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CONFERENCE
VIRGINIA FISHERIES AND THE ENVIRONMENT
MARSHALL-WYTHE SCHOOL OF LAW
COLLEGE OF WILLIAM AND MARY

DECEMBER 8, 1979

THE STATUS AND POTENTIAL OF VIRGINIA FISHERIES .L. Eugene Cronin

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William M. Feinberg

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Allen W. Haynie
Thomas J. Schoenbaum

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College of William and Mary in Virginia
Williamsburg, Virginia
CONFERENCE

VIRGINIA FISHERIES AND THE ENVIRONMENT

AT THE

COLONIAL WILLIAMSBURG LODGE

WILLIAMSBURG, VIRGINIA
CONFERENCE ADMINISTRATORS

William B. Spong, Jr. ....... Dean, Marshall-Wythe School of Law
N. Bartlett Theberge . .Conference Director and Proceedings Editor

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(In Order of Appearance)

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L. Eugene Cronin, Director, Chesapeake Research Consortium

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Professor Theberge: Good morning, my name is Bart Theberge. As conference director, I would like to extend my welcome and also my thanks to the many people who helped make this conference possible, particularly those at the Marine Resources Commission, the School of Marine Science of the College of William and Mary and the very capable people at the Marshall-Wythe School of Law.

I would like to introduce William Spong, Dean of the Law School, who will make some opening remarks. Dean Spong.

Dean Spong: Thank you, Bart. There are plenty of seats in the front pews for those who are ready for a long day. I want to welcome you to this conference. This is the third in a series of conferences on environmental law organized by the Marshall-Wythe School of Law.

These conferences are funded by the Virginia Environmental Endowment. This conference is co-sponsored with the Virginia Marine Resources Commission and the Virginia Institute of Marine Science. We are pleased that you can be with us today to discuss a subject of vital importance to the Commonwealth of Virginia and nationally—the preservation of our fisheries.

I think this is the first time in Virginia that a group of speakers have been assembled to address the particular problems that will be discussed here today. We recognize that these problems are not going to be solved today. It is our hope, however, that the collective wisdom of those here will help focus upon the problems, and that the proceedings of this conference will be of help to many others.

In that respect, let me say that the proceedings of the conference will be transcribed, printed and disseminated to those in secondary schools, colleges, and to the industries that have particular interest in this type of conversation. It’s a privilege to welcome you here. To get the program underway, I want to introduce the moderator of the first panel. He is a graduate of the law school of the University of Virginia, presently the Assistant Attorney General of Virginia and the legal representative to the Virginia Marine Resources Commission. It’s a pleasure to turn the program over to Mr. Perkins Wilson.

Moderator Wilson: Thank you, Dean Spong. There is clearly something special about fish, fishermen and their environment. The scientists will tell you about what an unusual form of life the fish are. The
economists will tell you about their impact upon our lives. I think all of you have to remember a few things such as the herring decline during the middle ages and the decline of cities on the Baltic and North Seas. As whales began to decline a different kind of illuminating oil came into the picture. It came from rocks, petroleum, and we're still living in that age.

Commercial fishermen will tell you that, if you're lucky and smart and work hard, you can make a living at fishing. Sportsmen will tell you about the excitement and the pleasure of recreational fishing. I must admit that when I have gone sports fishing I was never sure whether I was more interested in the fish or the environment—the sea and the sky. All of these segments are represented here in this first panel. It's going to be an outstanding day and the most outstanding panel may be in front of you right now.

Doctor Cronin represents the scientific community. Mr. Fass is a businessman of some distinction. Doctor Strand is an economist and Mr. Herring is a sportsman. We have every important constituency represented here today except for the fish themselves.

Your first speaker will be Doctor Cronin who will discuss the situation from the scientific point of view. Doctor Cronin, please give us the status and the potential of Virginia fisheries from the scientific perspective.

Dr. L. E. Cronin: Thank you, Mr. Chairman and good morning ladies and gentlemen. I'm going to depart somewhat from the topic and begin with the general setting for the marine fisheries of Virginia. I'm very aware we have a mixed audience. Some of you know more than others, by far, about specific questions of Virginia fisheries. On the other hand, we have others less well versed in Virginia fisheries, from different backgrounds and different perspectives. My approach to this topic reflects that recognition.

