

# 2000 Chesapeake Bay Blue Crab Advisory Report

Prepared by the Chesapeake Bay Stock Assessment Committee's  
Technical Subcommittee<sup>1</sup>: June 2000

**State of the Stock:** Analysis of long term fishery independent surveys conducted in Chesapeake Bay (Maryland and Virginia trawl surveys, Calvert Cliffs crab pot survey and Baywide winter dredge survey) indicate that blue crab abundance has been below average in recent years while length based estimates of fishing mortality indicate that the stock is currently fully exploited. The estimated unweighted average fishing mortality rate (F) of 0.9 in 1999 is equal to the most conservative spawning potential threshold established in recent stock assessments ( $F_{10\%} = 0.9$ )<sup>2</sup>. Bay-wide harvest over the recent three years (1997-99) averaged 72 million pounds and is not significantly different from the time series average of 70 million pounds. The 1999 bay-wide harvest of 69.2 million pounds is slightly below the time series average.

**Management Advice:** As was the case in 1998, the current average, unweighted fishing mortality rate ( $F = 0.9$ ) did not exceed the threshold fishing mortality rates ( $F=1.21$  or  $F = 0.9$ )<sup>2, 3</sup> established by recent stock assessments. At the same time, average fishing mortality rates have matched or exceeded one threshold ( $F=0.9$ )<sup>2</sup> all other years since 1994. Fishing mortality rates from certain single surveys exceeded the other threshold ( $F=1.21$ )<sup>3</sup> in 1996 and 1997. As pointed out in last year's report, there is an urgent need to establish target fishing mortality rates which are distinctly lower and more risk averse than current threshold rates which are sometimes inappropriately interpreted as targets. In addition, it is critical that a carefully designed data collection program is in place prior to implementation of management objectives currently being formulated by the Bi-State Blue Crab Advisory Committee (BBCAC). The design of the data collection program should be based, in part, on the need for improved information on: (1) harvest and effort data for the commercial and recreational fisheries; (2) growth rates; (3) size at maturity; and (4) the age, size, sex and maturity composition of the harvest and stock.

**Stock Distribution:** For the purposes of this Advisory Report, blue crab distribution within the Chesapeake Bay and its tributaries was considered as a unit stock.

**Data:** Data from the two trawl surveys and the Calvert Cliffs pot survey are based on calendar year collections through 1999. The winter dredge survey data represent seasonal collections through the 1999/00 season. For abundance indices the dredge survey is referred to as 2000 data. For estimates of fishing mortality rates the dredge survey is referred to as 1999 data since the mortality took place in 1999. In general, age 0 crabs are less than 60 mm in carapace width; age 1 crabs are from 60 to < 120 mm and age 2+ crabs are 120 mm or greater in carapace width. These age cutoffs do not represent the actual growth patterns of many crabs but they do provide a consistent way to calculate abundance indices across years and across surveys. Cutoff points are under review through CBSAC funded work and the indices to be presented in the 2001 Advisory Report will likely reflect changes brought about through that funded work.

**Biological Reference Points:** The biological reference points, or threshold fishing mortality rates, according to recent stock assessments are  $F_{10\%} = 1.21$ <sup>3</sup> and  $F_{10\%} = 0.9$ <sup>2</sup>.  $F_{10\%}$  refers to that level of spawning potential which is 10% of the spawning potential expected in a stock in which no fishing occurs. This threshold fishing mortality rate was based on a longevity of 8 years, which corresponds to a natural mortality rate (M) of 0.375 (using the formula  $M = 3 / \text{longevity}$ ). Age-specific partial recruitment was based on the selectivity of the harvest gears and established as 10% (age 0), 75% (age 1), 95% (age 2) and 100% (age 3+).

**Fishing Mortality** The average, unweighted (four surveys) fishing mortality rate is 0.90 in 1999 (range = 0.85 to 0.94). None of the current fishing mortality rates exceeded the threshold fishing mortality rate  $F = 1.21^3$ . Two of the survey fishing mortality rates did exceed the threshold fishing mortality rate  $F = 0.9^2$ .

**Recruitment (1997-00):** Results from the winter dredge survey and the Maryland trawl survey indicate below average recruitment over the most recent three years. The Virginia trawl survey indicates average recruitment during this time period. (The Calvert Cliffs Pot survey was not included because it does not sample recruits.) With data for the three surveys combined, there does not appear to be a trend in recruitment in recent years but six of the last eight years have been below the time series average.

**Exploitable Biomass (1997-00):** Average exploitable biomass (generally crabs > 60mm in carapace width) for the last three years was considered average for both the Maryland trawl survey and the Calvert Cliffs pot survey. The Virginia trawl survey and the winter dredge were below the long term average. As with recruits, the average of the abundance indices has been below the time series average for six of the last eight years.

**Spawning Stock Biomass (1997-00):** Based on a Z-scaled index of mature females spawning stock biomass was not significantly different from the long-term average for three of the four surveys (MD Trawl, Winter Dredge, and Calvert Cliffs) and was below average for the Virginia Trawl Survey. Spawning stock biomass is currently below the time series (1968-00) average and has been for six of the last eight years.

**Harvest:** A three-year (1997-99) average, commercial bay-wide harvest (72 million pounds) is near long term average of 70 million pounds. The 1999 bay-wide harvest of 69.2 million pounds is near the long-term average and is an increase over 1998. For the 1945-1998 period, bay-wide commercial harvests exceeded 100 million pounds in 1966, 1981, 1983 and 1993. The 1993 harvest of 113 million pounds is the highest recorded harvest. No representative baywide measures of the recreational blue crab harvest exist.

**Special Comments:** The Chesapeake states have been very successful in managing several valuable species such as striped bass in large part because the necessary data needed to make the appropriate management decisions has been available. Blue crabs have not been as well managed as striped bass primarily because the data necessary to do so has not been available. We believe that a strong commitment to long term funding of essential blue crab monitoring and research activities will yield benefits to the crab fishery similar to those seen for other Chesapeake Bay species such as striped bass.

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**2. Miller and Houde, 1998**

**3. Rugolo, et.al., 1997**