Blue Crab Abundance Outcome – 2022-2023

Looking Back: Learning from the Last Two Years

Celebrate our Accomplishments & Best Practices

1. Since your last QPM, what key successes would you like to highlight to the Management Board? *NOTE: This is not intended to be a comprehensive review of the green actions in your action plan. Reflect on what you will continue in your post-QPM work/action plan.*

   Highlights:

   - Organized a blue crab science workshop
   - Received funding for and started planning a benchmark stock assessment
   - Funded a population simulation modeling project
   - Developed and distributed the annual Blue Crab Advisory Report

   A substantial decline in blue crab abundance in 2022 sparked interest in better understanding drivers of blue crab population dynamics (i.e., recruitment, abundance) and emphasized the need for a new benchmark stock assessment. In September 2022, the Chesapeake Bay Stock Assessment Committee (CBSAC) held a blue crab science workshop to discuss blue crab population drivers and the assumptions of the current stock assessment model to inform a new benchmark stock assessment. The workshop successfully identified specific science needs for CBSAC to prioritize for external funding opportunities and the model assumptions to address in the next benchmark stock assessment. The workshop report summarized all the information from the workshop, which was critical for the stock assessment planning process, i.e. development of the terms of reference and data workshop planning.

   The Sustainable Fisheries Goal Implementation Team (SFGIT) was successful in funding a blue crab project through the Chesapeake Bay Trust's GIT Funding Program. The project is developing a blue crab population simulation model that can be used during the stock assessment process to evaluate model performance under various assumptions to identify sources of bias and the most appropriate model for the Chesapeake Bay population. The simulation model can also be used to evaluate population response to various management and harvest scenarios, which will be useful for identifying appropriate management actions in the future.

   CBSAC also developed the annual Blue Crab Advisory Report, providing the results of the Winter Dredge Survey and management advice to fisheries managers and the public.

Evaluate our Progress

NOTE: Your responses related to outlook and recent progress will be used to update your outcome page on ChesapeakeProgress and the outcome status page.

2. Are we, as a partnership, making progress at a rate that is necessary to achieve this outcome? Would you define our **outlook** as on course, off course, uncertain, or completed? Upon what basis are you forecasting this outlook?

   The Blue Crab Abundance Outcome is on course and expected to be met by 2025. Since 2008, blue crab stock status has been evaluated based on female-specific management reference points for abundance and exploitation. Management aims to meet the abundance target of 196 million mature female crabs and avoid falling below the threshold of 72.5 million. If female abundance drops below the threshold, the blue crab population would be considered overfished, or depleted, and would no longer be at a sustainable level. Abundance of mature females has not fallen below this threshold since 2014, and even surpassed the target in 2017, indicating that the blue crab population has remained sustainable under the current management framework (Figure 1).

