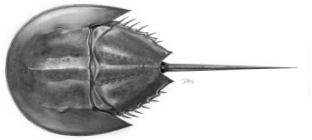
Horseshoe Crab Technical Committee Report

Presented to Horseshoe Crab Management Board

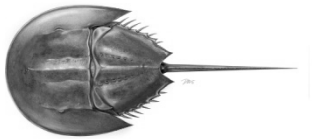
November 5, 2015



Overview

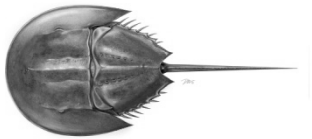
Four parts to presentation

1. ARM Framework Optimal Harvest Recommendation for 2016 season
2. Maryland alternative harvest proposal for 2016
3. Review of Horseshoe Crab Surveys
4. Review of Shorebird Survey



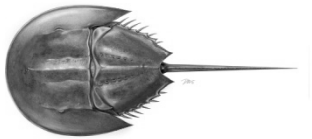
ARM Framework Optimal Harvest Recommendation for 2016 season

- VT trawl survey not conducted in recent years
- Composite Index
- Red Knot mark-resight population estimate
- ARM subcommittee & TCs recommend that the ARM Model go through ‘double loop’ review



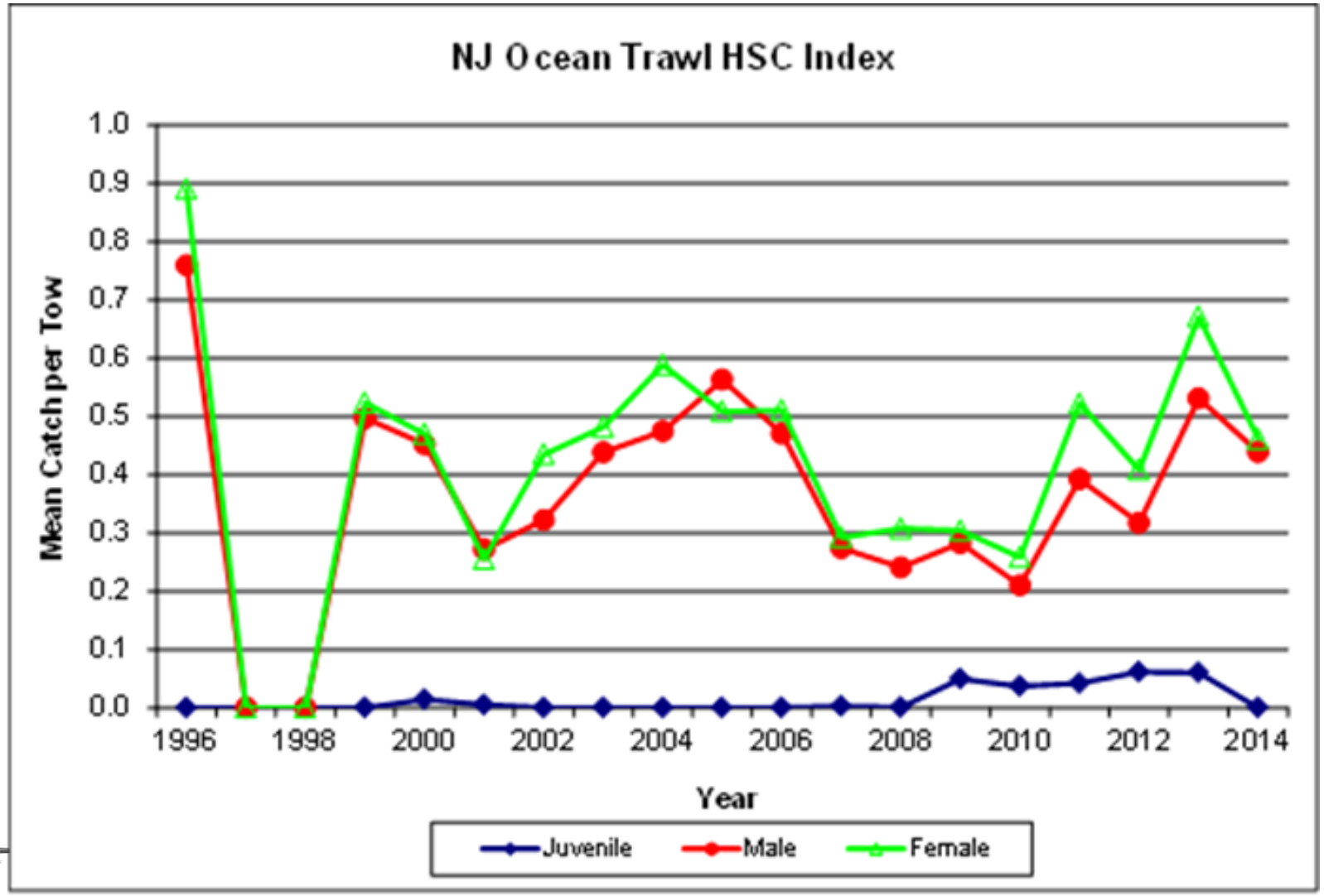
Maryland Harvest Proposal

- **Reduced quota (170,653) to allow female harvest (34,130)**
- **TC noted small harvest of DE Bay population**
  - **Technically not consistent with ARM output**
  - **Concern over precedent setting**

