

# Blue Crabs in the Chesapeake

BI-STATE BLUE CRAB ADVISORY COMMITTEE • BRIEF NUMBER ONE

## Managing and Protecting the Blue Crab

### The Issue

Blue crabs represent a major American seafood resource. In the Chesapeake Bay alone, harvests during the 1990s averaged more than \$50 million a year — and that's just the dockside value. While blue crab landings tend to rise and fall erratically over time, data from recent monitoring and fishery-independent surveys suggest that the blue crab in the Chesapeake Bay is being fished near the limits of its capacity. Since the blue crab serves as such an important cornerstone of the region's commercial and recreational fisheries, protecting the stock becomes a critical goal.

M.E. Warren



### The Response

Realizing the blue crab's importance to the region, and the necessity for a Baywide, bi-state approach, in 1999 the governors and legislatures of Maryland and Virginia each allocated \$150,000 to fund a two-year analysis of the blue crab and how it's managed. The responsibility for this study falls to the Chesapeake Bay Commission, comprised of legislators from Maryland, Virginia and Pennsylvania.

The Commission in turn relies upon its Bi-state Blue Crab Advisory Committee (BBCAC), formed in 1996 and composed of Commission members from both Maryland and Virginia. Serving alongside the legislators are natural resource experts from each state, and representatives from

key groups, including crabbers, processors, researchers and conservationists.

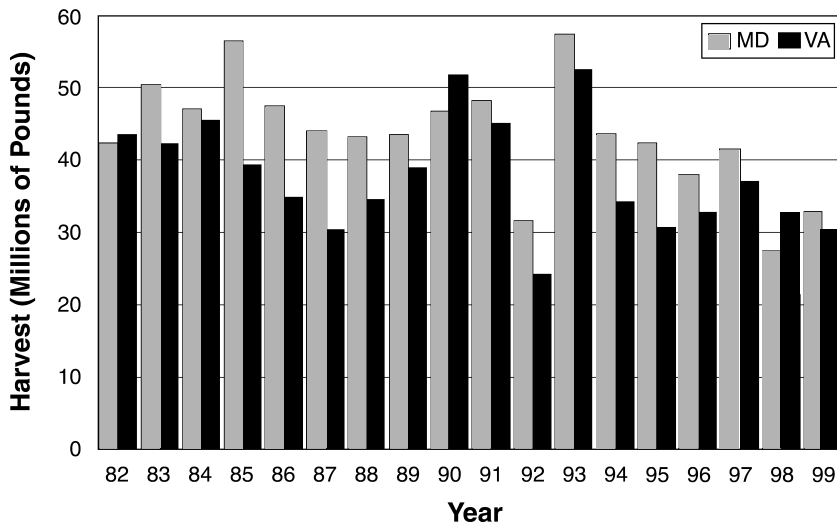
To take advantage of a full range of technical expertise, the Commission also created a blue crab Technical Workgroup, a select team of researchers and resource managers expert in crab biology, population dynamics, habitat and marine economics, designed to advise the Bi-state Advisory Committee, and to pull together the best information available anywhere on the blue crab.

### The Plan

During this past year, the BBCAC and its Technical Workgroup have designed a strategic plan meant to close key gaps in our knowledge and to help synthesize varying scientific and management perspectives. This workplan has resulted in:

- A thorough survey of those engaged in commercial crabbing, in order to determine cur-

## Commercial Blue Crab Harvest in Maryland and Virginia from 1982 to 1999



rent economic trends but also to hear directly from watermen their opinions about how the resource is and should be managed.

- Research to test the feasibility of habitat “corridors” intended to protect a core number of blue crabs as they migrate up and down the estuary.
- Research into the effects of predation on small crabs by other species, including striped bass (rockfish) and red drum.
- Analyses of target-setting methods and strategies, to help determine the best means of setting sustainable limits on the harvest of blue crabs in the Bay over the long term.
- A “stakeholder” effort designed to help bring the full range of players into the process. This effort is helping to stage a number of workshops and seminars, including a seminar on the blue crab at the annual watermen’s trade show in Ocean City, Maryland, and a management workshop, where experts from other regions join local experts to explore a long list of creative management options.

