2026 Chesapeake Bay Blue Crab Stock Assessment Update

Final Report: August 6, 2026
Prepared by: Maya Drzewicki
Revised: August 31, 2026 by M. Wilberg

EXECUTIVE SUMMARY

In 2026, a new benchmark stock assessment was conducted for Chesapeake Bay blue crabs using a Sex- and Length-structured Assessment Model (SLAM). Each year, this model will be updated with the most recent survey and harvest data, and the estimated abundance of mature male and mature female crabs and fishing mortality of male and female crabs (separately by sex, but across all sizes) will be used to assess blue crab stock status relative to the sex-specific management reference points derived from the assessment. The Chesapeake Bay Stock Assessment Committee (CBSAC) will meet each spring to review the results of the latest model update and to develop management recommendations for the upcoming crabbing season.

The 2026 update to the stock assessment indicated that the total abundance of all crabs (males and females of all ages) in 2026 was approximately 2.21 billion individuals. Recruitment, or the number of age 0 crabs (less than 65 mm carapace width), was estimated at 1.9 billion. Approximately 121 million mature female crabs were estimated to be present in the Bay at the start of the 2026 crabbing season, which is below the abundance threshold (124 million mature females) and the target (145 million crabs). The fishing mortality rate of fully selected female crabs in 2025 was estimated at 0.12 mo^{-1}. This is below the management target (0.22 mo^{-1}) and threshold (0.30 mo^{-1}). Approximately 1.0 billion male crabs (all sizes) were estimated to be present in the Bay at the start of the 2026 crabbing season, which is above the threshold (899 million) and above the target (909 million). The estimated fishing mortality rate of fully selected male crabs was 0.33 mo^{-1} is below the management target (0.5 mo^{-1}) and below the threshold (0.67 mo^{-1}).

These results suggest that overfishing is not occurring on male or female blue crabs. Female blue crabs are depleted (i.e., below the threshold abundance reference point), and male blue crabs are not depleted based on the current sex-specific biological reference points. However, the current male abundance reference point includes males of all sizes and is heavily affected by the above average estimated recruitment for 2026. CBSAC recommends developing a mature male reference point to assess stock status starting in 2027. Estimated mature female and harvestable male (≥5 in carapace width [13 cm]) abundances remain near the lowest levels of their respective time series. The recruitment indicator is between the threshold and median values.

1. INTRODUCTION

1.1 Background

The Chesapeake Bay Stock Assessment Committee (CBSAC) serves as a technical subcommittee of the Thriving Habitat, Fisheries, and Wildlife Goal Team within the Chesapeake Bay Program. CBSAC combines the expertise of state resource managers and scientists from agencies and universities around the Chesapeake Bay region, as well as federal fisheries scientists from the National Marine Fisheries Service's Northeast and Southeast Fisheries Science Centers.

1.2 Management Framework

The 2026 Chesapeake Bay blue crab benchmark stock assessment calculated Bay-wide threshold and target biological reference points for male and mature female abundance and fishing mortality rates using a spawning potential ratio approach (Wilberg et al. 2026). Ideally, the fishery should operate to meet target values and should not surpass the fishing mortality rate thresholds or cause the stock to fall below the abundance thresholds. The Chesapeake Bay-wide recruitment reference point can also be used to indicate extended periods of low recruitment, which may provide additional context for management decisions.

In response to the new assessment and suite of biological reference points, CBSAC is meeting throughout 2026 to develop recommendations for a new interjurisdictional management framework.

1.3 Stock Assessment Updates

The 2026 benchmark stock assessment was finalized in June 2026 and included data through 2023. A complete stock assessment update was conducted in July 2026, incorporating Winter Dredge Survey data through March 2026 and other survey and harvest data through 2025. The results of the update showed similar scale and trends in estimated abundance compared to the original 2026 benchmark assessment, indicating model stability, but the estimated reference points were slightly different (Table 1), which was expected given that new data were included in the model.

Table 1. Abundance and fishing mortality rate biological reference points for each sex generated by the 2026 benchmark stock assessment (2023 terminal year) and the July 2026 stock assessment update (2026 terminal year). For the 2026 update, abundance estimates are the number of crabs estimated to be in the Bay at the start of the 2026 crabbing season, and fishing mortality rates are for the 2025 crabbing season. Male abundance reference points are calculated using males of all sizes, and mature female abundance reference points include all mature females (i.e., have an abdomen shape that indicates they have gone through their maturation molt). Abundance and fishing mortality rate reference points are affected by changes in selectivity, monthly patterns of fishing mortality, growth, maturation, and historical recruitment. Because of these dependencies, the values of the reference points are expected to change somewhat with each assessment update.

Reference Point		Stock Assessment	
		2026 Benchmark (Terminates December 2023)	2026 Update (Terminates March 2026)
Abundance Millions of crabs	Male Target	896	909
	Male Threshold	886	899
	Mature Female Target	160	145
	Mature Female Threshold	138	124
Fishing mortality rate mo-1	Male Target	0.43	0.50
	Male Threshold	0.58	0.67
	Mature Female Target	0.16	0.22
	Mature Female Threshold	0.21	0.30
Recruitment Billions of crabs	BRP	1.24	1.23
	Median	1.55	1.53

1.4 Data Sources

Fishery-Independent Data

Indices of abundance from eight surveys were included in the assessment model. For surveys with designs that used random sampling (Winter Dredge Survey [WDS], VIMS Trawl Survey, and Chesapeake Bay Multispecies Monitoring and Assessment Program [ChesMMAP]), we used spatio-temporal models to estimate the indices, and for those with fixed site designs (Maryland Trawl Survey including the SERC Trawl Survey and PEARL Pot Survey), we used generalized additive models. The uncertainties of the indices of abundance were also estimated. The indices were month-specific because the sampling frames of the surveys were generally monthly. Additionally, the length and sex composition of crabs in each survey were quantified. Because recruitment was included in the model in February, we censored the size distributions of the surveys for August-January to remove new recruits prior to the time of recruitment in the model.

