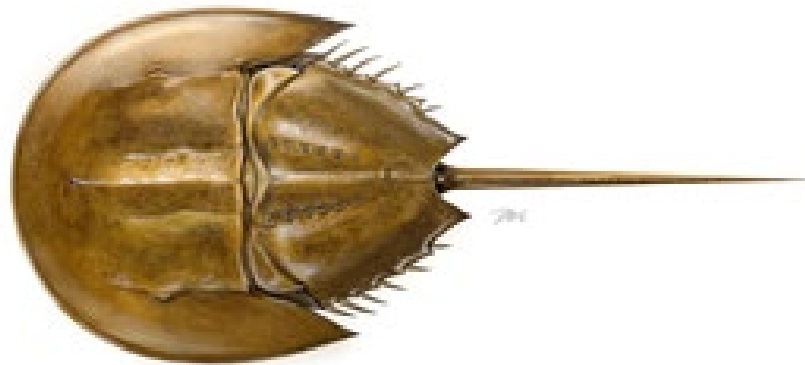


Work Group Recommendations on Biomedical Best Management Practices



**Horseshoe Crab Management Board
May 2023**

Background



- Board established a work group in November 2022 to review best management practices (BMPs) for handling biomedical catch and suggest options for updating and implementing BMPs
- Work Group Members:
 - Derek Perry (MA DMF)
 - Brett Hoffmeister (Associates of Cape Cod)
 - Katie Rodrigue (RI DEM)
 - Samantha MacQuesten (NJ DEP)
 - Benjie Swan (Limuli Labs)
 - Steve Doctor (MD DNR)
 - Nora Blair (Charles River Labs)
 - Dr. Daniel Sasson (SC DNR)

BMP History



- BMP document produced by WG in 2011 with recommendations for each step from capture to release
 - Collection, Transport to Facility, Holding/Bleeding, Post-bleeding Holding, Return to Sea
- BMPs are recommended in FMP but not required by ASMFC
 - FMP requires states to issue a special permit, or other specific authorization, for harvests for biomedical purposes, and return of horseshoe crabs taken for biomedical purposes to the same state or federal waters from which they were collected
 - States required to report # of biomedical HSC collected, # bled, # observed mortalities, # released