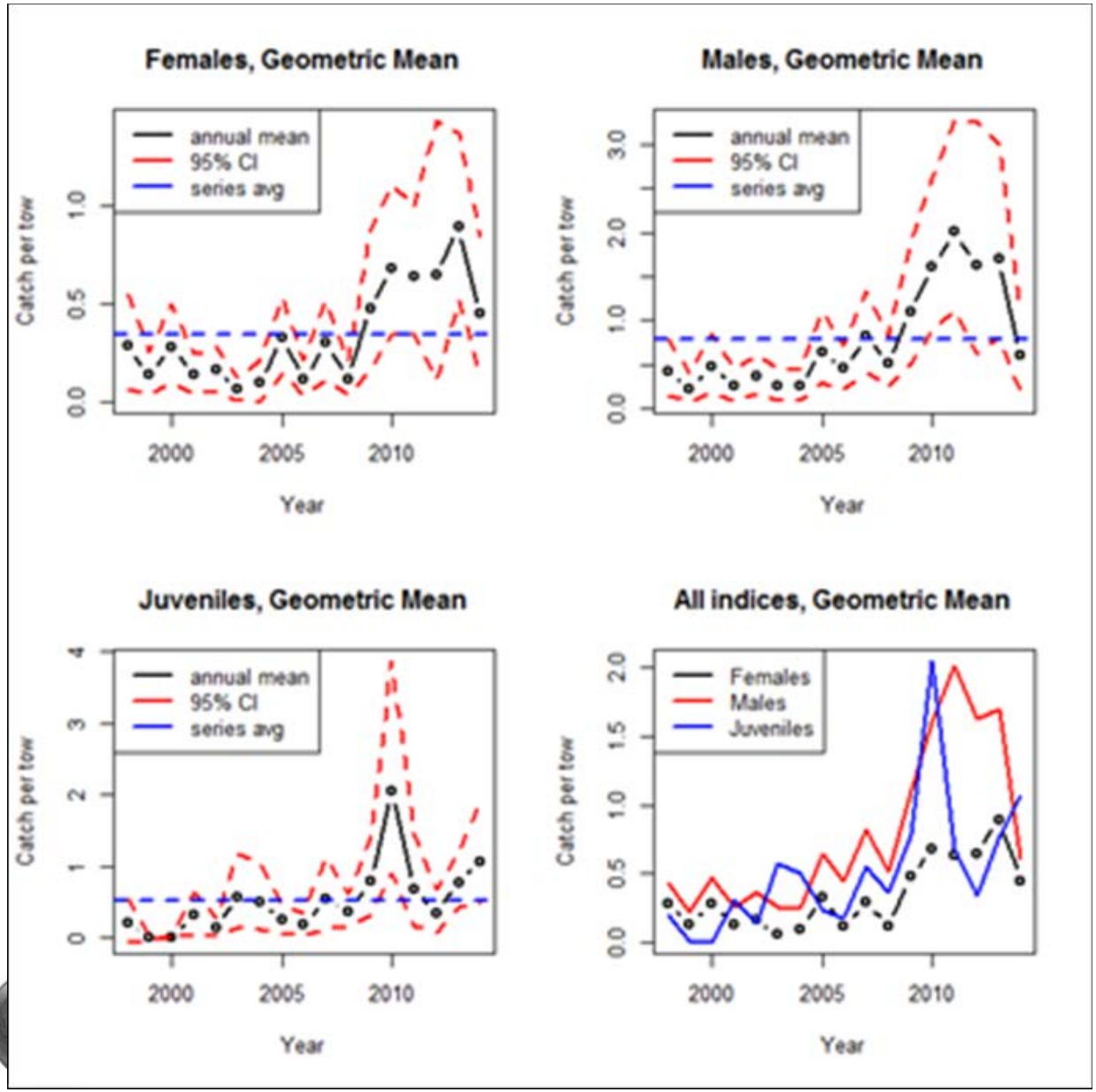


Horseshoe Crab Surveys

New Jersey Ocean Trawl survey



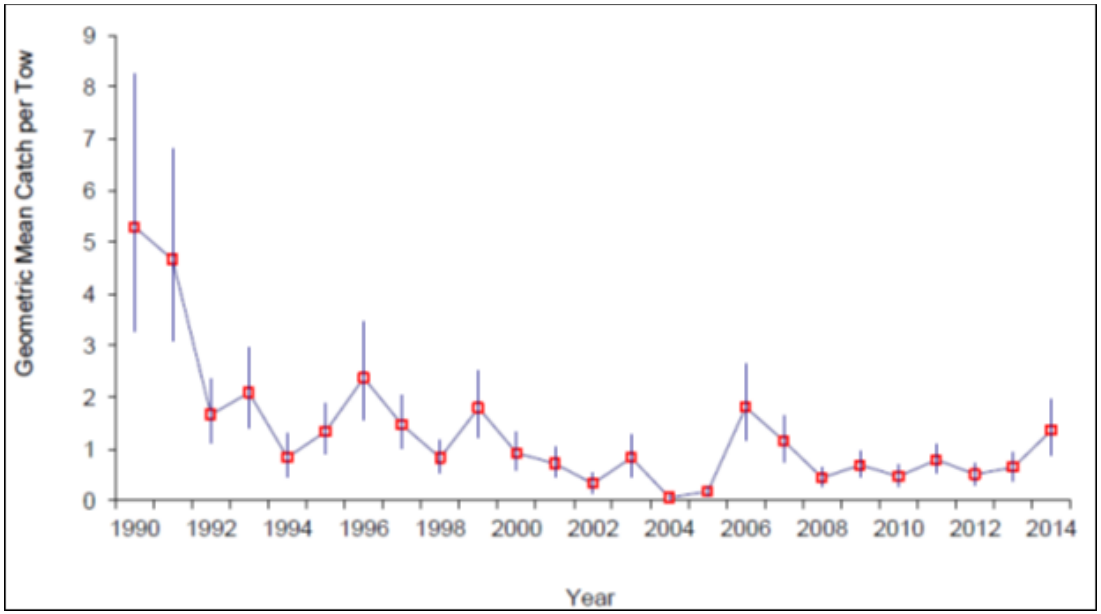
Horseshoe Crab Surveys



New Jersey

Delaware Bay Trawl survey

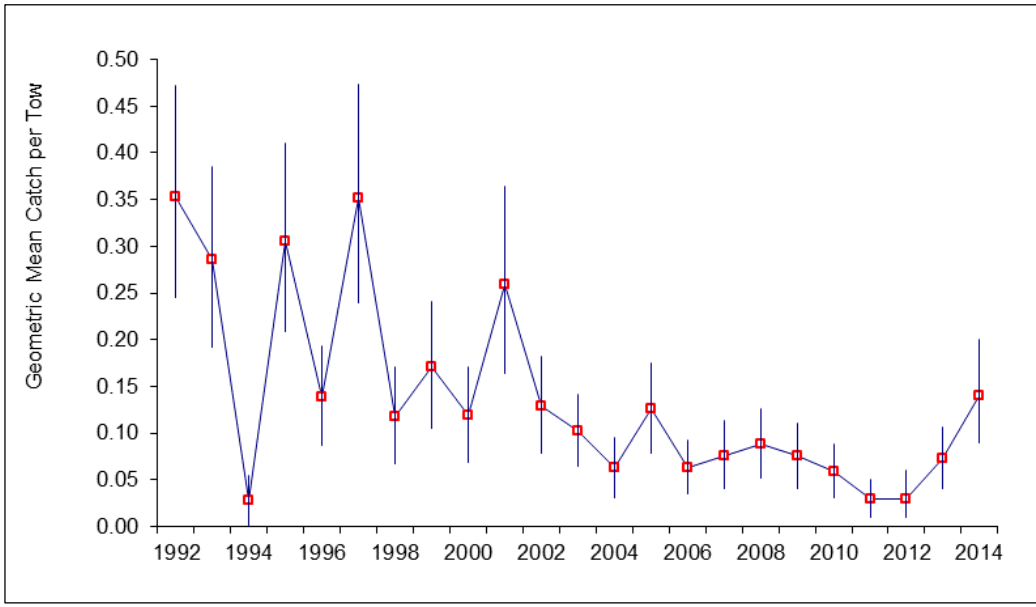
Horseshoe Crab Surveys

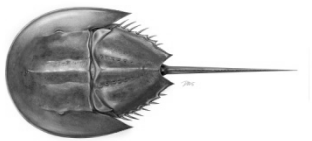


Delaware Surveys

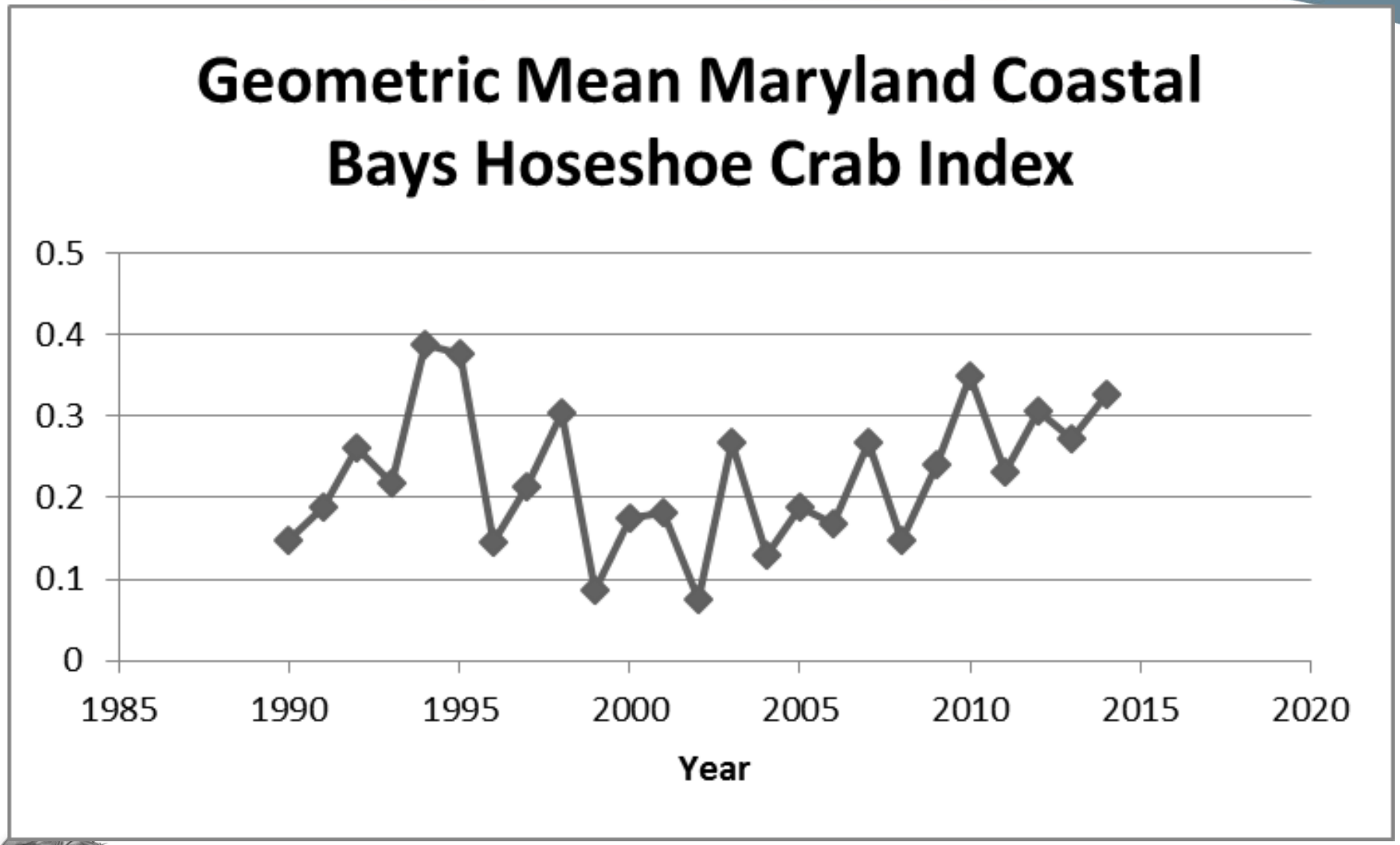
30ft trawl survey

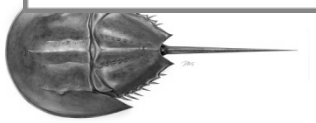
16ft trawl survey





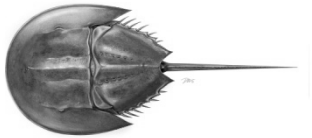
