Virginia Marine Resources Commission
Crab Management Advisory Committee (CMAC)
July 29, 2024 Meeting Information Follow-Up

At the July 29, 2024 meeting, CMAC made data requests and asked clarifying questions to help guide decision-making for management advice regarding the potential 2024-2025 winter dredge blue crab fishery. VMRC staff recorded the requests and questions and have provided answers in this document, to the extent possible. Staff forwarded some questions to Virginia Institute of Marine Science (VIMS) researchers, and they will be addressed at the August 20, 2024 meeting. Some questions/requests were beyond the scope of what could be addressed in part or in full in the time between meetings. Staff has noted these as research recommendations for consideration in the longer term.

Questions for VMRC Staff:

- What benefits have resulted from closing the dredge fishery in 2008 (other than achieving 34% reduction)?
    - We cannot quantify the costs or benefits of the 2008 crab dredge fishery closure due to its connection with other effort reduction measures implemented at the same time.
    - However, the 2008 34% reduction in effort overall was followed by an 80% increase in average adult female abundance in 2009-2024, relative to the previous period (1994-2008).

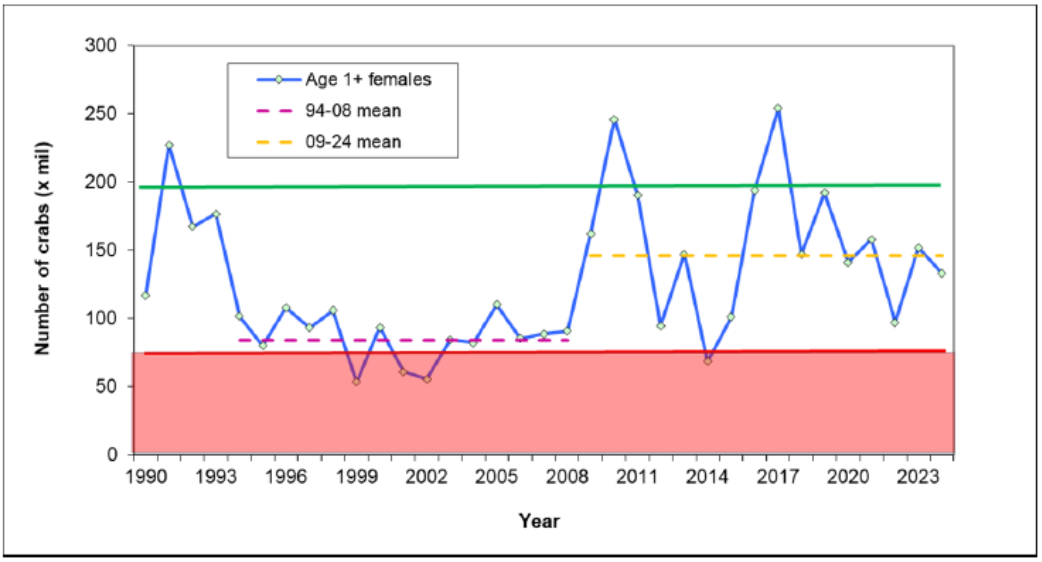
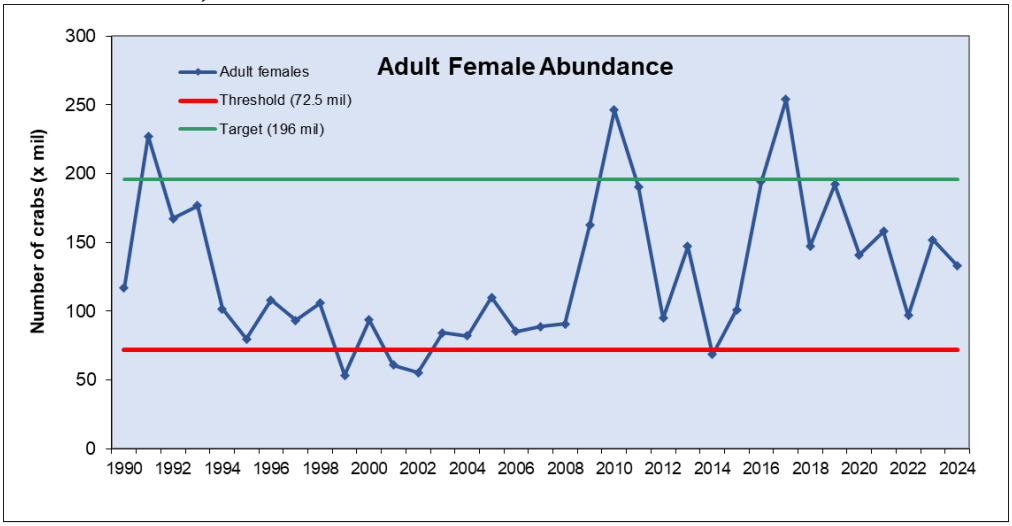


