework for establishing annual horseshoe crab sex-specific quotas in the Delaware Bay Region. The

Delaware's Good Nature depends on you!

ARM framework transparently incorporates the views of stakeholders along with predictive modeling to assess the potential consequences of multiple, alternative management actions in the Delaware Bay Region. The annual specification process determines the following year's ($t + 1$) harvest using horseshoe crab data from the previous year ($t - 1$) and shorebird data from the current year (t). Annual model outputs are reviewed by the ASMFC Technical Committees and Management Board prior to issuing state quota allocations. Should data be unavailable to populate the ARM model, quotas may be set at the Addendum VI levels or the previous year's ARM framework.

This proposed action would also establish measures for closing Delaware's horseshoe crab fishery. Presently, the Department lacks the ability to close the horseshoe crab fishery until landings reach the exact annual harvest limit. This method of closing the fishery fails to adequately consider the timeliness of harvest reporting and delinquent reporting. This has resulted in quota overages in some years. Overages pose a potential risk to horseshoe crab and shorebird resources. Further, overages must be deducted from the following year's quota and, therefore, may disadvantage harvesters or segments of the fishery the following year. Using the most recent landings data to predictively close the fishery upon reaching 95% of quota allocations will minimize the risk of harvest overages.

The Department has the authority to promulgate this proposed regulation amendment, pursuant to 7 Del. C. §2701. The proposed amendments to 7 DE Admin. Code 3214, Horseshoe Crabs – Annual Harvest Limit, were published in the January 1, 2013 edition of the *Delaware Register of Regulations*. It should be noted that the Department received no comment whatsoever from the public at any time during this

promulgation process, nor were any members of the public present at the time of the public hearing on January 23, 2013. Proper notice of the hearing was provided as required by law.

Subsequent to the public hearing held on January 23, 2013, the Department's presiding Hearing Officer, Lisa A. Vest, prepared her report and recommendation in the form of a Hearing Officer's Memorandum to the Secretary dated February 20, 2013, and that Report in its entirety is expressly incorporated herein by reference.

II. Findings:

The Department has provided sound reasoning with regard to the proposed amendments to 7 DE Admin. Code 3214, Horseshoe Crabs – Annual Harvest Limit, as reflected in the Hearing Officer's Memorandum of February 20, 2013, which is attached hereto and expressly incorporated into this Order in its entirety. Moreover, the following findings and conclusions are entered at this time:

1. The Department has jurisdiction under its statutory authority, 7 Del.C. §2701 to make a determination in this proceeding;
2. The Department provided adequate public notice of the proceeding and the public hearing in a manner required by the law and regulations;
3. The Department held a public hearing in a manner required by the law and regulations;

4. The Department has reviewed this proposed amendment in the light of the Regulatory Flexibility Act, and believes the same to be lawful, feasible and desirable, and that the recommendations as proposed should be applicable to all Delaware citizens equally;
5. Promulgation of the aforementioned proposed amendments to 7 DE Admin. Code 3214 will enable Delaware to comply with specific Fishery Management Plans approved by the Atlantic States Marine Fisheries Commission, specifically, to manage horseshoe crabs in accordance with Addendum VII to the FMP, which instituted an Adaptive Resource Management (ARM) framework for establishing annual horseshoe crab sex-specific quotas in the Delaware Bay Region;
6. The aforementioned proposed amendments to 7 DE Admin. Code 3214 will establish the basis for setting Delaware's annual sex-specific horseshoe crab allocation(s) and establish criteria for closing the fishery in a manner to minimize quota overages;
7. Additionally, utilization of Delaware's most recent landings data to predictively close the fishery upon reaching 95% of quota allocations will minimize the risk of harvest overages, which pose a potential risk to horseshoe crab and shorebird resources. Should Delaware's annual horseshoe crab quota allocation be exceeded in any calendar year, the overage must be deducted from the following year's allocation, thus keeping Delaware in compliance with the ASMFC's IFMP for Horseshoe Crab;

8. The Department has an adequate record for its decision, and no further public hearing is appropriate or necessary;
9. The Department's proposed regulation, as published in the January 1, 2013 *Delaware Register of Regulations* and set forth within Attachment "A" of the Hearing Officer's Memorandum and attached hereto, is adequately supported, not arbitrary or capricious, and is consistent with the applicable laws and regulations. Consequently, it should be approved as a final regulation, which shall go into effect ten days after its publication in the next available issue of the *Delaware Register of Regulations*; and
10. The Department shall submit the proposed regulation as a final regulation to the Delaware Register of Regulation for publication in its next available issue, and shall provide written notice to the persons affected by the Order.

