REPORT OF THE NATIONAL BLUE CRAB INDUSTRY WORKSHOP

September 10-11, 1977
Charleston, South Carolina

Raymond J. Rhodes
W. A. Van Engel

SPECIAL REPORT IN APPLIED MARINE SCIENCE AND OCEAN ENGINEERING No. 185 and SPECIAL REPORT FROM THE SOUTH CAROLINA MARINE RESOURCES CENTER

Virginia Institute of Marine Science
Gloucester Point , Point, Virginia 23062

South Carolina Marine Resources Center
Charleston, South Carolina 29412

MAY 1978

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Edited by:

Raymond J. Rhodes
South Carolina Wildlife and Marine Resources Department

and

W. A. Van Engel
Virginia Institute of Marine Science

Sponsored by:

Coastal Plains Center for Marine Development Services
Wilmington, North Carolina

and

The Gulf & South Atlantic Fisheries
Development Foundation, Inc., Tampa, Florida

and

Division of Marine Resources
South Carolina Wildlife and Marine Resources Department
Charleston, South Carolina

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FORWARD

The National Blue Crab Industry Workshop was held on September 10-11, 1977 at the South Carolina Marine Resources Center of the South Carolina Wildlife and Marine Resources Department in Charleston, South Carolina. The workshop was organized to address the blue crab industry's major problem areas and stimulate innovative thinking for improving productivity. The problems faced by the blue crab industry are not necessarily unique compared to other food industries; consequently, methodology to mitigate these problems will probably be transferred from other industries. Much of what was discussed in the technology committees has been faced by other industries, although recent food processing and discharge regulations seem like an especially heavy load for the small blue crab entrepreneurs.

The Report does bring coherency to describing these problems by blending the opinions and expertise of industry members, researchers and public sector administrators. Interwoven with these problems is the increased strain upon the public sector to "squeeze" more out of the blue crab resource for different users. Admittedly, the commonwealth resource nature does superimpose an uniqueness to rectifying some industry problems which hinder economic productivity.

William's Warner's book, Beautiful Swimmers, tells a good story of the blue crab fishery in the Chesapeake Bay, adding refreshing humanistic brush strokes to the blue crab scene. This fishery, though small when measured against the GNP scales of forestry, coal and other natural resources industries, still serves as an environmental indicator for water quality and general ecological stability. Within its economic

scale, the ideas in the Report represent a joint industry and public sector "Afterword" of Beautiful Swimmers addressed to improving the industry's efficiency.

In closing, it is hoped that this meeting of the regulated and the regulators, the fishery biologist and seafood technologist, the entrepreneur and the administrators has syngeristicly facilitated the accurate identification of the industry's long-term needs. If nothing else is accomplished, at least honest dialogue has rekindled the spirit of constructive commitment to each participant's area of endeavor.

Raymond J. Rhodes
W. A. Van Engel
Editors

May, 1978

GENERAL SESSION I - Purpose and Direction

INTRODUCTORY COMMENTS ON THE GULF AND SOUTH ATLANTIC FISHERIES DEVELOPMENT FOUNDATION, INC.

Tampa, Florida

Roger D. Anderson
Executive Director

The Gulf and South Atlantic Fisheries Development Foundation, Inc. has, as its mandate, wise and careful fisheries development. With direction from the fishery trade associations of the Southeast, the Foundation serves as:

1) a means through which industry can determine its research and development needs, then implement projects and programs to meet them;
2) a mechanism through which fishery-related funds can be channeled to meet mutually desired objectives;
3) a conduit through which public sector organizations can effectively coordinate their efforts via a single fishery organization, representing both the Gulf of Mexico and South Atlantic; and
4) a potential advisory body to the Gulf of Mexico and South Atlantic Fishery Management Councils.

The Foundation is directed by a Board of Trustees composed of one or two representatives from each coastal state from Texas to Virginia. The Trustees represent statewide organizations or, in the absence of such organizations, fishery cooperatives and/or individuals closely identified with a wide spectrum of statewide fishing activities.

Ideas for development come from many sources but require approval by a majority of the Board members before implementation. Current support for the Foundation's activities comes primarily from the Coastal Plains Regional Commission and Economic Development Administration. In addition, however, member organizations contribute time and support, as do cooperating agencies/institutions such as the National

Marine Fisheries Service, Florida Department of Natural Resources and South Carolina Wildlife and Marine Resources Department.

The Foundation aims to cooperatively establish research and development plans for those fishery resources that the Board believes have commercial potential. Thus, while the Foundation is a private, non-profit corporation, it works closely with state, federal and other organizations that share similar goals and objectives. This proposed working relationship includes:

1) the identification of problems that require limited commercial development;
2) the development of problems and projects that will attempt to solve these problems; and
3) the responsibilities of each organization's role in such efforts.

As a result, the Foundation seeks out the research and development expertise existing in the National Marine Fisheries Service, Sea Grant programs, state agencies and other institutions/agencies, endeavoring to communicate industry's definition of the problems into development projects. Foundation contracts are then awarded to the most qualified individuals and organizations. This cooperative use of expertise ensures the wisest and most efficient use of available resources. Also noteworthy is that the Foundation does not intend to compete with state and academic institutions for existing monies, nor does it plan to conduct research itself.

The Foundation cooperatively administers these programs through the commitment of the Trustees, its Executive Committee and the

Executive Director. The Executive Director handles day-to-day activities including contract administration, information dissemination and general staff support. He, in turn, relies on the Executive Committee, composed of the President, Robert P. Jones (Southeastern Fisheries Association), Vice President, Robert G. Mauermann (Texas Shrimp Association), and Secretary-Treasurer, Norman P. Angel (North Carolina Fisheries Association), for ongoing guidance. The Board meets quarterly, but is regularly appraised of all important business and activity between meetings.

Central to the Foundation's goals and objectives is assistance to the states of the Southeast in developing more fisheries interest and support. In most instances, this will be accomplished through the individual action of the member associations. Where resources are not currently available, the Foundation will endeavor to bring monies forward.

To date, our nation has not endeavored to focus on the development of many of our fisheries. However, with the expertise available, industry-government-academic partnerships will lead to both better conservation and use of the marine stocks of the Gulf and South Atlantic.

A STATE VIEW

Raymond J. Rhodes

SOUTH CAROLINA MARINE RESOURCES CENTER
Charleston, South Carolina

I have been asked by Calvert Tolley, George Harrison and others of the National Blue Crab Industry Association to give a state view on the blue crab fishery. I really appreciate this opportunity to address a group with such diverse skills and experience. I am glad to see the range of topics which will be discussed in each workshop committee. What you don't need is for me to quickly review all of these topics. I do feel we need to stand back for a few minutes so we don't miss the forest for the trees, in order to avoid the results personified by the airline pilot who announces to his passengers: "I have some good news and some bad news. The bad news is that we are hopelessly lost. The good news is that we are making excellent time."

I would first like to discuss why states are involved in blue crab resource management within their waters and then chart a course to improving our understanding of the type of state involvement which solves problems and does not hinder innovations in the blue crab industry.

I believe the key phrase in separating governmental "got-to-do's" and "ought-to-do's" is commonwealth resource management. What do I mean by "commonwealth resources"? These are the natural resources which every man wants but no institution or man can manage for every man. Resources are generally considered common property resources when the nuisance and cost of appropriating private ownership and defending it would far exceed the benefits (e.g., with a mobile creature like the blue crab) and there is a common law tradition for certain species, like the blue crab, to be available for use by all.

In the past, another reason for a resource being considered a common property was that many natural resources were believed to be inexhaustible. Of course, we now realize that no resources are inexhaustible, they must be managed and conserved for the greatest public good.

There are many problems associated with the utilization of common property resources. In some cases these problems are unique to the fishing industry in itself. Probably the most commonly discussed problem is overcapitalization. This is an economic term that means there are too many fishermen or packers chasing the same critter. Blue crab harvesting, as do other fisheries, displays symptoms of this problem. During the 1960's, the commonly proposed solution to overcapitalization was limited entry or licensing moratoriums. However, I think we must be very cautious in adopting that type of management philosophy because the cost of implementing and administrating such a program may exceed the benefits.

Another responsibility of fisheries management is efficiency of harvest. This has always presented a dilemma, since traditional gears may be threatened by introduction of new and more efficient methods. However, it may be more important to preserve traditional gear for the sake of maximizing participation than to increase actual harvest efficiency. Fishery administrators must be sensitive to both needs. The people in the seafood business are not necessarily there because they have the best economic return to their capital and labor. Trite as it sounds, fishing is not just a way of making a living, fishing is a way of life. I think this is true of both the harvesting and processing sector in the blue crab industry.

Not only must states manage their blue crab resources, they also must arbitrate conflicts between recreational and other fisheries interests. In the future, recreational interests will create an increasing challenge on the abilities to equitably solve the demand for the blue crab. However, I would assume that the maintenance of economically productive commercial fisheries will receive a high priority. An additional conflict is that between the blue crab harvester and harvesters of other species. In some cases, the commercial fishermen have been able to resolve their own differences and therefore minimize state involvement.

Probably the biggest sleeper, in terms of maintaining the stability of the blue crab resource in the United States, is the future of its habitat and the associated water quality. I think the Kepone situation in the James River has really brought home to all the states how precarious and valuable the blue crab and other fishery resources are in the United States. I have heard some comments that probably the best fishery management program that a state can be involved in is the rational protection of critical fishery habitats. I feel this philosophy must be an integral part of a state's coastal zone management activities.

How can we begin dealing with these types of problems? First, in terms of governmental involvement, I think we have to recognize problems which are related to the common property nature of the blue crab resource. These are problems in which the state will have to take wise and innovative initiative to minimize unfair resource allocation. This is one of the "got-to-do's" in fishery management.

I am not advocating the passage of regulations and statutes to resolve these problems. Competition and innovations within the free enterprise system may be the best solution.

Second, we have to recognize those problems associated with the common property but which may be more amenable to solutions used in non-fishery industries (Example: manpower training/quality control laws). A corollary of this second suggestion is that resource allocation has to be recognized before we start dealing with the strictly industry oriented problems. This is where I think the strong joint partnership with industry needs to be supported by key state agencies and institutions. With all due respect to federal employees in the audience, I feel the industry needs an ally when dealing with the federal regulatory tentacles. For example, it has been estimated that 130 million man hours are devoted annually by business to filling out approved government forms. This is not surprising because nearly 5,148 approved forms now exist. A Senate subcommittee estimated that $18 billion were spent annually by business on paperwork required by the federal government. The General Accounting Office estimates it costs $15 billion a year for the federal government to deal with this paperwork. Obviously, much time and energy is spent by business in "communicating" with the government instead of concentrating on business problems.