Figure 6. Winter Dredge Survey estimate of abundance of mature female blue crabs (age 1+), 1990-2024, relative to the female-specific reference points. These are female crabs measuring greater than 60 mm (2.4 in) across the carapace and are considered the "exploitable stock" capable of spawning within the year. The dashed lines represent the geometric mean of adult female abundance during two time periods: 2009-2024, after the current management framework was implemented (yellow dashes); and 1994-2008, the period of low abundance which prompted the management changes (purple dashes).

- How many of the last 34 years has the female abundance been above the target?
    - Since 1990, adult female abundance estimates have exceeded the target in three years (1991, 2010, and 2017) and fallen below the threshold in four years (1999, 2001, 2002, and 2014).



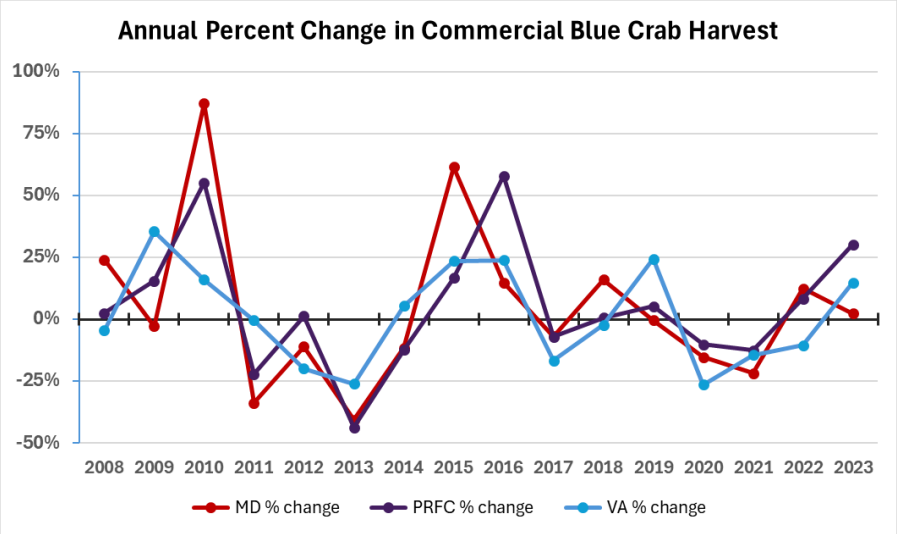
- What proportion of total harvest would a 1.5 million pound dredge fishery represent?
    - 8.79% of 2023 Virginia commercial harvest (~17.1 million pounds)
    - 3.82% of 2023 Bay-wide commercial harvest (~45.7 million pounds)
    - Note: 96% of dredge harvest is females = 1.44 million pounds
        - That is 12.81% of the 2023 Virginia commercial female harvest and 6.5% of 2023 Bay-wide commercial female harvest.