III. Order:

Based on the record developed, as reviewed in the Hearing Officer's Memorandum dated February 20, 2013 and expressly incorporated herein, it is hereby ordered that the proposed amendments to 7 DE Admin. Code 3214, Horseshoe Crabs – Annual Harvest Limit be promulgated in final form in the customary manner and established rule-making procedure required by law.

IV. Reasons:

The promulgation of the amendments to 7 DE Admin. Code 3214, Horseshoe Crabs – Annual Harvest Limit will enable Delaware to remain in compliance with the provisions of the Atlantic States Marine Fisheries Commission, Addendum VII, to the Interstate Fishery Management Plan for Horseshoe Crab. Specifically, these regulation amendments will establish the basis for setting Delaware’s annual sex-specific horseshoe crab allocation(s) and establish criteria for closing the fishery in a manner to minimize quota overages, in accordance with an Adaptive Resource Management (ARM) framework for establishing annual horseshoe crab sex-specific quotas in the Delaware Bay Region.

Protection of the horseshoe crab here in Delaware is a responsibility which the Department does not take lightly. In developing this regulation, the Department has balanced the absolute environmental need for the State of Delaware to promulgate regulations concerning this matter with the important interests and public concerns surrounding the same, in furtherance of DNREC’s mission of responsible environmental stewardship to ensure the sustainability of Delaware’s natural resources for the appreciation and enjoyment of future generations.



Collin P. O'Mara
Secretary

MEMORANDUM

TO: The Honorable Collin P. O'Mara
Cabinet Secretary, Dept. of Natural Resources and Environmental Control

FROM: Lisa A. Vest 
Public Hearing Officer, Office of the Secretary
Department of Natural Resources and Environmental Control

RE: Proposed Amendments to 7 DE Admin. Code 3214:
Horseshoe Crabs – Annual Harvest Limit

DATE: February 20, 2013

I. **Background:**

A public hearing was held on Wednesday, January 23, 2013, at 6:00 p.m. at the DNREC Richardson & Robbins Building Auditorium to receive comment on the Department's proposal to amend 7 DE Admin. Code 3214, Horseshoe Crabs – Annual Harvest Limit. The Department is proposing these regulation amendments to establish the basis for setting Delaware's annual sex-specific horseshoe crab allocation(s). Furthermore, this action seeks to establish criteria for closing the fishery in a manner that would minimize the likelihood of exceeding annual quotas.

Horseshoe crabs are managed under an Interstate Fisheries Management Plan ("IFMP") developed and implemented by the Atlantic States Marine Fisheries Commission ("ASMFC"), of which Delaware is fully represented. Addendum VII to the IFMP instituted an Adaptive Resource Management ("ARM") framework for establishing annual horseshoe crab sex-specific quotas in the Delaware Bay Region. The ARM framework transparently incorporates the views of stakeholders along with predictive modeling to assess the potential consequences of multiple, alternative

management actions in the Delaware Bay Region. The annual specification process determines the following year's (t + 1) harvest using horseshoe crab data from the previous year (t - 1) and shorebird data from the current year (t). Annual model outputs are reviewed by the ASMFC Technical Committees and Management Board prior to issuing state quota allocations. Should data be unavailable to populate the ARM model, quotas may be set at the Addendum VI levels or the previous year's ARM framework.

This proposed action would also establish measures for closing Delaware's horseshoe crab fishery. Presently, the Department lacks the ability to close the horseshoe crab fishery until landings reach the exact annual harvest limit. This method of closing the fishery fails to adequately consider the timeliness of harvest reporting and delinquent reporting. This has resulted in quota overages in some years. Overages pose a potential risk to horseshoe crab and shorebird resources. Further, overages must be deducted from the following year's quota and, therefore, may disadvantage harvesters or segments of the fishery the following year. Using the most recent landings data to predictively close the fishery upon reaching 95% of quota allocations will minimize the risk of harvest overages.

