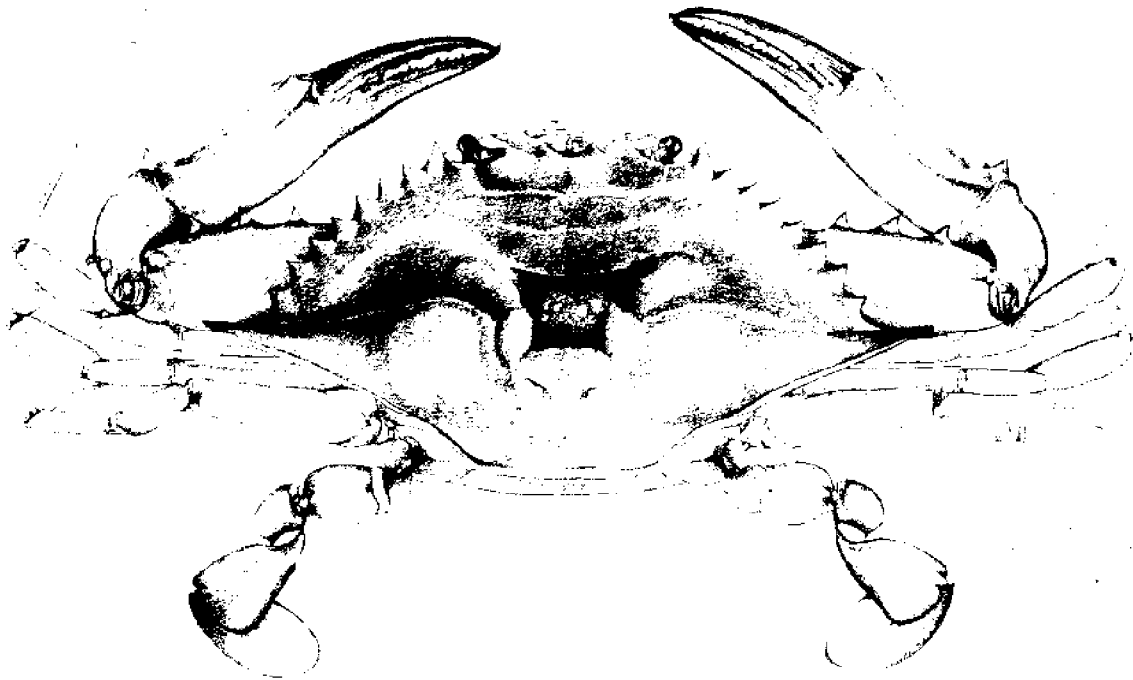


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Managing the Chesapeake Bay Blue Crab

A Meeting of Stakeholders



A WORKSHOP REPORT

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A WORKSHOP REPORT

Prepared by
The Institute for Environmental Negotiation at the
University of Virginia
and the
Maryland Sea Grant College
University System of Maryland

For the
Bi-State Blue Crab Advisory Committee
Chesapeake Bay Commission

August 2000

This report resulted from a meeting of stakeholders held in Solomons Island, Maryland on February 2-3, 2000. The meeting was part of a two-year effort by the states of Maryland and Virginia, guided by the Chesapeake Bay Commission, to study and review the status of the baywide blue crab fishery. In support of this effort, the Commission has been working with researchers, economists and policy analysts to characterize the state of the Bay's blue crab stock and the current economic condition of the fishery and the industries it supports.

An essential part of this review is the incorporation of insights, experiences and comments by a range of stakeholders. Participating in this meeting were legislators, resource managers, watermen, seafood processors, researchers and environmental groups from Maryland and Virginia. The Bi-State Blue Crab Advisory Committee, advised by a Technical Working Group of scientists and economists from both states, was formed in 1996 to advise the Chesapeake Bay Commission on matters of science and policy related to the blue crab.

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Summary

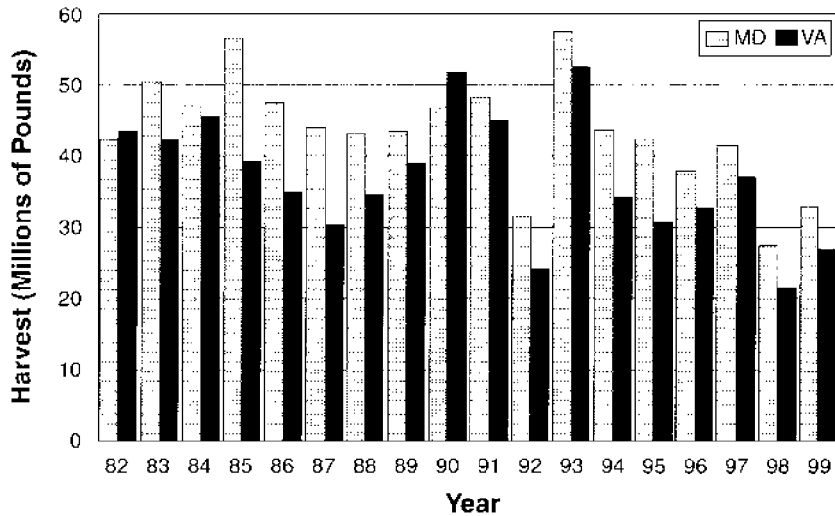


The Chesapeake Bay Commission's Bi-State Blue Crab Advisory Committee (BBCAC) is a baywide deliberative body comprised of legislators, resource managers, watermen, seafood processors, researchers and environmental groups from Maryland and Virginia. The BBCAC, advised by a Technical Working Group (TWG) of scientists and econo-

mists from both states, was formed in 1996 to advise the Chesapeake Bay Commission on matters of science and policy related to the blue crab. In 1999, the governors and legislatures of Maryland and Virginia responded to concerns about the health of the Bay's crab stocks by allocating \$150,000 each to support a two-year review of the current status of the crab and to investigate whether it could be better managed. In order to review potentially relevant management strategies in other fisheries around the world, and to gauge current interests and attitudes, the BBCAC convened a workshop in Solomons Island, Maryland, to bring together various stakeholders in the blue crab fishery, including watermen, seafood processors, regulatory agencies and legislators. Together they examined issues central to devising future management options for the Chesapeake Bay blue crab fishery, including alternative management techniques and the impact of regulations on the people who depend on the blue crab for their livelihood.

