



Amendment 1 1997 Chesapeake Bay Blue Crab Fishery Management Plan

I N T R O D U C T I O N

A unified management approach among the Bay jurisdictions was initiated with the development of the 1989 Chesapeake Bay Blue Crab Fishery Management Plan (FMP). The 1989 FMP recognized the importance of the blue crab resource, identified areas of concern, and recommended strategies to stabilize fishing effort. In 1997, the plan was completely revised to incorporate new information and management strategies. Major recommendations include: 1) restore and protect blue crab habitat and water quality; 2) stabilize the fishery; 3) limit access to the fishery and lower the cost of harvesting crabs; 4) prevent an increase in exploitation; 5) design and implement a survey to estimate recreational catch and effort; 6) monitor the commercial fishery; 7) improve enforcement of regulations; and 8) develop socioeconomic data collection to assess the social and economic utilization of the blue crab resource. In order to provide long-term protection for the blue crab stock, the plan set forth several strategies and actions that required reevaluation after several years. Strategy 1.1 initiated the development of "references (biological reference points) for evaluating stock status and implementing fisheries or habitat management measures." The strategy also stated that "targets" would be defined as "safe management levels" and "limits" (thresholds) would be "maximum limits for sustainability."

Several actions were delineated to address the strategy. First, the 1997 Baywide stock assessment (Rugolo et al) was scheduled to be updated in 1999 and every five years thereafter.

The stock assessment would be used as a tool to determine the status of the blue crab population. In addition, new assessment tools would be considered, if available. The Chesapeake Bay Stock Assessment Committee (CBSAC), established in 1985 by the National Marine Fisheries Service (NMFS) with support of the NOAA Chesapeake Bay Office, has supported the funding of several important research projects that contribute to updating the stock assessment. After the 1997 Blue Crab FMP was adopted, it became apparent that the stock assessment should be updated annually and not every fifth year. The CBSAC Technical Workgroup was tasked with updating the stock assessment and since 1998, has prepared an annual Blue Crab Advisory Report.

The second action under the strategy for protecting the blue crab stock was a blue crab target setting effort to examine how environmental variables affect stock size and recruitment; to examine blue crab harvest and abundance by life history stage, time and area; and, to develop a regional model to predict life stages and regions of greatest sensitivity of blue crab to changes in exploitation patterns and rates. This effort resulted in the preparation of a "Blue Crab Target Setting Final Report" (Miller and Houde 1998). The report concluded that fishing effort was "higher than is desirable to maintain a high-quality fishery in perpetuity;" fishing mortality (F) should be stabilized and reduced; and that the blue crab stock was "growth overfished." The report recommended an overall reduction in F by at least 30%; con-

tinued monitoring of the blue crab resource; and additional information on the effects of the recreational fishery.

The third action to meet the strategy for protecting the blue crab stock was to convene a special Bi-State Blue Crab Advisory Committee (BBCAC) under the Chesapeake Bay Commission to review the status of the blue crab resource and the effectiveness of regulations. The BBCAC consists of a joint panel of legislators; representatives from the blue crab industry, commercial and recreational fisheries; representatives from Maryland, Virginia, and the Potomac River Fisheries Commission; and, other interest groups. In addition, a technical workgroup (TWG) was formed comprised of researchers, resource managers, resource economists and other experts to advise on a number of technical issues. The fourth action tasked the TWG with an economic assessment of various biologically-determined thresholds and target levels. The TWG was also tasked with assessing the economic ramifications of policies designed to stabilize harvest and effort levels. Since its original conception in 1999, the roles of the BBCAC and TWG have expanded.

After a two-year analysis of the blue crab resource and how it is managed, the BBCAC completed an action plan (BBCAC 2001) and the following recommendations were made:

- 1) adopt a threshold and target for the blue crab resource;
- 2) reduce fishing effort through a phased approach to reach the adopted target;
- 3) ensure that reductions in effort are fairly distributed among all user groups; and,
- 4) analyze multispecies interactions and habitat interactions.

Although using biological reference points for managing the blue crab resource began in January 2001, this amendment formally adopts fishery management thresholds and targets for the blue crab resource in Chesapeake Bay. The amendment reaffirms the strategy to reduce fishing effort and recognizes the importance of monitoring, habitat protection and ecosystem processes.