Work Group Meetings

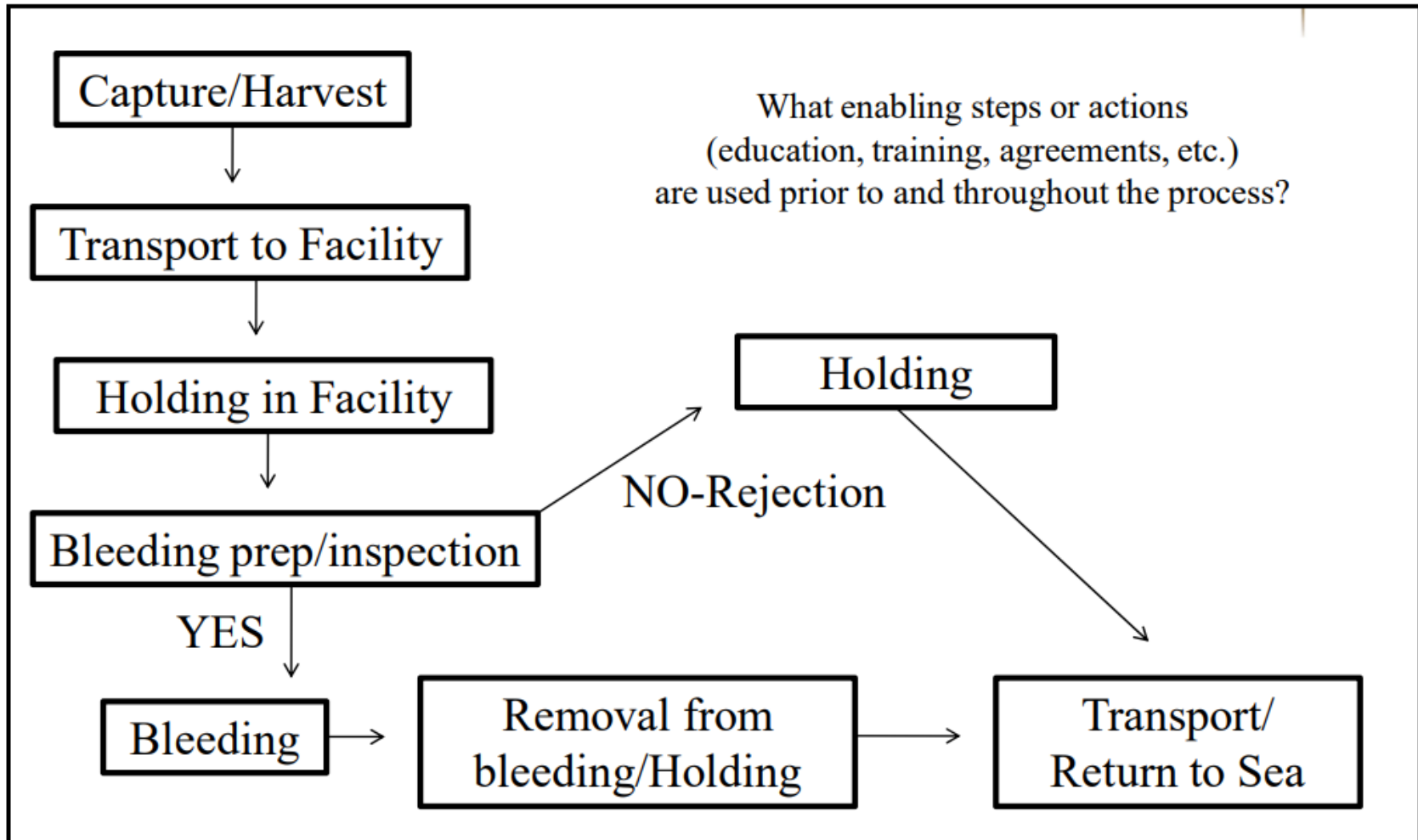


- The work group met five times from Jan-April
- Reviewed BMPs from 2011
- Drafted a new document to replace the 2011 BMPs
 - More contextual background on biomedical industry
 - Purpose of the BMPs
 - FMP Requirements
 - Updated BMPs
 - Research Recommendations