There are several indications that the Chesapeake Bay blue crab fishery is in need of better management. Virginia crab harvests have decreased from 42 million pounds in the 1980s to 34 million pounds in more recent years, and there has been a 70% decrease in female biomass. According to most resource economists, the fishery is also suffering from "gear saturation." It was postulated at the workshop that the same amount of crabs could actually be caught with one half of the pots now being used. Furthermore, in Maryland, it appears that the number of pots actually used is only 17% of the total pots currently licensed. The impact the fishery could have on the blue crab population

Commercial Blue Crab Harvest in Maryland and Virginia from 1962 to 1999



if all permitted gear were fished appears tremendous. In addition, an unknown factor affecting the crab fishery resides in the impact of recreational harvests. Approximately 29,000 recreational crab licenses were sold in 1999 in the state of Maryland alone, and surveys in 1983 and 1988 estimate that from 11-40 million pounds of crabs are harvested per year by sport crabbers.

Watermen and seafood processors explained that they are facing financial and physical hardship to make a living.

Processors/packers are seeing first hand a decline not only in numbers but in the size of crabs. In the 1970s, for example, 100 crabs yielded 13 to 14 pounds of meat. Now the same number only yields 7 to 10 pounds. In addition to the importation of Asian meat, a greater number of crabs are coming from North Carolina and Delaware, often providing picking houses with larger, easier-to-process crabs. Generally, the watermen's effort is substantially increasing, while harvest and income are stagnant or decreasing. In addition, watermen are frustrated that the public tends to institute management techniques that often harm the livelihoods of working watermen, without considering other factors that can contribute to the decline of crab populations, such as declines in submerged aquatic vegetation (SAV).

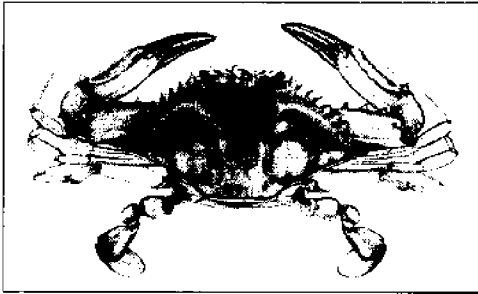
One question posed at the workshop was whether problems created by current regulations could be solved by some form of "rights-based" fishery. One particular alternative management solution discussed at the workshop was the Individual Transferable Quota (ITQ). An ITQ is a transferable property right, which entitles the holder to harvest a specified number, volume or weight of fish or shellfish. According to some fisheries experts, ITQs can increase profit and quality, enhance safety, create fisher-supported stock assessments, improve technical and economic efficiency, and provide greater benefits to society. As reported at the workshop, there have been substantial improvements in more than 40 fisheries around the world using ITQs. Nevertheless, great skepticism (and some strong opposition) was expressed about the desirability and feasibility of implementing an ITQ program for the Chesapeake Bay blue crab fishery. These concerns were based on the potential for ITQs to supplant a more numerous, traditional fishery with more concentrated ownership

and management. Fears about the potential concentration of ownership from ITQs emerged repeatedly as a concern, and many workshop participants felt that ITQs may lead to serious inequities in the initial distribution of licenses, income and subsequent wealth.

Participants discussed several next steps for devising future management options for the Chesapeake Bay blue crab fishery:

- Clearly articulated goals for the fishery need to be developed, with assistance from the TWG and BBCAC, before a baywide management system can be developed.
- Enough interest exists in the Individual Transferable Effort (ITE) certificate program for Florida's spiny lobster fishery to justify further exploration into that approach.
- The BBCAC should also investigate other management options, such as creating a Virginia sanctuary for the lower Bay, protecting and restoring submerged aquatic vegetation and increasing baywide water quality.

Overview



In order to investigate options for managing the Chesapeake Bay blue crab and the transferability of approaches used for other fisheries, the Chesapeake Bay Commission's Bi-State Blue Crab Advisory Committee (BBCAC) convened an interactive workshop in Solomons Island, Maryland. The workshop was

facilitated by the Institute for Environmental Negotiation at the University of Virginia and by Maryland Sea Grant. The purpose of the workshop was to bring together various stakeholders in the blue crab fishery, including watermen, seafood processors, regulatory agencies and legislatures, to examine issues that need to be considered in devising future management options for the Chesapeake Bay blue crab fishery. Participants discussed alternative management techniques in light of current scientific knowledge of the blue crab and the impact of regulations on the people who depend on the blue crab for their livelihood.

Fishery Management Applications from Other Fisheries

Bonnie McCay (Rutgers University). Management strategies from other fisheries were offered for comparison with those currently in place for the Chesapeake Bay blue crab to help determine potential applicability for future management of the Bay crab fishery.

Traditional fisheries management in the U.S. involves both open access and the use of controls on fisheries, such as quotas or gear and season limits, under the principle of maximum sustained yield (MSY). Most agree that there are problems with MSY due to difficulty in understanding population dynamics and interactions of multiple species in dynamic ecosystems. These complexities have led to calls for ecosystem management.

The problem with open access is that it can lead to "tragedies of the commons" where too much harvesting effort overwhelms a given stock of fish. This has led to calls for limiting entry and creating "rights-based management."

The most proactive example is the “individual transferable quota” (ITQ) system. However, since rights include more than property rights — rights are also political, including the right to participate in management — and many have called for greater fishing community involvement in management beyond the conventional rights-based scenario.

Four cases of “rights-based” management were presented, three of which involve privatized property rights and the fourth of which involves greater community rights.

Surf Clam & Ocean Quahog Fisheries: ITQs in Theory

The first ITQ fishery in the U.S. was the system created for the Mid-Atlantic surf clam and ocean quahog fishery in 1990. It was designed to fit economic theory about the advantages of marketable property rights in a fishery. The ITQ system resulted in a drastic decline in numbers of boats and workers in a fishery previously overcapitalized and led to concentration of ownership and power in relatively few firms. While this change has reduced the number of firms involved in the fishing effort, some argue that it has increased incentives for those who remain to invest in the health of the fishery, by funding more research, for example.

Halibut & Sablefish Fisheries of the North Pacific: ITQs with a Heart

The Pacific halibut fishery off Alaska had been well-managed in biological terms but the use of a quota, combined with open access, eventually led to costly and dangerous races for fish harvest once a year. The “Individual Fishery Quota” system, which began in 1995, allows fishermen to spread their catches over the year. As with ITQs, this program allows for trading and some consolidation, but the system is also designed to maintain the traditional owner-operator basis of the fishery and to prevent concentration of quotas in processing firms and large fishing companies. Also, a loan fund has been created to help crew-members and others buy into the fishery.

