

Results from the 2025 ARM Framework



Horseshoe Crab Management Board
October 28, 2025

Revised ARM Process

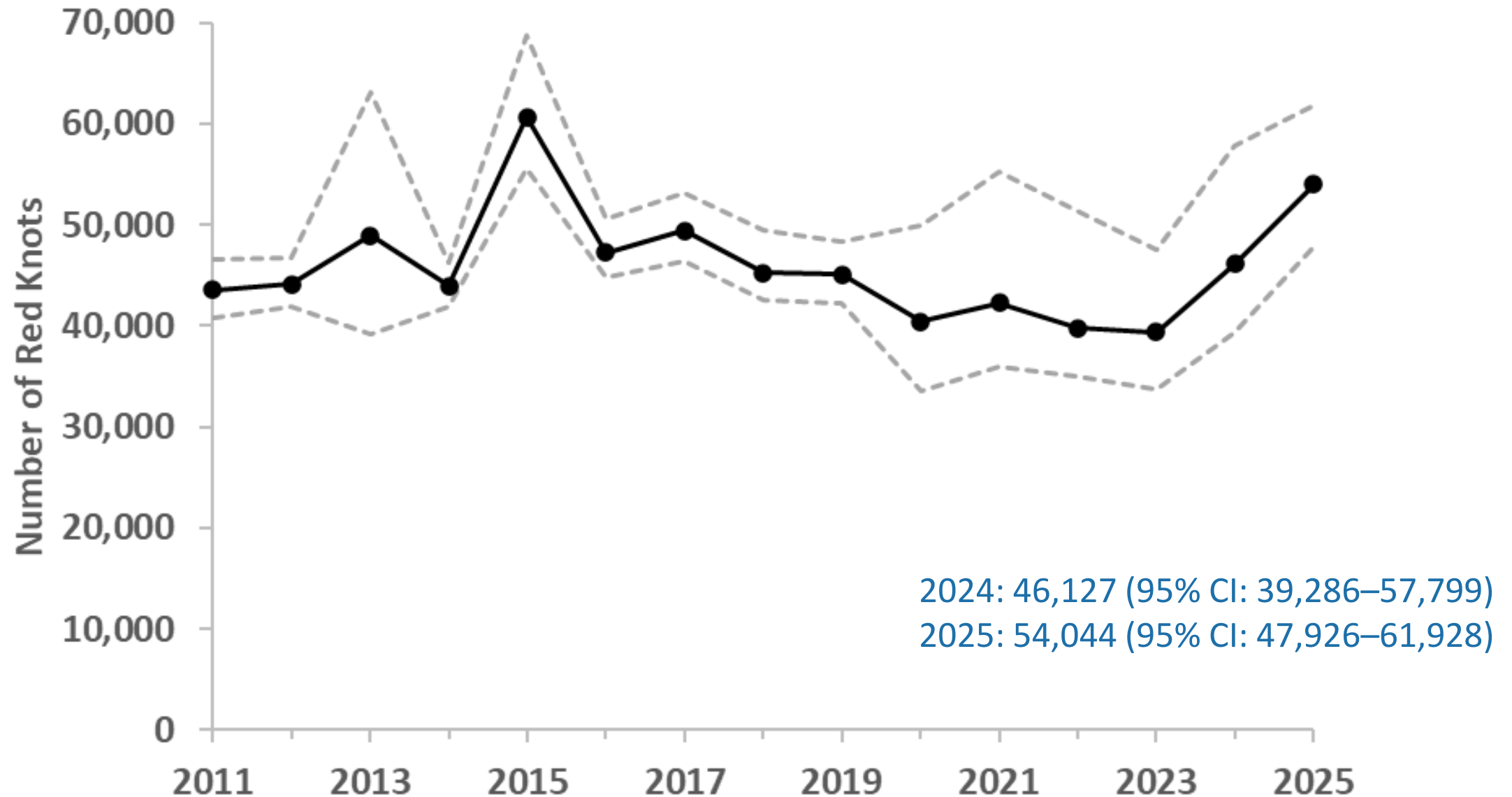
- ARM Framework was revised and accepted by the Board for management use in 2022
- Under Addendum VIII (2022) ARM Framework is updated annually to produce bait harvest recommendations for the Delaware Bay
- Maximum harvest recommended:
 - 210,000 Females
 - 500,000 Males
- 2024 Recommendations:
 - 175,000 Females, and 500,000 Males
 - Board opted for 0 female harvest

“Manage harvest of horseshoe crabs in the Delaware Bay to maximize harvest but also to maintain ecosystem integrity, provide adequate stopover habitat for migrating shorebirds, and ensure that the abundance of horseshoe crabs is not limiting the red knot stopover population or slowing recovery.”

- Annual harvest specifications require:
 - Red knot population estimates from mark resight analysis
 - CMSA Horseshoe crab population estimates
 - Data:
 - DE Adult Trawl (2024)
 - NJ Ocean Trawl (2024)
 - VT Trawl (2023)
 - Discard estimates (2023)
 - Bait landings (2023)
 - Biomedical mortality (2023)