### Setting Thresholds and Targets

Without a doubt, one of the most challenging tasks facing those who care about the future of the

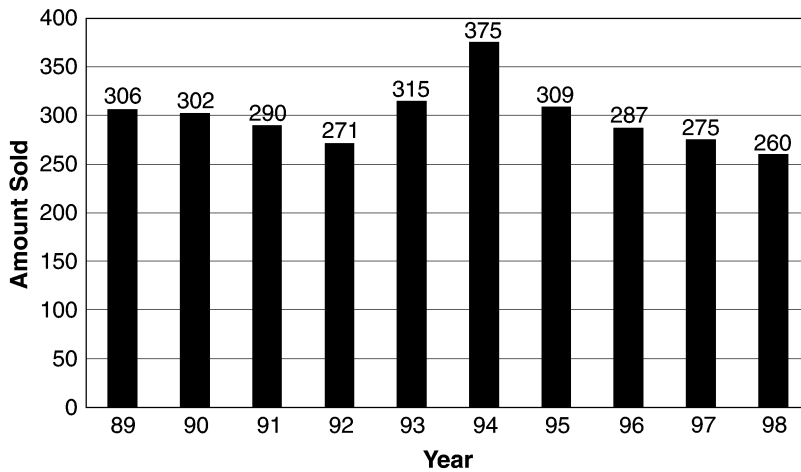
Bay blue crab is the setting of thresholds or targets for a sustainable population over the long term. Target setting is both a science and an art. Crabs are not inanimate — we cannot gauge their biomass as one might measure the reserves of a coal mine or a natural gas deposit. Crabs move. They reproduce. And they die, whether anyone catches them or not. Of course, if they are caught in a crabbers pot or net, they will die sooner, their reproductive potential perhaps cut short — and therein lie many of the key questions faced by natural resource managers and marine biologists.

**Population Limits.** The goal of targeting is simple, even if the terms can sometimes seem confusing. Basically, through targeting those responsible for managing the blue crab seek to regulate the rate at which a population is harvested. Researchers express this exploitation rate as “F,” the instantaneous rate of fishing mortality, and they determine this rate by tracking the abundance (of a single age class) in the population at two successive time points. As they gauge changes in population between the time of the first measurement and the second, researchers realize