Florida’s Spiny Lobster Trap Certificates: ITQs without the Q

In the early 1990s, an excessive number of traps and a decline in Florida’s lobster population led to a program aimed at reducing the number of traps employed in the fishery. Shares were given to participants that could be sold or leased to licensed fishers, but an anti-monopoly limit of 1.5% — as well as transfer fees — were put in place to protect the smaller players. The number of traps was incrementally reduced, until a decrease in the amount of catch resulted, at which point the number was held constant. The system required accurate information about the harvest in order to support these decisions. Currently, the lobster fishery has stable catches, and traps have been reduced to 1996 levels. In a similar system for rock lobster in Australia, the number of traps has been reduced greatly, and the economic value of each trap has escalated to about \$25,000 (Australian), resulting in significant barriers to entry in this fishery.

Community-Based Management in Nova Scotia, Canada

An ITQ system for groundfish in Nova Scotia also includes attempts to protect owner-operators and community interests. Concentration of ownership of ITQs and control by processors occurred with these species, and some groups protested the expansion of ITQs to other fisheries. Instead, authorities have created community management boards, which are granted shares of the total allowable catch by the government and which can make decisions about how local people will fish the shares. This program serves as a good example of community-based management, where people exercise their political rights to determine the nature of property rights. Other examples exist, including community development quotas granted to remote, rural communities in Alaska. Also, in the state of Maine, lobstering is now being managed by democratically elected committees from different zones in the state.

Discussion

Discussion following Dr. McCay's presentation focused on impacts of the various management strategies on local fishing industries. In the surf clam fishery, some smaller fishing interests were forced to sell, while some argued that those who cheated in reporting their harvests were rewarded with larger quotas. In the Florida spiny lobster system, fishermen were all given the minimum quota and required to purchase additional quotas in order to maintain previous harvest levels. In response to questions concerning impacts on small fishing operations, McCay commented that protecting the interests of those fishermen requires strict enforcement and monitoring so that cheaters are not rewarded. Allocating adequate resources to enforcement has been central to the quota systems in the Alaskan and Canadian fisheries.

Surveying Chesapeake Crabbers

Anne Rhodes (Virginia Commonwealth University). Results of a watermen survey conducted by Virginia Commonwealth University are beginning to illuminate the current sentiment of watermen who will be affected by future decisions about management of the blue crab.

In order to determine current attitudes and to characterize current economic conditions in the Chesapeake blue crab fishery, survey experts at Virginia Commonwealth University designed a survey instrument, with review from watermen, resource managers and others. This survey was sent to commercial crab license holders in both Maryland and Virginia, and posed questions about current management regulations, as well as financial information. So far, this watermen survey has yielded a response rate of 38%. Of those of who have responded, 90% have added recommendations for improving the fishery.

Other fisheries in which the crabber may be employed were segregated out of the survey by having respondents allocate their total income between all the fisheries in which they participate. Rhodes responded to concerns about surveys being used to impose regulations or determine income taxes, by assuring attendees that surveys are not reported to the IRS. Information from the surveys will be pre-released to watermen focus groups to determine the fairness and accuracy of the analysis.

Stakeholders Attitudes and Insights

Introduction

Ann Swanson (Executive Director, Chesapeake Bay Commission)

While rights-based and other nonconventional approaches to fisheries management may not seem appealing or even appropriate for the Chesapeake blue crab, in order not to close the door on any innovative thinking it is important to consider a broad range of examples and possibilities. And while many have voiced opposition to rights-based options such as ITQs, any analysis that omits such approaches — used in many parts of the world — would be incomplete. In other words, it is important to consider all strategies at the outset of this process of investigating management strategies for the crab.

It is equally important to determine problems with the crab fishery and to uncover issues that might ordinarily be overlooked. For this workshop, we will begin to look at the status of the blue crab, followed by a discussion of problems associated with managing this complex fishery and potential solutions for improving management strategies.

Status of Blue Crab Management Strategies

Scientists and watermen from both Virginia and Maryland describe current blue crab management strategies to elucidate the present regulatory framework in Virginia and Maryland and how these strategies do or do not work in tandem to provide for a healthy and productive crab fishery.

The Virginia Blue Crab Fishery

Jack Travelstead (Virginia Marine Resources Commission)

Crab catch averages in Virginia have declined from 42 million pounds in the 1980s to 34 million in the latter part of the 1990s. There has been a doubling or even tripling of effort in the soft shell catch, and it appears that about half of this effort results from redirected hard shell crabbing and the remainder from new entrants into the peeler fishery. At present, some 74% of the Virginia crab fishery is comprised of female crabs, with 80% of the fishery made up of hard crabs and 10% of soft crabs.

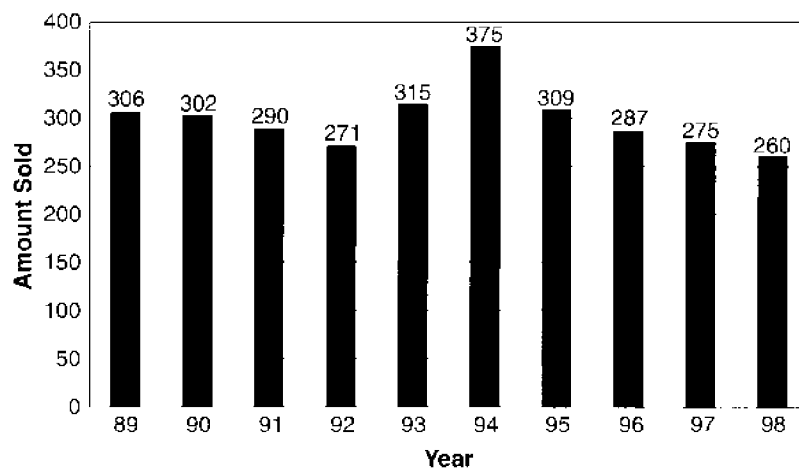
Last year saw a poor harvest of crabs, especially during the earlier part of the year. The dredge fishery did well, however, despite the bad year and a decrease in effort because new entrants are prohibited to that fishery. Though there are 240 licensed dredgers, only 80 are active and 40 dredgers account for most of the harvest.

