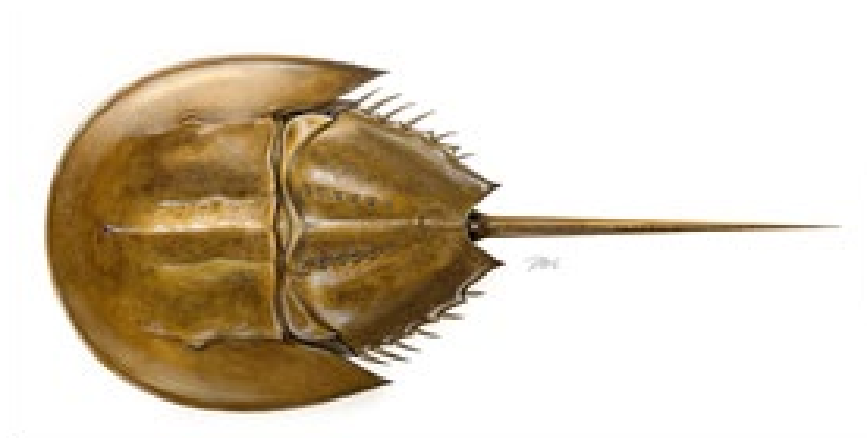


# 2022 Harvest Specifications for the Delaware Bay



# Adaptive Resource Management (ARM)



*Manage harvest of horseshoe crabs in the Delaware Bay to maximize harvest but also to maintain ecosystem integrity and provide adequate stopover habitat for migrating shorebirds*

- Red knot and HSC population thresholds
- Red knot and HSC abundance estimates
- 5 harvest packages
- Harvest recommendations

# Harvest Packages



- 5 harvest policies range from full moratorium to a max harvest of 420,000 males and 210,000 females, including two male only harvest options

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

# Thresholds in ARM Utility Functions



## Population thresholds



### Female HSC:

80% carrying capacity  
(or 11.2 million F crabs)