Virginia marine fisheries are based on something of a three part system. You have several major rivers, estuaries, you have a portion of the Chesapeake Bay and you have a portion of the Atlantic Continental Shelf. Now, each of these is different. Each of them offer different opportunities and each has different limitations.

In the Potomac, which Virginia and Maryland share, as far as fishing rights are concerned, you have spring salinities from zero to about ten parts per thousand. The open ocean for comparison is about 35 parts salt per thousand parts of water. When I say ten, I mean ten parts of salt per thousand parts of water. But in the fall, the Potomac changes from zero to ten to zero to 17. That is a dynamic change in the distribution over the year. Virginia owns the total Rappahannock system which is different; similar in some ways but distinctive. It is saltier in the spring when it ranges from zero to 13 at the mouth. In the fall it ranges from zero to 18. Virginia owns the York River; zero to 16 in the spring; zero to 21 in the fall. Virginia owns the James River, although it is most unfortunately closed to harvesting—almost closed to
harvesting at the present time because of our collective inadequacies in
taking care of it. The James has a spring salinity of zero to 17; fall
salinity goes up to 22 parts per thousand. Each of these river systems
includes what has been called the critical zone of the saline. That is the
low salinity area from just below the lowest trace of salt up to ten to
12 parts per thousand. This is a critical area for reproduction and for
larval development of many species important to the economy of
Virginia.

Virginia also owns a portion of the Chesapeake Bay which it shares
with Maryland. The Virginia portion is the saltier portion. In the
spring it ranges from 12 to 24 parts per thousand. In the fall, the
salinity ranges from 18 to 30. Virginia also owns a portion of the
Atlantic Coast out to the three mile limit. This area is not as salty as the
open ocean or the West Coast or the Mediterranean. It is a highly
productive area, not yet fully husbanded.

Virginia also participates in the management of the area beyond three
miles out to the 200 mile limit, including very complex areas in the
Gulf Stream and parts of the open ocean. Virginia fisheries involve about
4100 miles of shoreline within the Bay plus the coastal region and a
long and extraordinarily diverse part of the Atlantic continental shelf
and the waters above that shelf.

Virginia fisheries are linked with other fisheries. Therefore, it's very
important to put Virginia fisheries in perspective. For example, Vir-
ginia's portion of the Chesapeake system is only about half of the
Bay. Dynamically, by the migration of fish and in every other way, it
is linked with the Maryland portion. We are increasingly recognizing
and taking that fact into account in some of the attempts and approaches
to both science and management. Some of the species are just inherent
to that system. The blue crab is a shared resource between Virginia
and Maryland that cannot be isolated at the state line by regulation
or anything else. Crabs don't pay much attention to geographical bound-
daries or state law. Many of the fish which come into the Bay through
Virginia reach Maryland waters requiring that our knowledge of them
and our management of them must be on the system approach.

I should also note the whole center of Pennsylvania contributes about
half the fresh water running into the Chesapeake Bay and must always
be taken into account and dealt with. The impacts of such contributions
to the environment of the Bay are not as obvious at the mouth of the
Bay as in the Bay's upper reaches, but they are real. At the mouth of
the Bay, adjacent to waters of the continental shelf, an enormous ex-
change of water as well as fish and other organisms in and out of the
Chesapeake occurs that has great effects in enriching in some ways and
in some ways threatening our populations.

The last thing that I would emphasize by way of general background
is that the Bay is an area of great change. The Corps of Engineers is
the only group that I know of that has looked ahead and made some
projections as to how things will be in another 40 years. I don't think,
perhaps, that any of us would agree with every projection that they made
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the only group that I know of that has looked ahead and made some
projections as to how things will be in another 40 years. I don't think,
perhaps, that any of us would agree with every projection that they made
but at least they have taken a look. They project, for instance, that the Chesapeake Bay area will have doubled in population by the year 2020; that our energy requirements may go up 13 fold; that major shipping in the Bay will increase about six fold and recreational activity will increase six fold. Change has come and change lies ahead. Nothing remains constant. The projections they made also indicated that at the present rate, probably all of our major fisheries would be over-fished, fished beyond their sustainable level. Now, I don’t think that's true. I don’t think the states of Maryland and Virginia will permit it to happen and I don’t think that projection has to happen. It’s up to all of us to play a role in determining what will happen.