All past studies have shown that there is too much effort in the crab fishery. Catch per unit effort data, calculated from reports of daily catches from watermen, suggest that there is

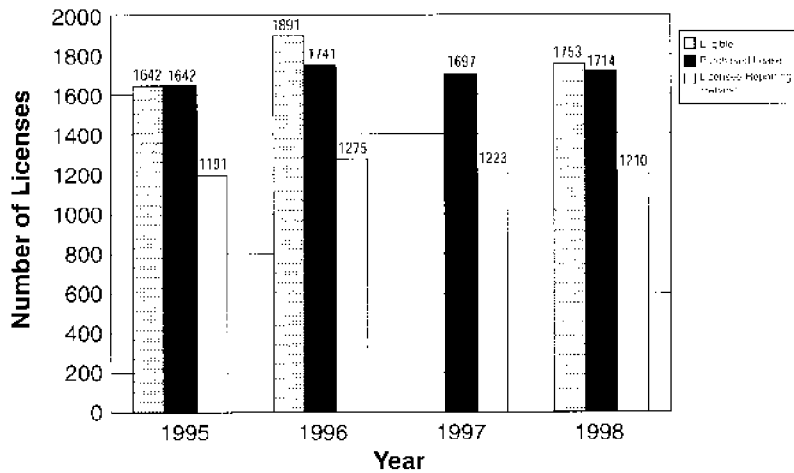
Number of Licenses, by Category and Year					
Category	1995	1996	1997	1998	1999
0-100	691	740	743	725	605
0-150	0	0	0	*99	96
0-200	0	0	0	*38	48
100-300	782	819	813	870	884
300-500	148	153	152	151	159
Over 500	5	0	0	0	0
License Totals	1626	1712	1708	1746	1792
Potential Effort Pots	380,200	396,200	394,200	417,750	429,200
% Change in Effort		4.20%	3.70%	9.90%	12.90%

* No license sold for these licenses. They were merely upgraded and are included in the 0-100 category. The Gear license for 1-150 and 0-200.

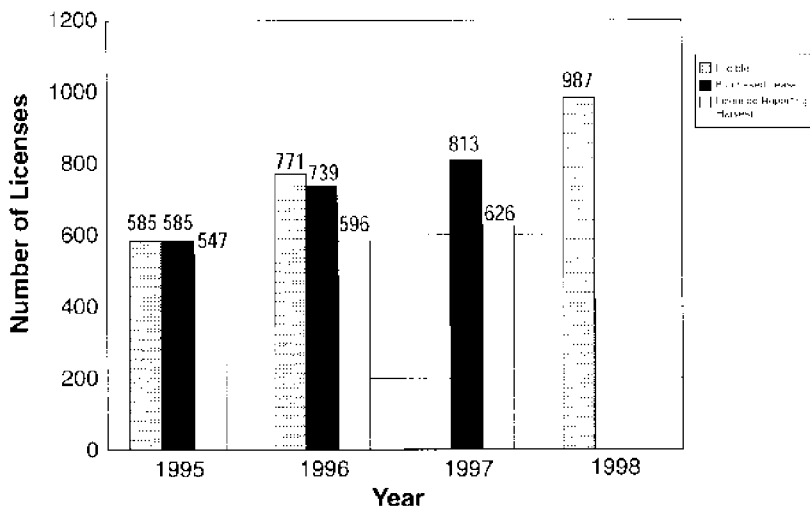
Ten-Year Crab Dredge License Sales



1995-1998 Hard Pot Eligibility, Number of Licenses Purchased and Number of Licenses Reporting Harvest



1995-1998 Peeler Pot Eligibility, Number of Licenses Purchased and Number of Licenses Reporting Harvest



1994-1999 Peeler Pot Averages

Year	Average
1994	191.68
1995	236.69
1996	228.50
1997	222.64
1998	233.70
1999	267.47

currently “gear saturation.” The same amount of crabs could theoretically be caught with one half of the pots now being used. Not only are harvests down compared to the 1980s, but there has been a 70% decrease in female biomass. In addition, importation of crabmeat may also be influencing the industry.

Reducing both harvest levels and excessive effort has been difficult. In 1986, limiting pots decreased new entry into the fishery, especially for young people, but the ability to transfer licenses remains when a crabber wants to leave the fishery or when there is a death in the family. More recently, the Virginia Marine Resources Commission (VMRC) attempted to come up with a method of returning to 1995 harvest levels. Some proposed eliminating crabbers who had recently entered the fishery and also reducing gear. The Commission decided to reduce pot limits from 400 to 300 and freeze the sale of licenses, though that freeze will sunset in May 2000. As a note of caution, Travelstead stated that any proposed regulations to increase minimum size would disproportionately affect the Virginia

fishery because female crabs (which are generally smaller than males) prefer the higher salinities of the lower Bay.

Discussion. Discussions have taken place in Virginia about initiating a pot-tagging program. Because the General Assembly did not appropriate funds for such a program, there will be no pot-tagging program in Spring 2000, although there is a possibility that such a program could be initiated in Spring 2001. Referring to enforcement efforts under current regulation, some participants expressed skepticism about how enforcement would work under any ITQ program that might be considered. More positive reactions came in response to a possible corridor/sanctuary program.

The Maryland Blue Crab Fishery

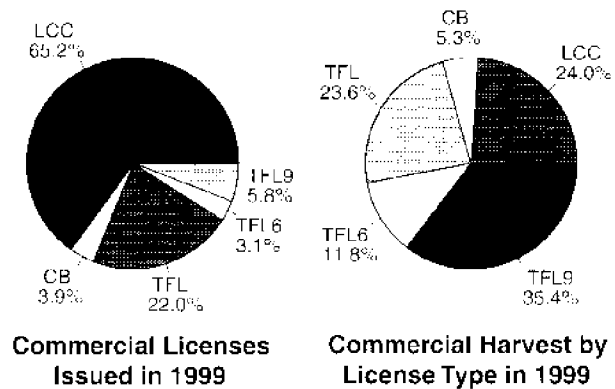
Harley Speir (Maryland Department of Natural Resources)

Blue crab fisheries exist in most of the mid to south Atlantic and Gulf States, but the Chesapeake Bay produces 40 to 50% of the national harvest of the blue crab, approximately 80 million pounds baywide. Most (62%) of the commercial landings in Maryland are from pots, while trotlines take another 36% of the landings in the tributaries. Over the past 10 years, Maryland commercial crab landings have slightly exceeded Virginia landings, averaging 40.7 million pounds annually.