STOCK STATUS

Data analyses indicate that blue crab abundance has stabilized near historically low levels and the blue crab stock continues to be at risk for recruitment failure (CBSAC TC 2003). The estimated fishing mortality rate (F) for 2002 was 0.86. This estimate is below the overfishing threshold (F=1.0) and above the target (F=0.7). Baywide recruitment, averaged over the most recent three years (2000-2002), has been stable at historically low levels (CBSAC TC 2003). The 2002 Chesapeake Bay commercial harvest was approximately 52 million pounds and is approximately 31% below the 1968-2001 average of 75 million pounds. The 2002 commercial harvest reflects a low exploitable abundance and harvest constraints implemented during 2001 and 2002. There is consensus among biologists and members of the BBCAC to adopt biological reference points (BRPs) or targets and thresholds for managing the blue crab resource and develop rules for implementing management actions. Given the current circumstances of low recruitment, low spawning stock biomass and low exploitable stock abundance, the Chesapeake Bay Stock Assessment Technical Committee has recommended improvements in estimating fishing mortality rates and evaluating the need to develop a rebuilding plan to achieve the spawning stock target.

Stock Status Strategy

The Bay jurisdictions will adopt appropriate biological reference points for managing the blue crab resource and control rules for implementing management actions. The BRPs are expected to change over time as new data becomes available and the stock is reassessed. Thresholds and targets will be updated according to new assessments and control rules will be developed to manage the resource. i.e., delineate actions to be taken if the BRPs are under achieved, achieved or exceeded.

Action 1—The jurisdictions will adopt a threshold fishing mortality rate that preserves 10% of the blue crab spawning potential, relative to an unfished stock, and a minimum stock size threshold. The current overfishing threshold is F=1.0.

Action 2—The jurisdictions will adopt a target fishing mortality rate of F_{20} which if achieved, will increase the blue crab spawning potential from 10% to 20% relative to that of an unfished stock. The current target F is 0.7.

Action 3—The jurisdictions will develop control rules based on the BRPs for managing the blue crab resource.

Action 4—The Bay jurisdictions will utilize the results of fishery-independent surveys to determine stock status. Currently, four surveys are utilized to determine stock status and include the Virginia trawl survey, the Maryland summer trawl survey, the Calvert Cliffs crab pot survey, and the Baywide winter dredge survey. In addition, the Baywide zooplankton monitoring survey provides data for evaluating trends in blue crab larval abundance.

F I S H I N G E F F O R T

Based on the current assessment of the stock, the trend in fishing mortality rates (F) is unclear. Length-based estimates suggest F may be declining while estimates of abundance suggest exploitation is increasing. The methodology used to estimate F needs to be refined. Spawning stock abundance has declined since the early 1990s (CBSAC TC 2003; Calvert Cliffs Pot Study 2002; Virginia Trawl Survey 2002; Winter Dredge Survey 2002; Lipcius and Stockhausen 2002). There is some disagreement among scientists as to the degree to which the stock has declined. The most recent (2000-2002) abundance estimates were the lowest in the time series. The average exploitable abundance of age 1+ crabs is below average. Since blue crab recruitment is highly variable from year to year and has been at low levels over the last few years, the blue crab resource is believed to be at risk of overexploitation.

Fishing Effort Strategy

The Bay jurisdictions will adjust fishing effort to achieve the adopted BRPs.

Action 5—The Bay jurisdictions will reduce the exploitation rate of legal-sized blue crabs to meet the target BRP. Methods to achieve this objective may include time limits, seasons, gear restrictions, catch limits, size limits, and/or other methods as necessary and appropriate.

M O N I T O R I N G

Biological, environmental and fishery data are needed in order to successfully manage the blue crab resource and assess blue crab stock status. The 2002 Blue Crab Advisory Report identified the following baywide information needs: 1) harvest and effort data from the commercial and recreational fisheries; 2) growth and mortality rates; and, 3) the age, size, sex and maturity composition of the harvest and stock. Environmental effects on the blue crab resource, especially during the early larval stages that occur outside of the Bay, are important to understanding and possibly predicting annual recruitment to the stock. Blue crab play an important role in the food web of the Chesapeake Bay. They are an important prey item for a variety of fish and other predators in the Bay. Their role as prey should be considered in managing the blue crab resource from an ecosystem perspective.

Monitoring Strategy

The Bay jurisdictions will collect fishery-dependent and fishery-independent data on the blue crab resource and where possible, increase the biological understanding of its role in the food web of the Bay.

Action 6—The Bay jurisdictions will continue to monitor the blue crab resource in the Bay and work towards developing a baywide monitoring approach.