The Department has the authority to promulgate this proposed regulation amendment, pursuant to 7 Del. C. §2701. The proposed amendments to 7 DE Admin. Code 3214, Horseshoe Crabs – Annual Harvest Limit, were published in the January 1, 2013 edition of the *Delaware Register of Regulations*. It should be noted that the Department received no comment whatsoever from the public at any time during this promulgation process, nor were any members of the public present at the time of the

public hearing on January 23, 2013. Proper notice of the hearing was provided as required by law.

II. Summary of Hearing Record:

At the time of the hearing on February 23, 2013, Stewart Michels of the Department's Division of Fish and Wildlife offered the Department's twelve (12) exhibits pertaining to these proposed amendments to 7 DE Admin. Code 3214, and this Hearing Officer entered them into the formal hearing record developed in this matter. Included within those Departmental exhibits was a copy of the Start Action Notice for this promulgation (SAN No. 2012-13), copies of the legal notices regarding the holding of this public hearing on January 23, 2013, a copy of the Atlantic States Marine Fisheries Commission's Addendum VII to the IFMP for Horseshoe Crab, a copy of the ASMFC's Stock Assessment Report No. 09-02 (Supplement B) regarding a framework for adaptive management of horseshoe crab harvest in the Delaware Bay, a copy of the ASMFC's Stock Assessment Report No. 09-02 regarding the terms of reference and advisory report to the Horseshoe Crab Stock Assessment Peer Review, a copy of the ASMFC's Stock Assessment Overview regarding Horseshoe Crabs, and a copy of the actual proposed amendments to Regulations 3214 as noted above.

For the benefit of the record developed in this matter, Mr. Michels then offered a brief summary of the horseshoe crab's current status, as set forth in the most recent ASMFC Delaware Bay Stock Assessment. The Department has been assessing the horseshoe crab population with two traditional fishery management models. The first type of model, known as the Surplus Production model, evaluates trends in all life stages combined, estimating total population size and fishing mortality. The results from this

model indicate that relative abundance decreased from 1991 to 2000, and then increased steadily from 2000 to the present time. Current relative biomass for horseshoe crabs in the Delaware Bay area is about equal to the 1996-97 levels; relative fishing mortality peaked in 1998-99, and has since declined. The current relative fishing mortality approximates the 1991 level.

The second type of model used by the Department to assess the population, known as the Catch Survey model, evaluates both pre-recruits and fully recruited ages of horseshoe crabs during the years 2001 to 2007. The data collected by this model estimated stock size for horseshoe crabs in the Delaware Bay area increased from 3 million to 9.6 million during this time period, while the exploitation rate fell from approximately 15% down to 1% for the horseshoe crab population in the Delaware Bay. Conclusions reached by the Department's Horseshoe Crab Peer Review panel, based on this data, were that horseshoe crab abundance appears to have increased in recent years, but still may be below the 1998 reference point, and below levels of the early 1990s.

Both the above models address only the horseshoe crab component of this multi-species management issue in Delaware, and do not include data on migratory shorebirds, which depend largely on horseshoe crab eggs to fuel their northward migration to their Artic breeding grounds. Thus, there was a great deal of speculative interpretation of the data collected from these two models. Since then, the ASMFC has developed an Adaptive Recourse Management ("ARM") model, which establishes some multi-species linkage. For example, instead of the red knot and the horseshoe crab being evaluated on independent tracts, the ARM model melds both species together and links them for review.

Mr. Michels stated that the ARM model is quite unique, as it requires a lot of stakeholder input to set objectives and to determine some parameters for management actions. Then, the model itself becomes an iterative process, where, as new data becomes available, it is input into the ARM, where it develops a “learning sequence” before eventually the objectives and management alternatives are reevaluated and revisited. Given this, the first task of the ASMFC with regard to utilization of this ARM model was to set the objectives, which, in this case, were to maximize the harvest of horseshoe crabs in the Delaware Bay, but with some constraints, as the ASMFC did not want to allow unregulated harvest of horseshoe crabs.