Third, absurd government regulations and policies should not be perpetuated by administrators or tolerated by business. I expect this kind of workshop to collectively identify and initiate the "rooting out" of the absurd. What do I mean by absurd? I would like

to give an example presented by Don Whitaker with N.M.F.S. at the 1975 SINA meeting here in Charleston. He reported that the Continental Can Corporation had effectively protected its employees from noise by providing them with comfortable ear protectors and requiring that they wear them. This program was set up at an annual cost of $100,000. O.S.H.A. demanded that Continental Can Company reduce noise by building sound shields around thousands of machines at a cost of $34 million. Government experts claimed that the sound shields could be designed and installed in two months. The court ruling was that after seven more years of research, it might be feasible to install the shields. O.S.H.A. had to admit that it found not a single employee who was not wearing ear protectors. O.S.H.A. itself admits that the protector reduced the noise level well below federal standards. This type of absurdity increases the consumers' costs with benefits to none.

Unlike the wandering airline pilot we cannot afford to be hopelessly lost but making excellent time. We can identify relevant problems and supply creative alternatives which will guide future planning by state, federal, local and industry institutions. This will involve some risk related to the constructive questioning of traditional concepts and policies. I believe the industry members can understand and accept this because they take risks every day as businessmen. To myself and other government employees, I can only say, behold the turtle, he only makes progress when he sticks his neck out.

A VIEW FROM INDUSTRY

George H. Harrison

TIDEWATER SEAFOOD, INC.
Newport News, Virginia

No jokes! We are here for a rather serious meeting and discussion. You didn't come here to hear me crack any jokes anyway. First of all, I want to say thank you, I appreciate the opportunity of being here; first, to Dr. Joseph, Dr. Burrell, Mr. Rhodes, VIMS south; Dr. Anderson, VIMS deep south, Tampa; and Van Engel of VIMS home office; thank god we still got him left. I would also like to thank President Calvert Tolley.

Before I get into my prepared comments, it is very heartening for me as a taxpayer to observe guys like Ray Rhodes and Van Engel who have taken a great deal of their own time and in several instances their own personal money to fly to meetings and so on, to get this workshop going. I know of a couple of instances where funding was not available; they got there; we appreciate it very much. Ray, Van Engel and Roger Anderson have done a fantastic job in putting this program together; we really thank you!!

I think the first thing that we should do is to look at our agenda and see what is going to happen in the next two days. By the way, I have never been known to be at a loss for words; I will have to keep my own time. They told me to talk for fifteen minutes, and I have prepared for seven minutes because I knew all meetings start late and everybody else runs over their time. We are already about ten minutes ahead. But I still won't bore you, I hope.

The meeting today is set up on a format, that I think should be explained as to what is coming to pass. In our preliminary organizational meetings, we discussed how to do the job and a workshop type session was decided as the most effective way. You will notice that

after I conclude, we can take our break and go immediately to workshop committee meetings. On the last page of the agenda, you have a list of the committees which have been set up and the topics which will be considered. We are hoping that each committee is well represented by the various factions of government people from their own specialities and that the industry people will spread themselves among each committee so that we can get good, well-rounded results from each separate committee. Now these committees will meet after the break this morning until lunch and all of the afternoon. If the committee co-chairmen feel that it is necessary after the shrimp boil this evening, they can call their committee back into session. That will be at the option of each committee co-chairmen. Tomorrow morning, we will have the oral reports of each committee with comments from the floor after each report is given. This way we can get a good well-rounded set of results. We are looking basically for a good road map; a method of charting the course for the blue crab industry. Hopefully we can come up with enough good information and enough guidance that our state and federal government people can put together a program or road map, call it anything you want, for the next few years.

I am supposed to give you a view from industry. That could probably take several days and to condense it down into just a few minutes is a little hard to do. You always start when somebody talks about history and I don't pretend to delve into the history of the blue crab industry except in a very sarcastic kind of way. We will start with my family as an example: in 1902, my grandfather put some crabs in a basket, dropped them into a retort and cooked them, took them out and cooled them off, took out his old trusty knife, picked

them, put the crabmeat in some oyster cans, put them in a box and iced them up, put them on a steamboat and shipped them to the market. In 1977, if the retort has not fully rusted away, I am sure somebody salvaged it and patched and maybe still using it because that is the kind of industry that we have. The cans today are smaller, made of lighter alloys but are basically the same thing. And if that old wooden fish box could still be found and somebody could repair it, we would still be using it. The steamboat has given way to the truck; thank God Henry Ford gave us a little progress. The Barlow Knife ground off and now we got rid of the wooden handle. And last but not least, the same fish market is receiving crabmeat from all of us or many of us at least. In short, the past 75 years have given us rather little progress in essence. The crabmeat industry today, is where the bulk of the U.S. food industry was just 50 years ago!

That ladies and gentlemen, is what I consider to be the shame. Unfortunately, the ones of us who cling mostly to the backward era, are very conspicuous by their absence here today. We have leaders, we have progressive people. We have people like Walt Zachowski and Stan Waskiewicz at Blue Channel, who are the leaders in technology in our industry. We have Clayton Brooks, Ted Reinke, Calvert Tolley and many other people too - I can't name them all - who spent thousand of hours of research to help our industry, who will make no mention of the money that is involved. We have others who have devoted many hours in many areas of our industry, such as in-depth research of pasteurization which has been done by Euclid Lewis and some other people and then again there is my work with the Va. Health Department and U.S. Food and

Drug Administration. (I keep them all so busy, they don't have time to work with you.) Fortunately for us in industry, we had some progress forced upon us. Guys like Carol Brinsfield, Cloyd Wiley and some other sanitarians, that have spoon fed us to produce a better product or more healthful wholesome product; and as much as I cuss, damn and raise hell about FDA, we all know that they have done a lot of things that we disagree with, but their goal is right even if many of their methods are wrong. We look at the government sector, for all the bumblings the National Marine Fisheries Service is guilty of, there are a few bright rays of sunshine, such as Bob Learson's technology group, Burt Tinker and the other people that work so hard up there, and please let's not forget to give due credit to Lew Ronsivalli, Bob's boss. He is the one who catches all the hell because he's got a group of people who will get out there and do a job and not just sit around shuffling paper and wasting their money.

In the biological research area, we have the bright rays of Van Engel, who is the crutch that has held many of us up in the past. Last winter and spring, when many of us in Virginia thought we were going to be faced with imminent bankruptcy, he is saying, "Hold out fellows, I told you, a new crop of blue crabs is coming." Thank God he was right! We got the youngsters coming along like Harriet Perry and Ray Rhodes and many others in several other states, that give all of us in the industry great pride and we hope we give them sufficient respect, too.

First of all, I want to say thanks to all of those before us who have contributed to making this industry what it is today, even if we are still backward. Second, the direction for progress and the

foundation for advancement in this industry, for the next five to ten years, will take place and be decided right here today and tomorrow by you. Third, I want to advise you that the Gulf and South Atlantic Fisheries Development Foundation, Inc. in conjunction with the National Blue Crab Industry Association stands ready to coordinate and lead this effort for progress that you folks decide upon.

My fourth task or pleasure is to give each and every one of you a charge. Your charge will be to take part in your workshop assignments, contribute to them, share your thoughts with your fellow man and contemporaries and don't be afraid to ask questions because all good ideas start with unanswered questions.

The preliminary results of this workshop will be presented at the NBCIA meeting in Atlanta in November. We hope at that point that our road map for the future of the industry will be completely drawn and decided upon. Actually we will have a few holes in it but we will fill them in. Then, we in the industry must put all of the political and bureaucratic pressure to bear to see that this road map and its ideals are followed. I am not going to repeat the suggested topics, which are on the last page of your agenda, but there are some things that you should look at with some regards to the final product that each study group puts out. We want the blue crab fishery management group to devise ways of instituting better management programs from the state level with support from the National Marine Fisheries Service (e.g., better statistical programs, etc.). Their largest assignment will be how to involve states that are not already involved in the blue crab research and other programs necessary to our

industry. As the man says, we don't criticize anybody, that's not what we are here for; but if your home state is not doing the "job," it is not helping the blue crab industry. Then we must get your state involved. This is what we want.

The blue crab Quality Control and Sanitation Committee should expound on the suggested topics with an eye towards the eventual publication of a manual for every plant operator to use as his operating bible. Also, the possibility should be explored as to voluntary inspection and grading standards such as the Department of Agriculture offers.

The blue crab Processing Technology Committee could take a workshop into several weeks of study, however, one of the most pointed subjects to study will be the ramifications of old regulations and new technology. Some of us who are trying to be progressive are fighting this everyday and its very disheartening. We know we are right, all we have to do is prove to FDA that we are right. The "Development of Crab Gear and Underutilized Species" is a highly interesting subject, but where the future of many of us lies. Let your minds wander; that's good for the industry. You folks have a big task.

Now you have a little history, little sarcasm, a little tribute and finally, a large task before you.

GENERAL SESSION II - Committee Reports and Discussions

INTRODUCTORY REMARKS

President, National Blue Crab Industry Association

Calvert B. Tolley
President
Meredith & Meredith, Inc.
Wingate, Maryland

Very shortly we will hear words of wisdom as a result of this workshop meeting from eminent scientists, regulatory people, and industry. A fisherman from our area was recently elected president of one of our local seafood organizations, and brought with him his compass. Captain Louis reported that this compass was used by him to show what direction he was going on the water. He felt that it was important that the organization over which he was presiding to know what direction they wanted to travel. And as George Harrison said yesterday, we need to charter a course and pursue it.

I also agree with George about the changes in the industry since 1902. The crab industry is going to change dramatically in the next few years and we are at that crossroad. We are still much like the farmer when he set aside his mule and plow and bought a tractor. The hard fact is that 63% of all seafood consumed in this country is imported. We all need to rush out to buy that tractor. The industry should stop selling products simply to undersell a competitor but also pack a quality product. Seafood will never be cheap again, in my opinion, and if you will furnish a consumer with a fresh quality product, they will beat your door down to buy regardless of price.

We had some visitors from the Mid-West recently who knew nothing about the blue crab and its habits. Naturally, we told about the molting of the crab in order to grow and its migration in the Chesapeake Bay, the difference between the male and female and their double appendages used for reproduction and that the female could reproduce over a million eggs during a lifetime. And one of the visitors said, this story reminds them of the old saying

"that two heads were better than one." So let us put our heads together and make this one of the most productive meetings that the crab industry ever had.