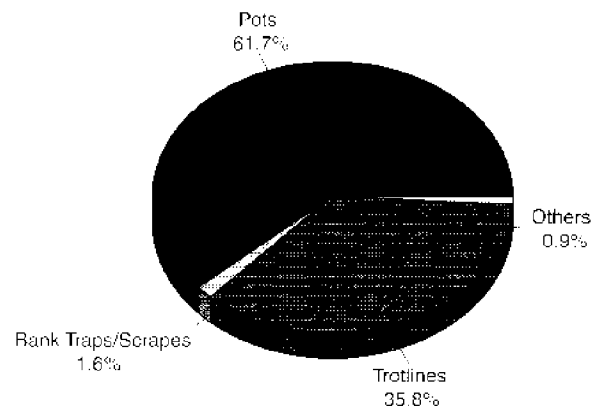
In Maryland, harvest of mature female crabs is legal at any size, but harvest of sponge crabs (showing external eggs) is prohibited. (Sampling reveals relatively few sponge crabs in Maryland waters.) Maryland commercial landings of females have ranged from 30 to 43% of the total annual harvest. Peeler and soft crab landings in Maryland are relatively stable at 1.2 to 1.8 million pounds annually, but the dockside price of crabs has increased over the years.

In 1994, authorities limited entry into Maryland's commercial crab fishery. In 1990, 6,429 licenses were issued, and numbers remained around this level through the 1990s. The majority (65%) of licenses are the LCC (Limited Crab Harvester License), which permit up to 50 crab pots, trotline, scrapes or traps. The TFL (Unlimited Tidal Fish License) permits use of all fishing gear, and the CB3 (Crab Harvester License-300) permits the use of up to 300 crab pots. The TFL and CB license holders can buy additional 300 pot authorizations up to a maximum of 900 pots. Though a minority of the fishermen, TFL licenseholders report harvesting 71% of the landings.

Not all license holders use their permits to crab. Over the past five years from 36% to 46% of license holders reported not crabbing, with most (65%) of these noncrabbers holding LCC licenses. License numbers are therefore not a good indicator of effort. It appears that the number of pots actually used constitutes only 17% of the pots that could be used if all crabbers deployed the number of pots for which they are licensed. There is no license required specif-

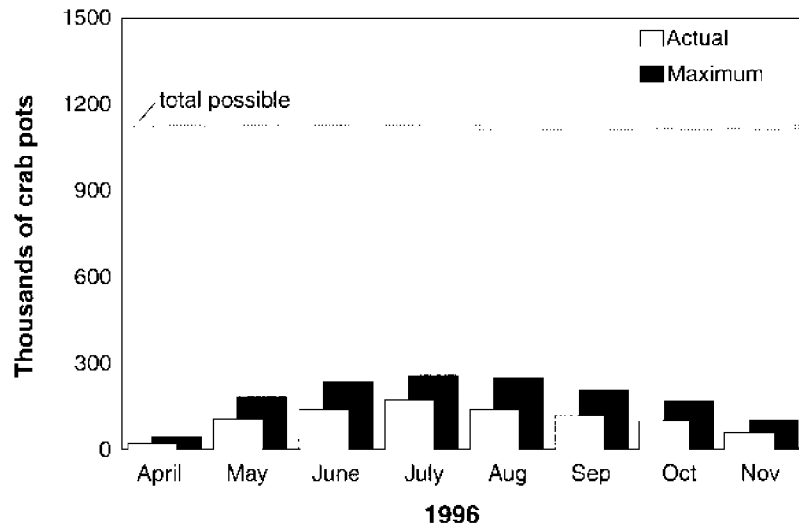


In 1999 there were 6,444 commercial licenses issued and 32.6 million pounds of blue crab harvested commercially.

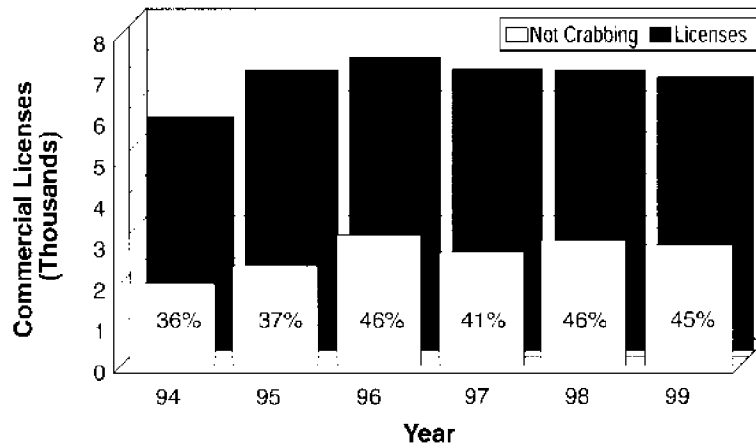


Distribution of Maryland commercial harvest by gear, 1989-1999 average.

12 Managing the Chesapeake Bay Blue Crab



Number of crab pots reported used in Maryland and the maximum number of pots that could be fished by reporting potters, and the possible number of pots that could be used by all potters.



Percentage of commercial license holders that reported not crabbing compared to the total number of licenses issued.

ically for peelers, so the impacts from this part of the fishery are unknown. Unlike the commercial fishery, the number of participants and catch levels in the sport fishery is not routinely surveyed. In 1999, Maryland issued 29,000 recreational crab licenses, and surveys in 1983 and 1988 estimate from 11-40 million pounds of crabs were harvested per year by sport crabbers.

The Watermen's View

Ken Keen (*Maryland Waterman*)

Jeff Crocket (*Tangier Watermen's Association, Virginia*)

Mr. Keen questioned whether or not there is a problem with the number of crabs in the Bay. Some watermen feel that industry regulations are not being enforced, and the surprising number of recreational crabbers in Maryland has the potential to make matters worse. Keen asked if perhaps pressure could be taken off of the fishery, and if crabbers would be able to transition to other types of fisheries or other professions. Crabbers are in a difficult financial situation due to the importation of crabmeat, which is causing a shift in the market.

Jeff Crocket began by expressing the opinion that cull ring regulations are breeding increasingly smaller crabs. The declining size of crabs will lead to decreasing profits, he said, which will drive watermen out of business long before the blue crab becomes extinct. Crocket questioned whether regulations have resulted in a net benefit to the health of the industry. Regulations and declining profit margins keep some watermen in business against their will, while forcing others to drop out of the business. Contrary to the opinions of many, abuse of regulation is not widespread. Crocket proposed that a moratorium be put in place on all new regulation for the next five years, until it can be proven that the crab population is threatened. Crocket noted that other factors that influence the crab population are not being considered, such as declining sea grass beds.

Discussion. Participants discussed whether the crab fishery is truly in danger, and if so, what solutions would make sense. Anecdotal evidence indicates that the crab population has decreased. In addition, scientists from both states have indicated that crabs harvested per unit of effort are declining. This can be explained in two ways — there could be fewer crabs, but there also could be too many pots. Either way, individual watermen are suffering the consequences. People have had to sacrifice 25% of their incomes in recent years to continue crabbing.