- What is the purpose of a stock assessment? How would opening the dredge fishery in 2024-2025 affect the stock assessment?
    - The purpose of fishery stock assessments is to increase our understanding of how a stock is changing over time, to examine fishing pressure trends, and to determine the current health of a stock as well as the fishing rates that would allow sustained catches while allowing enough of the stock remaining to reproduce and maintain itself into the future. Ideally, assessments occur on a regular basis, using updated datasets to determine the stock status relative to reference points. During a "benchmark" stock assessment like the one coming up, scientists have the opportunity to broaden the research aspects of the assessment and make changes to which data sets are used (and how), the types of model(s) used and how they are implemented.
    - Opening the winter crab dredge fishery in 2024-2025 will not impact the 2025 benchmark stock assessment. The last year of data used in the assessment will be 2024. Assuming a Jan-Feb winter dredge fishery, data from the winter dredge fishery will not be included in the benchmark assessment. However, major changes to management are often postponed during ongoing assessments to reduce the chance of having to walk back new measures in response to the stock assessment results.

- Are there available VMRC staff for observer coverage of a winter dredge fishery?

- Current staffing levels are not sufficient to cover typical monitoring levels (2-5% of trips); however, occasional observed trips could be arranged.

- How consistent have the jurisdictions been on "keeping their word" with respect to harvest adjustments?
  - Realized harvest is a result of numerous factors including management measures, stock abundance/density, and environmental conditions. Commercial harvest from Maryland, PRFC, and Virginia fluctuates annually (see figure below).
  - In 2014, Maryland, Potomac River Fisheries Commission (PRFC), and Virginia signed the Chesapeake Bay Watershed Agreement to establish goals and to collaborate on Chesapeake Bay management issues, including the blue crab fishery.
  - Based on annual Chesapeake Bay Stock Assessment Committee (CBSAC) Blue Crab Advisory Reports (available since 2012), the management recommendations in most years have been to maintain a "risk-averse and cautious management approach."
    - In 2016, CBSAC recommended "scaling back" harvest in 2017 to protect recruits (age-0 crabs). MD, PRFC, and VA all shortened the crab pot season and reduced bushel limits for the 2017 season. Harvest decreased in 2017 relative to the previous year in all three jurisdictions.
    - In 2021, CBSAC recommended implementing measures to protect recruits in 2022. The three jurisdictions enacted various management measures to do so. In 2022, VA harvest decreased while MD and PRFC harvest increased relative to the previous year.
    - The 2024 CBSAC Blue Crab Advisory Report summarizes each jurisdiction's management actions from 2008-2023 (see Appendix B of the report, beginning on page 27).



Percent change in MD, PRFC, and VA commercial harvest in each year relative to the previous year. Zero would indicate that harvest remained the same from one year to the next.

- How does the exploitation rate in the Chesapeake Bay blue crab fishery compare to the exploitation rates of other fisheries?
    - As briefly noted during the meeting, comparisons of exploitation rates across species with very different life histories (i.e., reproductive cycles, development, migration patterns, life span, etc.) is not a pragmatic exercise. Sustainable fisheries harvest depends upon maintaining the stock at a size that is capable of reproducing at a rate that can compensate for losses. Differing growth characteristics *require* differing levels of exploitation.

- Is there a difference between dredged and potted crab prices?
    - Looking at Delaware's Crab fishery commercial landings for the past five years (2018-2022). Dredge price per pound was 42% lower than that harvested by pots.