BLUE CRAB FISHERY MANAGEMENT

Committee Report

Co-Chairpersons

J. Clayton Brooks
J. M. Clayton Company
Cambridge, Maryland

and

Harriet M. Perry
Gulf Coast Research Laboratory
Ocean Springs, Mississippi

Committee Report Presented by J. Clayton Brooks

I think the Blue Crab Management Committee was a little bit different than the other committees in the respect that we had not only fishery management but the scientific people to get together with. Harriet Perry said, "you'll never get two scientists to agree to anything," and I would say you'll never get two managers to agree to anything, but we do have something here that I will read you and I think these are precise recommendations that came out of that meeting.

The Committee's work was organized into the following goal and objectives:

Goal

Management of the blue crab fishery of the Atlantic and Gulf coasts to provide for the maximum sustainable yield as modified by relevant economic, social or ecological factors.

Objectives

1) Establish committees under the Atlantic and Gulf States Marine Fisheries commissions to accomplish the following:

2a) Promote the establishment, coordination and standardization of assessment and monitoring programs on a state-by-state and/or regional basis in order to predict fluctuations in blue crab stocks and to determine the causes of these fluctuations if possible.

2b) Improve the collection, analysis and dissemination of statistical data regarding the commercial and recreational blue crab fisheries, with data to include effort, catch, value, fishing location, gear and bait.

3a) Identify critical blue crab habitats and support their preservation.

3b) Identify sources of environmental degradation and consider the impact of these changes on all phases of blue crab development.

4) Expand extension education relevant to management rationale to the general public.

5a) Describe the fishery and identify areas where additional data are needed to improve the base for formulating a management plan.

5b) Determine the interaction between the blue crab fishery and other fisheries.

6a) Evaluate existing blue crab harvesting regulations for biological, economic and political rationale.

6b) Encourage standardization of state management regulations as biological and socio-economic considerations allow.

QUESTION - Raymond J. Rhodes, S. C. Wildlife and Marine Resources Department

Summarize what would be the value of predicting the commercial abundance of crabs? I feel this could be major benefit from biological monitoring programs.

ANSWER - J. Clayton Brooks, Maryland

We in the Chesapeake Bay area watch the comments from VIMS, University of Maryland or the Department of Natural Resources in Maryland to determine what they feel about the populations of the blue crab in our waters and not just the marketable crabs, but the juveniles too. I feel that if the industry had predictive information on blue

crab populations in the South Atlantic and Gulf states, it would certainly help us in planning how to serve our customers' needs year round, especially in Maryland where we have a very short blue crab season. If we had blue crab predictions in these other states, (e.g., North Carolina, Texas) we could estimate what amount of crab meat from the Gulf to put on the market, because we all use the same market. It would just be very valuable to have a blue crab prediction for industry members in all these states.

COMMENT - Calvert Tolley, NBCIA

I believe it's up to the scientific community to give us as many facts and accurate information as possible, so that industry can assess it's situation and put their dollars where it should go. If biologists predict accurately, good; if they don't, too bad!

PROCESSING TECHNOLOGY

Committee Report

Co-Chairpersons

Stanley E. Waskiewicz
Blue Channel Company
South Carolina

and

Robert J. Learson
National Marine Fisheries Service
Gloucester Laboratory
Gloucester, Massachusetts

Committee Report Presented by Robert J. Learson

The processing technology session covered all the aspects of the blue crab industry from harvesting to the market place. The attendees discussed each point with the view of defining a given problem and making specific recommendations for needed technological study. The following are the recommendations of the group:

Level A - short term recommendations:

1) In many of the subject areas, it was determined through discussion that the necessary technological information was already available to the industry, however, the problem was in the area of technology transfer. Thus, the Committee recommends that the communication of technological advancement be upgraded through extension activities and demonstration projects, e.g., Sea Grant and fishery development programs.

2) Although research has been carried out on many phases of cooking crabs, much of the information has not been integrated. This Committee recommends that research and/or in-plant demonstrations be conducted to determine the effects of these processes (steam, retorting, boiling, and cooling) on the relative yields, quality, and bacterial load for the purpose of defining critical points in these processes.

3) The Committee recommends adaptation of new technology on the use of retortable pouches, sealed trays, and plastic containers for fresh, pasteurized, frozen and sterilized crabmeat.

4) The Committee recommends that a comprehensive loose-leaf manual in layman's terminology with provision for updating be compiled to include all regulations concerning plant construction and modification: OSHA, EPA, EFD, and other federal and state agencies.

5) Having recognized through our discussion that there are several conflicts between new processing technology and various state and federal regulations, the Committee recommends that a review be made of state and federal regulations for the purpose of bringing their processing regulations in line with modern food technology and to insure that regulatory guidelines do not stifle the technological advancement of the blue crab industry.

6) The Committee strongly recommends that the blue crab technological research be coordinated through a central clearinghouse (i.e., NBCIA) to avoid duplication and poorly conceived projects.

Level B - long term recommendations:

1) The Committee recommends continued study of the mechanization of blue crab processing, including "debacking," picking, continuous processing, etc., both in the private sector as well as the public sector.

2) The Committee agreed that culling practices both at sea and dockside where culling refers to undersize crabs, fish, seaweed, and other undesirable materials, are inadequate in many cases and represent an economic loss as well as a

potential sanitation problem. We, therefore, recommend new technological research on methods of separating live from dead crabs, undersized crabs, fish, etc.

3) The general practices of live crab storage on board the vessel, in the plant and through methods of transportation are inadequate and lead to economic loss and quality problems. The Committee feels that the necessary technology is available and the problem lies in technological transfer.

4) The Committee recognizes that the technology for the treatment of effluent is available but recommends that research be instituted to consider the feasibility of recycling process water and in the use of new concepts of physical/chemical treatment with the goal of minimizing discharge.

5) The Committee recommends that long term research be undertaken on methods to conserve energy. This would include recycling of wasted energy---hot water, steam, boiler stack discharge, ice melt, etc. Also, alternate sources of energy such as solar energy should be investigated for application in the blue crab processing.

6) The Committee recommends the continuation of research in areas of utilization of crab waste as human food, fertilizer, and industrial use (e.g., chitin/chitosan production).

The Committee appreciates the input of the participants and their enthusiastic participation.

QUESTION - J. Clayton Brooks

Did this committee consider the upcoming blue crab GMPs that are being followed-up by FDA? And if so, what do you recommend in the way of industry participation with FDA when this time comes?

ANSWER - Robert J. Learson, NMFS

We did not discuss GMPs per se because they are not a technological problem and would come under the Quality Control and Sanitation Committee. We discussed good manufacturing methods but since our Committee was dealing with technological advancement in the future, we did not discuss GMPs in detail.

COMMENT - Wayne Bough, University of Georgia, Marine Extension Service

I work in waste treatment. I want to give you an idea of what is being done in the waste treatment area, in terms of other industry groups, be they lobby or trade association groups. I support the water re-use aspects, but to start talking about end-of-pipe treatment with zero discharge, I don't support that as a recommendation of this group. Let me tell you about what's being done due to the output of the Eastland Fisheries Commission. At the Washington, D.C. Conference, it came out with a recommendation that seafood effluents be considered for what they are and the uniqueness of them and look at the possibility of allowing the discharge of these effluents back to rivers and oceans. National Canners Association has taken the same point of view. Many groups and scientists, including myself, in asking for revisions in the Water Pollution Control Act Amendments of 1972 are calling for the EPA to consider the uniqueness of seafood effluents. If you want to have zero discharge, you can have it, but

we don't think that it is really necessary. And so, the result of this now, because of all the lobbying, is that one of their proposed amendments 292-500 will require EPA within the course of a year to publish a document justifying whether or not secondary waste treatment is necessary on seafood effluents. I think that if you come out with a kind of position saying, we all are going to work on end-of-pipe treatment, we are looking towards zero discharge, EPA would love to see that. I don't think that position would be consistent with what NCA is doing, so I think you should consider it carefully before adopting that position.

ANSWER - Robert J. Learson, NMFS

This committee was looking at potential areas of technological research. I think every one in the group agreed with zero discharge as the ultimate goal. As long as you have an effluent, you're going to have a problem. We feel that this is a good area for technological research and that's all we are really recommending. We are not recommending that the Industry achieve zero discharge. What we are saying is that this would be a good area for technological research.

COMMENT - Wayne Bough, University of Georgia, Marine Extension Service

As you will see later in one of the outputs of our committee, at least a minority committee report, when we met and wrote this thing up last night, rather than spending money on end-of-pipe treatment, I think our money is better spent on in-plant controls, to reduce the waste in the plant. Then whether you are located in a municipality or whether you are doing your own treatment, or whether you are discharging to the river, if you can remove 60-80%

of the waste in the plant, your money is a whole lot better spent than on consulting engineers building end-of-pipe treatment systems that you have to operate. Your plant people are much more able to handle in-plant kind of things and it is much better for you than acquiring the headache of an end-of-pipe treatment system. So perhaps, I have a different philosophy of waste treatment than most, but I believe that it's a good one for the food industry.

COMMENT - Calvert Tolley, Maryland

The crab industry has one big problem because it has stricter requirements than most industries. But when you consider that a charter boat going out fishing with a party, puts over more scrap than a processing plant you can reach some comparison. This is a hand picking operation we are talking about, but a mechanized operation may be a little different, but still these requirements are very strict. In order to reach a zero discharge, in most cases you chlorinate and there is a great feeling in a lot of the industry that chlorination can cause problems, rather than benefits. And some have a feeling that chlorination stops the proper propagation of crabs and other seafood species. So you should take that into consideration.

COMMENT - Robert J. Learson, NMFS

I just have one further comment. In our recommendations, we also include recycling waste water, reduction of solid waste and potential uses of waste. I do not feel we are that far apart.

QUESTION - Walter Lubkin, Jr., South Carolina

I was unable to attend that committee yesterday, but a problem that all of us should be concerned with is the possibility

of a declining bait situation for crab industry in the near future. And I would like to see some research done on the possibility of some substitute bait that could be used in the advent of the disappearance of bait fish or possibly that you would come up with something that would be as good as what we use now, that would be cheaper than what we use. And I was just wondering if this would follow along with this committee and would be something justifiable?

ANSWER - Robert J. Learson, NMFS

I think I can speak for the Committee. We did not discuss that area, but I think it is a very valid point. This has happened, for example, in the State of Maine where they use ocean perch as the primary bait for lobsters. Over the past couple of winters, the ocean perch catch has been down in the State of Maine, and the cost of ocean perch frames for bait has been high. For this reason, there has been quite a bit of work done on artificial bait in New England; and I think that some of this technology could be transferred for blue crab.