Fishery-Dependent Data

We characterized monthly catch data for each management jurisdiction (Maryland, Virginia, and the Potomac River) for 1994-2025. We used 1994 as the beginning of our time series because that was the first year mandatory commercial landings reports were available for all jurisdictions. Catches were separated into six fleets: Maryland Pot, Maryland Trotline, Virginia Pot, Virginia Dredge, Potomac River, and peeler (aggregated across gears and jurisdictions). The fleets represent fishing modes with different selectivity and monthly patterns of harvest. To estimate total harvest (including landings, dead discards, and recreational harvest) of blue crabs, the landings were expanded by fleet, month, and year-specific expansions. The sex ratios and size compositions of the catch for each fleet were estimated using several data sources including cooperative commercial monitoring, dealer monitoring, and concomitant survey data.

2. POPULATION SIZE (ABUNDANCE)

2.1 Total Abundance

The estimate of total blue crab abundance (males and females of all sizes) in Chesapeake Bay was 2.2 billion crabs in February 2026 (Figure 1; note that abundance is reported for March 1 to correspond with the beginning of fishing season and the time of the Winter Dredge Survey). This was an increase from the 2025 estimate of 1.1 billion.

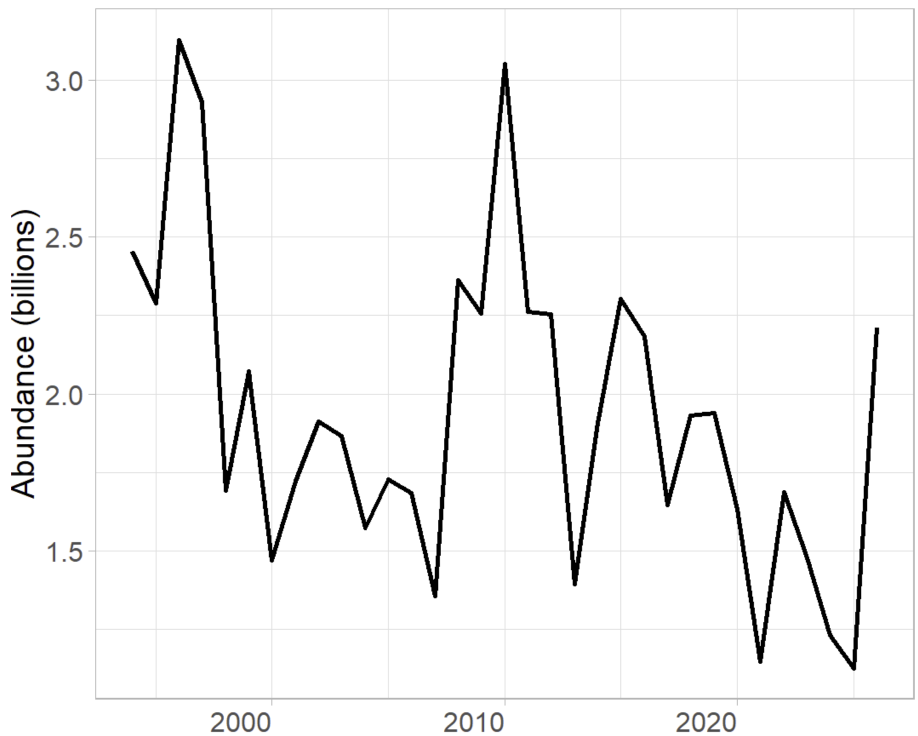

Figure 1. Estimated total blue crab abundance (males and females of all sizes; billions) in the Chesapeake Bay, 1994-2026.

2.2 Recruitment

Recruitment is estimated as the number of age 0 crabs (less than 65 mm carapace width) in February of each year. Estimated recruitment has shown a declining trend since 2010 with an uptick in the most recent year. The estimated abundance of juvenile crabs in 2026 was 1.9 billion, which is an increase from the 2025 estimate of 837 million and was the highest estimated value since 2010 (Figure 2).