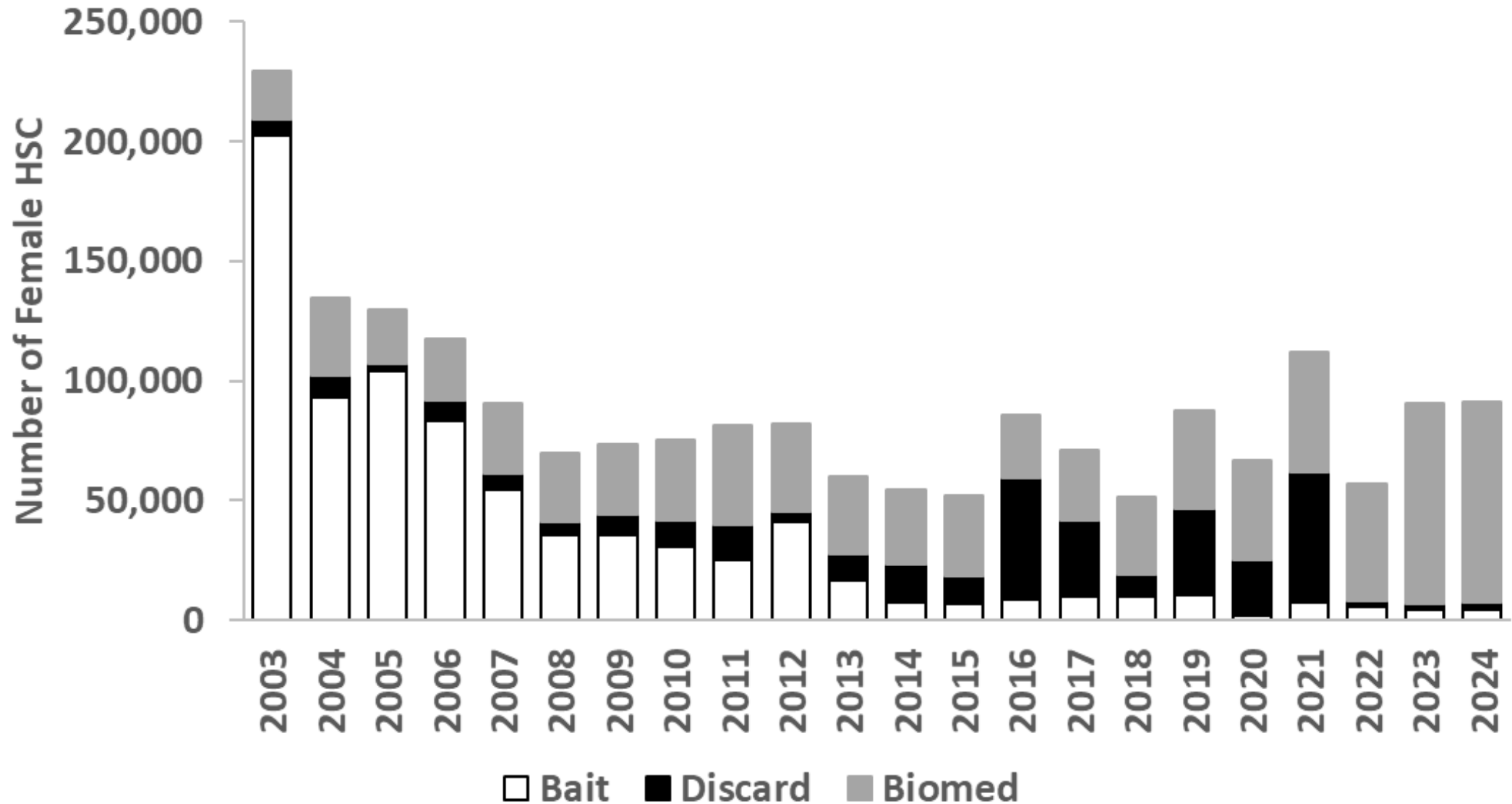


Red Knot Population Estimates



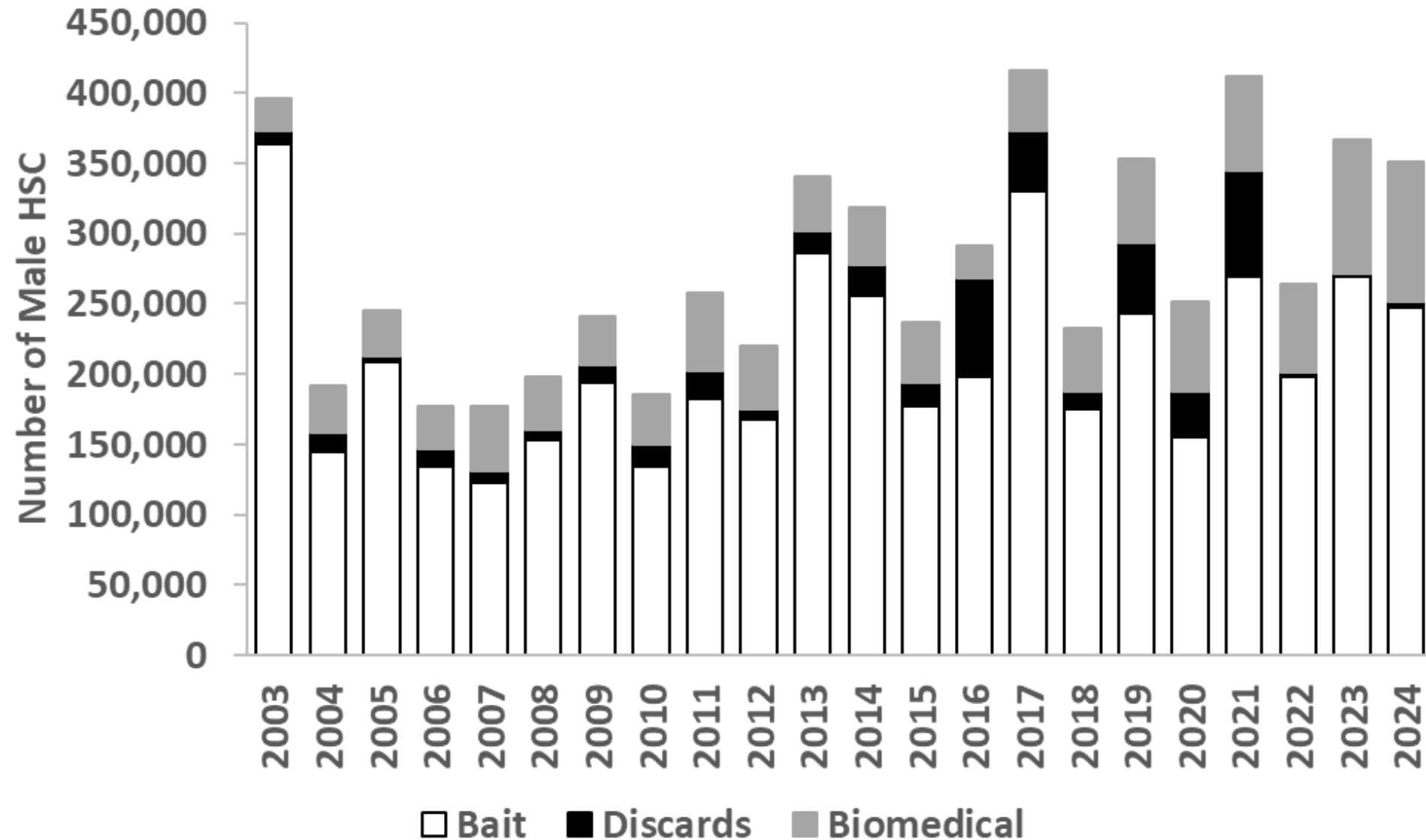


Female Harvest

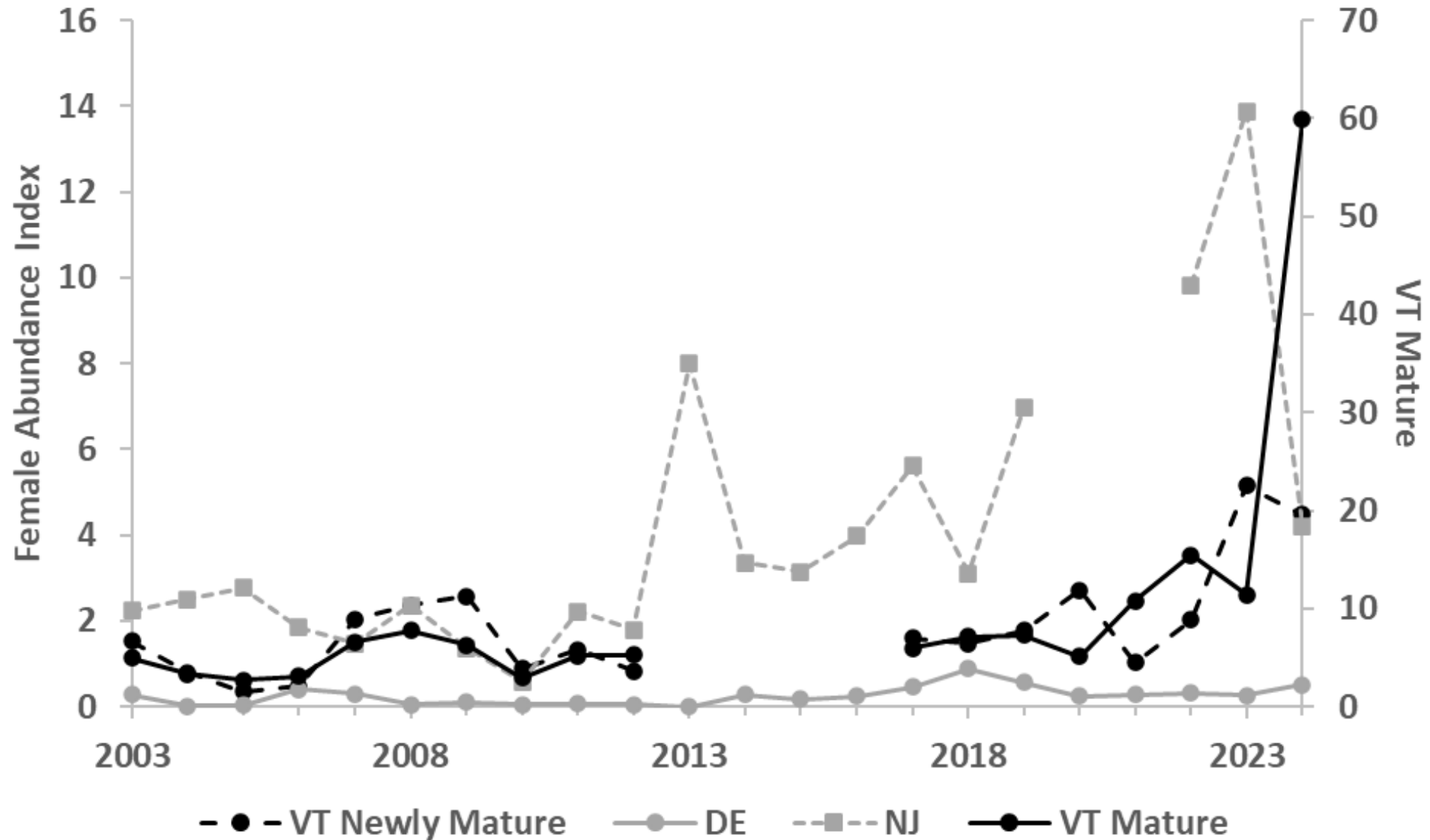




Male Harvest

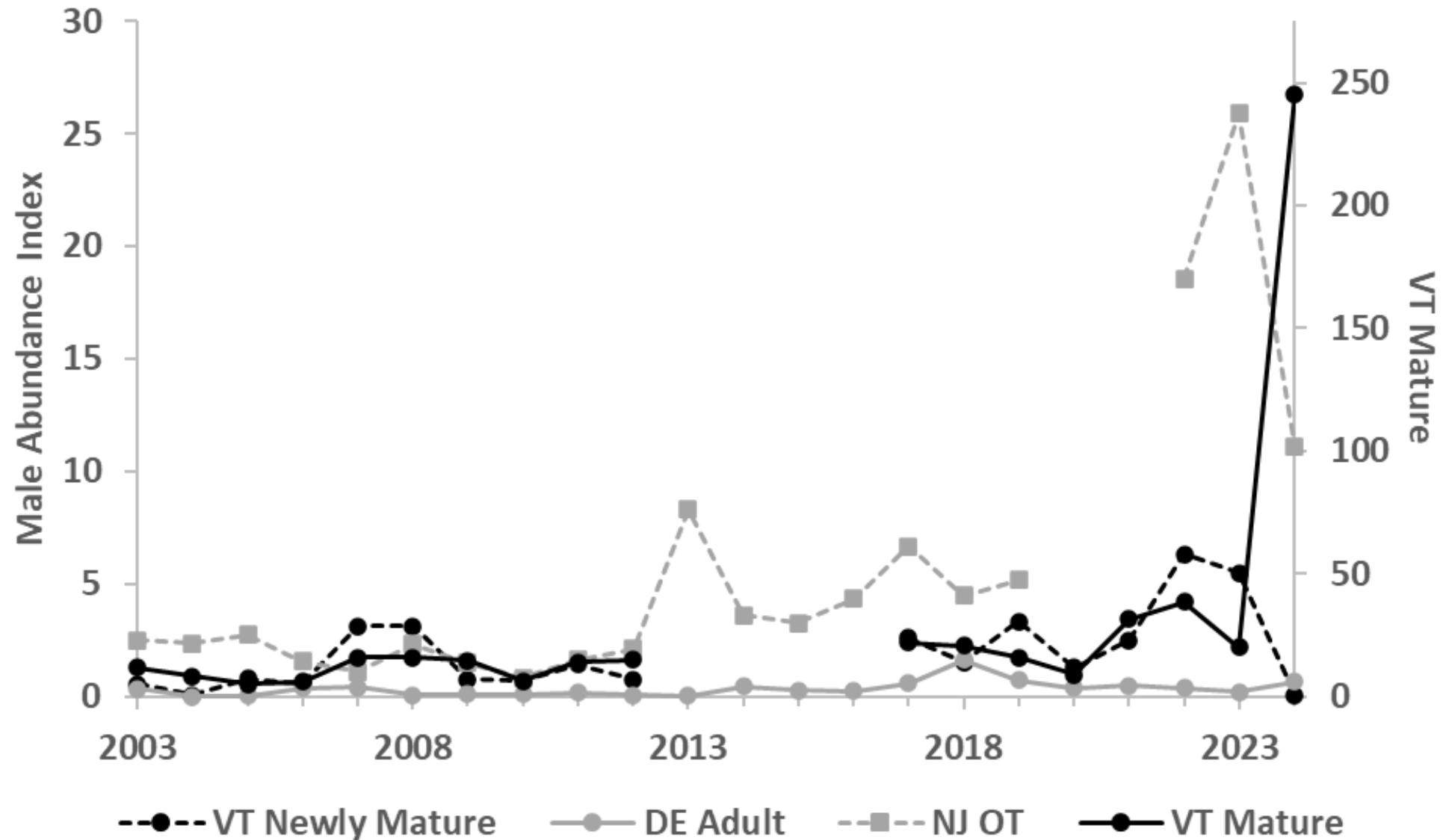


Female Indices





Male Indices

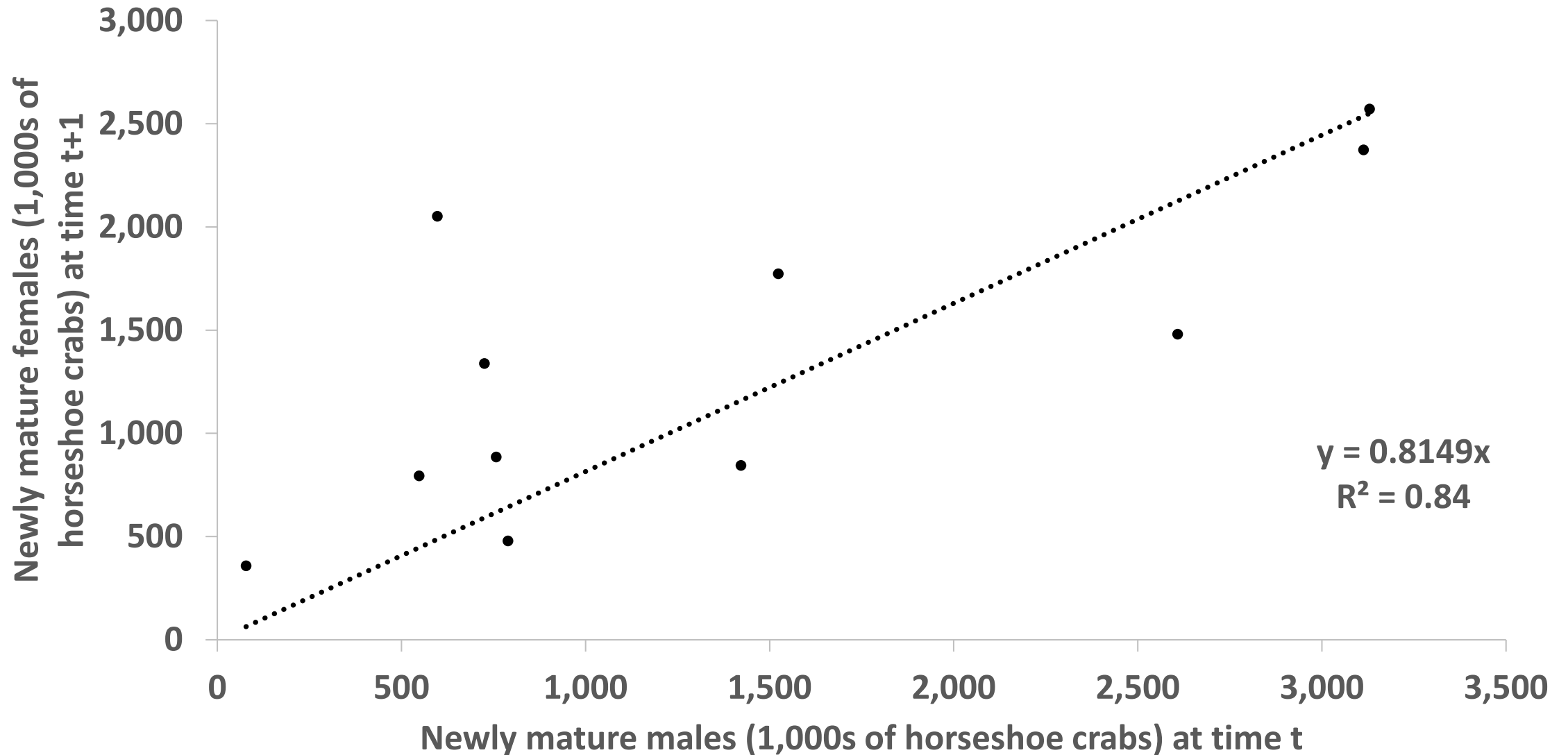


- Zero Female newly mature horseshoe crabs in 2022
 - CMSA is a simple stage-based model that sums the newly mature and mature crabs, and subtracts harvest/mortality to predict population
 - CMSA will not run with 0 as newly mature
- Low Female newly mature 2020-2024
 - Catchability
 - Recruitment failure
 - Mis-identification

- Correction in 2024
 - Newly mature Females were likely being misclassified as immature not as mature
 - Increase in abundance of crabs make processing a representative subsample more difficult
 - Not as many crabs were probed for eggs as should have been
 - Newly mature Males in year t and newly mature Females in year $t+1$ represent the same cohort and should have a positive relationship
 - Newly mature Females in year $t+1$ should be slightly less than the newly mature Males in year t due to natural mortality