ANSWER - George H. Harrison, Virginia

To go along on this bait situation, our company is a distributor of artificial bait. We have just taken the "line" on and we are still in the experimental phases, but it appears that one of the artificial baits that Bob is talking about for lobsters works rather well with the blue crab. We are still too early in our testing, to give you any really conclusive results as to what it will do in catch record of a pot next to pot with natural bait. It looks at this particular point, like artificial bait will substitute rather well and not really hurt the catch, so you can do some more checking on that.

DEVELOPMENT OF CRAB GEAR AND UNDERUTILIZED SPECIES

Committee Report

Co-Chairpersons

Walter F. Lubkin
Coastal Seafood Company
Beaufort, South Carolina

and

Warren F. Rathjen
National Marine Fisheries Service
Gloucester, Massachusetts

Committee Report Presented by Walter F. Lubkin

I would like to thank the people that participated in our committee yesterday. I thought we had real good participation by everyone in it from the industry standpoint and also from the technological field. Interest was focused on supplemental products to process other than blue crab that would fit with the existed processing facilities. We discussed offshore species that are underutilized, e.g., Johah crab, red crab and rock crab. But after discussing these species and their distributions, up and down the Atlantic and the Gulf coast, we picked out specifically the red crab to be the highest priority crab species because it is distributed along the whole Atlantic coast and the Gulf coast. And we came up with some recommendations pertaining to the red crab listed in order of priority:

1) The committee suggests that industry request funding for research that would assess the stock of red crabs by region to determine the feasibility of using this resource for off season or possibly year round. The same information would be desirable for other species of crab but red crab assessment would have the highest priority.
2) This research would also determine the most feasible gear for each region. We felt that there might possibly be some variation between the Atlantic area and the Gulf for the best fishing gear for red crab.
3) The research should determine the economic feasibility for each region.

4) The research should also produce recommendations for a management plan to best utilize this species. We are concerned that there should be some limitation or management plan obtained before you start fishing on the resource, so that it would be an ongoing thing.

5) We thought that there should be some market research carried out for red crab.

6) We felt that the industry should support grants and low interest loans to individuals or companies with projects that could help introduce a new vessel or processes. In some instances, we felt that it would be beneficial for support dollars to go with an individual or a firm that wanted to step out and do something where there is some risk involved.

7) Blue crab industry supports the changes of law, which has already been mentioned before, in another committee*, but we also thought it was very important that it is necessary to change laws that would prohibit new processing technology that would be possibly involved with other crabs.

*Processory Technology Priority level A - short term recommendation 5. A review be made of state and federal regulations for the purpose of bringing their processing regulations in line with modern technology and to insure that regulatory quidelines do not stifle the technological advancement of the blue crab industry.

These are recommendations by the committee that the industry would support itself, e.g., culling traps or other trap improvement:

1) Industry should support necessary studies to introduce soft shell blue crab shedding operations where they are not utilized. Most of the shedding is done in Maryland, Virginia and North Carolina; there is very little done south of these states. There have been some studies, but not enough to determine whether it is feasible in South Carolina or Georgia, for example. There was research at the S. C. Marine Resources Center, but ran out of funds before it was determined whether the approach was feasible.

2) Also, we will support development of fisheries in the southeast that could be utilized by existing crab processing facilities. We are talking about underutilized species other than crab species that could possibly be used as an off season or supplement producing item for crab plants and/or fishing boats that now exist.

QUESTION - Euclid W. Lewis, Georgia

I believe you referred to grants going to industry to develop equipment or finance it. Were you referring to the harvesting end of it or the processing end, or both?

ANSWER - Walter F. Lubkin, South Carolina

We did not rule out processing innovations but it was primarily aimed at fishing efforts, in case they found a stock of red crabs south of South Carolina. The first fellow that wanted to try to get into the thing, he might not be able to risk that much

capital to try without a grant. You know if he made it, fine; if he didn't, it wouldn't ruin him for life, financially.

COMMENT - Calvert Tolley, NBCIA

One of the things that is needed in the seafood industry is low interest loans. I don't think anybody wants any out right gifts or anything like this, but there are going to be a lot of changes and innovations in the seafood industry. And one of the things that is vitally necessary is low interest loans. This covers all fields, whether it is a new type of gear for red crab, or whether it is mechanization of blue crab plants. But this is one thing we sincerely and very deeply need.

QUALITY CONTROL AND SANITATION

Committee Report

Co-Chairpersons

Euclid W. Lewis
Lewis Crab Factory
Brunswick, Georgia

and

Dr. George J. Flick
Virginia Polytechnic Institute
Food Science and Technology Department
Blacksburg, Virginia

Quality Control and Sanitation

High Priority.

1. Plant sanitation.
2. Crab cooking.
3. Marketing Quality Control.
4. Reduction of waste loads from crab processing.

Medium Priority.

1. Coordination of research and services.
2. The quality control of harvesting and transporting live crabs.
3. Product standardization.
4. Inspection of plants and products.

N. B. recommendations are not listed in any particular priority other than high and medium.

High Priority 1: Plant Sanitation

Problem: The majority of crab processing plants are unable to staff and maintain an adequate quality control program. Assistance is needed to improve sanitation through in-plant surveys of processes, products, and clean-up. Educational programs, workshops, and on-site visits to train and motivate plant supervisors and workers in sanitation practices are needed. Assistance is necessary in interpreting state and federal regulations and in complying with these regulations. An analytical laboratory and an extension specialist are needed to provide the advisory, educational, and analytical assistance.

Recommendation: Request funding for a sanitation assistance project in each state having a blue crab industry to provide for an extension specialist and analytical laboratory.

High Priority 2: Crab Cooking

Problem: Crab plants do not use standardized equipment or processing procedures. No clear studies have been published relating these variables with the sensory and microbiological quality of final products. Educational programs concerning equipment and unit processing operations are needed. These programs should include the motivation and training of cook operators so that a product, using recommended practices and techniques, can be produced.

Recommendation: Develop training programs and material for crab plant managers and cooking operators. Encourage and support research through group or individual action relating cooking procedures and equipment, with sensory and microbiological quality. This research should be coordinated by the National Blue Crab Industry Association. (Note Processing Technology Priority A - short term recommendation - number 2.)

High Priority 3: Marketing Quality Control

Problem: A substantial quantity of fresh and processed crabmeat is sold in retail food stores. A limited amount, however, is marketed through establishments that specialize in the sale of seafood items. Generally, these merchants and others involved in the distribution system lack adequate knowledge concerning the sanitary practices relating to quality and the maintenance of quality. Consumers and educators are also unaware of the type crab products available (particularly pasteurized crabmeat), techniques of handling and storage, and proper preparation methods.

Recommendation: Educational programs for retail seafood establishments be developed and presented by Sea Grant Advisory programs. Also public information materials for consumers and educators be prepared by the National Marine Fisheries Service, National Consumers Education Center, for extension agents and educators. It is also recommended that either seafood home economics extension positions be established in the U.S. or that each state designate home economists having seafood products responsibilities.

High Priority 4: Reduction of Waste Loads from Crab Processing

Problem: Solutions are needed to reduce waste loads and minimize pollution from crab processing plants. Whether discharging into municipal or private treatment systems, reduction of wastes by in-plant controls and by-product recovery are preferred to end-of-pipe treatment systems. Discharge into rivers and estuaries will not be allowed to continue at present levels. Federal effluent guidelines and even more stringent state water quality criteria mandate increasingly stricter treatment requirements for blue crab wastes. In-plant controls, by-product recovery, dry clean-up practices, water recycling and separate handling of concentrated wastes are treatment techniques which are more economical and often more effective than end-of-pipe treatment systems.

Recommendation: Encourage and sponsor research and development of process changes, in-plant controls, and by-product recovery to reduce waste loads from crab processing. This information will be disseminated through publication and workshops to be coordinated by the National Blue Crab Industry Association. (Note Processing Technology Priority B - long term recommendations - number 4 and 6.)

Medium Priority 1: Coordination of Research and Services

Problem: A number of federal and state agencies, trade associations, and private industries sponsor research and publish materials of potential value to the blue crab industry. These programs lack coordination, and may overlap or even go unnoticed.

Recommendation: All proposals for publicly funded programs related to the blue crab industry should be reviewed and coordinated by the National Blue Crab Industry Association. (Note Processing Technology Priority A - short term recommendations - numbers 1 and 6.)

Medium Priority 2: The Quality Control of Harvesting and Transporting Live Crabs

Problem: Federal, state and local health regulatory agencies generally do not have jurisdiction over the handling techniques employed on the crab harvesting vessels and vehicles transporting live crabs. Presently, the only quality control concerning these operations is exercised by crab buyers and processors. It is imperative that standardized operating procedures be developed to regulate both crab harvesting vessels and crab transport vehicles since live crabs are regularly shipped from Gulf to Middle Atlantic states. Crab mortalities during these shipments may increase if warm or hot environmental temperatures exist and/or shipments are prolonged. It is not uncommon to have crabs, in a deteriorative condition, offered to processors.

Recommendation: Develop a code of practice for the harvesting, handling on vessels, and transportation of blue crabs. (Note Processing Technology Priority B - long term recommendation - number 3.)

Medium Priority 3: Product Standardization

Problem: There is no standard nomenclature for styles of crabmeat on the market.

Recommendation: It is recommended that in a coordinated fashion, the Food and Drug Administration, the National Marine Fisheries Service, and the appropriate state agencies having interest and jurisdiction in such matters, take action to resolve the issue. It is further recommended that the National Blue Crab Industry Association take an active role in providing the aforementioned agencies the necessary inputs for product standard development.

Medium Priority 4: Inspection of Plants and Products

Problem: There are a number of federal, state, county, and municipal agencies involved in inspecting blue crab plants and associated products. Consequently, differing inspectional criteria, standards for evaluations and qualifications for inspections result.

Recommendation: Further study should be undertaken to determine the basis upon which current microbiological standards for crabmeat were promulgated and to determine the utility of microbiological criteria as a sole measurement of product quality, as contrasted with compliance to good manufacturing practices and acceptable physical and organoleptic properties. The various agencies involved in plant and product inspections should standardize plant evaluation requirements and criteris for end product evaluation. More frequent regulatory surveillance is needed in blue crab processing plants. The frequency of inspection should be increased to at least once a month by the appropriate state agency having jurisdiction. The increased funding necessary to support the additional human and financial resources for each state agency should be supplied by the federal government. It is

Continuing Recommendation: further recommended that increased inspection of crab products offered for import to the United States be performed by the Food and Drug Administration. Increased in-service training for inspectors of crab plants and products should be given to personnel of allagencies involved in inspecting plants and products. Such training should emphasize the unique critical quality control points associated with blue crab processing as well as inspection requirements of other agencies.