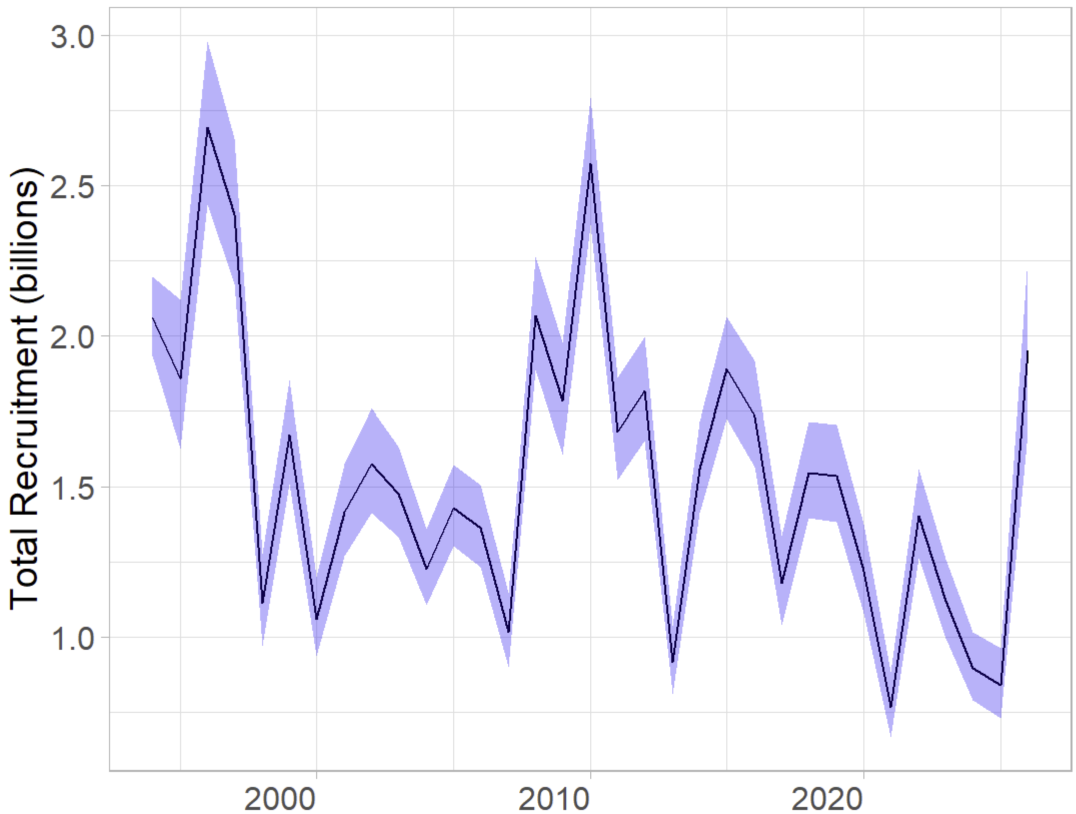

Figure 2. Estimated recruitment of blue crabs (billions) in Chesapeake Bay during 1994-2026. The shaded region represents 95% confidence intervals.

2.3 Harvestable Abundance

The abundance of harvestable male crabs (≥5 in carapace width [13 cm]) in 2026 was 60 million, a decrease relative to the 2025 estimate of 76 million harvestable males (Figure 3). The 2026 estimate of mature female abundance was 121 million, a decrease relative to the 2025 estimate of 134 million mature female crabs. The 2026 estimate is the lowest of the time series for harvestable males and the second-lowest for mature females.

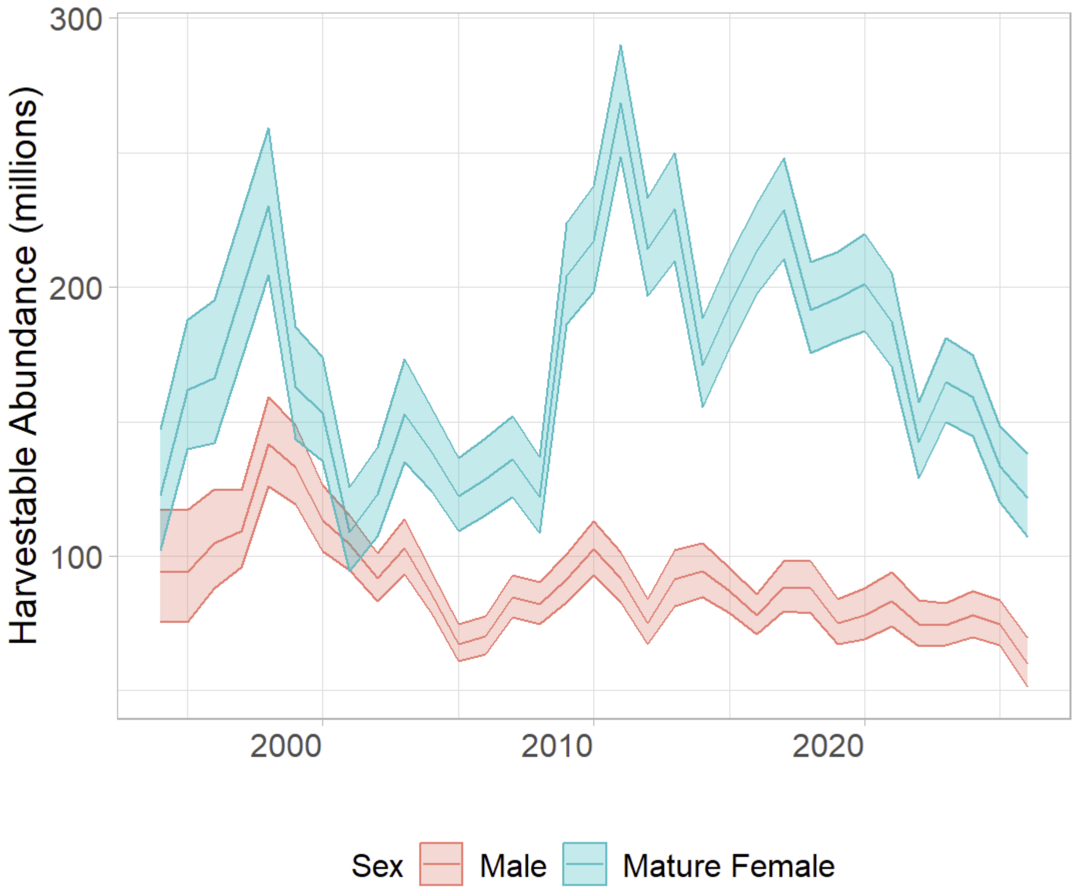

Figure 3. Abundance of harvestable males and mature females (millions), 1994-2026. The shaded region represents 95% confidence intervals. Male crabs measuring greater than or equal to 13 cm (5 in) across the carapace are considered 'harvestable' because they are above or near the minimum size limit for male hard crabs.

2.4 Overwintering Mortality

Winter conditions affect the survival and year-class strength of tropical and subtropical species such as the blue crab. For adult blue crabs, overwinter mortality is highly correlated to temperature and salinity, with mortality increasing at lower temperatures and salinities (Rome et al. 2005). Overwinter mortality, which is estimated as the percentage of dead crabs found in the WDS, is included in the stock assessment estimates of abundance. In 2026, overwinter mortality estimates in Chesapeake Bay were higher than in recent years due to severe winter conditions and were above the 1994-2026 average (Figure 4).