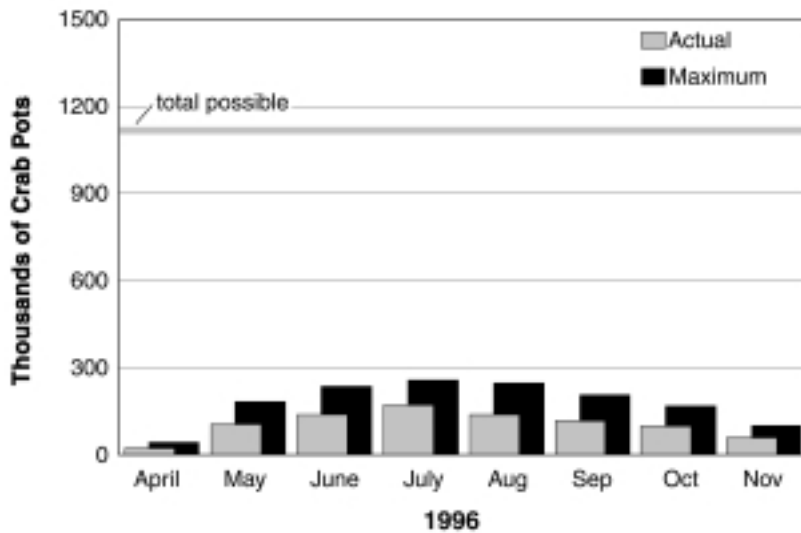


Skip Brown

### Ten-Year Crab Dredge License Sales in Virginia



### Crab Pots Fished out of Maximum Possible Pots (Number of Total Licenses) in Maryland in 1996



that there are two factors that will cause population abundance to differ — natural mortality (M) and fishing mortality (F). Because it results from fishing pressure, “F” can be regulated by resource managers, who can manipulate gear efficiency (size limits, escapement panels, excluder devices, etc.) or control the effort invested (number of days, amount of gear, area exploitable, etc.).

At one end of the spectrum there would be no fishing at all (F equals 0), and of course there

would be no yield. At some point near the other end of the spectrum, the fishing rate will be too high to leave enough fish or shellfish (in this case, crabs) to allow for natural reproduction. This point is termed “recruitment overfishing,” and represents an upper limit to exploitation. Managers must set a reasonable threshold well below that point.

**Growth Targets.** Another way to think of overfishing concerns growth. If a fishery starts removing smaller and smaller individuals, there reaches a point where the yield drops. This is termed “growth overfishing.” At the opposite end of the continuum, individuals are left in the population to grow until natural mortality reduces their abundance, in essence taking them out of the fishery. Accordingly, management would reasonably seek as a target an intermediate exploitation rate — that is, not taking the fish out too soon, and not leaving them in too long — to optimize yield.

Fisheries managers generally aim for this target by determining a rate of yield per crab (per “recruit”) — an approach which is easier for species where “recruitment” is more easily measured (as with the striped bass, for example, where resource managers are able to track a young-of-the-year index). For now, setting targets for blue crab fishing rates — a harvesting rate that is not too high and not too low — will require considerable ingenuity. Especially important will be

monitoring efforts that do not depend simply on harvest figures (since harvests may go up or down due to numerous social and economic factors). One such “fisheries-independent” survey — the winter dredge survey — has been sponsored by the federal government through the National Oceanic and Atmospheric Administration, but funding for that program is now ending, and the states are taking over the survey.

## *Unanswered Questions*

While many may call for “action” and not “research,” the truth is that resource managers and decision-makers are counting on scientists to answer a number of crucial questions. For example, determining the age of crabs remains difficult, since crabs molt and lose many of the defining characteristics that would help us identify their age. For now modelers must estimate an age range for crabs in the Bay. That range must be long enough to allow for an “outer limit” — that is, not the age we expect most crabs to reach, but the limit that crabs could reach, if we were not fishing for them. Research now underway is helping to devise new means for determining the age of crabs, giving us a better understanding of their life cycle.

Protecting female crabs, and their eggs, remains an important part of crab conservation efforts. But some researchers and others point out that without males to fertilize these eggs, reproduction will still not take place. So what is the best strategy for protecting an adequate number of both males and females, and which populations most need our protection?

Providing healthy habitat for crabs to grow and reproduce remains essential for ensuring sustainable populations for the future. The disappearance of submerged aquatic vegetation in many areas of the Bay, for example, combined with heavy fishing pressure, raises considerable concern that high quality habitat may not be adequate to support the key life stages of the crab. With support from the Chesapeake Bay Commission and others, researchers are designing potential blue crab “corri-

dors” or “sanctuaries,” protected areas that would provide routes for blue crabs to transit to and from key nursery, feeding and spawning areas. In Virginia, just such a sanctuary has been established, protecting crabs from June through September in waters deeper than 35 feet. Such corridors should help assure that not every area of the Bay risks over-exploitation by commercial and recreational crabbers, but careful research and monitoring will be needed to analyze their effectiveness.

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*For additional information about the Bi-State Blue Crab Advisory Committee, contact the Chesapeake Bay Commission at 410-263-3420 (Maryland) or 804-786-4849 (Virginia). Web: [www.chesbay.state.va.us](http://www.chesbay.state.va.us)*

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