QUESTION - Calvert Tolley, Maryland

I have one question. You made the statement that in the shipment of blue crabs, maybe from the Gulf up to the mid-Atlantic, that not quite 60-80% of the crabs were dead, and they were offered for sale. I assume that you mean that when those crabs arrived at their destination, they were dead and were not sold to consumers. Instead they were picked out of the load and rejected or something of this nature. Is this what you meant? I think it should be clarified.

ANSWER - Dr. George J. Flick, VPI

We did not mean that these crabs were sold. It has been observed that crab mortalities during these shipments will approach 60-80% during the summer and it is not uncommon to have crabs of deteriorative condition offered for sale. What we are referring to, was that when blue crabs shipped from the south to the north would arrive at your plant you would either have to refuse them or, if you bought them, have to dump them.

QUESTION - George H. Harrison, Virginia

Dr. Flick and Euclid, I wish you would elucidate in your report about the inspection of imported crabmeat that not only is blue crab meat imported but snow crab, tanner crab, king crab, etc. We don't want to lose that thought.

COMMENT - Calvert Tolley, Maryland

You know that there are increasing amounts of crabmeat imported into this country and there are so many different species. One of the things that should be done is that a standard of identity of each species should be required on the can. I was reading in the

Frozen Food Age that 83% of ground fish, fillets and steaks were imported into this country. And that's a lot. We don't know how much crabmeat is being imported but these shipments are being increased all the time.

QUESTION - Robert Brown, Wadmalaw Island, South Carolina

What are some possible alternatives of getting crabs from point A to mid-Atlantic, or wherever it is going to be used, in the condition that its going to be usable?

ANSWER - Euclid W. Lewis, Georgia

There have been some studies done on this by Burt Tinker and Bob Learson. We say that more research is needed to help get crabs from point A to point B and research needed on the local conditions, where they are handled each day. You don't transport crabs too far in June, July and August. If you do, you are in trouble. I don't think they are going to find an answer to that problem. You have a problem at your local plant today if crabs stay out in the sun and are handled improperly.

COMMENT - Calvert Tolley, Maryland

The care of this crab really starts from the time the crabber dumps his pots.

COMMENT - Euclid Lewis

The report of receipt of 60-80% dead crabs came in from a processor. I believe that he was also including culled crabs that had been improperly handled in that days work, but I don't know this for a fact. Of course, we know it happens in transportation too. Normally in hot weather the fishermen take care of the big jimmies but the culls are dead when they go to the processor.

COMMENT - Dr. Terry C. Titus, Clemson University

I would like to comment on, or throw out for your consideration the term "zero discharge " brought up in the second presentation on Processing Technology.

That is flag term. I think that the Quality Control and Sanitation Committee addressed this, but they did not use the term "zero discharge." I suggest seriously reconsidering leaving out of the Processing Technology report, the term "zero discharge" when discussing the application or transfer of technology. This is based on the point that we have many, many wise owls, so to speak in Washington, D.C. and they look and read a lot of things. We know from the past that the NCA proposed self-governing regulations to update their canning industry, e.g., controls on supervisors to operate retorts and container closures. In 1973, that became what we now know as GMP, Section 128-B, requiring certification. We have some seafood canners here and they are very familiar with it. There is on the books right now, a similar proposal put out by the Pickle Packers Association, which we anticipate will become another set of GMP requiring certification. What I am saying, and I don't mean to be rambling on is when you recommend "zero discharge," that could be saying to a regulatory agency that you absolutely want it, when there may be practical alternatives. I don't think it would be good to leave that term in the report. That's all I have to say and I know you'll do what you want.

COMMENT - Calvert Tolley, Maryland

Thank you for saying it like it is, zero is very little.

APPENDICES

BLUE CRAB LAWS AND REGULATIONS OF THE SOUTH ATLANTIC AND GULF STATES IN 1977

Charles M. Bearden

SOUTH CAROLINA MARINE RESOURCES CENTER
Charleston, South Carolina

BLUE CRAB LAWS AND REGULATIONS, SOUTH ATLANTIC AND GULF STATES IN 1977

State laws and regulations pertaining to the blue crab (*Callinectes sapidus*) fishery along the Atlantic and Gulf coasts of the U.S. are based upon past management experience and biological knowledge, as well as social and economic considerations. Although considerable variation exists among the respective States, current laws and regulations are generally aimed at providing for the protection of spawning females and undersized crabs, and controlling fishing effort through restrictions on gear, fishing areas, catch and season.

Attitudes concerning the conservation value of various blue crab laws and regulations also differ throughout the Atlantic and Gulf Coast states. Some states provide for strict protection of egg bearing female crabs or "sponge" crabs, while others provide for limited protection of such crabs through the establishment of closed areas or sanctuaries. Most states have a minimum legal size for hard blue crabs (usually five inches, carapace width), although in some cases, the possession of a percentage of undersized crabs or tolerance limit is allowed. Restrictions on gear (trawls, dredges, scrapes, pounds, pots, etc.) and legal seasons and areas for the use of such gear also differs from state to state. Catch limits or quotas are not imposed by most States, although in Virginia, daily quotas may be set on winter dredge boats.

The effectiveness of many of these laws and regulations is questionable, since the impact of fishing on the blue crab resource is still not fully understood. For the most part, fishery biologists are of the opinion that at current and past levels of fishing effort, spawning stocks

have been adequate to maintain blue crab population sizes, and that the fluctuations in abundance are caused by natural factors such as temperature and salinity extremes, food supply, predation, disease and the like. The biological or conservation value of restrictions on size, egg bearing females, fishing areas, etc., is therefore, a subject of some controversy.

Although opinions differ as to the biological significance of many current laws and regulations insofar as the blue crab resource is concerned, there is general agreement that some of these measures can provide economic and other benefits. Catch limits on winter dredge boats in Virginia, for example, are felt to help producers avoid oversupply at a time when labor for picking is scarce. Minimum size limits, and restrictions on taking egg bearing females (under some circumstances) can be of value to the processor from the standpoint of meat yield, etc. Mesh size restrictions on crab trawls can allow for the escape of shrimp and undersized fish, etc.

Most coastal states require licenses for commercial blue crab fishermen, dealers or processors, and taxes on the catch. Licenses may be on the individual fisherman or on the vessel used. Taxes levied by weight, volume or in some cases, by number of crabs (soft shell). Provisions for the taking of blue crabs for personal consumption without a license requirement are included in most state laws and regulations.

Requirements for the identification of crab fishermen, vessels and gear are varied from state to state along the Atlantic and Gulf coasts. Some states have little or no requirements along these lines, while others, such as Florida, have very stringent regulations for the identification of the individual crab fishermen, vessels and pot buoys.

Some major problem areas with respect to blue crab management regulations are felt to be: the lack of regulatory flexibility and responsiveness by state fishery management units; overly restrictive laws and regulations; and lack of adequate law enforcement (in some instances). Gear theft, lost or derelict crab pots, lack of gear selectivity for sublegal crabs; and conflicts between crab fishermen, other commercial fishermen and recreational boaters are also considered by many to be serious problems.

The following is a summary and comparison of current laws and regulations in the major crab producing states along the Atlantic and Gulf coasts.

I. MARYLAND

A. Administrative Organization - Maryland Department of Natural Resources.

B. Licenses and Taxes

1. Commercial fishermen - $5.25 (Scrape, dip net, net, trotline)
2. Packer, shipper or processor - $10.00/person
3. Soft crab buyer, seller, shipper - $5.00/person
4. Crab pot (general) - $25.00. / Crab pot (Worchester Co.) - $37.50.
5. Collapsible crab trap (over 5) - $5.00
6. Wire bank trap - $2.50
7. Channel pound - $5.00
8. General license requirements for crab pots.

(a) A person who owns private property along the shore may set two unbuoyed crab pots to catch crabs for non-commercial purposes without obtaining a license. The crab pots shall be set in front of his property and within 100 yards of the shore. The crab pots shall be attached by a line to the property or a privately owned pier or dock.

(b) A resident of the State may not catch crabs for commercial purposes with crab pots unless he first obtains a crab pot license from the Department.

(c) A general crab pot license may not set more than 100 crab pots per license. The crab pots may not be set in the waters of Chincoteague Bay, Sinepuxent Bay, Isle of Wight Bay, Assawoman Bay, and their tributaries in Worcester County.

(d) Each pot individually set shall be marked with a buoy that is easily visible on the surface. Each string of pots shall be

marked at each end with a buoy that is easily visible on the surface. Each buoy shall be clearly marked with the license number of the licensee in letters at least two inches high, and, if the buoy is attached to a string of crab pots, with the number of pots in the string. In addition, the Department may require individual numbered markers supplied by the Department to be attached to every buoy.

(e) A person may not fish a crab pot licensed to another person.

9. Special license requirements for crab pots.

(a) Applies only to the waters of Chincoteague Bay, Sinepuxent Bay, Isle of Wight Bay, Assawoman Bay, and their tributaries in Worcester County. Differs from general license requirements in license fee ($37.50), maximum number of pots (150) and identification requirements for fishermen and pots. Provides that licensee must submit an affidavit, countersigned by a law enforcement officer, certifying the loss, theft or defacement of crab pot identification tags issued in order to obtain replacement tags. Also provides that identification tags may not be taken or destroyed and that a person may not use another person's identification tag to mark his pots.

C. Laws and Regulations

1. General Statutes

S. 4-808. A person may not catch hard crabs in any waters in the State, between January 1 and April 1.

S. 4-309(a) Minimum size limits for hard crabs - five inches, spine to spine (tolerance limit of four hard crabs per bushel or ten per barrel allowed). No peelers less than three inches across the shell or any soft crabs less than three and one-half inches may be caught or in possession.

(b) Worcester County - No fat crabs, green crabs, snot crabs, or buckram crabs may be caught, in possession, etc.

(c) Green crabs less than five inches or any buckram crab unlawful to catch or possess.

2. Departmental Regulations

Protection of female crabs

A person may not possess, transport, or pack a female crab from which the egg pouch or bunion has been removed or an egg-bearing female crab known as the sponge crab which was taken from the waters of the State.