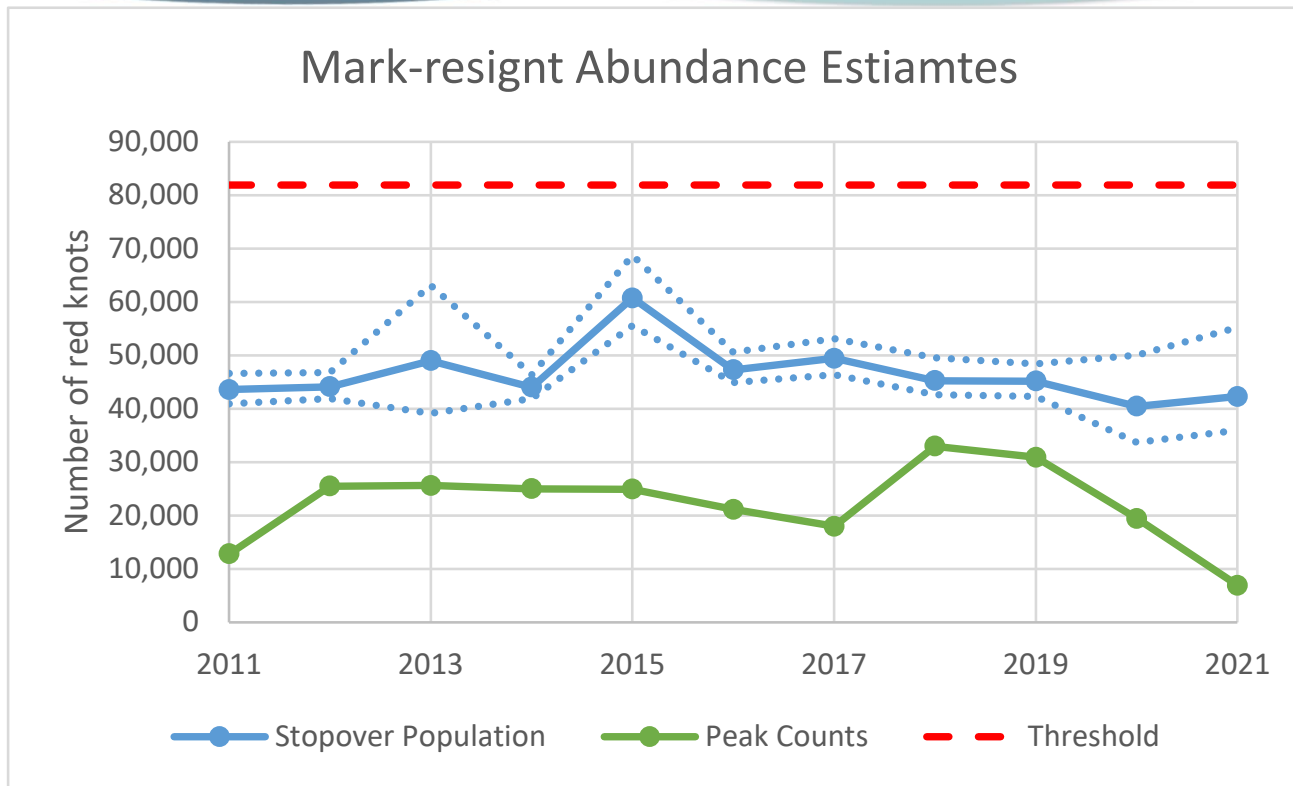


### Red knot:

81,900 birds

- There is value in female HSC harvest if these thresholds are met.

# Red Knot Abundance

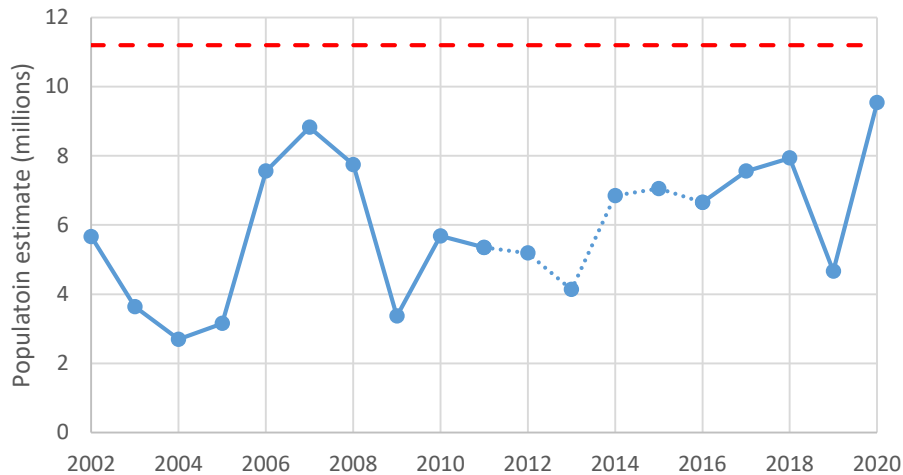


- 2021 estimates are slightly higher than 2020 estimate (greater uncertainty)
- 2021 estimated stopover duration was 10.3 days, slightly less than 2020 estimate of 10.7 days
- 2021 estimate of 42,271 is below the utility threshold of 81,900 birds

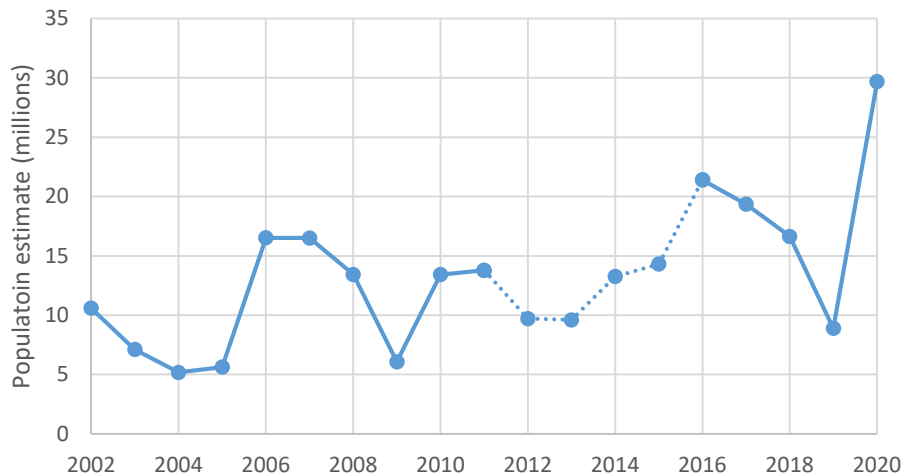
# Horseshoe Crab Abundance



Female



Male



- HSC abundance estimates are based on VT trawl survey
- VT trawl survey not funded every year, so **composite index** was developed
  - Uses DE 30' trawl, NJ DB trawl, and NJ ocean trawl surveys
- 2020 estimate of 9.5 million females is under the 11.2 utility threshold
- 2020 had 9.5 million females, 29.7 million males