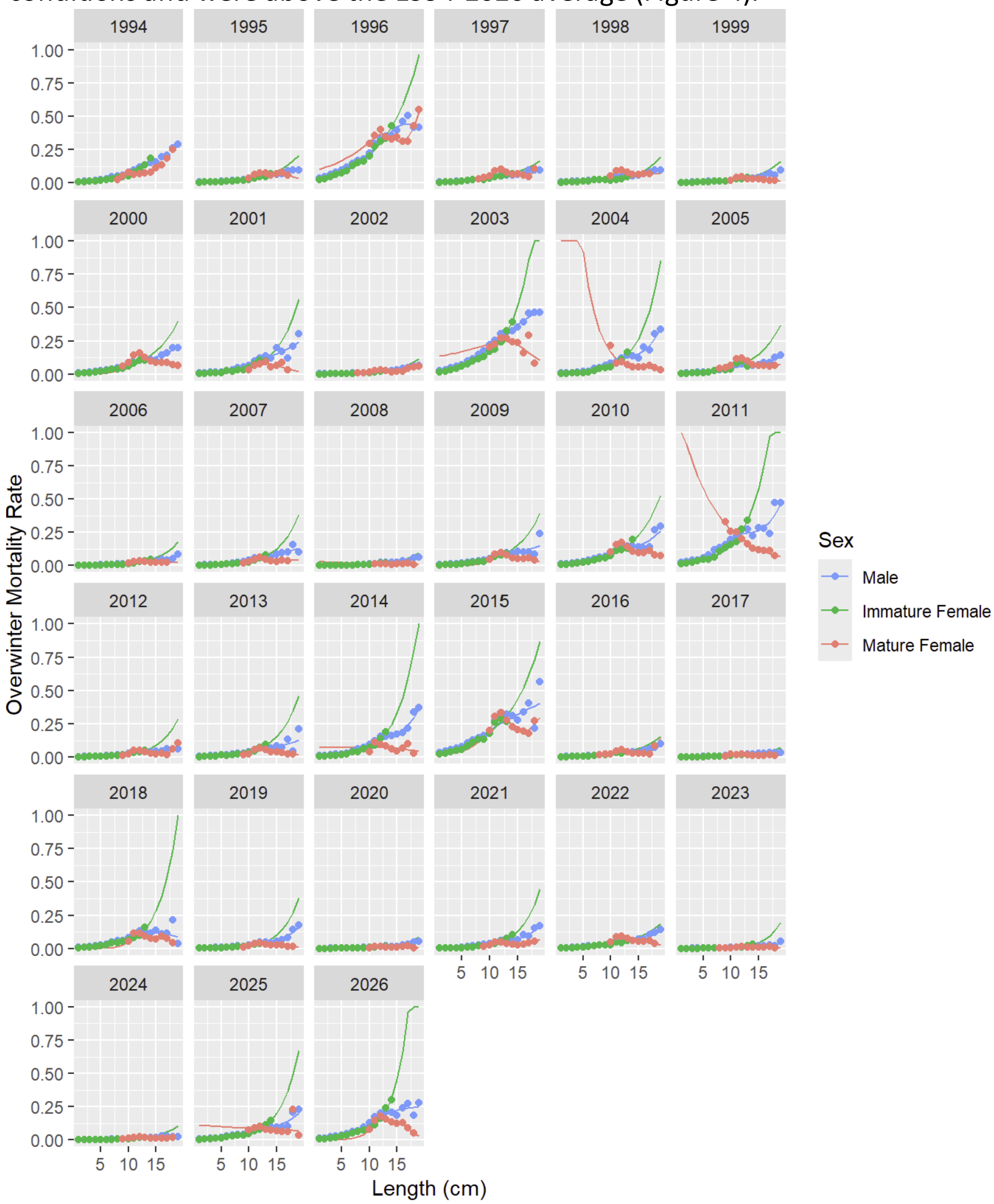

Figure 4. Estimates of overwinter mortality rates (proportion that died) for each year, sex, and length bin.

3. HARVEST

3.1 Commercial Harvest

Preliminary reports indicated a decrease in Bay-wide commercial blue crab harvest in 2025, with an estimated total of 17.9 million kg harvested (39.5 million lb; Figure 5), which is well below the long-term average of approximately 26.9 million kg (59.3 million lb).

Figure 5. Estimated catch of blue crabs (1,000 kg) summed over fleets and sexes in Chesapeake Bay during 1994-2025. Estimated catch includes adjustments for dead discards from the commercial fishery and recreational catch.