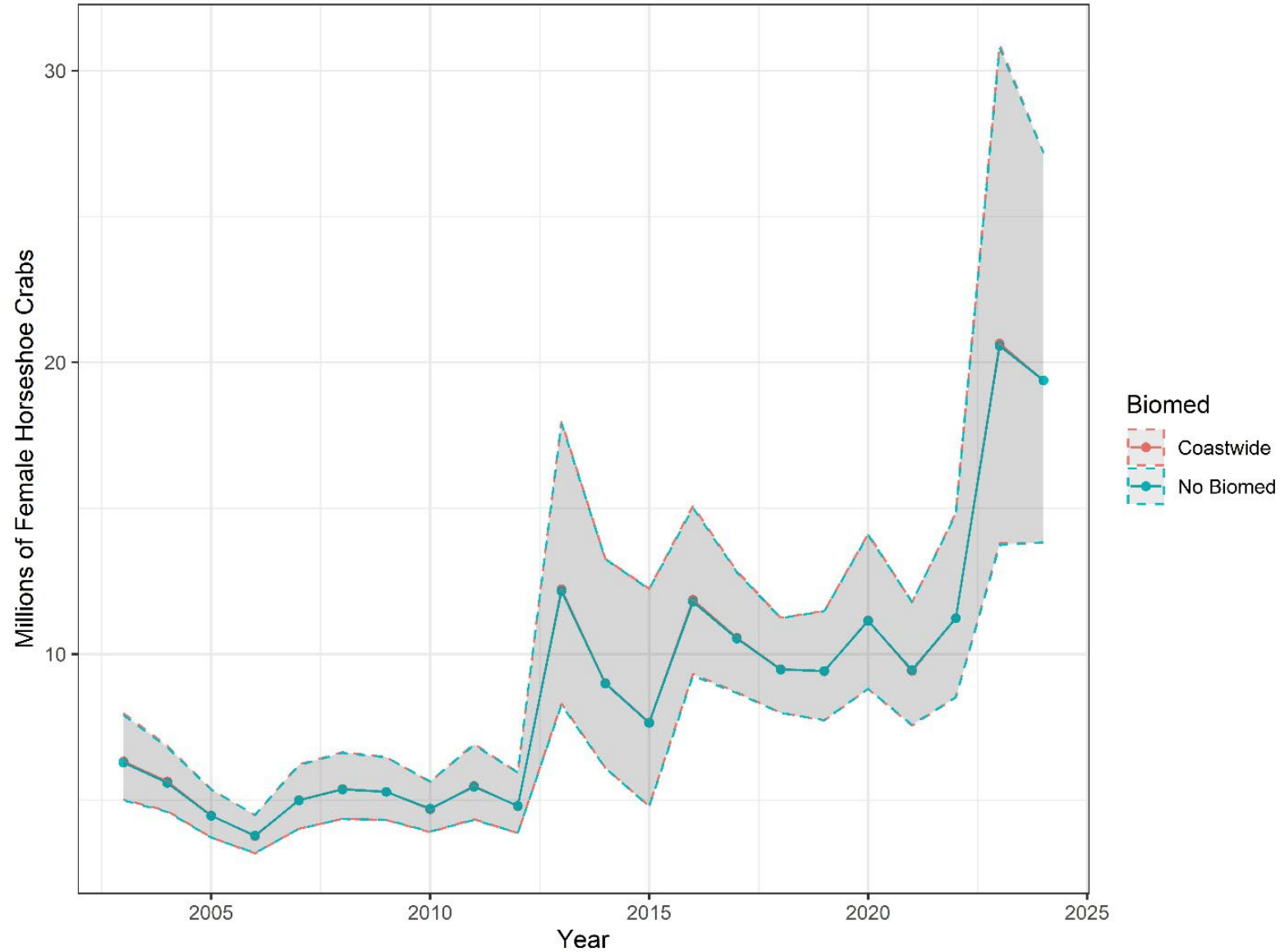


VT Newly Mature



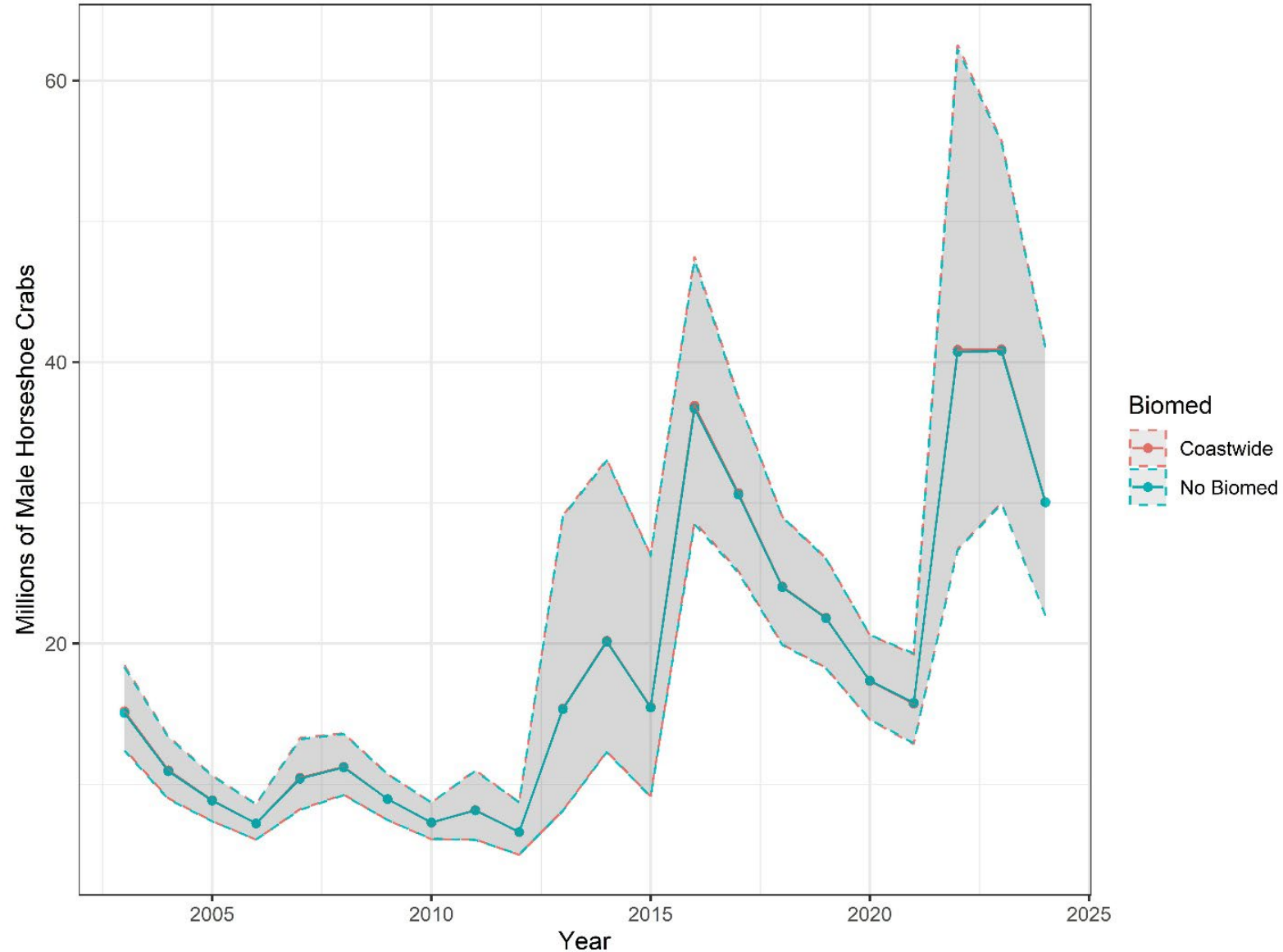


Female Estimate





Male Estimate



2026 Harvest Recommendation

- Harvest recommendation is based on the results of CMSA and mark-resight models
- Per Addendum XIII harvest is rounded down to the nearest 25,000 crabs
- Recommendation for 2026:
 - 500,000 Males
 - 175,000 Females

2026 Harvest Recommendation

- Addendum IX allows the Board to set harvest specifications for male-only harvest for up to 3 years at a time based on the ARM recommendation
- Options:
 - Male and female harvest for 1 year only
 - Male only harvest for 1, 2, or 3 years (2026-2028)
 - Specifications can be reviewed annually, but no action is required to maintain male-only harvest specifications for 3 years

2026 Quota Allocation

State	Delaware Bay-Origin Quota		Total Quota	
	Male	Female	Male	Female
Delaware	173,014	60,555	173,014	60,555
New Jersey	173,014	60,555	173,014	60,555
Maryland	132,865	46,503	126,410	44,243
Virginia	21,107	7,387	40,667	20,331
TOTAL	500,000	175,000	513,106	185,684

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No Female Harvest and 2-to-1 offset:

State	Delaware Bay-Origin Quota		Total Quota	
	Male	Female	Male	Female
Delaware	173,014	-	173,014	-
New Jersey	173,014	-	173,014	-
Maryland	132,864	-	255,980	-
Virginia	21,107	-	81,331	-
TOTAL	500,000	-	683,339	-

- Set specifications for Delaware-Bay origin bait harvest for the 2026 fishing year, or male-only harvest for up to three years



Questions

Update on Stakeholder Engagement Process on the Reward, Utility, and Harvest Policy Functions of the ARM Framework

Horseshoe Crab Management Board
October 28, 2025



- July 2024 Stakeholder workshop
 - Key recommendation – “using current ASMFC processes, refine the ARM reward and utility functions with stakeholder input”
 - Utility, Reward, and Harvest Policy (U/R/H) functions are value-based
- ARM Subcommittee was tasked with reviewing and discussing what stakeholder input would be needed and the process
- **Recommended a third-party, independent, structured decision-making (SDM) expert to guide/facilitate the process**