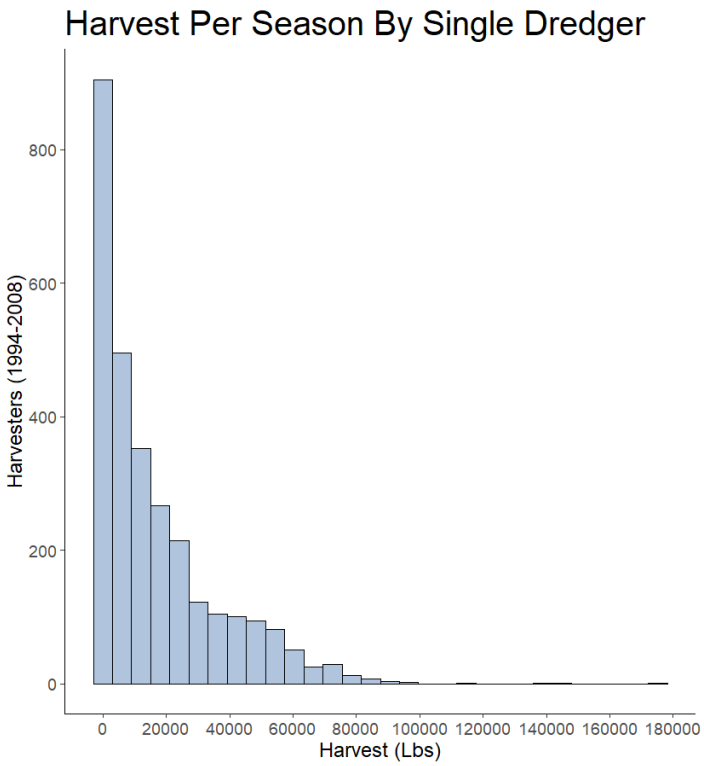
Delaware Crab Fishery 2018-2022			
	Avg	Value	$/lb
Dredge	359,813	593,231	$1.65
Pots & Traps	3,883,762	9,001,594	$2.35

-29.78%*

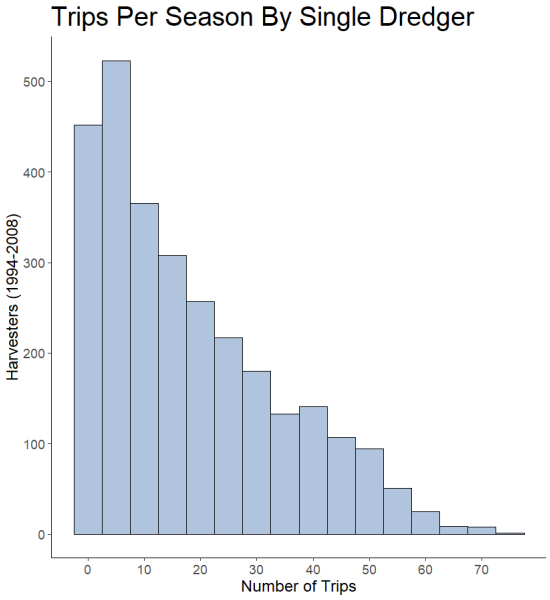
* Percent difference corrected on 8/22/2024 from previously released memo.

Data Presentation Request:

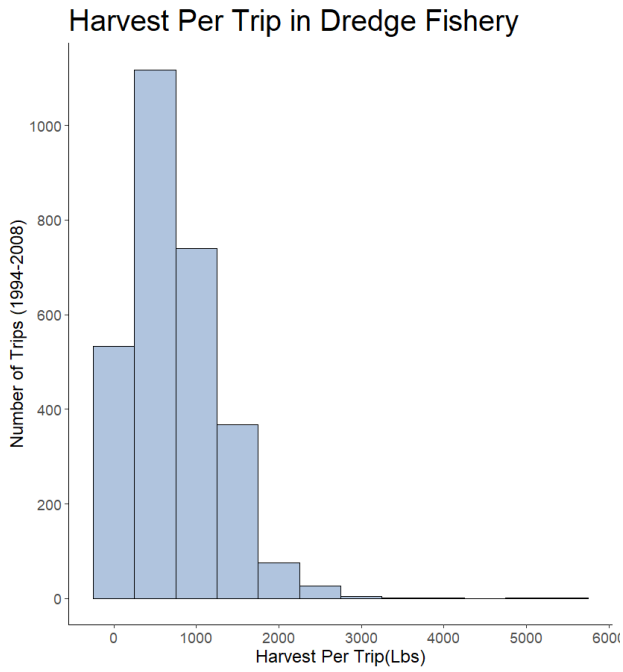
A request was made to use historic daily landings to forecast harvest that could occur under various numbers of licensees. Staff have looked into these data and prepared estimates. Visualizations are provided here, and this information will be discussed in full at the August 20, 2024 meeting.