A person in the business of transporting crabs may possess and transport, and a licensed crab packer may possess, transport, and pack, a female crab from which the egg pouch or bunion has been removed or an egg-bearing female known as the sponge crab, if:

(i) The crab was taken from waters other than those of the State; and

(ii) The person possessing the crab has an executed invoice showing its point of origin, and exhibits the invoice upon demand to any Natural Resources Police Officer.

Restrictions on Fishing Methods and Gear

(a) Lawful methods. A person may catch crabs in the tidal waters of Maryland only by the methods given in this regulation.

(b) Scrapes and dredges. A person may catch crabs by scrape or dredge, subject to the following limitations.

Structural details

The total weight of a scrape or a dredge may not exceed 45 pounds;

The width of the bar of a scrape or a dredge may not exceed 48 inches;

A scrape or dredge may not have teeth or projections of any kind;

A scrape or dredge may not have any flat plate attached to the scraping bar, which is the bar that touches the bottom;

A scrape or dredge may not have any diver, chain or other device attached to it or the staking line to hold the scrape or dredge to the bottom.

Number of dredges or scrapes permitted. A person may not use more than two scrapes or dredges in any vessel that is propelled by an engine.

Time for catching crabs. A person may not catch crabs from October 31 to April 14, inclusive. From April 15 to October 30, inclusive, a person may not catch crabs earlier than one hour before sunrise or later than sunset.

(c) Dipnets. A person may catch crabs with any type of dipnet.

(d) Trotlines. A person may catch crabs with a trotline, subject to the following limitations.

A person may not place a trotline in the water so that it intersects another trotline already placed in the water.

A person aboard a vessel from which one or more trotlines with a combined length exceeding 100 yards are being fished shall be deemed to be catching crabs for commercial purposes.

A non-resident of Maryland may not catch crabs with one or more trotlines having a combined length exceeding 100 yards;

The length of a trotline is measured along the bait line.

(e) Handlines. A person may catch crabs with any type of handline.

(f) Seines. A person may catch crabs with seines, subject to the following limitations.

The length of a seine may not exceed 50 feet.

A person shall haul up a seine in the water, not on shore.

(g) Hand-drawn net scrapes. A person may catch crabs with a hand drawn net scrape only in the waters of Queen Anne's County and Kent County.

(h) Wire bank traps and channel pounds. A person may catch crabs with a wire bank trap or channel pound subject to the following limiations.

Definitions

"Bank trap" means an enclosure no more than four feet long and no more than four feet wide, with a single row of hedging no more than 75 feet in length;

"Channel pound" means an enclosure no more than eight feet long and no more than four feet wide, with two rows of hedging, each no longer than 100 feet.

Structural Requirements

A row of hedging attached to any wire bank trap or channel pound may not exceed more than one-third the distance across the body of water in which the bank trap or channel pound is placed.

To permit air-breathing animals to survive, each wire bank trap and channel pound shall be constructed and placed in the water to provide at least 12 inches of air space between the surface of the water at mean high tide and the top of the trap or pound.

A marker shall be attached to each wire bank trap and channel pound which clearly identifies the name and license number of the owner in letter at least two inches high.

Legal Fishing Areas

A person may place a wire bank trap or channel pound only in waters designated by departmental regulations.

A person may not place a wire bank trap or channel pound nearer than 100 yards to another trap or pound.

A person shall remove a wire bank trap or channel pound from the water within 30 days after he had stopped fishing the bank or pound, or by October 1, whichever comes first.

(i) Collapsible crab traps. A person may catch crabs with a collapsible crab trap, subject to the following limitations:

A "Collapsible crab trap" means a manually operated portable device having a flat bottom no more than one square foot, and no more than four articulated sides, each with an area no more than one square foot. The trap shall be designed so that failure to apply manually exerted tension on the closing mechanism allows the crabs to escape. A holder of a license to catch crabs with collapsible crab traps may not fish more than 50 traps. The Department may not issue more than one license to a person. Each collapsible crab trap which is not attached to a pier, wharf, or boat shall be marked with a buoy bearing the name of the owner.

(j) Crab pots. A person may catch crabs with crab pots, subject to these following limitations:

The sides of a crab pot may not be more than 24 inches long. A crab pot shall be constructed of wire having a mesh not less than one inch measuring along its longest axis when the wire is unstretched.

Areas where crab pots may be set. Crab pots may be set in the waters of the Chesapeake Bay, Pocomoke and Tangier Sounds. All other bays, sounds, tributaries, etc. are excluded. A detailed description of areas open to crab pot fishing is provided in Maryland regulations.

No crab pots may be set in water less than four feet deep at low tide.

No crab pot may be set within 100 feet of any aid to navigation or within 100 feet of the channel of St. Catherine Sound.

From May 1 to September 30, inclusive, a person may not set a crab pot within 200 yards of a public bathing beach running not more than 100 yards along the shore which is plainly marked as such.

D. Unlicensed Daily Catch Limit

A person who does not possess a license to catch crabs may catch not more than one bushel of crabs on any day.

II. VIRGINIA

A. Administrative Organization. Va. Marine Resources Commission

B. Licenses and Taxes.

(1) Commercial Fisheries

Dip nets, ordinary trotlines, hand rakes - $3.75
Patent trotlines - $15.75
Crab pot boat operator - $15.00
Crab pot boat operator and assistants -$25.00
Power-lifted dredge or scrape boat - $30.00
Crab trap or pound -$3.00 per trap
Hand Scrape - $8.25

(2) Crab purchaser

Business License - $25.00
Vessel or Vehicle License - $15.00

C. Laws and Regulations

1. General Statutes

Size limit on crabs

Unlawful to catch or possess hard crabs less than five inches across the shell. Tolerance limit of 10% allowed. Adult female crabs, peeler crabs and soft crabs are exempt from these limits.

Protection of female crabs

Unlawful to catch crabs within a designated sanctuary area near the mouth of Chesapeake Bay between May 15 to September 15.

Restrictions on fishing, methods, gear, etc.

(a) Scrapes or dredges - unlawful for catching crabs between April 1 and December 1. Commission may open season 15 days earlier than December 1, or extend season by 15 days beyond April 1.

No scrapes or dredges allowed in any rivers, inlets or creeks except on ocean side of Accomack and Northampton counties. (Does not apply to taking of soft crabs or peelers).

(b) Crab traps or pounds. Unlawful to place or maintain any crab traps or pounds in a navigable channel marked with official U.S. navigation aids or within 100 yards of any other crab trap or crab pound. Traps, leads, poles and gear shall be completely removed from their locations no later than December 1.

(c) Crab pots. (a) It is unlawful to place or maintain any crab pots in navigable channel marked with official U.S. navigation aids.

(b) Identification-any person owning or using crab pots shall display his license number on the flat or stake attached to each pot, in legible letters of not less than one inch in height.

(d) Catch limits or quotas. The Commission may limit the amount of crabs taken by any boat in any done day whenever it determines such regulation is in the interest of conservation and the crabbing industry. (Current limitation on crab dredger catch is 25 barrels a day per boat).

(e) Taking crabs on Sunday or at night between one hour after sunset and one hour before sunrise in any waters in the State is unlawful. Does not apply to peeler pounds or floats or peeler crabs taken from pots (5% tolerance limit of hard crabs allowed).

(f) Crabs for household use-any person may take up to one bushel of crabs per day by dip net or one single crab pot for personal use without obtaining a license.

III. NORTH CAROLINA

A. Administrative Organization - N.C. Dept. of Natural Resources and Community Development.

B. Licenses and Taxes

1. Commercial fishermen - N/A
2. Commercial fishing vessel
   Vessels without motors - $1.00
   Vessels with motors, less than 18' - $3.00
   Vessels with motors, 18-26' - $50/ft.
   Vessels with motors, over 26' - $75/ft
   (Non-resident vessel (any length) $2.00
3. Unprocessed crab dealer - $5.00
4. Crab processor 0 $10.00
5. Taxes - Soft crabs - $.02/dozen
   Hard crabs - $.10/100 pounds

C. Laws and Regulations

1. Departmental regulations

Minimum size limits - unlawful to take, buy or possess, any hard

crabs measuring less than five inches across shell, spike to spike, except peelers (10% tolerance limit in any quantity of crabs is allowed).

Regulations on taking female crabs - no specific regulations

Restrictions on fishing methods, gear, etc.

(a) Scrapes or dredges - unlawful to take crabs by such devices between April 1 and November 30.

(b) Trawls - any crab trawl must have a mesh length of no less than three inches. Trawls used for taking peeler crabs must have a mesh length of no less than two inches and cannot be more than 25 ft. in corkline length. (Corkline length provisions not applicable in Dare and Currituck counties). No trawling allowed in permanently closed nursery areas.

No crab trawling is allowed between 8:00 p.m. on Saturday and 8:00 P.M. on the following Sunday.

(c) Crab pots - no crab pots may be set in any marked navigation channel. Director may designate open areas for crab pot fishing during May 1 through November 1 of each year.

(d) Crab spawning sanctuaries - no crabbing with commercial gear allowed during April 1 - August 31 in sanctuary areas (Oregon, Hatteras, Ocracoke, Drum and Barden Inlets).

Crabbing for personal use. Any individual may use crab pots, at any time for personal consumption, provided not more than one pot per person is used and no boat is used to aid in the taking.

IV. SOUTH CAROLINA

A. Administrative Organization - S.C. Wildlife and Marine Resources Department, Division of Marine Resources

B. Licenses and Taxes

1. Commercial fishermen - $5.00 (vessel captain)
2. Crab pots - Resident $10.00/100/ Non-resident $50.00/100
3. Crab trawl vessel - Resident - $75.00/ Non-resident $200.00
4. Crab boat (other than trawl)- 18 ft. and under - $2.50
5. Crab canning - $100.00
   Crab processor - $25.00
   Crab buyer/shipper - $20.00
6. Crab trap net - $3.00
7. Taxes on crabs - $.10/100 lbs.
8. License registration number must be displayed on crab trawlers in 2 in. x 18 in. numerals.

C. Laws and Regulations

1. General Statutes

Protection of female crabs - unlawful to catch, hold or possess any female crabs bearing visible eggs or any female crab from which the egg pouch has been removed. Does not apply to importing sponge crabs from other States under permit.

Minimum size of blue crabs - unlawful to catch, destroy, hold or possess any blue crab of a smaller size than five inches across the shell from tip to tip. Does not apply to crabs in floats or breeder sanctuaries in the process of shedding.

Restrictions on fishing methods and gear - (a) crab trawls - unlawful to have on board any boat trawling for crabs a net having a mesh size of less than four inches (stretch mesh).