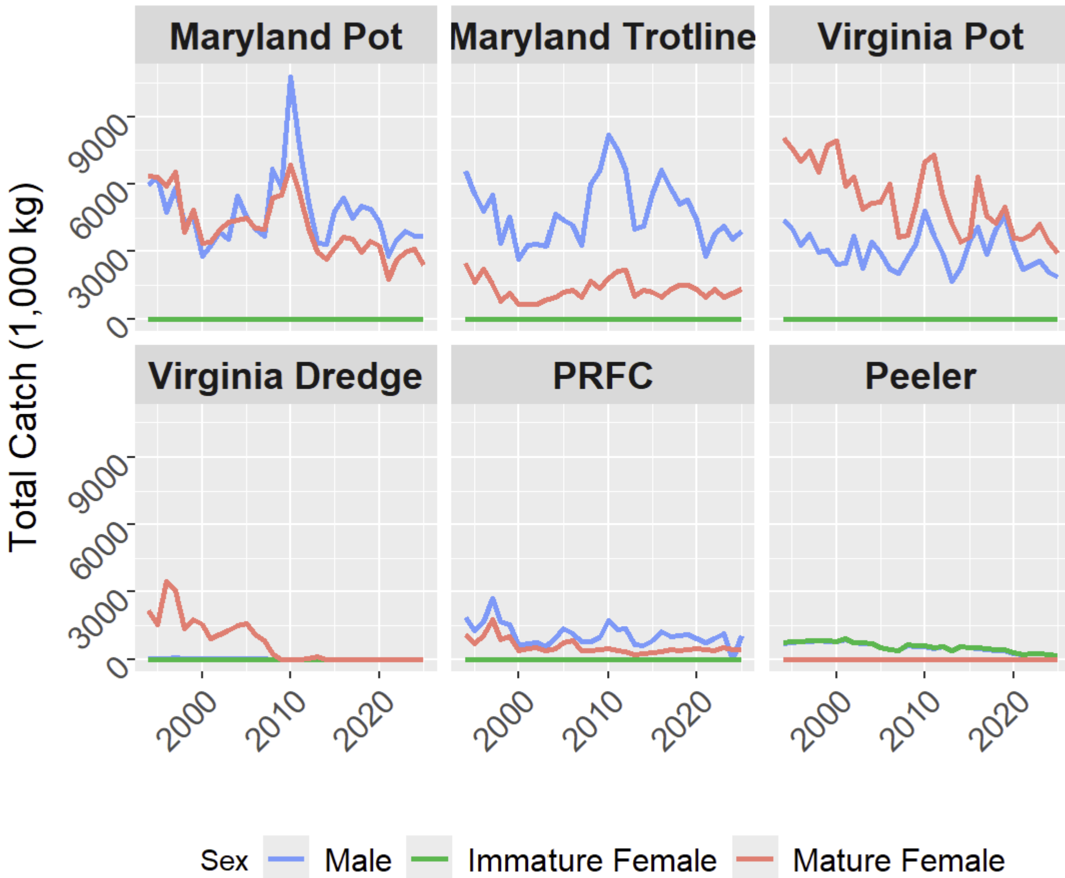

Figure 6. Estimated catch of blue crabs (1,000 kg) by sex and fleet in Chesapeake Bay during 1994-2025. Estimated catch includes adjustments for dead discards from the commercial fishery and recreational catch. Note that there was male catch in the Virginia dredge fishery, but the amounts were small. Male and immature female catches were assumed to be equal in the peeler fishery.

3.2 Recreational Harvest and Dead Discards

The stock assessment includes expansions of the landings to account for recreational harvest and dead discards in the commercial fishery. Estimates of recreational harvest were year- and sex-specific with different values applied to fisheries in each jurisdiction based on available estimates (Table 2; Ashford and Jones 2001; Semmler et al. 2021).

To produce estimates of dead discards in the other fleets, we used reported dead crabs from the Maryland Cooperative Data Collection Program. For each year, sex (males and mature females), and gear (hard pots, peeler pots, or trotlines), we calculated the proportion of observed dead blue crabs. We assumed these dead crabs encountered in the gear would be discarded. The proportion of dead discards for each year, sex, and gear was multiplied by the year, sex, and gear-specific landings to estimate the amount of dead discards in pounds. The same yearly proportion was used each month of a given year. The amount of dead discards was added to the commercial landings and recreational catch. There were no data to inform the proportion of dead discards for pots in Virginia waters or the Potomac River, so we used the estimates from Maryland.

Table 2. Recreational fishery estimates as percentages of the commercial fishery for each jurisdiction and sex.

State	% of Commercial	Sex
MD, PRFC pre-2008	9.73%	M & F
MD, PRFC	11.2%	M only
VA	4.08%	M & F

4. STOCK STATUS

4.1 Fishing Mortality Rate Reference Points

Spawning potential ratio (SPR) reference points are widely used to manage fish stocks around the world (Gabriel et al. 1989; Clark 1991). SPR estimates the fraction of lifetime reproduction that should be realized when a stock experiences fishing mortality relative to the lifetime reproduction of an unfished stock. The SPR reference points are calculated separately for males and females. We used 40% SPR to calculate the threshold reference points, suggesting that our management goal for the blue crab fishery is to maintain at least 40% of the lifetime reproductive potential of the stock. These thresholds were established to ensure that the population remains robust to climate change (Shertzer et al. 2024). The recent declines in recruitment without an identified cause and the recent collapses of other crab stocks due to environmental changes also justify more conservative reference points for fishery management (Szuwalski et al. 2023). The target fishing mortality rate reference points were calculated as 0.75 of $F_{40\%}$.

The achieved fishing mortality rates and the estimated target and threshold reference points varied over time with different patterns for males and females. The threshold $F_{40\%}$ reference points averaged 0.67 mo^{-1} for males and 0.30 mo^{-1} for females, and the target values averaged 0.50 mo^{-1} for males and 0.22 mo^{-1} for females. The reference points for males are likely higher than those for females because males have minimum size limits that are larger than the size at 50% maturation. Estimated fishing mortality rates were less than the threshold except for 2010 and 2011 for males and 1994 for females. Fishing mortality rates relative to $F_{40\%}$ decreased over time for males and females, with females having a more consistent decline (Figure 7). In the most recent year, fishing mortality rates were below the threshold or target fishing mortality rate reference points for both males and females.

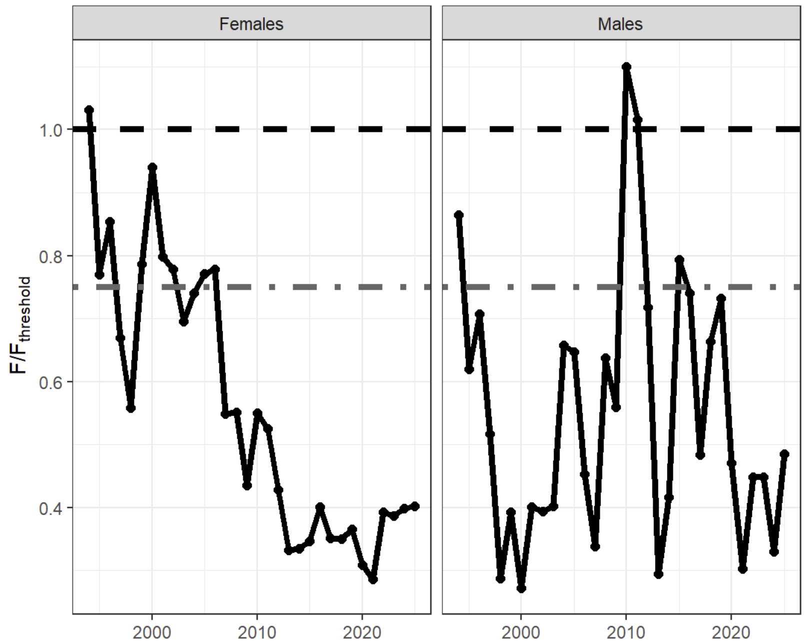

Figure 7. Estimated relative fishing mortality (black line with black points) relative to the threshold (black dashed line) and target (gray dot-dashed line) reference points ($F_{40\%}$) for Chesapeake Bay blue crabs during 1994-2026 by sex.