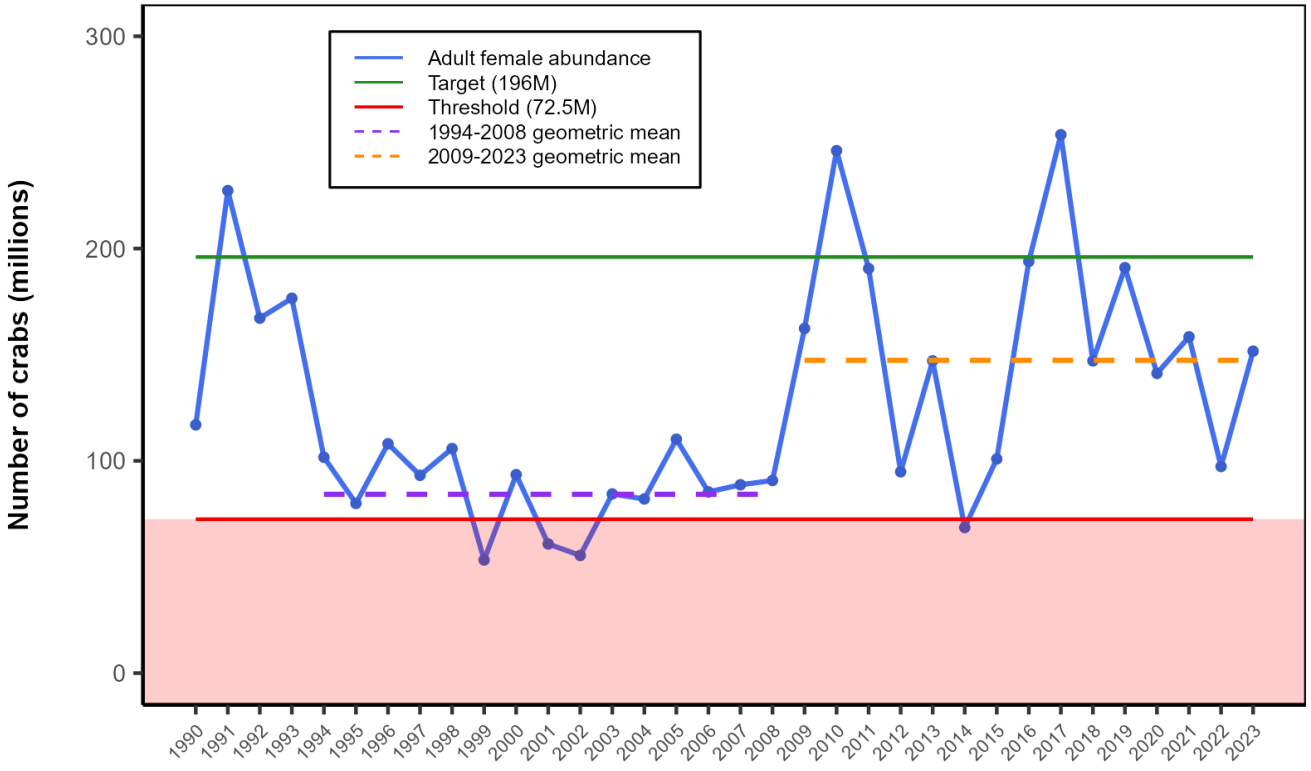

Figure 1. Estimated abundance of mature female blue crabs from the Winter Dredge Survey, 1990-2023, relative to the female-specific management reference points. The dashed lines represent the geometric mean of adult female abundance during two time periods: 2009-2023, after the current management framework was implemented (yellow); and 1994-2008, the period of low abundance that prompted the management changes (purple).

3. How would you summarize your **recent progress** toward achieving your outcome (since your last QPM)? If you don't have an indicator, would you characterize this progress as an increase, decrease, no change, or completed? *(Tip: If you have an indicator and it was updated since your last QPM, use your answer to question 16 from your Analysis and Methods document.)*

   Although the abundance of mature female blue crabs in 2022 was at the lowest point in recent years at 97 million, abundance has remained above the management threshold (72.5 million) and increased 57% to 152 million in 2023. While blue crab populations naturally exhibit high interannual variability, CBSAC has prioritized better understanding environmental and ecological factors that may influence blue crab population dynamics in the Chesapeake Bay. The commitment of the jurisdictions, with the support of CBSAC, to conduct a benchmark stock assessment is also a monumental step in ensuring that the best available science is used to evaluate the blue crab population and the progress of this outcome.

Lessons Learned

4. If our outlook is off course, what has been the most critical influencing factor or gap that needs to be addressed to accelerate progress?

   N/A

5. For "red" actions, what is preventing us from taking action? Are these actions still needed?

   The "red" actions in the 2022-2023 Blue Crab Logic & Action Plan were no longer necessary or a priority once the jurisdictions agreed to conduct a benchmark stock assessment. For example, developing a standard operating procedure for updating the management reference points would not be useful if the reference points change with the new benchmark. This action should be addressed after the stock assessment is completed. The action to develop goals and recommendations for standardized cooperative fisheries data collection programs also fell through due to stock assessment planning. In retrospect, the need for this action is negligible. Currently, the Maryland Department of Natural Resources is the only jurisdiction with this kind of catch sampling program and while it would be ideal for the Virginia Marine Resources Commission and the Potomac River Fisheries Commission to implement similar programs, funding and staff resources are lacking and there is no identifiable source of funding for this type of long-term monitoring in the near future. Therefore, this action would not likely have an impact on outcome progress and can be disregarded.