- **Composite index values for 2013 - 2015**

# 2022 Harvest Recommendation



## HSC and red knot abundance estimates:

Horseshoe crab abundance (millions)			Red knot abundance ( $\times 1,000$ )	
Year	Male	Female	Year	Male and female
2020 (Fall)	29.7	9.5	2021 (Spring)	42.27

## Harvest package recommendation:

Recommended harvest package	Male harvest ( $\times 1,000$ )	Female harvest ( $\times 1,000$ )
3	500	0

- Both red knots and female HSC are below utility thresholds, therefore no female harvest is recommended

# 2022 Harvest Recommendation



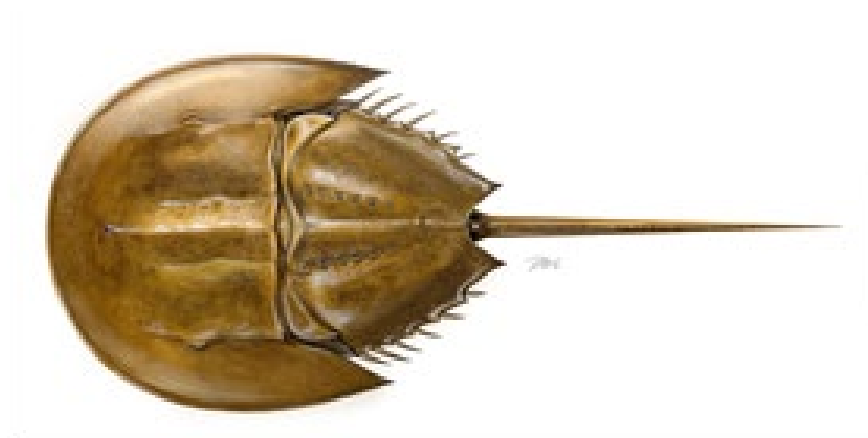
State	Delaware Bay Origin HSC Quota		Total Quota	
	Male	Female	Male	Female
Delaware	162,136	0	162,136	0
New Jersey	162,136	0	162,136	0
Maryland	141,112	0	255,980	0
Virginia	34,615	0	81,331	0



A large, reddish-brown horseshoe crab is shown on a sandy beach. The crab is positioned in the center of the frame, facing towards the right. Its body is a deep, glossy reddish-brown color, and it has a prominent, rounded carapace. The legs are visible, and the tail fan is extending to the right. The background is a light-colored, textured sand.

Questions?

# Progress Update on Revision to ARM Framework





# Timeline

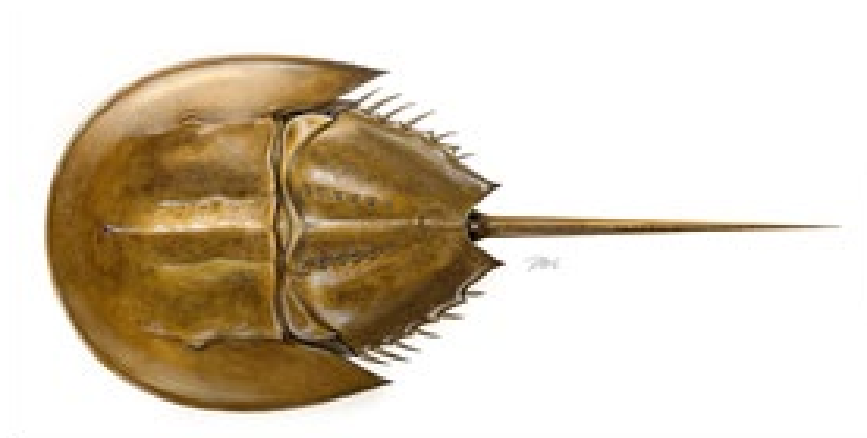
Item	Date(s)
ARM Revision Review Webinar	October 4 <sup>th</sup> , 2021
Report draft to DBETC	October 13 <sup>th</sup> , 2021
DBETC & HSC TC Review Webinar	October 25 <sup>th</sup> , 2021
Peer Review Prep	November, 2021
Peer Review Workshop	November 16 – 18, 2021
Post-Review	January, 2022
Present Reports at ASMFC Winter Meeting	February, 2022



# Minority Opinions

If there is not Management Board objection, we will add a TOR to the peer-review TORs to address any minority reports.