Recommended Changes to BMPs



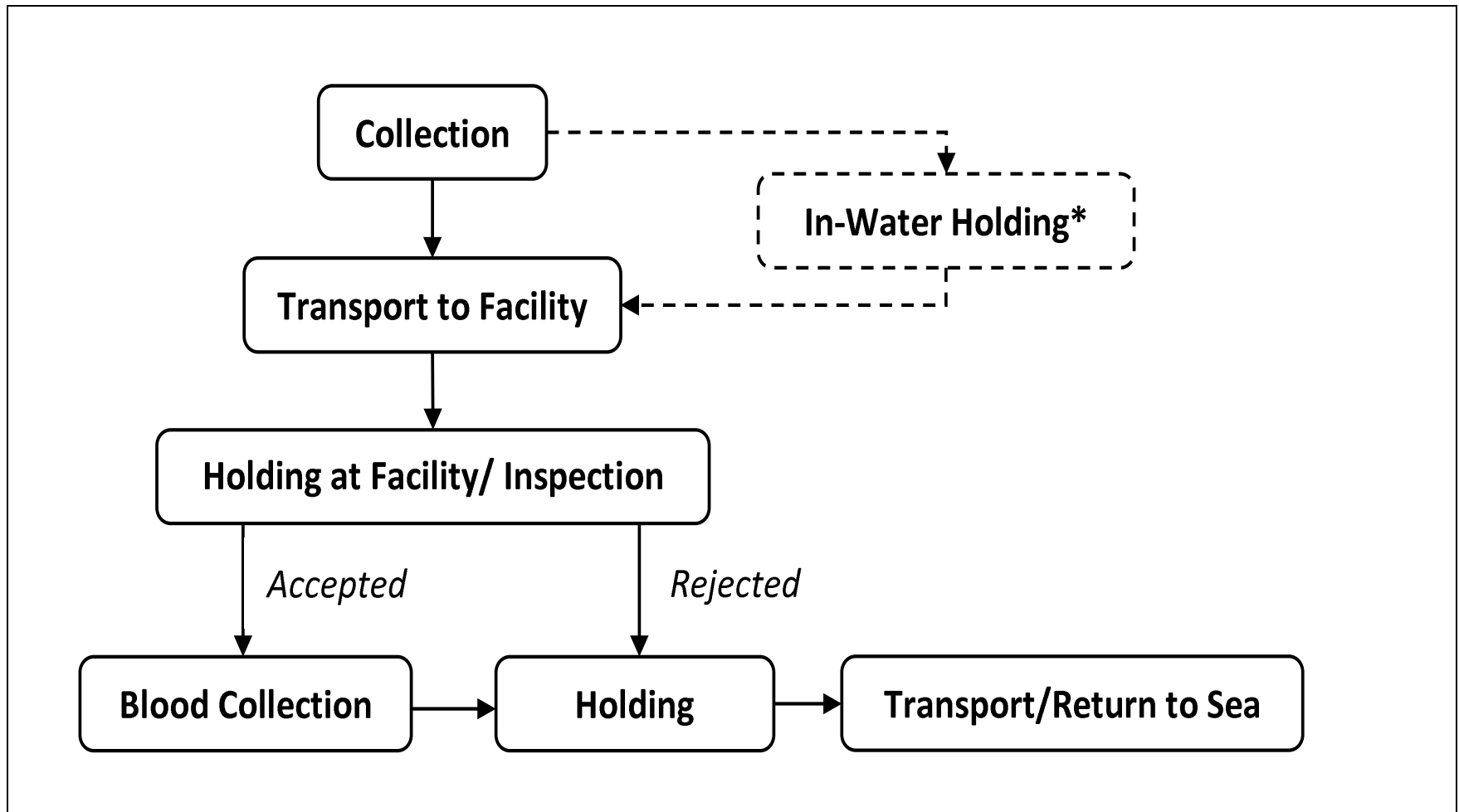
- Original Diagram



Recommended Changes to BMPs



- Updated diagram



Recommended Changes to BMPs



- Overarching BMPs moved to top
- Reorganized to better align with biomedical process
- Added a section with “In-water holding” BMPs
- Most BMPs maintained, some combined to reduce redundancy
- Some changes to improve applicability across states/regions
 - Range of environmental conditions and regulations
 - What is “best” in one state may not be in another

Recommended Changes to BMPs



Overarching practices for all steps

- Keep horseshoe crabs cool and moist, and minimize exposure to direct sunlight and anoxic conditions
- Avoid prolonged exposure of gills to fresh water
- Establish a dialogue among collectors, the biomedical company, and the state regulatory agency to address concerns and challenges
- Have a written agreement between collectors and the biomedical company, outlining practices and expectations
- Perform reviews of the various steps and contractors/employees throughout the process
- Ensure proper monitoring and recording of mortality at each step in the chain of custody
- Return horseshoe crabs taken for biomedical purposes to the same state or federal waters from which they were collected
- Avoid keeping horseshoe crabs out of the water for longer than 36 hours in total

Recommended Changes to BMPs



Collection

- Minimize tow times for targeted horseshoe crab trawl tows
- Handle horseshoe crabs carefully to minimize injury (e.g., avoid dropping/tossing horseshoe crabs, etc.)
- Minimize exposure to direct sun, avoid extreme temperatures and rapid temperature changes
- Night collection is recommended, especially during periods of excessive heat, when permitted by state regulation
- Sort out and return immediately to the water individuals that do not appear to be healthy (damaged, slow movement), soft shelled, or undersize horseshoe crabs (based on state regulations)
- Educate collectors in BMPs
- Specify expectations of collectors in written agreements
- Periodically observe horseshoe crab collectors' adherence to BMPs
- Horseshoe crabs marked as having been bled during the calendar year should be immediately released

Recommended Changes to BMPs



In-Water Holding

- Minimize holding time
- Avoid overcrowding
- Monitor water conditions (e.g., temperature, dissolved oxygen, salinity) and minimize exposure to stressful conditions
- Follow state guidelines on holding conditions, where applicable

Recommended Changes to BMPs



Transport to Facility

- Limit number of horseshoe crabs to a suitable number dependent on container size and shape to minimize damage to horseshoe crabs
- Minimize travel time
- Keep transport containers protected against direct sunlight and heat
- Secure containers in transport vehicle

Removed:

- *Maintain temperature between approximately ambient water temperature at time of collection and 10°F below ambient-water temperature*
- *Maintain good ventilation while stacked in bins*

Recommended Changes to BMPs



Holding at Facility/ Blood Collection

- Minimize holding time at the facility, **ideally** to less than 24 hours
- Follow written procedures for proper care and handling when sorting horseshoe crabs and moving them between bins and within the facility
- Inspect horseshoe crabs for health and damage, selecting only undamaged and healthy individuals for blood collection
- Maintain clean, sanitary conditions during blood collection
- Maintain same level of care for rejected horseshoe crabs while they are being held until release back to state or federal waters
- Avoid collecting blood from individual horseshoe crabs more than once per year (e.g., by marking, tagging, etc.)
- If horseshoe crabs are marked, ensure that the mark is residual and not harmful
- **Cease blood collection once blood flow rate slows**
- Do not use suction to collect blood
- Perform internal audits to maintain quality control over written procedures