Horseshoe Crab Surveys



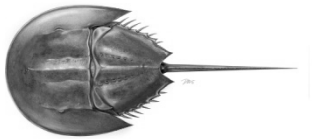


Shorebird Survey

- Shorebird stopover & winter population estimates have remained low but stable over the last few years(2010-2014)
- The proportion of red knots reaching adequate weight (180 grams) improved in 2015.
- Surface densities of horseshoe crab eggs also improved, but not significantly.



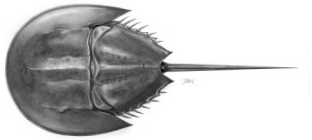
Questions?



Horseshoe Crab ARM Model Review

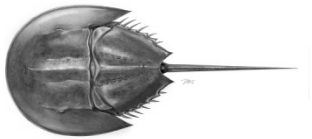
Presented to Horseshoe Crab Management Board

November 5, 2015



Overview

1. ARM Model Framework
2. Review Timetable from Addendum VII
3. ARM subcommittee & Technical Committees recommendation
4. Next Steps



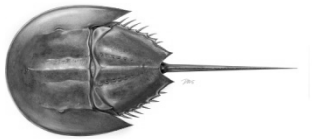
ARM Framework

Two species Model

1. Horseshoe Crab population
   - Two sex, age-structured matrix model

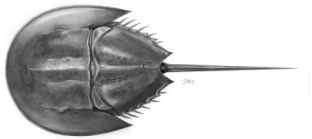
2. Red Knot population
   - Three life stage population model