- May 2025 Board meeting – Board supported a stakeholder engagement process to get input on U/R/H functions of the ARM

- Commission released a Request for Proposals for workshop facilitators
 - Contracted with Compass Resource Management
- Press release seeking applications for participants
 - Invitations sent to selected participants
- Planning meetings to develop meeting schedules, content, etc.

Step 1. Small Group Interviews with Stakeholders (October/November)

- Compass will conduct group interviews with stakeholders
 - Groups: bait fishery, dealers, biomedical, shorebird conservation, horseshoe crab conservation, and ecosystem conservation
- Inform participants about process and expectations
- Increase understanding of stakeholder values and perspectives

Step 2. Educational Meetings (November/December)

- Series of webinar meetings
- Establish the scope of workshop discussions and goals
- Increase understanding of U/R/H functions of the ARM Framework
- Explain the differences between 2009 and 2021 ARM Frameworks
- Allow dialogue between technical experts and stakeholders (Q&A session)
- Open to all interested stakeholders

Step 3. Stakeholder Workshop (January 2026)

- In-person 2-day workshop (location TBD)
- Smaller group of active participants representing bait fishery, dealers,
- Goal of eliciting information on values to inform the revision of the U/R/H functions
- Stakeholders provided specific questions to elicit the necessary information

Step 4. ARM Subcommittee and Delaware Bay TC Meetings (Winter 2026)

- Series of virtual meetings
- Review information elicited from stakeholders at workshop
- Perform technical work to develop alternative U/R/H functions to better align with stakeholder values
- DBETC will meet and review changes
- Recommendations to the Board for possible changes

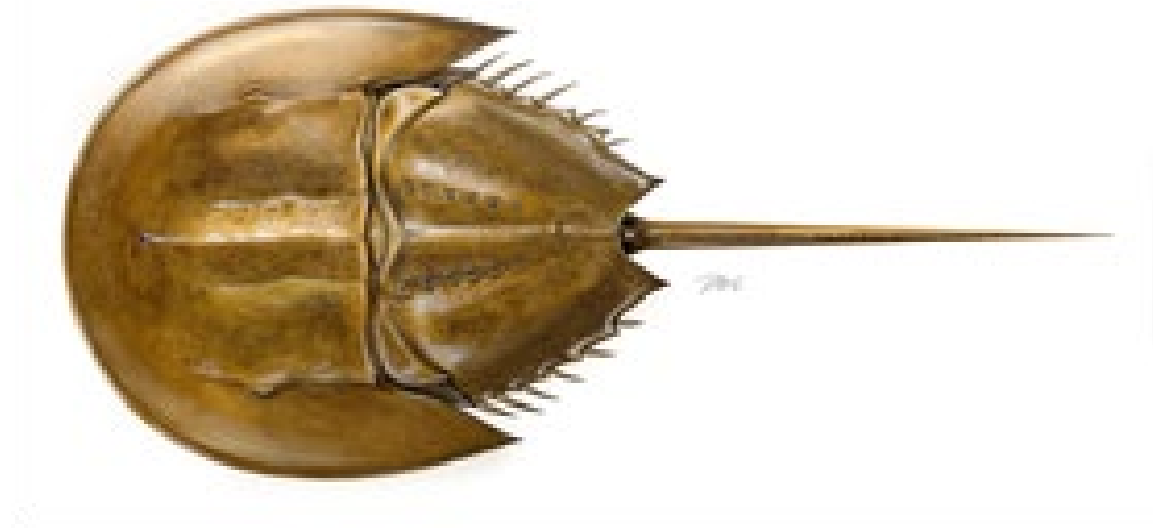
Step 5. Board Meeting to Consider Proposed Changes (May 2026)

- Re-run the ARM model optimization with the alternative U/R/H functions
- Present changes and results to the Board
- If the Board wished to pursue the recommendations at that time, it would need to initiate an Addendum to consider adopting any changes to the U/R/H functions.