4.2 Abundance reference points

The abundance reference points were calculated as the equilibrium abundance that resulted from median recruitment and fishing at the fishing mortality reference point (Restrepo et al. 1998). The $N_{40\%}$ threshold reference points averaged 899 million for males (all sizes) and 124 million for mature females. Estimated female abundance was higher than the $N_{40\%}$ threshold reference point in most years (Figure 8). The lowest values for females were in 2001 and 2002. In the most recent year, mature female abundance was below the threshold. Estimated male abundance was above and below the $N_{40\%}$ reference point in a similar number of years. The status of males relative to $N_{40\%}$ declined over time but increased above the threshold and target in the most recent year (Figure 8). Because the male abundance reference point estimate includes all sizes, the signal is overwhelmed by the large numbers of recruits. CBSAC recommends calculating the male abundance reference point based on mature males only (≥ 10 cm) starting in 2027.

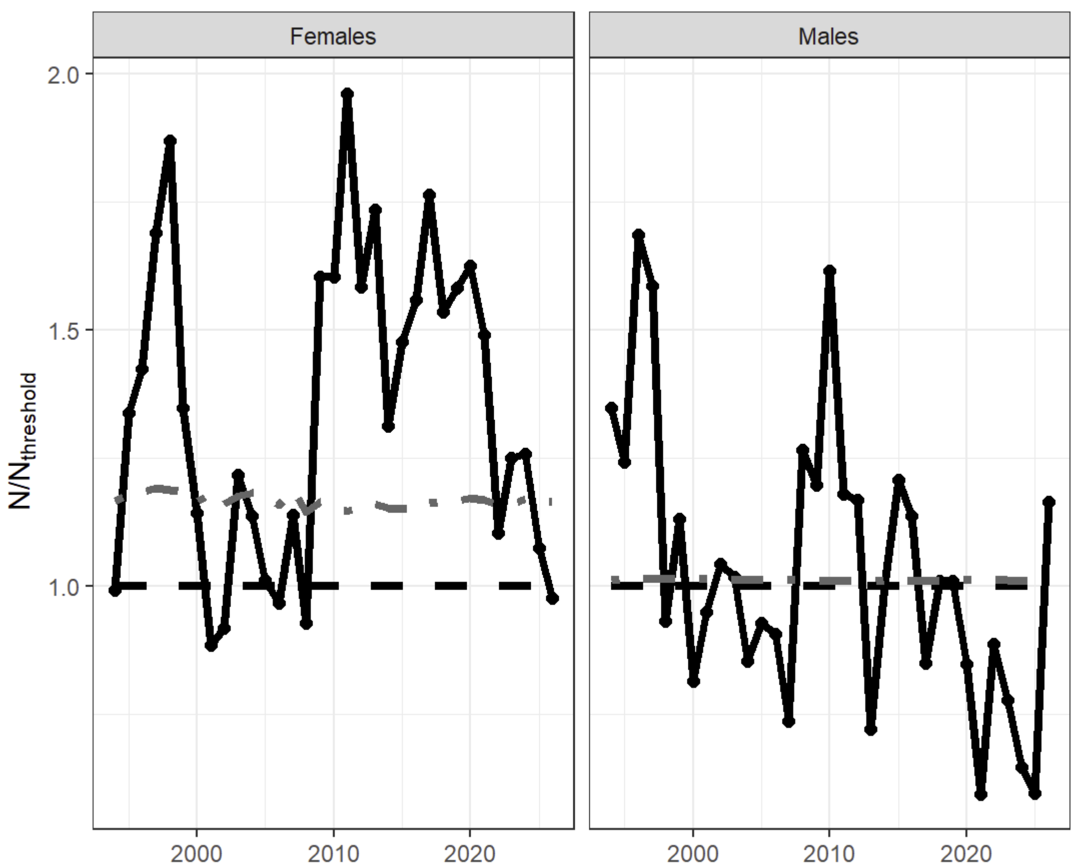

Figure 8. Estimated relative abundance ($N/N_{threshold}$; solid black line and black points) relative to the threshold (black dashed line) and target (gray dot-dashed line) reference points for blue crabs in Chesapeake Bay during 1994-2026 by sex.

4.3 Recruitment reference point

The goal for the recruitment reference point was to identify a level of recruitment that could indicate impairment. We chose an empirical threshold reference point as the 25th percentile of estimated recruitment. The stock assessment committee noted that individual years of low recruitment were less concerning than multiple sequential years of low recruitment. Recruitment can fluctuate greatly from year to year but has been trending downwards since the 2010s (Figure 9). The recruitment index, calculated as a three-year running average of recruitment, has been below the threshold since 2021, except for 2026 which is slightly above the recruitment threshold. Prior to 2021, the recruitment index was above the threshold for all years.