Linked population dynamics evaluated with regression analysis



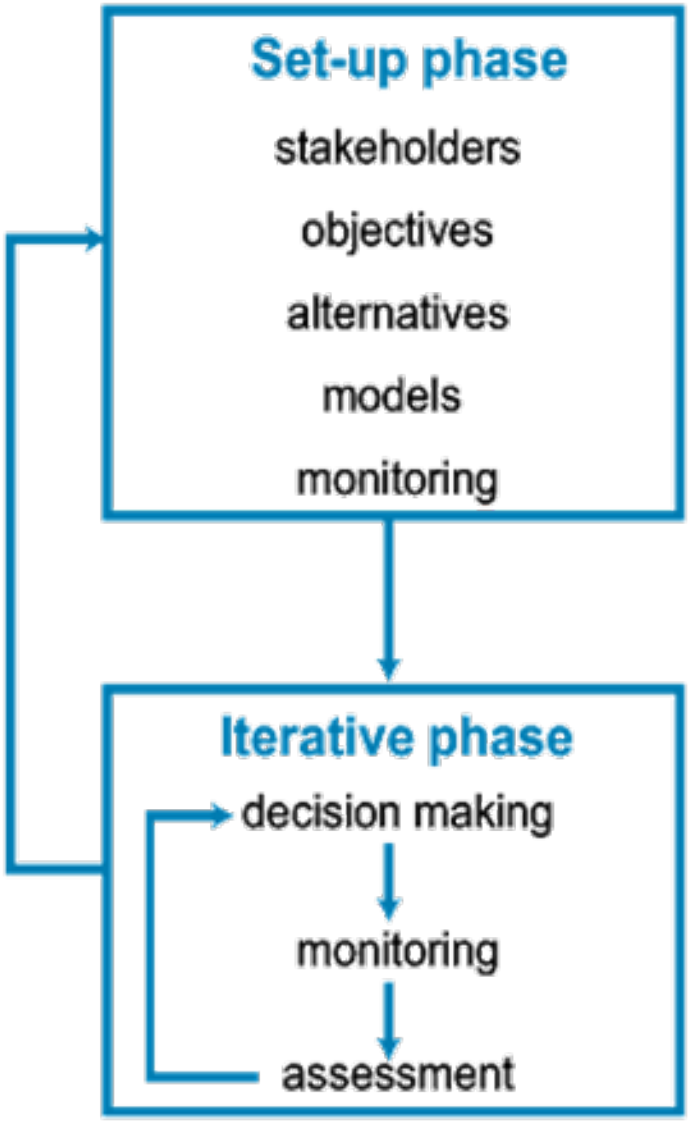
ARM Framework cont'd

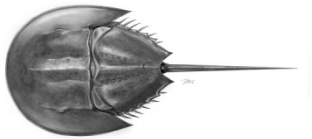
- Evaluated the population models against horseshoe crab harvest from 1998-2008
- Original model design had 8 alternative management harvest packages
- Published Framework (2011)
- Addendum VII (February 2012) set the ARM for management use



Addendum VII

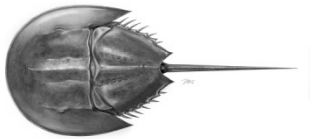
- **Annual specification process**
  - Based on survey data
- **Outlined timetable for 'double loop learning' (3-4 years)**
  - Adaptive management
  - Revisit Set-Up phase





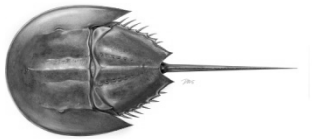
Addendum VII Timeline

- **Winter 2016**: Public Comment period
- **Spring 2016**: Public comments presented to Technical Committees. Technical Committees develop recommendations to the Board
- **Spring 2016 Board Meeting**: Board selects preferred changes to the model components and tasks TC to work with ARM subcommittee to make changes to the model
- **Fall 2016**: Changes incorporated into the ARM model and annual specification process



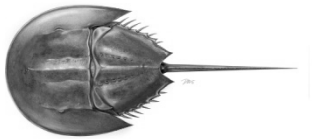
HSC TCs & ARM recommendations

- Both TCs and ARM subcommittee recommend reviewing and updating the ARM model
- Higher priority over benchmark stock assessment given biomedical data confidentiality



Draft ARM Review Items

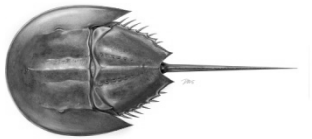