Lawful to trawl for crabs in legal offshore areas and sounds, bays during December, January, February and March. (Commission may regulate seasons and areas for crab trawling as it sees fit, however).

Trawling for crabs prohibited near shoreline of Horry County, and off ocean beaches of Hilton Head and Hunting Islands during May 15 - September 30.

Shrimp trawlers may retain and market crabs taken incidentally during June 1 - November 30.

(b) Crab pots - unlawful in Chechessee Creek, except for personal use, May 1 - October 1.

Unlawful in Pawleys Island and Midway Creeks, Georgetown County except for personal use.

Identification cards required of crab pot helpers or assistants.

Crabbing for personal use- no license required for crabbing for personal use with hand lines, dip nets, drop nets or two crab pots per person.

2. Departmental Regulations

Operation of Crab Pots

(a) Every crab pot float or buoy shall be marked with number issued by Division.

(b) No crab traps may be placed within 100 yards of a public boat ramp.

(c) No crab pots may be set so as to be left dry at low water.

(d) No glass bottles, jugs or metal cans may be used as floats or crab pots.

(e) No crab pots shall be abandoned or left unattended for more than five days.

V. GEORGIA

A. Administrative Organization - Ga. Department of Natural Resources, Coastal Fisheries Division.

B. Licenses and Taxes -

1. Commercial Fishermen : Resident boat operator - $2.00
Non-resident boat operator - $5,00

2. Commercial Trawler: 18 ft. and under - $25.00
over 18 ft. - $25.00 + $.50/ft. over 18 ft.

3. Boats (other than trawler): Under 18 ft. - $5.00
Over 18 ft. - $5.00+$.50/ft.over 18 ft.
(Non-residents are charged an additional $25.00 per vessel plus vessel's home state non-resident fee in excess of $25.00)

4. Soft shell crab dealers license - $10.00

5. Tags with identification numbers furnished by Department required on all commercial fishing vessels.

C. Laws and Regulations

1. General Statutes

Taking of crabs under certain conditions prohibited, taking of peelers and soft-shell crabs.

(a) It shall be unlawful for any person to take or possess in this state the following:

Spawning female crabs during the months of May or June.

Any crab measuring less than five inches (5") from spike to spike across the back; provided, however, that any person may take or possess the following:

Peelers measuring at least three inches from spike to spike across the back; and

Soft-shell crabs measuring at least three inches from spike to spike across the back.

Any crabs taken or possessed in violation of this subsection may not be intentially killed and must be returned to a suitable habitat as soon as practicable.

(b) It shall be unlawful for any person taking peelers or soft shell crabs to sell such crabs to any person other than a soft-shell crab dealer.

(c) It shall be unlawful for any person other than a licensed commercial fisherman or a soft-shell crab dealer to possess peelers in commercial quantities.

(d) It shall be unlawful for any person other than a soft-shell crab dealer to operate a shedding facility.

(e) It shall be unlawful for a soft-shell crab dealer to purchase peelers from any person other than a licensed commercial fisherman.

Restrictions on fishing methods, gear, etc.

(a) Crabs may be taken with power-drawn nets of four and one-half (4½) inch stretched mesh from any waters outside, on the seaward side, of the sounds at any time during the year, or from the waters of Cumberland, St. Simons, Sapelo, St. Andrews, Wassaw and Ossabaw Sounds during the months of January, February and March, when the Board has determined that taking of crabs within said waters will not be detrimental to the conservation of crabs or shrimp. Possession of any net with mesh smaller than that provided herin while taking crabs shall be prima facie evidence of the violation of this Section.

Commercial crab catching near property line or in channel of stream prohibited. It shall be unlawful for any person to catch crabs for commercial purposes within one hundred feet (100') of the property line of any other person or any extensions of such person's dock. It shall be also unlawful to place or set crab traps in the channel of a stream.

IV. FLORIDA

A. Administrative Organization - Florida Department of Natural Resources, Division of Marine Resources.

B. License and Taxes

1. Commercial fishermen: Alien or non-resident - $25.00
2. Processor or Dealer: Resident wholesale - $100.00
   Non-resident wholesale - $150.00
   Resident retail -$10.00
   Non-resident retail - $25.00
3. Crab pot - permit required.

C. Laws and Regulations

1. General Statutes

Minimum size limits - none, except Citrus County 5 inches, point to point of shell.

Protection of female crabs - unlawful to sell or offer for sale, any egg bearing blue crabs.

Restrictions on fishing methods, gear, etc.

(a) Crab pots - no person, firm or corporation shall transport on the waters, fish with, or cause to be fished with, set, or place any trap designed for taking blue crabs, unless such trap has current state permit number permanently attached to the buoy and said trap shall have a two (2) inch square opening on one of the sides. The permit number shall be affixed in legible figures at least one inch high on each buoy used. The blue crab permit shall be on board the boat, and both the permit and the crabs shall be subject to inspection at all times. Only one permit shall be issued for each boat by the Department upon receipt of an application on forms prescribed by it. This subsection shall not apply to any individual fishing with no more than five traps.

A buoy or a time release buoy shall be attached to each trap, or at each end of a weighted trotline, and shall be of sufficient strength and buoyancy to float and of such color, hue and brilliancy to be easily distinguished, seen or located. Such color and permit number shall also be permanently and conspiciously displayed on the boat used for setting and collecting said traps and buoys, in the manner described by the Division of Law Enforcement, so as to be readily identifiable from the air and water. This subsection shall not apply to an individual fishing with no more than five traps.

It is unlawful for any person willfully to molest any traps, lines or buoys, as defined herein, belonging to another without permission of the permit holder.

Traps may be worked during daylight hours only, and the pulling of traps from one hour after official sunset until one hour before official sunrise is prohibited.

2. Department Regulations

Vessel and crab pot buoy identification

(a) Any vessel engaged in blue crab fishing pursuant to the provisions of Chapter 370.135, Florida Statutes, shall at all times while engaged in blue crab activities have the buoy design of its permitted buoy painted on a float piece of permanent material permanently affixed to the uppermost structural portion of the vessel and displayed horizontally with the painted design up. If the vessel is of opened design (example:

skiff boat), one seat shall be painted with buoy assigned color with permit numbers painted thereon in contrasting color. Numbers are to be 10" in height.

(b) The buoy design placard will be reproduced on a 20" in diameter circle outlined in a constrasting color on the above mentioned flat piece of permanent material, together with the permit numbers permanently affixed under the 20" circle in numberals of not less than 10" in height.

(c) Nothing shall be placed on or above said placard as it is displayed on the vessel.

(d) Any person, firm or corporation violating this rule shall be punished as provided by law.

VII. MISSISSIPPI

A. Administrative Organization - Mississippi Marine Conservation Commission

B. Licenses and Taxes

(1) Crab vessel - $2.00
(2) Wholesale Dealer - $100.00

C. Laws and Regulations

1. General Statutes - none, except above licenses

2. Departmental Regulations

Fishing for sponge crabs is prohibited in an area described as follows:

"South of the Intracoastal Waterway, commencing at the Alabama-Mississippi boundary, and running west to the Gulfport-Ship Island Channel". Any persons taking said sponge crabs by net, trap or other means shall immediately return same to the water.

All crabs caught in trawls regardless of the location shall be immediately returned to the water unless the boat operating the said trawl shall have a valid license as provided in Section 49-15-29 (d) of the Mississippi Code of 1972.

Any person fishing for crabs by means of crab traps or crab pots shall mark each said trap or pot with the corresponding license number set out on the pot or trap in such a manner to be clearly visible to an inspecting officer.

VIII. ALABAMA

A. Administrative Organization- Alabama Department of Conservation and Natural Resources, Marine Resources Division.

B. Licenses and Taxes

Seafood packer, canner or processor - $50.00

C. Laws and Regulations

1. General Statute - none, except above license

2. Departmental Regulations

(a) Minimum size of blue crab - shall not measure less than four inches from widest point of upper shell, possession of crabs of less size prohibited.

IX. LOUISIANA

A. Administrative Organization - Louisiana Dept. Fish and Wildlife

B. Licenses and Taxes

(1) Commercial crab pots (100 traps): Resident - $50.00
Non-resident - $500.00
(Additional traps - $25.00/ 100 traps)
Limit of 300 traps.

C. Laws and Regulations

1. General Statutes

Minimum size of Blue Crabs - five inches in width as measured from point to point of the upper shell. (Soft shell crabs - 4½")

Protection of Female Crabs- no person shall keep or sell adult female crabs in the berry stage, and such crabs shall be returned immediately to the water.

Restriction on gear and fishing methods

(a) Crab trawls - illegal

(b) Crab pots - each crab trap must be marked with a numbered tag issued by the Commission.

A recreational crab fisherman may use up to five traps without obtaining a license, and may use a maximum of ten traps provided that he first obtains a recreational license and tags therefore at a cost of two dollars.

Use of untagged traps shall be unlawful. Each trap shall be attached to a visible float of six inches minimum diameter, except that in Lake Maurepas and Lake Pontchartrain there shall be a three inch minimum diameter.

Crab traps which are not longer serviceable or in use shall be removed from the water by the owner thereof. No person shall intentionally damage or destroy tagged crab traps or the floats or lines attached thereto, or remove the contents thereof, other than the licensee or his agent.

No crab traps shall be set in navigable channels or entrances to streams.

Commercial dealers, distributors or processors shall not purchase crabs from anyone not licensed.

IX. TEXAS

A. Administrative Organization - Texas Park and Wildlife Dept., Coastal Fisheries Division

B. Licenses and Texas

1. Commercial fisherman - $10.00
2. Wholesale fish dealer (business) - $250.00
3. Wholesale fish dealer (truck) - $125.00
4. Fish boat - $6.00
5. Seine net - $1.00

C. Laws and Regulations

Minimum size of blue crab - none

Protection of female crabs - unlawful to take egg bearing female crabs.

Restrictions on fishing methods, gears, etc.

(a) Crab trawls - must have webbing size of not less than five inches stretch mesh. Crabs taken during legal shrimping operations may be retained.

(b) Crab pots (traps) - must be marked with floating, visible buoy not less than 10 inches in diameter, and such buoys must float 10 inches above the water line. If plastic bottles are used, they must not be less than one gallon size.

(c) Crabs may be taken in any number and at any time by dip net, set line, hand line, gig, trotline, crab pot and 20 foot seine in Aransus, Brazoria, Cameron, Jackson, Jefferson, Kennedy, Kleberg, Matagorda, Nueces, Orange, Refugio and Willacy counties.