Horseshoe Crab

FMP Review for the 2024 Fishing Year



October 28, 2025

Presentation Outline

1. Status of the FMP
2. Status of the Stock
3. Status of the Fishery
4. Compliance Review
5. *De Minimis* requests
6. PRT Recommendations
7. Board action

- **FMP Approved (1998)**
- **Addendum I (2000)** – State bait harvest quotas & *de minimis*
- **Addendum II (2001)** – Quota transfers
- **Addendum III (2004)** – DE Bay state bait quotas & seasonal closures
- **Addendum IV (2006)** – DE Bay state bait quotas & seasons
- **Addendum V (2008)** – Extension of Add IV
- **Addendum VI (2010)** – Extension of Add V
- **Addendum VII (2012)** – DE Bay ARM Framework
- **Addendum VIII (2022)** – Adopted ARM Revision
- **Addendum IX (2025)** – Allows multi-year male-only specs for DE Bay

Status of the Stock

- Benchmark stock assessment peer reviewed in 2019, updated in 2024
- Regional status based on trend-analysis relative to 1998
- DE Bay population estimates using catch multiple survey analysis (CMSA)



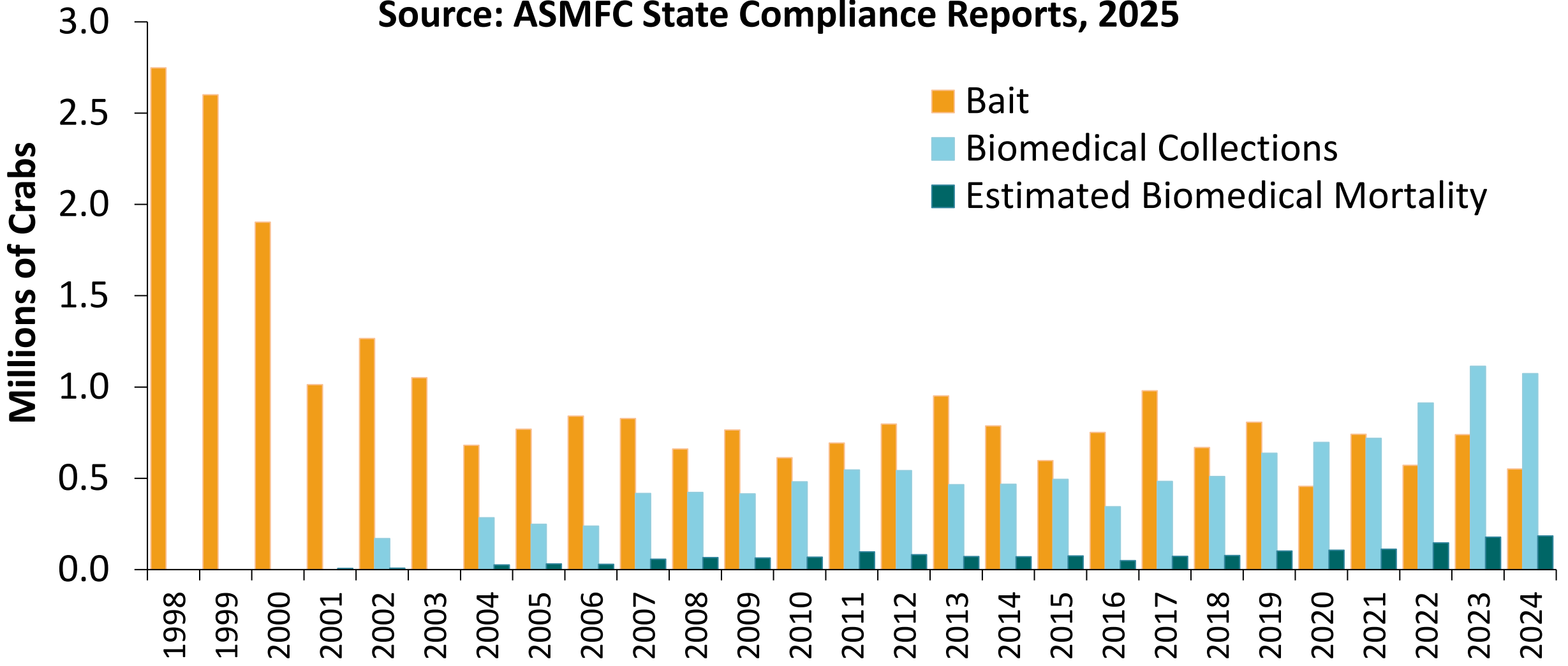
Region	2009 Benchmark	2013 Update	2019 Benchmark	2024 update	2024 Stock Status
Northeast	2 out of 3	5 out of 6	1 out of 2	1 out of 2	Neutral
New York	1 out of 5	3 out of 5	4 out of 4	3 out of 4	Poor
Delaware Bay	5 out of 11	4 out of 11	2 out of 5	0 out of 5	Good
Southeast	0 out of 5	0 out of 2	0 out of 2	0 out of 2	Good
Coastwide	7 out of 24	12 out of 24	7 out of 13	4 out of 13	Good