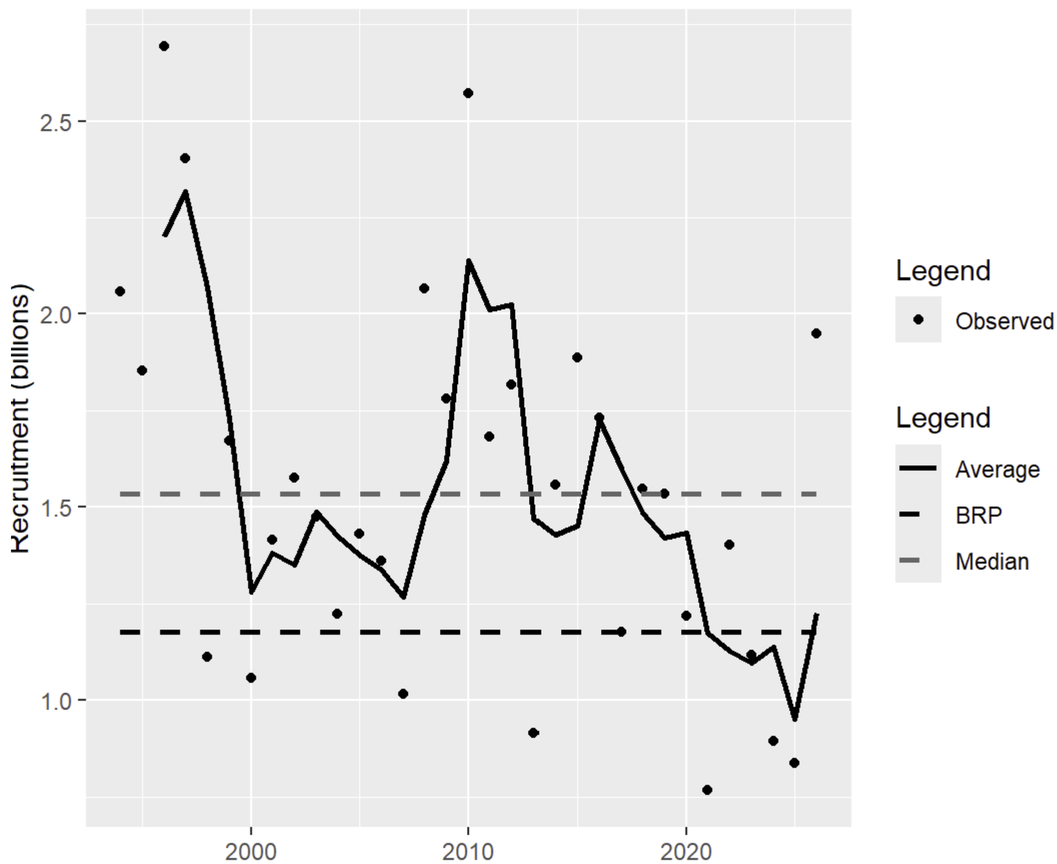

Figure 9. Estimated annual recruitment (black points) and the three-year running average estimated recruitment (solid black line) relative to the threshold reference point during 1994-2026 (black dashed line). The median recruitment for this timeframe is also plotted for reference (dashed gray line).

Additional Online Resources

Maryland Department of Natural Resources:
https://dnr.maryland.gov/fisheries/pages/blue-crab/index.aspx
Potomac River Fisheries Commission: http://prfc.us/
Virginia Marine Resources Commission: https://mrc.virginia.gov/
Virginia Institute of Marine Science:
https://www.vims.edu/research/units/programs/bc_winter_dredge/index.php
Chesapeake Bay Program: https://www.chesapeakebay.net/issues/blue_crabs
Chesapeake Bay Stock Assessment Committee:
https://www.chesapeakebay.net/who/group/chesapeake_bay_stock_assessment_committee

Chesapeake Bay Stock Assessment Committee Membership

CBSAC Members	Organization/Affiliation
Ingrid Braun-Ricks (Chair)	Potomac River Fisheries Commission
Christina Garvey (Program Coordinator)	NOAA Chesapeake Bay Office/Chesapeake Research Consortium
Bruce Vogt	NOAA Chesapeake Bay Office
Alexa Galvan	Virginia Marine Resource Commission
Brooke Lowman	Virginia Marine Resource Commission
Mandy Bromilow	Maryland Department of Natural Resources
Marvin (Trey) Mace	Maryland Department of Natural Resources
Alexei Sharov	Maryland Department of Natural Resources
Mike Wilberg	UMCES, Chesapeake Biological Laboratory
Tom Miller	UMCES, Chesapeake Biological Laboratory
Rom Lipcius	Virginia Institute of Marine Science, William & Mary
Mike Seebo	Virginia Institute of Marine Science, William & Mary
Gina Ralph	Virginia Institute of Marine Science, William & Mary
Tom Ihde	Morgan State University, PEARL
Daniel Hennen	NOAA Northeast Fisheries Science Center
Amy Schueller	NOAA Southeast Fisheries Science Center

Literature Cited

Ashford JR and Jones CM (2001) Survey of the blue crab recreational fishery in the Chesapeake Bay 2001. A completion report to Maryland Department of Natural Resources. Old Dominion University, Norfolk, VA.

Ashford JR, Jones CM (2011) Survey of the blue crab recreational fishery in Maryland, 2009. Final report to the Maryland Department of Natural Resources. Annapolis, MD. 29p.Jensen OP, Miller TJ (2005) Geostatistical analysis of the abundance and winter distribution patterns of the blue crab *Callinectes sapidus* in Chesapeake Bay. Transactions of the American Fisheries Society 134: 1582-1598.

Liang D, Nesslage G, Wilberg M, Miller T (2017) Bayesian calibration of blue crab (*Callinectes sapidus*) abundance indices based on probability surveys. Journal of Agricultural, Biological, and Environmental Statistics 22(4): 481-497.

Miller TJ, et al. (2011) Stock Assessment of the Blue Crab in Chesapeake Bay, 2011. Final report to the NOAA Chesapeake Bay Office. UMCES Report Number TS-614-11.