H A B I T A T

In response to reduced abundance in the blue crab stock and increased fishing pressure on the resource, Virginia designated areas that are closed to blue crab harvest. Virginia established the Hampton Roads and Bayside Eastern Shore Blue Crab Management Areas and implemented provisions to control the harvest of crabs from these areas. The Hampton Roads Blue Crab Management Area consists of all tidal waters inshore and upstream of a line formed by the extreme south and north ends of the westbound span of the Hampton Roads Bridge Tunnel. Virginia also established the Virginia Blue Crab Sanctuary (2002) which protects 927 square miles from harvest, June 1st through September 15th. No commercial or recreational crabbing is allowed from the sanctuary.

E C O S Y S T E M

Submerged aquatic vegetation (SAV) beds in nearshore shallow waters provide important habitat for blue crabs, especially postlarval and juvenile stages. Blue crabs use bay grasses as protective habitat from predators, as nursery areas, and as forage grounds. The estimated abundance of post-larval blue crabs in vegetated habitats in the middle/lower Bay is four times greater than in unvegetated areas (Orth et al. 1996). A new goal to restore 185,000 acres of SAV in the Chesapeake Bay by 2010 was agreed upon by Bay jurisdictions in April 2003. This commitment reflects the need to restore SAV beds to healthy abundance and will provide habitat to support blue crab populations in Chesapeake Bay. Salt marsh-fringed habitats (e.g. mud coves and marsh shorelines in tributaries) are also critical nursery habitats for juvenile blue crabs especially the medium to large juveniles. Salt marsh habitats protect not only young blue crabs but also support the main prey items of blue crabs, especially bivalves (Seitz et al. 2003). Salt marsh areas are particularly susceptible to shoreline development and relative sea level rise. Efforts should be made to protect and restore these habitats.

Habitat Strategy

The Bay jurisdictions will identify and protect critical blue crab habitat.

Action 7—Maryland and Virginia will consider designating additional sanctuary areas to protect blue crab habitat based on new research data.

Action 8—The jurisdictions will continue to protect submerged aquatic vegetation (SAV) in potential post-larval settlement areas.

Action 9—The jurisdictions will restore and protect submerged aquatic vegetation (SAV) in Chesapeake Bay to achieve the new goal of 185,000 acres of SAV by 2010. The Chesapeake Bay Program's 2003 Strategy to Accelerate the Protection and Restoration of Submerged Aquatic Vegetation in the Chesapeake Bay identifies the actions necessary to achieve this goal, including attainment of water clarity in shallow-water bay grass designated use areas.

Action 10—The jurisdictions recognize the value of salt marsh-fringed habitats and will promote the protection and restoration of marsh-fringed shorelines, creeks and coves.

Blue crabs play an important role in the food web of the Bay. They are prey for a variety of finfish including striped bass, weakfish, bluefish, and black drum. In their softshell phase, they are particularly prone to predation from a variety of fish, birds, sea turtles, and other crabs. Although they are opportunistic and generalists in their food habits, they are a major predator on a number of molluscs including oysters and soft clams. There are a number of studies in progress to define blue crab trophic interactions. The Fisheries Ecosystem Plan (FEP) under development for the Chesapeake Bay will provide guidelines for incorporating multispecies and ecosystem considerations into Bay FMPs.

There is concern about blue crabs and their interactions with three species of non-native crabs specifically, the green crab (*Carcinus maenas*), the Japanese shore crab (*Hemigrapsus sanguineus*) and the Chinese mitten crab (*Eriocheir sinensis*). These non-native species have been identified as potential threats to the blue crab population in terms of habitat and trophic interactions. Currently, the green crab and Japanese shore crab have been detected in Maryland's coastal waters and in the lower Chesapeake Bay.

Ecosystem Strategy

The jurisdictions will incorporate information on ecosystem processes relating to blue crabs as it becomes available and utilize the information to determine management actions as necessary. Precautionary management that considers ecosystem services provided by the blue crab and accounts for the potential effects of climate variability in the stock should be adopted.

Action 11—Utilize the guidelines from the Fisheries Ecosystem Plan (FEP) to incorporate multispecies and ecosystem considerations into existing CBP fishery management plans.

Action 12—As data becomes available on food web dynamics, adjust fishing mortality rates on the blue crab population to include predator and prey needs.

Action 13—Evaluate the impact of non-native crab introductions on the blue crab population and develop recommendations accordingly.

C O N C L U S I O N

The goal and objectives of the 1997 Chesapeake Bay Blue Crab Fishery Management Plan continue to be appropriate for managing the blue crab resource in the Bay. Each year as more biological monitoring data become available for stock assessment analysis, the ability to develop management strategies and actions improves. The most recent stock assessment indicates that recruitment is declining, there is a low female spawning stock size, and the exploitable stock size is also low.

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