Processors and packers also are seeing a decline in the crab population. In the 1970s, 100 crabs yielded 13 to 14 pounds of meat. Now the same number yields only 7 to 10 pounds. Bigger crabs are sold to restaurants, and picking houses tend to get what is left over, namely smaller, less desirable crabs. Declining harvests and increasing regulation have made it impossible for new generations of watermen to enter the industry.

Potential problems with instituting an ITQ system concerned some workshop attendees. It was stated that ITQs only work for corporate management and that ITQs drive smaller operators out of business. It was suggested that a more acceptable solution would be to better manage the entire Bay ecosystem


in order to protect the blue crab. Additionally some suggested that more research is needed in determining the impact of the submerged aquatic vegetation (SAV) loss on the blue crab population.

Discussion of Leading Statements

These statements, and the opportunity for general responses, were offered as a basis for initiating discussions among participants about attitudes and views of fisheries management in general and blue crabs in particular. The comments that follow represent the views of workshop participants.


 **Statement 1.** When there is a public concern related to declines in blue crabs, the crabbers are perceived and treated as the principal source of the problem rather than other possible contributors, such as crab population cycles, natural variations in conditions, water pollution or habitat loss.

Participants agreed that there is public misperception of the watermen's profession. The public, caught up in nostalgia for the past and lacking a general understanding about the nature of the crab resource, tend to romanticize the profession, while at the same time viewing watermen as a cause of environmental degradation of the Chesapeake Bay. In addition, there is a great deal of misunderstanding among the general public about the impacts of the winter dredge fishery. Participants felt that perception about the sponge crab fishery and other fisheries that target female crabs are influenced by emotional feelings about taking "mommy" crabs. Also, crabbers are easier to regulate than other factors that may be contributing to the decline of the blue crab. Some noted that crab loss is probably more of a systemic problem than simply a matter of overharvesting by crabbers. Management must address the predator/prey issue, multi-species approaches, and land use/water clarity. Some felt that much of the blame for the decline of blue crabs must lie with land use practices in the Chesapeake Bay watershed. More emphasis needs to be put on determining the impact of declining submerged aquatic vegetation (SAV) and poor water quality on the biology of the blue crab, and information on these issues needs to be distributed to the public.

 **Statement 2.** Crabbers should play a substantial and direct role in developing crab fishery management rules and regulations.


All discussion groups agreed that it is crucial to have more industry participation from the very beginning for the success of any management effort. Crabbers have knowledge of the industry, are the ones being regulated, and

they have a vested interest in improving the fishery. The extent of their participation in regulating the crab is difficult to determine, however. Some question whether crabbers can be objective in deciding regulations that will affect their own income. In addition, the management process should involve other stakeholders, including environmentalists, restaurant owners and others, and there should be dialogue and cross communication between stakeholders, including scientists involved in data collection and crabbers.


 **Statement 3.** The “fisherman’s problem”— that conventional fishing customs motivate people to overfish — is real and applies to crabs as well as other common resources. This problem arises because of interaction between predictable human behavior and finite resources; that is, the fish are not “owned” until they are captured, so every fisherman is motivated to “capture” them before others do. This interaction between humans and fish will almost always lead to wasteful fishing effort and to over-exploitation of the fishery.

Many felt that the “fisherman’s problem” of harvesting a common property resource is not as clear cut as it seems. The nature of the crab fishery, given that the crab is fished heavily throughout its life cycle, can lend itself to the tragedy of the commons, but a tragedy of the commons does not always have to happen. Some concluded that the fishermen’s problem “can” lead to over-exploitation, but it will not “always” happen.

Some participants felt frustrated that the finger is always pointed at regulation of a finite natural resource without considering the natural refereeing and management that goes on within the fishing industry. This inherent refereeing takes the form of some crabbers dropping out of fishing altogether and working in other industries or making parts of their living from harvesting other forms of marine life. The problem may reside with a public that always expects that a set number of crabs will be available. The public tends to ignore the natural progression of a population, which goes up and down over time, and they seek to institute management techniques that tend to harm watermen’s livelihoods (e.g., fishermen’s limited entry for ten years). The “use it or lose it” licensing strategy, they argue, works against the natural ebb and flow of business and may force someone to keep crabbing even though it may not be economically viable. Participants also felt that excess effort in the recreational fishery needs to be examined.

 **Statement 4.** Crabs, like other fishery resources, belong to all the people of a commonwealth or state. The government has a “public trust” to protect and manage that resource. Those who have traditionally harvested those resources do not have a legal right to capture that resource if the resource itself is threatened.

Most participants agreed that government has a duty to protect the resource. The difficulty lies in determining how governments should protect the resource. A recurring problem between fishermen and the public centers on where the line is drawn in terms of oversight of the resource. Watermen should have a greater voice in policy since crabbing is their legacy and livelihood, but ultimately, the public decides if a resource is threatened by passing legislation. Some participants stated that the right to take a common property is granted by the state, while others claimed that there is no constitutional "right" to fish regardless of the consequences.

 **Statement 5.** Currently, crab management focuses on limiting "inputs" rather than "outputs." Thus there is a tendency for more and more regulations, seasons, gear, times, size limits, etc. More attention to limiting "outputs" or catches could reduce the need for more regulations.

Almost all participants felt that output controls were hard to implement. Identifying a quota system would be very difficult due to the biology of the crab and the nature of the industry. The crab goes through several developmental stages, which are harvested with different gear and techniques and sold for different prices. One single quota on the crab fishery would not be as effective or as simple as it is for other fisheries, they felt. Such a system would require the need for more detailed data than are currently available on both harvest and stocks.

Furthermore, the industry is still driven by markets and economics. Rigid output restrictions that do not respond to market changes, such as seasonal demand, are inadvisable. On the other hand, recent proposed Potomac River regulations would leave wide discretion to the Commission in limiting catch quota. As a result, watermen are expending more effort in anticipation of upcoming regulation changes. In light of this, it may be better to have more stability in any quota system (i.e., fewer changes and fluctuations in the quota). The greatest concern with the quota system is that it could create a monopoly that drives smaller crabbers out of business.

Introductory Panel for Draft Management Strategy

James Kirkley (Virginia Institute of Marine Science), Len Shabman (Department of Agricultural and Applied Sciences, Virginia Polytechnic and State University) & Doug Lipton (University of Maryland, Department of Agricultural and Resource Economics)

A select panel of economists presented, in detail, one particular management strategy, the ITQ system, as a “straw man” to be discussed by three small groups. The purpose was not to adopt a particular system but rather to provide a structured framework for discussing innovative crab management options.