Rains SAM, Wilberg MJ, Miller TJ (2018) Evaluation of fishery-induced sperm limitation in Chesapeake Bay blue crab using an individual-based model. Marine Ecology Progress Series 596: 127-142.

Ralph GM, Lipcius RN (2014) Critical habitats and stock assessment: age-specific bias in the Chesapeake Bay blue crab population survey. Transactions of the American Fisheries Society 143(4): 889-898.

Rome MS, Young-Williams AC, Davis GR, Hines AH (2005) Linking temperature and salinity tolerance to winter mortality of Chesapeake Bay blue crabs (*Callinectes sapidus*). Journal of Experimental Marine Biology and Ecology 319: 129-145.

Schneider AK, Shields JD, Fabrizio MC, Lipcius RN (2024) Spawning history, fecundity, and potential sperm limitation of female blue crabs in Chesapeake Bay. Fisheries Research 278: 107094.

Semmler RF, Ogburn MB, Aguilar R, North EW, Reaka ML, Hines AH (2021) The influence of blue crab movement on mark-recapture estimates of recreational harvest and exploitation. Canadian Journal of Fisheries and Aquatic Sciences 78(4): 371-385.

Sharov AF, Vølstad JH, Davis GR, Davis BK, Lipcius RN, Montane MM (2003) Abundance and exploitation rate of the blue crab (*Callinectes sapidus*) in Chesapeake Bay. Bulletin of Marine Science 72: 543-565

Appendix

Appendix A. 2026 Blue Crab Stock Assessment Team Members

Assessment Team Members	Organization/Affiliation
Mike Wilberg (Lead)	University of Maryland Center for Environmental Science
Tom Miller	University of Maryland Center for Environmental Science
Dong Liang	University of Maryland Center for Environmental Science
Madison Sholes	University of Maryland Center for Environmental Science
Maya Drzewicki	University of Maryland Center for Environmental Science
Rob Latour	Virginia Institute of Marine Science
Rom Lipcius	Virginia Institute of Marine Science
Troy Tuckey	Virginia Institute of Marine Science
Gabby Saluta	Virginia Institute of Marine Science
Mike Seebo	Virginia Institute of Marine Science
Zoe Benson	Virginia Institute of Marine Science
Gina Ralph	Virginia Institute of Marine Science
Jim Gartland	Virginia Institute of Marine Science
Matt Ogburn	Smithsonian Environmental Research Center
Rob Aguilar	Smithsonian Environmental Research Center
Kiera Hegley	Smithsonian Environmental Research Center
Tom Ihde	Morgan State University
Amanda Bevans	Morgan State University
Ingrid Braun-Ricks	Potomac River Fisheries Commission
Glenn Davis	Maryland Department of Natural Resources
Mandy Bromilow	Maryland Department of Natural Resources
Alexei Sharov	Maryland Department of Natural Resources
Mavin Mace III	Maryland Department of Natural Resources
Alexa Galvan	Virginia Marine Resources Commission
Brooke Lowman	Virginia Marine Resources Commission

Appendix B. Estimated total abundance (N), abundance of all males, abundance of mature males (larger than 10 cm), abundance of legal males (larger than 13 cm), abundance of immature females, and abundance of mature female blue crabs from the Chesapeake Bay-wide updated stock assessment 1990-2026. Abundance units are in thousands of crabs.

Year	N	All males	Mature males	Legal males	Immature females	Mature females
1994	2452910	1210364	204600.8	93957.66	1119824	122722.1
1995	2287895	1113413	204676.3	94023.58	1012562	161919.7
1996	3126471	1511147	206869	104826.7	1448915	166409.1
1997	2929123	1419978	243899	109299.7	1310756	198388.8
1998	1693716	834191.5	273326	141700	629220.1	230304.3
1999	2071386	1009718	200392.5	133232.5	898683.7	162984
2000	1469236	728536.5	202882.4	113514.4	587309.5	153389.7
2001	1722734	851163.2	164737.4	104560.5	762604.5	108966
2002	1911461	934496.6	166717.9	91665.25	853932.4	123032.5
2003	1867078	910512.7	188851.5	102941	803735	152830.4
2004	1574381	764957.1	163696.7	85986.72	670600.5	138823.9
2005	1726977	830659.9	134753.1	67348.79	774134.5	122182.8
2006	1684410	813692.4	147626.7	70363.97	741974.2	128743.7
2007	1356486	661317.9	160565.4	84814.88	558970.2	136197.4
2008	2360778	1134933	139994	82208.5	1103899	121945.6
2009	2254409	1075249	200786.4	91414.78	974897.9	204262
2010	3048993	1447322	201283.7	102472.4	1384546	217125.4
2011	2261390	1061011	227336.6	91719.2	931944	268434.5
2012	2251669	1052186	167118.9	75166.08	985219.2	214263.5
2013	1393884	650021.3	190791.6	91313.32	514868.9	228993.4
2014	1907650	901312.3	149109.1	94286.8	835134.2	171203.6
2015	2300143	1086332	168937.5	86867.85	1020367	193443.4
2016	2181243	1022621	174739.8	78058.3	944996.3	213626.4
2017	1646661	766972.3	184182.7	88450.93	651119	228569.9
2018	1932885	906685.5	155983.8	87929.74	834523	191676.3
2019	1938833	907595	157593.8	75142.01	835276.7	195961.2
2020	1631830	761978.1	162516.7	78135.84	668790.1	201061.8
2021	1146239	533446.5	152598	83322.52	425838.2	186953.9
2022	1688585	795534.8	119385.7	74618.5	750507.8	142542.8
2023	1477683	698904.4	148550.8	74210.87	614004.6	164774.3
2024	1231928	581743.5	141466.3	77984.04	491148.2	159036.5
2025	1126286	535911	125872.3	74821.42	456831.9	133543.6
2026	2209576	1047523	109529.4	59659.83	1040533	121520.2