1. Evaluate the model set up
2. Optimization Algorithm Update
3. Evaluate Monitoring Programs
4. Revisit the Objective Function



Next Steps

- Consider whether to proceed with a review and update of the ARM Model in 2016

- Provide staff guidance on how the review and update of the ARM Model should proceed



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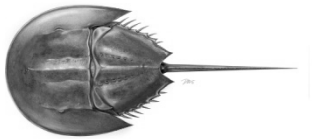
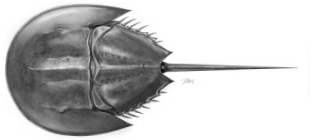


HSC Specifications for Delaware Bay Region

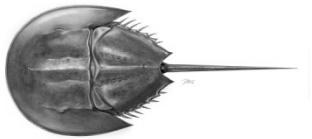
Presented to Horseshoe Crab Management Board

November 5, 2015



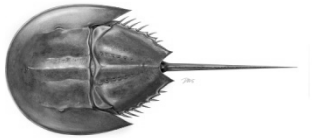
ARM Harvest Recommendations

- Model is based on estimates of red knot and horseshoe crab abundance
  - HSC abundance data from Composite Index
  - Shorebird Abundance from 2015 Mark-Recapture Survey
- ARM Model recommends harvest package 3; same as previous two years



ARM Optimum Harvest Packages

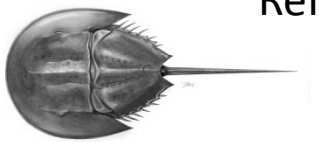
Harvest package	Male harvest (×1,000)	Female harvest (×1,000)
1	0	0
2	250	0
3	500	0
4	280	140
5	420	210



HSC Quota By State

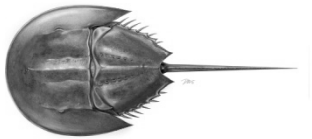
	Delaware Bay Origin HSC Quota		Total Quota	
State	*Male*	*Female*	*Male*	*Female*
Delaware	162,136	0	162,136	0
New Jersey	162,136	0	162,136	0
Maryland	141,112	0	255,980	0
Virginia	34,615*	0	81,331*	0

*Refers to harvest east of the COLREGS line.