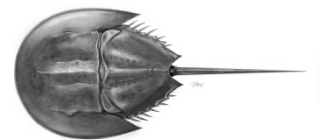
# Questions?





# Horseshoe Crab FMP Review for the 2020 Fishing Year

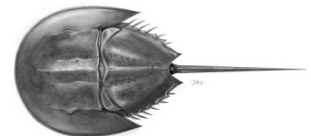
Horseshoe Crab Management Board  
October, 2021



# Management History



- **FMP Approved (1998)**
- **Addendum I (2000)** – State bait harvest quotas and *de minimis*
- **Addendum II (2001)** – Quota transfers
- **Addendum III (2004)** – DE Bay state bait quotas and seasonal closures
- **Addendum IV (2006)** – DE Bay state bait quotas and seasons
- **Addendum V (2008)** – Extension of Add IV
- **Addendum VI (2010)** – Extension of Add V
- **Addendum VII (2012)** – DE Bay ARM Framework



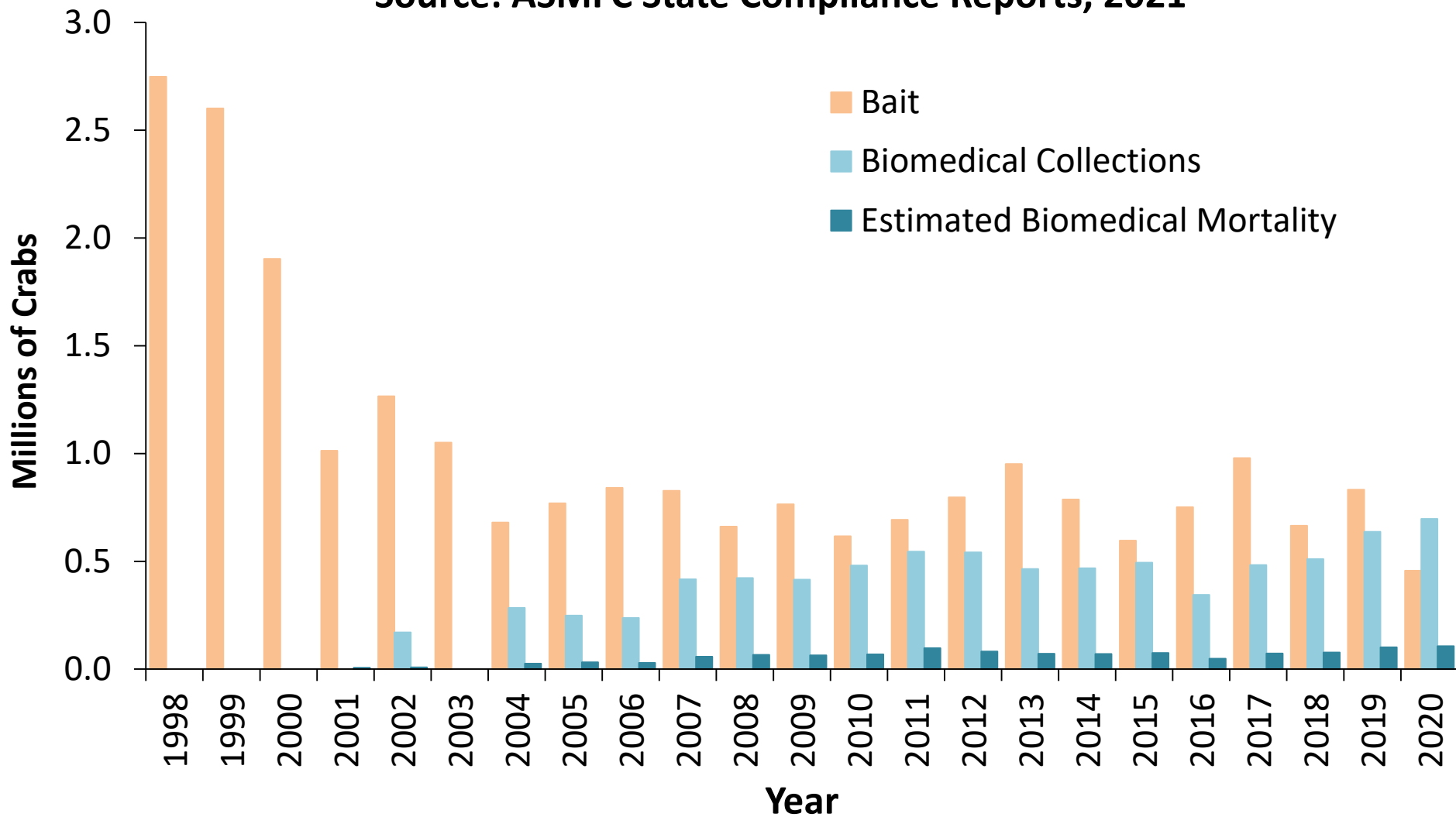
Descriptions in Section I of FMP Review

# Annual Total Harvest



## Coastwide Horseshoe Crab Bait Landings & Biomedical Collections

Source: ASMFC State Compliance Reports, 2021

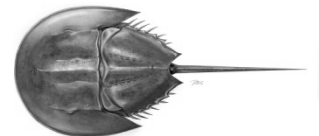




# 2020 Bait Fishery



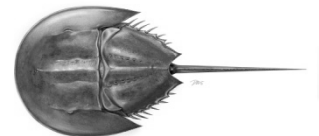
- Total coastwide harvest was 456,675 crabs
  - 45% decrease from 2019
- Approximately 28% of the ASMFC coastwide quota (1.59 million lbs) was landed
- Majority from MA (36%), DE (27%), NY (14%) and MD (13%)
  - Account for 90% of coastwide bait harvest in 2020
- Likely that declines resulted from COVID-19 pandemic



# Biomedical Use



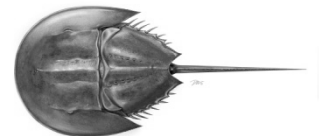
- Biomedical-only crabs collected in 2020: 697,025
  - 9% increase from 2019
- Biomedical-only mortality estimate: 106,339
  - Biomed Mortality = # Observed Dead Before Bleeding + 15% x # Biomed-Only Bled