Why even consider rights-based strategies? Is there something wrong with the current open-access or controlled access strategies?

With current open-access or even controlled access approaches, the fisheries typically achieve an equilibrium, which is not in the best interest of the resource or society. Often the result is (1) biological overfishing, in which too many fish (either in total or of certain sizes) are being harvested, and (2) economic overfishing, in which too many resources are used to harvest fish and the cost of fishing is unnecessarily high. As such, society is not obtaining the maximum possible benefit from the fishery. Although open-access — and even most controlled access — schemes, can be made to control most types of biological overfishing, they usually fail to adequately control economic overfishing.



What are rights-based strategies?

Generally interpreted, rights-based strategies are management methods designed to instill a sense of private property rights. In actuality, rights-based strategies include all types of management — even open-access in a broad sense. Most, if not all, rights-based strategies only offer the individual fishermen the right to harvest a certain number or certain volume or weight of fish. They place a limit on the quantity. Alternatively, rights-based strategies might be viewed as attempts to enhance private ownership of a fishery. Privatization as we traditionally view it, however, need not be the outcome of a rights-based strategy.



What is an ITQ?

An ITQ is a transferable property right, which allows the holder the right to harvest a specified quantity, number or weight of fish. The goal of an ITQ is to

meet biological targets, while reversing the trend of decreasing technical efficiency and productivity, and increasing net incomes. An ITQ may be bought, sold, given away, loaned, leased, bequeathed or not used by the owner. An ITQ is, however, an incomplete property right. Property in the fish passes to the owner only after the fish have been harvested.

ITQ Management Throughout the World

Currently, there are more than 60 fisheries throughout the world being managed with ITQs. The first major ITQ program was in New Zealand and is viewed as the most comprehensive in the world. ITQs are used to manage the Australian southern bluefin tuna fishery, the Tasmanian, Victorian, and South Australian abalone fisheries, the Western Australian pearl shell and pilchard fisheries, the Australian southeast trawl fishery, and are planned for New South Wales. South Africa also manages its abalone fishery by ITQs, and ITQs systems are in place in 23 Canadian fisheries. In the U.S., ITQs have been used to manage the ocean quahog/surf clam, wreckfish, several Pacific coast herring sac roe fisheries, and the Alaskan fixed gear sablefish and halibut fisheries. In addition, ITQs have been applied to several Wisconsin Great Lakes fisheries.

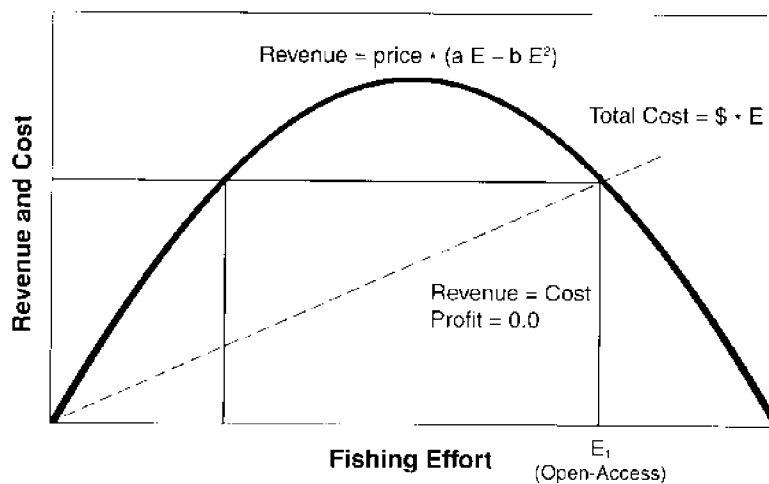
Workings of ITQs

Initial allocation is the most contentious issue of instituting an ITQ. Usually, most initial allocations are based on historical participation in the fishery. However, questions always arise about who should receive quota: vessel owner, processors, wholesalers, dealers, captains, communities, crew, etc. After initial allocation, a market system is created that determines who stays and who exits from the fishery. As a result, managers no longer have to worry about optimum fleet configuration.

Potential Benefits of ITQs

ITQs make it possible to move licenses from generation to generation and allow business the flexibility to grow or contract without “picky” regulation. Overall, ITQs increase profit and quality, enhance safety, create fisher supported stock assessments, improve technical and economic efficiency, and provide greater benefits to society. There have been substantial improvements in more than 40 fisheries of the world using ITQs. In New Zealand, 23% of respondents to a survey claimed ITQs improved quality and 10% reported reducing fishing effort. Several Canadian fisheries experienced increased profitability after instituting their ITQs. The British Columbia sablefish fishery, in particular, experienced a

Sustainable Yield-Derived Open-Access Equilibrium



57% increase in profits, and 80% of the British Columbia halibut fishers indicated they were better off with ITQs. Moreover, the price of halibut increased by 55% because of improvements in quality.

ITQs have also reduced the number of vessels and associated on-board labor. ITQs in the British Columbia sablefish fishery reduced fleet size by 35% in one year. The number of vessels in the southern bluefin tuna fishery of Australia declined by nearly 80%. Prior to ITQs, the U.S. surf clam and ocean quahog fishery had approximately 149 vessels that fished about 8 hours per month. There are now fewer than 30 vessels regularly harvesting surf clams and quahogs.

Potential Problems of ITQs

In spite of the benefits of ITQs, there still remain some problems with participating in an ITQ system. A traditional fishery may be sacrificed to profit and economics. In some fisheries, there are serious bycatch problems and inequities in the initial distribution of ITQs, income and subsequent wealth. Sometimes, ITQs tend to reduce employment in fisheries in the short run, and concentrate power over the fishery. In other cases, individuals stay in the ITQ fishery longer than they should because their investment in a vessel is often irreversible, and there is no other fishery they can enter. As a result, there have been serious negative community impacts in some cases (e.g., dislocation of family, increased drug usage, and increased crime). In addition, monitoring and enforcement costs have risen in some fisheries to prevent quota busting (e.g., illegal black fish landings in Iceland). Because of the critical nature of establishing an annual TAC, more money must be spent to make stock assessments more precise. ITQs can also encourage high-grading, fishers discarding small or less valu-

able fish so they will not count against the ITQ quota. Lastly, ITQs are very difficult to implement in multi-species, multi-product, and multiple jurisdictional fisheries.