(d) Crabs may be taken only by crab lines, hooks or lines, trotlines and no more than three crab pots per person in Burnett Bay, Crystal Bay and Black Duck Bay in Harris County.

NATIONAL BLUE CRAB INDUSTRY WORKSHOP REGISTRATION

September, 10-11, 1978
South Carolina Marine Resources Center
Charleston, South Carolina

AMASON, Jack L.
Sea Garden Seafoods, Inc.
P.O. Box 87
Valona, GA 31332
(912) 832-4437

ANDERSON, Roger
Gulf & South Atlantic Fisheries
Development Foundation, Inc.
Lincoln Center, Suite 571
Tampa, FL 33609
(813) 870-3390

BEARDEN, Charles M.
S.C. Wildlife & Marine
Resources Dept.
P.O. Box 12559
Charleston, SC 29412
(803) 795-6350

BEEBE, Stan
Program Officer
Coastal Plains Regional Commission
215 East Bay St.
Charleston, SC 29401
(803) 723-5321

BOUGH, Wayne A.
Marine Extension Service
University of Georgia
P.O. Box 517, South Yards
Brunswick, GA 31520
(912) 264-7268

BRADLEY, Kit
Tidewater Seafood
Newport News, VA 23607
(804) 247-0123

BROOKS, J. Clayton
The J.M. Clayton Co.
Box 321
Cambridge, MD 21613
(301) 228-1661

BUNDY, Mark M.
Maryland Dept. of Natural Resources
Tawes State Office Bldg.
Annapolis, MD 21401

BURRELL, Vic.
S..C Wildlife & Marine
Resources Dept.
P.O. Box 12559
Charleston, SC 29412
(803) 795-6350

CAROON, L. Reginald
Caroon Bros. Seafood
Box 106
Lowland, NC 28552
(919)745-3286

CAROON, M.N.
Riverview Crab Co.
Rt. #1, Box 352
Oriental, NC
(919) 249-2762

COLE, Richard W.
Delaware Division of Fish &
Wildlife
Tatnall Bldg.
Dover, DE 19901
(301) 678-4431

CONLEY, Weston F., Jr.
RCV Seafood Corp.
Morattico, VA 22523
(804) 462-2600

CUMMINS, Robert, Jr.
National Marine Fisheries Service
P.O. Drawer 1207
Pascagoula, MS 29567
(601) 762-4591

CUPKA, David
S.C. Wildlife & Marine Resources
Dept.
P.O. Box 12559
Charleston, SC 29412
(803) 795-6350

DAFLER, Richard J.
Clemson University
Seafood Extension
223 P&AS Bldg.
Clemson, SC 29631
(803) 656-3399

DECKER, Jerry
Key Electro Sonic
4733 Huntsman Blvd
Decatur, GA 30034
(404) 987-0922

DEWITT, Wiley
P.O. Box 365
Crescent, GA 31304
(912)832-5135

DUKES, J. Donovan
Dept. of Health &
Environmental Control
1000 Aire Park Rd.
Charleston Hgts., SC 29405
(803) 554-5533

DUKET, Pamela
Dept. of Natural Resources
580 Taylor Ave
Tawes State Office Bldg.
Annapolis, MD 21401
(301) 269-3365

EVERHART, Buddy
S.C. Dept. of Health &
Environmental Control
Sullivans Island, SC 29482
(803) 883-3877

FLICK, George J.
Virginia Polytechnic Institute
& State University
Food Science & Technology Dept.
Blacksburg, VA 24061
(703) 951-6965

GATES,Keith W.
N.C. State University
Seafood Laboratory
P.O. Box 51
Morehead City, NC 28557
(919) 726-7341

HARRIS, Robert E. Jr.
Virginia Institute of Marine Science
Gloucester Point, VA 23062
(804) 642-2111

HARRISON, George
Tidewater Seafood Inc.
817 Jefferson Ave
Newport News, VA 23607
(804) 247-0123

HAUSE, J. Luke
S.C. Dept. of Health &
Environmental Control
2600 Bull St.
Columbia, SC 29201
(803) 758-5551

HINES, Robert James
Coastal Plains Marine Center
1518 Harbour Dr.
Wilmington, NC 28401
(919) 791-6432

JOHNSON, Josse
Georgia Dept. of Agriculture
Savannah, GA 31402
(912) 964-6351

KINSLOW, M.D.
U.S. Food & Drug Administration
880 West Peachtree, St., N.W.
Altanta, GA 30309
(404) 881-4265

LACEY, William H., III
S.C. Wildlife & Marine
Resources Dept.
P.O. Box 12559
Charleston, SC 29412
(803) 795-6350

LAURIE, Pete
S.C. Wildlife & Marine
Resources Dept.
P.O. Box 12559
Charleston, SC 29412
(803) 795-6350

LEARSON, Robert J.
National Marine Fisheries Service
Emerson Ave
Gloucester, MA 01930
(617) 281-3600

LEEDY, Michael R.
United Shellfish Co., Inc.
P.O. Box 146
Grasonville, MD 21638
(301) 827-8171

LEWIS, Euclid W.
Lewis Crab Factory, Inc.
P.O. Drawer L
909 Bay St.
Brunswick, GA 31520
(912) 265-0820

LOFTON, Sandra R.
Gulf Coast Research Lab.
East Beach
Ocean Springs, MS 29564
(601) 875-2244

LONERGAN, Daniel J.
Virginia Marine Resources Commission
2401 West Ave
P.O. Box 756
Newport News, VA 23607
(804) 245-2811

LUBKIN, Walter F., Jr.
Coastal Seafood Co., Inc.
P.O. Box 628
Beaufort, SC 29902
(803) 838-2831

MACY, James B., Jr.
Key Electrosonic Milton-Freewater ORE
107 River Dr.
Morehead City, NC 28557
(919) 726-5669

MARLOWE, W.H.
S.C. Crab Co., Inc.
McClellanville, SC 29458
(803) 887-3544

MOODY, Michael W.
Louisiana Cooperative Extension
Service
Room 202-D, Knapp Hall
Louisiana State University
Baton Rouge, LA 70803
(504) 388-2180

MOORE, Charles
S.C. Wildlife & Marine
Resources Center
P.O. Box 12559
Charleston, SC 29512
(803) 795-6350

MUNN, Norton
M & M Seafood Co.
Rt. #1, Box 198
Awendaw, SC 29429
(803) 928-3578

NEILSON, Lance
Coastal Seafood
Isle of Palms, SC 29451
(803)884-3723

OUTTEN, William A.
Department of Natural
Resources
Tawes State Office Bldg.
580 Taylor Ave
Annapolis, MD 21401
(301) 269-3365

PAPARELLA, Michael W.
University of Maryland
Marine Products Laboratory
Crisfield, MD 21817
(301) 968-1655

PERRY, Harriet M.
Gulf Coast Research Laboratory
East Beach
Ocean Springs, MS 39564
(601) 875-2244

PORTER, J. Keith
Executive Director, Virginia
Seafood Council
2600 Washington Ave., Suite 310
Newport News, VA 23607
(804) 247-6681

POWELL, John J.
National Marine Fisheries Service
College Park, MD 20740
(301) 344-4173

PRIER, Bob
Chesapeake Bay Seafood
Industries Association
Box 1034
Easton, MD 21601
(301) 822-1440

RATHJEN, W.F.
National Marine Fisheries Service
P.O. Box 1109
Gloucester, MA 01930
(617) 281-3600

RHODES, Raymond J.
S.C. Wildlife & Marine
Resources Dept.
P.O. Box 12559
Charleston, SC 29412
(803) 795-6350

RUDOLPH, Clayton L.
Virginia State Health Dept.
401A Colley Ave
Norfolk, VA 23407
(804) 627-3661

SANDIFER, Paul
S.C. Wildlife & Marine
Resources Dept.
P.O. Box 12559
Charleston, SC 29412
(803) 795-6350

SEAGRAN, Harry L.
National Marine Fisheries Service
College Park, MD 20740
(301) 344-4176

SIELING, William
Dept. of Natural Resources
580 Taylor Ave
Tawes State Office Bldg.
Annapolis, MD 21401
(301) 269-3365

STAND, Ivar
University of Maryland
Dept. of Agricutlure
& Resources Economics
College Park, MD 20742
(301) 454-3805

STRICTLAND, Sid
Georgia Dept. of Agriculture
9240 Garlan Dr.
Savannah, GA 31406

THEILING, Dale
S.C. Wildlife & Marine
Resources Dept.
P.O. Box 12559
Charleston, SC 29412
(803) 795-6350

TINKER, Burton L.
National Marine Fisheries Service
Gloucester Laboratory
Emerson Ave
Gloucester, MA 01930
(617) 281-3600

TITUS, Terry C.
Clemson University
Food Science Dept.
223 P&AS Bldg.
Clemson, SC 29631
(803) 656-3399

TRAVIS, Neil B.
Division of Shellfish Sanitation
Control
1100 W. 49th St.
Austin, TX 78756
(512) 458-7111/458-7510

TOLLEY, Calvert B.
Meredith & Meredith, Inc.
Box 120
Farm Creek Rd.
Wingate, MD 21675
(301) 847-8151

VAN ENGEL, Willard
Virginia Inst. of Marine Science
Gloucester Point, VA 23062
(804) 642-2111

VARN, A.S., Jr.
A.S. Varn & Son, Inc.
P.O. Box 1593
Savannah, GA 31402
(912) 355-4404

VERDI, Michael
Virginia Inst. of Marine Science
Gloucester Point, VA 23062
(804) 642-2111

WALLACE, James H.
Virginia Marine Resources Commission
2401 West Avenue
P.O. Box 756
Newport News, VA 23607
(804) 245-2811

WARD, Donn R.
VPI & SU
P.O. Box 369
Hampton, VA 23669
(804) 722-3791

WASKIEWICZ, Stan E.
Blue Channel Co.
P.O. Box 128
Port Royal, SC 29935
(803) 524-3153

WHITAKER, J. David
S.C. Wildlife & Marine
Resources Dept.
P.O. Box 12559
Charleston, SC 29412
(803) 795-6350

WOLFF, Maury
N.C. Division of Marine Fisheries
P.O. Box 769
Morehead City, NC 28557
(919) 726-7021

WOJCIK, Frank J.
Virginia Inst. of Marine Science
Gloucester Point, VA 23062
(804) 642-2111

ZACHOWSKI, Walter A.
Blue Channel Co.
P.O. Box 128
Port Royal, SC 29935
(803) 524-3153