With a great deal of stakeholder input, the ASMFC determined that the harvested female is valued only when red knots exceeded an abundance threshold, which, in this case, was 45,000 red knots, or, when female horseshoe crabs exceeded a certain abundance threshold, which, in this case, was 11.3 million horseshoe crabs. Thus, only when either one of those two conditions was met would the ARM model allow a harvest of female horseshoe crabs. Similarly, the harvest of male horseshoe crabs is valued (or, allowed) only when males do not limit horseshoe crab production, which is when you have a greater than two-to-one operational sex ratio. In other words, as long as male abundance is greater than two-to-one males to females, the ARM model would allow some male harvest.

Using the ARM model, and with stakeholder input, the ASMFC developed five scenarios that could potentially be output as a result of the model input data: (1) a full moratorium on both the male and female horseshoe crabs; (2) allow the harvest of 250,000 males and no females; (3) allow the harvest of 500,000 males and no females;

(4) allow the harvest of 280,000 males and 140,000 females; and (5) allow the harvest of 420,000 males and 210,000 females. The ASMFC would then (1) build predictive models regarding how the system will respond to each management action; (2) implement these management actions based on the ARM model predictions; and then (3) monitor to evaluate the accuracy of the model. An opportunity to reevaluate, based on new data, and to update the predictions occurs at the end of this process, which in turn allows the ASMFC to revise the management actions as necessary. The ARM model also allows a number of alternative multi-species models to predict optimal harvest strategies.

This ARM model was reviewed by the ASMFC through its peer review process. The peer review findings determined that the modeling exercise went through a deliberative, stakeholder-sensitive process, and that there was rigorous scientific assessment of the critical uncertainties surrounding the linkage between horseshoe crab harvest management and red knot conservation. The ASMFC's peer review panel endorsed a shift toward a management strategy for Delaware Bay horseshoe crabs that attempts to balance potentially conflicting objectives for horseshoe crab exploitation and red knot conservation while seeking to reduce uncertainty about the linkage between the two species. The peer review also found a thorough and appropriate job of using available data and published models and analyses to inform the development of the alternative models. Thus, the ASMFC's peer review panel certainly endorsed the concept of the utilization of the ARM model for species management.

Subsequently, Addendum VII to the IFMP for Horseshoe Crab formally adopted the use of the ARM model for management in the Delaware Bay region. Without the adoption of this model, harvest of this species would have reverted to the Addendum III

levels, which, in Delaware's case, were 150,000 horseshoe crabs of either sex. In support of the adoption of Addendum VII, DNREC hosted an ASMFC public hearing on draft Addendum VII on January 6, 2012. Addendum VII was approved by the ASMFC's Management Board on February 9, 2012. The Board approved the annual specifications on October 25, 2012, which then laid the basis for the DNREC public hearing which took place regarding this matter on January 23, 2013, as noted above.

Based on the outputs of the ARM model, the current management option for the optimal harvest strategy allowed is a 500,000 male-only harvest. No female horseshoe crabs can be harvested from the Delaware Bay area. That management option would yield a harvest of 162,136 male horseshoe crabs for the State of Delaware in the year 2013. However, it is important to note that Delaware exceeded its ASMFC allocation by 255 male horseshoe crabs in 2012. Therefore, Delaware's final allocation will be 161,881 male horseshoe crabs.

The proposed amendments to Delaware's Horseshoe Crab Regulations (7 DE Admin. Code 3214) will enable the Department to manage this species as follows: Section 1 establishes the process to determine Delaware's annual quota, which is authorized by the ASMFC; Section 2 allows the Department to begin to shut down the fishery once 95% of the annual harvest has been achieved (DNREC would close the fishery based on recent fishery performance, and how fast landings are coming in. The proposed language would allow the Department to provide a date and time on which to shut down that fishery, thereby (hopefully) preventing quota overages); and Section 3, in the event that a quota overage does occur, will make it explicit that Delaware will subtract from the subsequent year's quota any overages that occur in the present year.

For the Secretary's review, and in order for the Secretary to gain a thorough understanding of this proposed promulgation, copies of the above-referenced proposed amendments are attached hereto as Appendix "A", and the same are expressly incorporated into this Hearing Officer's Report. It should be noted that the Department adhered to all appropriate Delaware statutes and the regulatory development process in this matter, and that the Department has met the required public notice obligations regarding this proposed amendment. It should also be noted that the Department has reviewed these proposed amendments in the light of the Regulatory Flexibility Act, and believes the same to be lawful, feasible and desirable, and that the recommendations as proposed should be applicable to all Delaware citizens equally.