Questions?

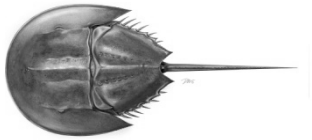
State	Total Quota	
	Male	Female
Delaware	162,136	0
New Jersey	162,136	0
Maryland	255,980	0
Virginia	81,331	0



IUCN Letter on Biomedical Fishery in the Gulf of Mexico

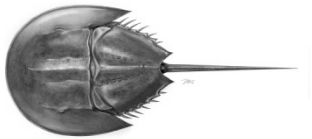
Presented to Horseshoe Crab Management Board

November 4, 2015



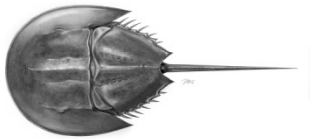
Overview

- **Horseshoe Crab biology**
- **Management on the Atlantic Coast**
- **IUCN letter**



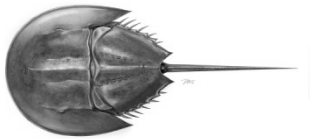
Horseshoe Crab Biology

- **Limulus Polyphemus**
- **Range from Maine to Yucatan Peninsula and the Gulf of Mexico**
- **Spawning occurs primarily in late spring, high tide around full & new moon**
- **Delaware Bay- largest spawning population**
- **Delaware Bay Estuary- largest staging area for shorebirds**



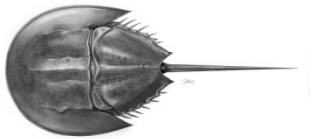
FMP History

- **Started in 1998**
- **Bait**
  - **Conch and Whelk; American Eel**
  - **State by state quotas**
- **Biomedical**
  - **Limulus Amoebocyte Lysate (LAL)**
  - **Permit & harvest reporting requirements**
  - **57,500 crab mortality threshold**



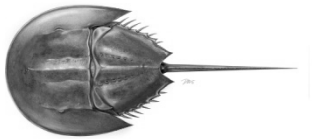
IUCN Letter

- Concern over recent biomedical fishery in the Gulf of Mexico
- Permit issued to Harvester
  - Can harvest on both Gulf and Atlantic Coast



Horseshoe Crab TCs

- Share concern over recent biomedical fishery in the Gulf of Mexico
- Open a line of communication with GSMFC
- Biomedical Horseshoe Crab BMPs (reduce mortality)



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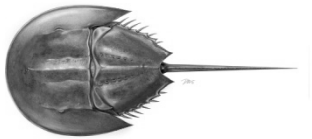