ITQ management has simply not worked well in some fisheries. British Columbia halibut fisheries had serious high-grading problems, the British Columbia abalone fishery closed because of stock depletion, and the Atlantic Coast Canadian Nova Scotia-Fundy herring fishery had serious illegal catches and problems with quota busting. The European Community fisheries subject to Common Fisheries Policy (CFP) actually declared their experience with ITQs to be an unworkable disaster.



Can Individual Transferable Quotas or Effort be used to manage the blue crab fishery?

Individual Transferable Quotas or Effort *can* be used to manage the blue crab fishery. But first, different gear types, multiple products (soft, hard, sponge), many geographic/political jurisdictions (Maryland, Virginia), commercial versus recreational fishing and the high variability of the harvest must be addressed. Both ITQs and ITEs will require some work. Individual Transferable Effort, specifically, would require the standardization of different gear types or using a conversion factor. Initially, allocation of effort (e.g., pots) could be based on current effort (licenses). Virginia already has regulations that limit future effort based on current effort. Later on, targets for the amount of gear would be based on biological, economic and social concerns; and then gear allocation would be reduced to meet targets (e.g., 50% reduction in harvest). Sale or lease of effort rights would be allowed in the system. On the other hand, Individual Transferable Effort, requires the determination of a Total Allowable Catch and denomination of quota. Initial allocation of the quota to individuals would be difficult. Quota transfers would be allowed and good monitoring and enforcement would be necessary. There also could be locally managed quotas. Currently, however, there is a moratorium on ITQs to allow for the accumulation of historical data on harvests for initial ITQ allocation.



Concerns Over Applying ITQs to the Blue Crab Fishery

The problems of other fisheries that have used ITQs do not necessarily have to occur in the management of the blue crab. The mistakes of other fisheries provide lessons that can be used to adjust a blue crab ITQ system accordingly. The change over to private property rights does not necessarily have to result in the breakdown of the community. For example, farming communities use private property and are a viable industry. For any management system to work, the watermen have to believe in it, since total enforcement is not possible.

Discussion

Discussion among participants focused on the potential impact of recreational crab harvest on instituting an ITQ system. It was questioned whether there were any ITQ systems that have recreational watermen outnumbering commercial watermen by as much as five times, as may be the case in the blue crab fishery. Presenters pointed out that the Florida spiny lobster actually has a large number of recreational trappers, and that in New Zealand, some fishery management systems have quotas for recreational fishers and/or tribal groups.

Discussion of ITQ Straw Man

Before delving into the feasibility of implementing an ITQ, some participants wanted a clear understanding of the exact problem with the fishery. It is generally agreed that effort is increasing, while harvest and income are stagnant or decreasing. The Technical Work Group of the Bi-State Blue Crab Advisory Committee (BBCAC) has concluded that crab biomass and size are decreasing and that the reproductive potential of the crab is falling. In addition, watermen seem to be suffering economic hardship. The exact extent of these problems must be determined. Knowing this, clearly articulated goals for the fishery need to be developed by the TWG and BBCAC. Only then can a management system be developed. A management scheme must have an established goal.

Great skepticism (and some strong opposition) was expressed about the desirability and feasibility of implementing an ITQ program for the blue crab fishery. As a necessary step towards creating an ITQ system, establishing a Total Allowable Catch raised a great deal of concern. A TAC would be difficult to determine especially when the scientific study of blue crab populations has been so limited and inconclusive. It would also be hard to establish the form of the TAC, such as value of catch, number of crabs or pounds of crabs. The diversity of markets for the crab (soft, peeler, hard, basket-trade) would constitute another complication. In addition, a TAC does not account for the recreational part of the harvest. Frustration also was expressed with the typical approach for determining a TAC from average annual yields because allocation shares would then be based on recent individual catches and could possibly reward cheaters and eliminate currently inactive crabbers. Participants were also greatly concerned that an ITQ would drive long-time traditional crabbers out of business.

Participants expressed the desire to give an equal weight to other management options, particularly an ITE program. More information should be obtained on the Florida ITE program for spiny lobster specifically concerning catch allocation, quota transfers, effort reduction, recreational catch, provisions

that address crab harvests declining more than desired and goals of the program. It was suggested that individuals familiar with the Florida program should present their approach to the BBCAC. It was also suggested that current programs could be "tweaked" and/or more strictly enforced to move closer to true ITE systems by increasing minimum sizes, focusing effort on the soft crab market, reducing hard crab catch, and reducing pots. Participants also mentioned other management options such as creating a Virginia sanctuary for the lower Bay, protecting and restoring submerged aquatic vegetation and increasing water quality in the Bay.

Constituency Panel

Johnny Graham (Graham & Rollins Seafood Company, Va.), Jack Brooks (J. M. Clayton Company, Md.), Larry Simms (Maryland Watermen's Association) & Jim Jenrette (Lower Eastern Shore Watermen's Association)

Those who depend on the blue crab for their livelihoods, watermen and seafood processors in particular, reflected on their experiences with regulations and market forces in the past and present and articulated their reactions to the straw man proposal.

There was particular concern expressed by the Virginia and Maryland packers over the importation of foreign crabmeat and replacement of the domestic labor force by foreign workers. Labor issues are complicating the packing industry. People want to work a steady 35 hours per week, but in a cyclical and often variable fishery this is impossible. As a result of these major problems, two Virginia factories are closing next year. Almost all members of the panel were particularly concerned over the decreasing size of blue crab they were seeing harvested, though the Maryland processor expressed the opinion that crab size is not decreasing.

The ITQ system did not seem feasible or desirable to anyone on the panel. In general, an Individual Transferable Effort (ITE) system seems to be a more acceptable management approach than an ITQ system. Members of the panel would rather see greater enforcement and/or "tweaking" of current regulations and a baywide protected habitat corridor.

Final Reflections

Ann Swanson (Executive Director, Chesapeake Bay Commission) & Carolyn Watson (Assistant Secretary, Maryland Department of Natural Resources)

While quota system proposals received considerable skepticism and opposition from attendees, most agreed that all management options were important to consider. Some suggested that ITE (Individual Transferable Effort) needed further study, since this seemed to work well for the Florida Spiny Lobster. The workshop was successful in bringing together a multitude of stakeholders and eliciting a lively expression of views and opinions. The workshop is only the first step in the process of determining the most appropriate management option for blue crab. Continued cross-communication will be necessary for the development of management options that garner widespread support. Future studies and workshops will continue to inform the work of the Bi-State Blue Crab Advisory Committee, and at the insights and experiences of all stakeholders will continue to prove invaluable for managing the Chesapeake Bay blue crab.