6. What have we learned over the past two years that we'll need to consider in the coming two years?

   The blue crab science workshop identified knowledge gaps around blue crab population dynamics and the fishery that CBSAC should prioritize to better understand trends in abundance and recruitment, including:

   - Better estimates of juvenile abundance

- Quantifying relationships between blue crab abundance and environmental/habitat factors (e.g., wind events, coastal freshwater flow, dissolved oxygen concentrations, seagrass/marsh abundance)
- Improved understanding of blue crab habitat use and movement
- Quantifying relationships between blue crab and predator abundances
- Factors that affect population productivity (e.g., sperm quantify/viability, sperm:egg ratios, brood production)

While CBSAC has the expertise to address these gaps, funding continues to be a limiting factor to completing this kind of work. For some science needs, available data is also a limiting factor (e.g., predator abundance).

Assessing our Efforts and Gaps

Reflection: Review the factors currently identified in your Management Strategy as influencing our ability to meet our outcome by reflecting on the following questions. What influences our success or our effectiveness in meeting our outcome? What has limited our ability as a Partnership (or GIT/workgroup) to get this work done? Update your Management Strategy if anything has changed.

Factors

7. Summarize any newly identified influencing factors, and why they were added to your Management Strategy. If any factors have been deleted, are they the result of our actions, and what have we learned as a result?

   Although discussions at the blue crab science workshop prioritized data gaps for CBSAC to address based on available data and current understanding, all the influencing factors discussed were already identified in the 2022-2023 Blue Crab Management Strategy.

8. Prioritize and summarize here the factors best tackled as a Partnership (or GIT/workgroup), that have the greatest impact to achieve our outcome.

   As a result of the discussions at the blue crab science workshop, CBSAC has decided to prioritize science needs for which data are readily available and that relate environmental change to blue crab population dynamics. Specifically, CBSAC would like to address questions about the effects of coastal oceanic conditions on blue crab recruitment, and the relationships between habitat availability (i.e., seagrass, marsh) and blue crab abundance/recruitment.

Gaps

9. For those high priority factors summarized above, what is getting in the way of addressing them or what gaps continue to exist despite the current efforts to address those factors?

   Limited funding is the biggest barrier to addressing CBSAC's science needs.

Focusing on the Next Two Years: Actions and Needed Support

10. Describe any scientific (including the impacts of climate change), fiscal, or policy-related developments that have already or may influence your work over the next two years.

    The blue crab science workshop revealed how much remains unknown about blue crab population dynamics, identifying data gaps that should be prioritized for future funding opportunities in order to improve our understanding of population trends. Specifically, research and monitoring efforts should focus on quantifying the impact of environmental conditions (e.g., water temperature, oxygen concentrations, habitat availability, oceanic conditions) and climate change on blue crab recruitment and abundance.

11. Based on these developments and the learning discussed in the previous sections, summarize any new actions you are planning to address these gaps over the next two years.

    Actions:

    - Complete the benchmark stock assessment
    - Fund science needs related to environmental change

    Over the next two years, CBSAC's primary focus will be completing the benchmark stock assessment as this will determine the management framework (possibly with new reference points) for the Chesapeake Bay blue crab population going forward. Additionally, CBSAC will identify potential funding sources for research that will address the previously mentioned knowledge gaps and provide support for such funded projects.

12. Have you identified new needs, or have previously unmet needs, that are beyond the ability of your group to meet and, therefore, you need the assistance of the Management Board to achieve? If yes, provide any detail that would assist the Management Board in assessing this need.

    An optional approach for providing this information is to use the SPURR thought model.

    - *Specific and actionable need*
    - *Programmatic partner*
    - *Urgency of the needed action*
    - *Risk of not acting*
    - *Resources required*

    While CBSAC has the expertise to address the data gaps mentioned previously (e.g., quantifying relationships between blue crab abundance and environmental conditions, predator abundance, and habitat availability; analyses of brood production and population productivity; blue crab habitat use and movement studies), additional funding is required to complete these activities.

13. What steps are you continuing, or can you take, to ensure your actions and work will be equitably distributed and focused in geographic areas and communities that have been underserved in the past?

The SFGIT has prioritized the participation of HBCUs/MSIs on CBSAC, adding a new member from Morgan State University in 2023. The SFGIT also strongly encourages PIs on CBSAC to include minority students in blue crab research and management processes.