Horseshoe Crab 2015 FMP Review

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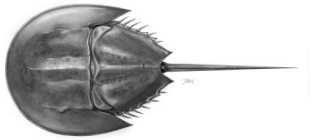
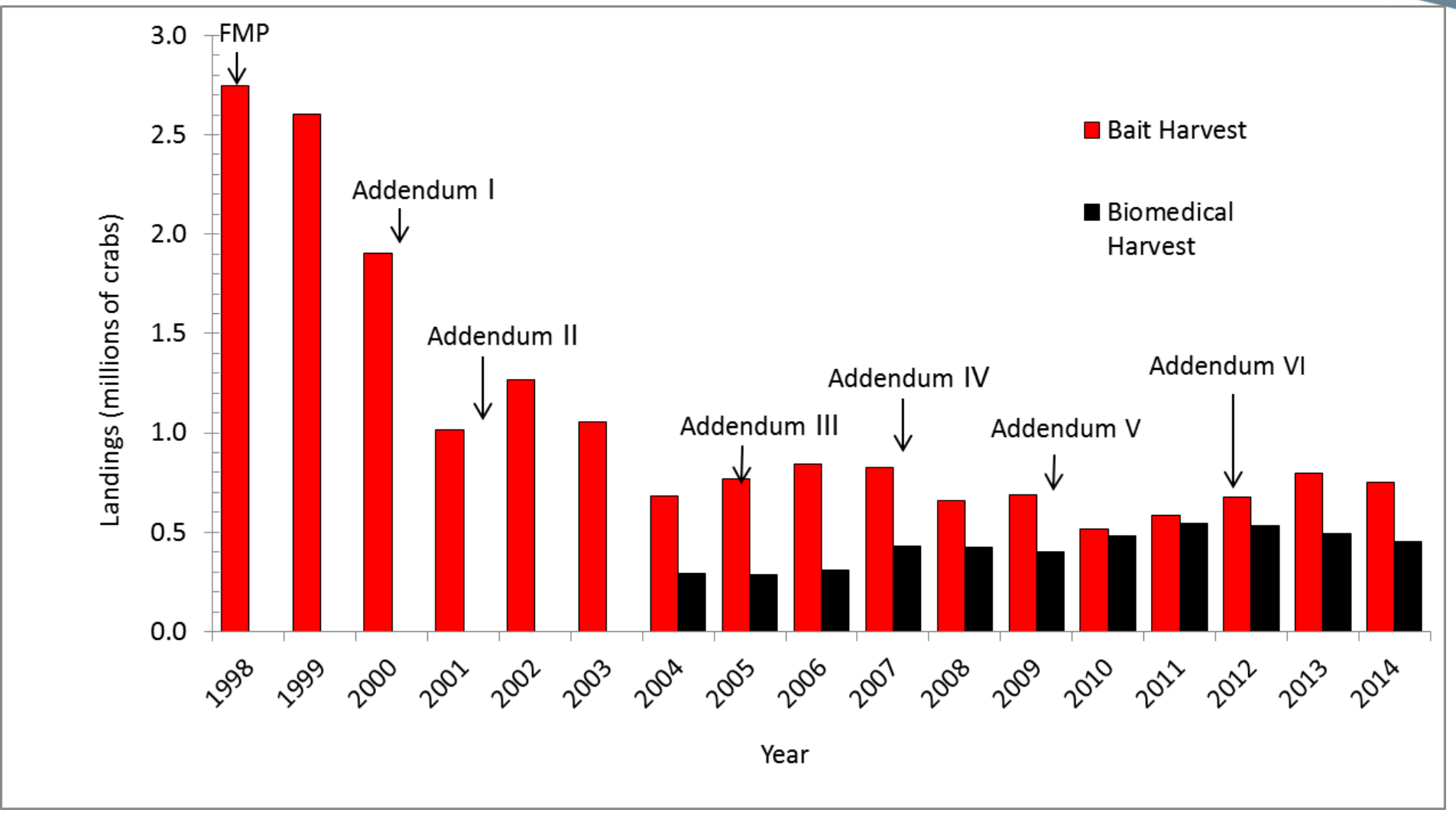
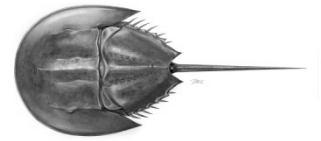


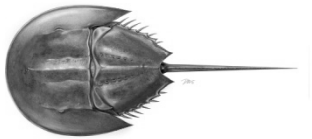
Annual Total Harvest





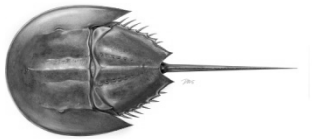
2014 Bait Fishery

- Total coastwide harvest was 753,268 crabs
- Decrease of 18% from 2013
- Well below the coastwide quota (1.58 million lbs)



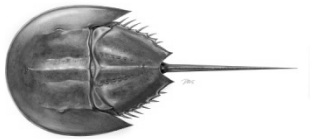
Biomedical Harvest

- **Reported number of crabs brought to biomedical facilities: 524,103**
  - **8% decrease from previous 5-year average**
- **Crabs used as bait and bled: 72,089**
  - **7% decrease from past 5-year average**
- **Coastwide mortality estimate: 78,798**



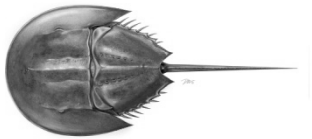
State Compliance

- **PRT found all states management measures to be consistent with the FMP**
- **DC did not submit a report**
- **PRT recommends that DC take steps to be removed from Board**



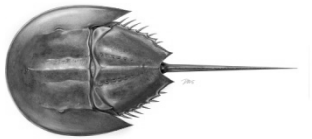
Additional Issues

- **PRT and TCs strongly recommends the continuation of the Benthic Trawl Survey**



Request for *De minimis*

- **PRFC, SC, GA, and FL all qualify and request *de minimis* status for 2015**
- **NJ qualified but did not request**
- **PRT recommends all requests for *de minimis* status be granted**
  - **Conditional approval for FL**



Questions?