III. Conclusions and Recommendations:

Based on the record developed in this matter, I conclude that the Department has provided appropriate reasoning regarding the need for the proposed amendments to 7 DE Admin. Code 3214, Horseshoe Crabs – Annual Harvest Limit. Accordingly, I recommend promulgation of these proposed amendments in the customary manner provided by law.

Further, I recommend the following findings:

1. The Department has jurisdiction under its statutory authority, 7 Del.C. §2701, to make a determination in this proceeding;
2. The Department provided adequate public notice of the public hearing in a manner required by the law and regulations;
3. The Department held a public hearing in a manner required by the law and regulations;

4. The Department has reviewed these proposed amendments in the light of the Regulatory Flexibility Act, and believes the same to be lawful, feasible and desirable, and that the recommendations as proposed should be applicable to all Delaware citizens equally;
5. Promulgation of the aforementioned proposed amendments to 7 DE Admin. Code 3214 will enable Delaware to comply with specific Interstate Fishery Management Plans approved by the Atlantic States Marine Fisheries Commission, specifically, to manage horseshoe crabs in accordance with Addendum VII to the FMP, which instituted an Adaptive Resource Management (ARM) framework for establishing annual horseshoe crab sex-specific quotas in the Delaware Bay Region;
6. The aforementioned proposed amendments to 7 DE Admin. Code 3214 will establish the basis for setting Delaware's annual sex-specific horseshoe crab allocation(s) and establish criteria for closing the fishery in a manner to minimize quota overages;
7. Additionally, utilization of Delaware's most recent landings data to predictively close the fishery upon reaching 95% of quota allocations will minimize the risk of harvest overages, which pose a potential risk to horseshoe crab and shorebird resources. Should Delaware's annual horseshoe crab quota allocation be exceeded in any calendar year, the overage must be deducted from the following year's allocation, thus keeping Delaware in compliance with the ASMFC's IFMP for Horseshoe Crab;

8. The Department has an adequate record for its decision, and no further public hearing is appropriate or necessary;
9. The Department's proposed amendments to this regulation, as published in the January 1, 2013 *Delaware Register of Regulations* and as set forth within Appendix "A" hereto, are adequately supported, not arbitrary or capricious, and are consistent with the applicable laws and regulations. Consequently, they should be approved as final regulation amendments, which shall go into effect ten days after their publication in the next available issue of the *Delaware Register of Regulations*; and
10. The Department shall submit the proposed regulation amendments as final to the *Delaware Register of Regulation* for publication in its next available issue, and shall provide written notice to the persons affected by the Order.



LISA A. VEST
Public Hearing Officer

APPENDIX "A"

3214 Horseshoe Crab Annual Harvest Limit

(Penalty Section 7 Del.C. §2705(b))

- 1.0 The annual harvest ~~limit~~limits for horseshoe crabs taken and/or landed in the State shall be ~~100,000 male horseshoe crabs for a period extending from November 1, 2010 through April 30, 2013, or whatever the Atlantic States Marine Fisheries Commission has approved as Delaware's current annual quota. No female horseshoe crabs may be taken/landed at any time~~determined in accordance with the annual sex-specific allocations identified in Addendum VII to the Atlantic States Marine Fisheries Commission's Interstate Fishery Management Plan for Horseshoe Crab.

- 2.0 When the Department has determined that ~~the 95% of an annual sex-specific horseshoe crab quota~~ allocation has been ~~met~~ landed, the Department shall establish, based on recent fishery performance and landings, a date and time to order that component of the horseshoe crab fishery closed, and no further horseshoe Horseshoe crabs of the component specified may not be taken during the remainder of the calendar year once closed by the Department.

- 3.0 Any overage in the State's annual horseshoe crab quota will be subtracted from the following year's horseshoe crab quota allocation.

7 DE Reg. 220 (8/1/03)

10 DE Reg. 1029 (12/01/06)

11 DE Reg. 685 (11/01/07)

12 DE Reg. 975 (01/01/09)

14 DE Reg. 904 (03/01/11)