Status of the Fishery

Coastwide Horseshoe Crab Bait Landings & Biomedical Collections

Source: ASMFC State Compliance Reports, 2025



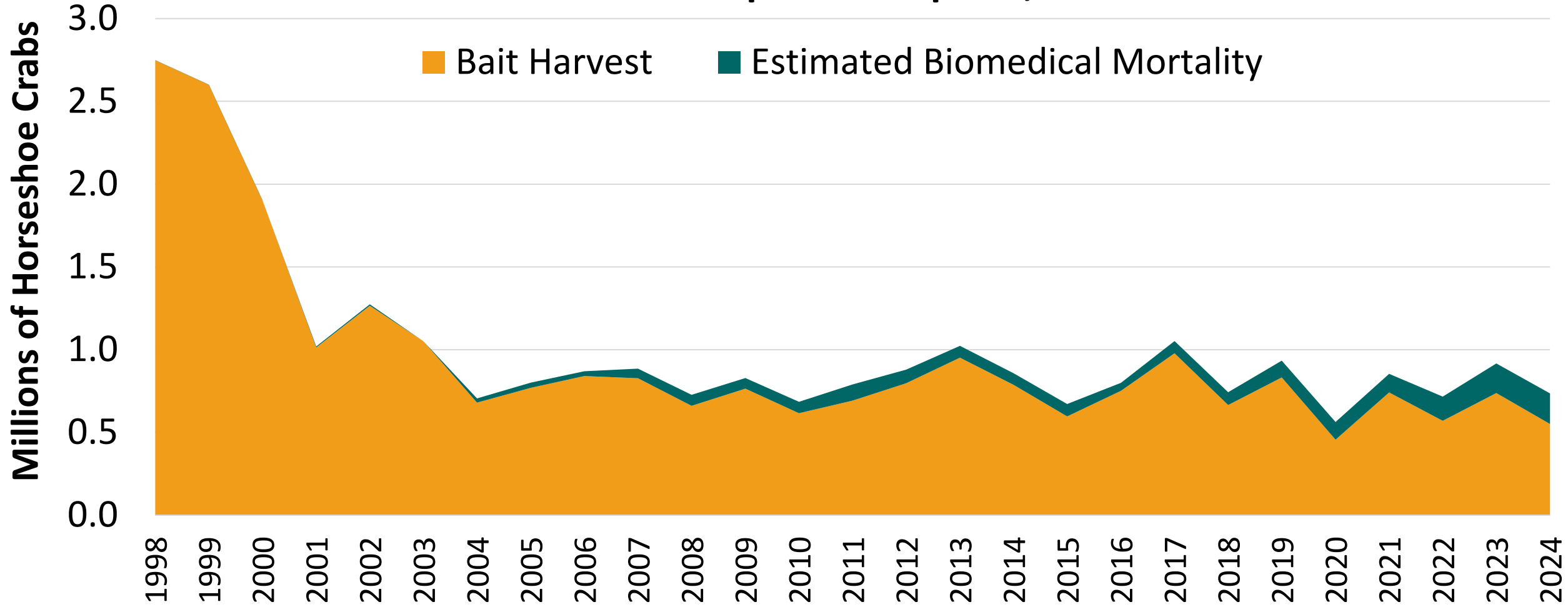
- Total 2024 coastwide harvest was 550,908 crabs
 - *RI and FL landings are confidential*
 - 25% decrease from 2023 landings of 738,789
- 34.6% of coastwide quota of 1.59 million crabs
- Almost all harvest is from MA (25%), NY (25%), VA (20%), DE (15%), and MD (13%)
- 77% of bait landings were male, 21% were female, and 2% were unclassified in 2024
 - MA data not provided

- Biomedical-only crabs collected in 2024: 1,073,329 crabs
 - 3% decrease from 2023 (1,113,644 crabs)
 - 56% male, 44% female
- Biomedical-only mortality estimate: 184,693 crabs
 - Biomed Mortality = $15\% \times \# \text{ Biomed-Only Bled} + \# \text{ Observed Dead Before Bleeding}$
 - 25% of total directed removals; biomedical mortality + bait harvest (735,601 crabs)
- Total removals decreased by 20% from 2023



Total Horseshoe Crab Mortality (Bait and Biomedical) 1998-2024

Source: State Compliance Reports, 2025



- All states and jurisdictions appear in compliance with FMP provisions
 - MA did not meet compliance report deadline
- As of Oct. 1, 2023, hand harvest of horseshoe crab and eggs is prohibited in CT
- NY implemented additional lunar closures for May-June

De Minimis Requests

- 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 requested and qualify for *de minimis* status

PRT Recommendations

- Continue seeking long-term funding for VT trawl survey
 - Funded through 2026
- Consider annual characterization of discard removals

Board Action for Consideration

- Consider approval of the FMP Review and state compliance reports for the 2024 fishing year, and *de minimis* status for SC, GA, and FL.

Questions?



Work Group Recommendations on Advisory Panel Composition

October 28, 2025



- July 2024 workshop on Delaware Bay management objectives consensus recommendation:
 - Evaluate Horseshoe Crab Advisory Panel (AP) to determine if it has adequate representation across stakeholder groups.
- Board expressed interest in reshaping the panel for a more even distribution of advisors from each region, and to conduct an open solicitation process for additional non-traditional stakeholders
- Work Group (WG) formed in May 2025 and tasked with developing recommendations on an appropriate distribution of advisors by region and user group and reviewing new nominations
 - 14 nominations for non-traditional stakeholders
 - 3 nominations for commercial fishery appointments

WG Recommendations

- The WG recommended the following distribution of advisors by region:
 - **Northeast:** three advisors, including one individual each from the commercial fishery, biomedical industry, and non-traditional stakeholder groups.
 - **Connecticut–New York:** two advisors, including one commercial fishery and one non-traditional stakeholder.
 - **Delaware Bay:** thirteen advisors, including five commercial fishery, three biomedical, and five non-traditional stakeholders.
 - **Southeast:** two advisors, including one biomedical and one non-traditional stakeholder.

WG Recommendations

- The WG recommendations aim to:
 - balance the relative interests of each region
 - represent various gear types in the commercial fisheries and diverse areas of expertise among non-traditional stakeholders
 - limit overall size of the AP to enhance interactions within the group

Recommended Appointments

	Northeast	CT-NY	Delaware Bay	Southeast
Commercial Fishery		Edwin Chiofolo	Stuart Potter Pete Bender	
Non-traditional	Helen Cheng	Jennifer Budai	Tim Dillingham Susan Linder Glen Gauvry Carly Touran	Jane Brockman
Remove		<i>John Turner</i>		

WG Recommendations

- Regularly evaluating meeting attendance to determine if additional changes to the panel membership should be considered
- Non-traditional advisor appointments are for a four-year term
 - After four years the Board could consider renewing their appointments or seek a change in representation

- Consider approval of WG recommendations for changes to the Horseshoe Crab AP membership