Recommended Changes to BMPs



Post-Blood Collection Holding

- Maintain the same level of care that is used prior to blood collection
- Return to the state or federal waters from where they were collected as soon as possible, following state guidance when applicable
- Keep horseshoe crabs in **low-light areas** to minimize movement and injury

Return to Sea

- Use same care in handling and transporting horseshoe crabs being returned to the water
- Include written instructions and requirements for return within agreements with collectors, if applicable
- Periodically observe horseshoe crab collectors on implementation of BMPs and/or other criteria

Research Recommendations



- Study survival rates over time when kept in in-water holding ponds or pens
- Study the impacts of biomedical collection processes on spawning of horseshoe crabs
- Compare mortality rates across different collection methods
- Estimate horseshoe crab discard mortality associated with trawling collection methods

Research Recommendations



- Review and summarize the findings of current literature on horseshoe crab mortality associated with blood collection, and compare across experiments that more closely reflect BMPs and do not reflect BMPs
- Quantify mortality rates of horseshoe crabs post-blood collection, applying the BMPs and other standard biomedical industry practices
- Study conditions that minimize movement and injury of horseshoe crabs during biomedical processes (e.g., light, density, etc.)

Additional Considerations



- Recommendation to task the Technical Committee with reevaluating calculation of the coastwide biomedical mortality estimates presented in Commission documents
 - Unclear if current method results in double counting of observed mortality
- Commission's FMP should be modified to use language that accurately reflects the practices used by the industry
 - E.g., collection vs harvest, shipping vs transport
- States should report to Board on non-FDA licensed operations that collect blood from horseshoe crabs

Next Steps

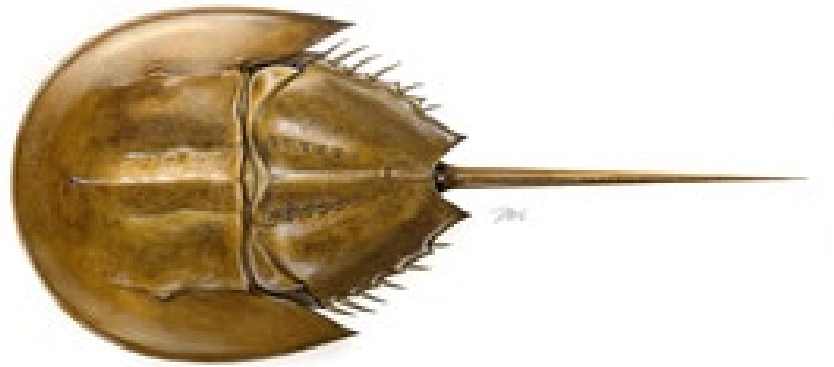


- Consider approval of BMPs as recommended by the work group

Questions?



Options for Evaluating Management Objectives for the Delaware Bay Horseshoe Crab Fishery



Horseshoe Crab Management Board
May 2023

Background



- In November 2022 the Board adopted the revised ARM Framework with Addendum VIII, and set specs for 2023 Delaware Bay bait harvest
 - 475,000 males, 0 females
- The Board discussed forming a work group to evaluate the current goals and objectives for the management of Delaware Bay horseshoe crab

Potential Options for Evaluating Objectives



1. Stakeholder Survey
2. Board Work Group
3. Ecosystem Management Objectives Workshop

Stakeholder Survey



- Low resource requirements
- Personnel needs:
 - ASMFC Staff, 5-6 Board members
- Timeline: 4-6 months
- Steps:
 - Establish Work Group to develop survey
 - Develop survey
 - Distribute survey
 - Analyze results and produce report
- Major budget items:
 - Work Group meetings

Board Work Group



- Medium resource requirements
- Personnel needs:
 - Board and Advisory Panel members, technical and stakeholder representatives
- Timeline: 6-9 months
- Steps:
 - Establish Work Group
 - Convene Work Group
 - Consult stakeholders
 - Develop recommendations
 - Produce Work Group report with recommendations
- Major budget items:
 - In-person work group meetings

Ecosystem Management Objectives Workshop



- High resource requirements
- Personnel needs:
 - ASMFC Staff, Board and Advisory Panel members, technical and stakeholder representatives, workshop chair and/or a hired facilitator
- Timeline: 9-12 months
- Steps:
 - Plan workshop(s)
 - Hold workshop(s)
 - Develop workshop report with recommendations
- Major budget items:
 - In-person stakeholder workshop(s), workshop facilitator

Next Steps



- Discuss the Board's intentions
 - What questions do you hope to answer through this process?
- Consider moving forward with one or more of these options

Questions?