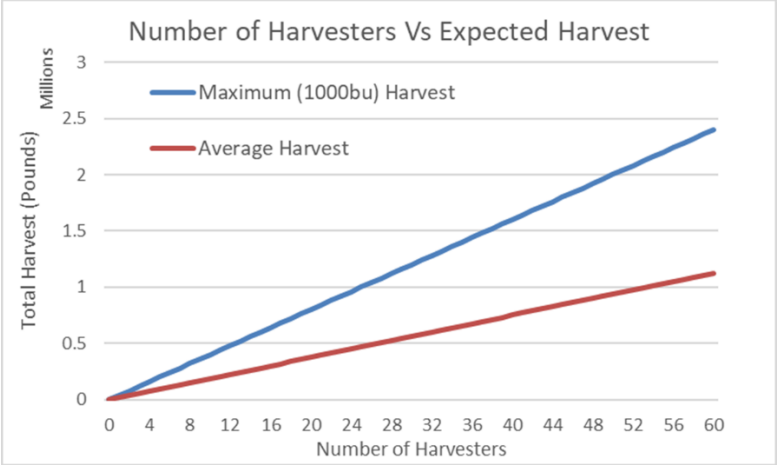
Distribution of harvest per season per dredger from 1994-2008. The average harvest by a dredger in a season was 16,800 lbs. Most dredgers harvested less than 5,000 lbs per season, and some seasons saw up to 180,000 lbs.



Distribution of number of trips taken by a dredger in a single season from 1994-2008. The average number of trips per season by a single dredger was 18. Most dredgers took fewer than ten trips while some dredgers took as many as 70 trips in a season.



Distribution of harvest from a single dredge trip. The average harvest in a single trip was 744 pounds.



The relationship between number of harvesters and expected harvest under the historic average harvest of 16,800 lbs per dredger (red line) and the maximum harvest proposed by the 2013 winter dredge plan of 1000 bushels (40,000 lbs) per dredger (blue line).

Questions forwarded to VIMS:

- How does imprecision in the WDS juvenile abundance estimate impact the exploitation rate?
- Winter dredge and spring pot fisheries will target the same population. What difference does it make if a crab is caught in the winter vs spring? There is a new paper from VIMS that discusses how important spring spawning crabs are for recruitment, and input from Rom was requested.
- Why is there so much emphasis on female crabs? What about low fertilization rate?
- Considering alternative forms of conservation equivalency/compensation, how could the savings (reduced harvest) associated with a year-round area closure be quantified?

Research Recommendations for beyond 2024

- Provide an update to the Kirkley's 2011 VIMS report "An Assessment of Harvesting Capacity in The Blue Crab, *Callinectes sapidus*, Fishery of the Commonwealth of Virginia."
    - This is not something VMRC can provide without an economist on staff. VMRC would support the efforts of an economist in providing an update on capacity in the blue crab fishery.
- Explore the relative impact of closing the winter dredge fishery compared to the effects of predation (specifically increasing predation pressure from blue catfish).
    - The topic of predation pressure has a lot of interest from the scientific community. This is a large question that will require considerable research. In the immediate term, some papers are available on the topic. For example, see:
        - Fabrizio et al. 2021. Predation Impacts of Invasive Blue Catfish on Blue Crabs in Estuarine Environments.
        - Hilling et al. 2023. Predatory impacts of invasive Blue Catfish in an Atlantic coast estuary.