  - 19% of total directed removals; biomedical mortality + bait harvest (563,014 crabs)



# COVID-19 Impacts



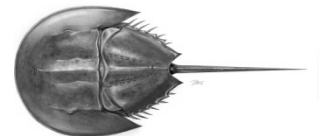
- COVID-19 pandemic impacted required sampling for many states
- Surveys not conducted in 2020
  - MA Benthic Survey, spring & fall
  - LIS Trawl Survey
  - NJ Benthic Survey
- Surveys with reduced effort in 2020
  - MA, NY, DE, spawning surveys
  - SC benthic survey



# De Minimis



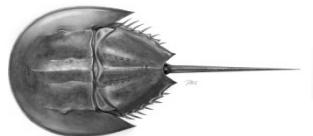
- Combined average bait landings (by numbers) for last two years < 1% of coastwide bait landings for the same two-year period
- SC, GA, and FL all requested and qualify for *de minimis* status for 2020
- NJ and PRFC qualified but did not request



# PRT Recommendations



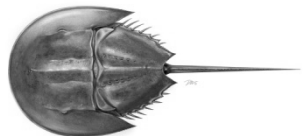
- Continue seeking long-term funding for VT trawl survey
  - Funded through 2021
- Consider annual characterization of discard removals
- FMP requires management Board to “consider management action” if biomedical mortality threshold (57,000 crabs) exceeded
  - Analysis for 2019 stock assessment indicated biomedical mortality levels did not affect stock status
  - Board could choose to take action or modify threshold



# PRT Recommendations



- All states and jurisdictions appear to be in compliance with FMP provisions
- *Board action:*  
Consider approval of the FMP Review and state compliance reports for the 2020 fishing year, and *de minimis* status for SC, GA, and FL.



**Questions?**