Now let me turn to the fisheries of Virginia. I’d like to express appreciation for information from the new annual report of the Marine Resources Commission, to Doctor DuPaul and Doctor Baker, for giving me an advance copy of the paper on the status of off-shore fishing, to Doctor Hargis, Doctor Haven and Paul Kendall for their massive analysis of the Virginia oyster industry; to Doctor John Merriner and Joe Smith who sent me their paper and finally to those who contributed two years ago to an excellent summary of the fisheries of the Chesapeake, their trends and problems for the Bi-State Conference on Chesapeake Bay; so I haven’t done any of this original research. It’s all stolen or what might be politely called “derived from literature.”

The first thing I would like to emphasize is diversity. If you looked at a map, you would see a number of villages around the Virginia part of the Chesapeake and some of the coastal areas and cities. Out of these have come, in the last 300 years, the fisheries of Virginia. The fishermen range from part-timers who may have a gill net out for a short time in the springtime to major ocean trawlers, ocean-scalloping or clam rigs, which are big business.

Landings vary from little country docks to cities such as Hampton and Reedville where large quantities of seafood are handled—again big business. Large fisheries are very important. Listen to the kinds of gear that are used in the Virginia fisheries—gill nets, float nets, stake nets, pound nets (although they’re in substantial decline), different kinds of seines, eel pots, crab pots, trot lines, patent trot lines, fykes, dredges, oyster dredges, scallop dredges, hydraulic dredges, surf and hard crab scrapes, various sizes and types of trawls, a large purse net fishery, rakes, tongs, patent tongs, hand tongs, crab trap nets, dip nets and even the toes and eyes of human beings looking for or feeling in the bottom for clams.

A great variety of fisheries exists and these fisheries are not easy to understand or to measure. In talking about the status of fisheries, I must talk about the status of data. First, I must define three things that are going to be dealt with all day. One is the fish stock—that’s out there—the population. The second is the fishing. What are people trying to do; how much effort, how much gear is involved. The third is what might be called the fisheries. That’s the whole ball of wax.
Everything from the fleet and the fish that they catch, through the processing, distribution and all of that. These are important to separate because we look at them differently and use them differently. Our information is not as good as we wish it were for any of these.

Primary data on fisheries in Virginia comes from commercial landings. These don’t always tell us detail—where it was caught or how much effort went into catching it. Fortunately, the National Marine Fisheries Service kept up a long-term record which is now maintained and improved cooperatively by the Marine Resources Commission. It is monthly and it is voluntary. It is not required and it is not complete. My impression is that it gives a continuous general indicator of great value as to what’s happening in the fisheries. It gives gross landings, gives gross trends and that is necessary. It is important and very useful.

A second kind of data is that usually obtained by the scientist, although the management agency frequently takes part. This data is much more detailed by species and includes data on economics and other aspects. It gives you signals of what’s happening, much more accurately than does the general gross catch rate. It tells you when the size of the fish are changing and that’s a very important thing. It will tell you when the reduction per day’s work is changing. That’s one of our most valuable tools and it can sometimes develop predictions of approximately what’s going to happen in the future in the way you cannot possibly get from gross landings. More importantly, frequently it can be used to determine the cause of a change and not merely describe the change.

There’s one aspect of the fisheries in Virginia that is almost undescribed and that’s recreational fishing. There have been short time studies of specific places—an estimate every five years. We know that there is an important recreational fishery, that it has its problems, opportunities, and faces changes. Bluefish, rock, sea trout, flounders, spot, croakers, white perch, sea bass, tantog, sharks, crab, clams, billfish, dolphin and other fish are important recreationally. Recreational fishing is one of the great growth industries of the mid-Atlantic region; it is not trivial but very important economically.

Let me touch on the commercial fisheries. Commercial landing records are a valuable clue, of course, and generally landings were high last year. This data is from the Marine Resources Commission’s new report. Virginia landed about 540 million pounds, fourth in the nation, at a value of sixty million dollars dockside which our economists can tell us later how much that means by the time it gets to the table or as the final product.

Let’s start with oyster industry. The Chesapeake Bay has produced more oysters than any other part of the world. They’re native and well adapted to the area but the trends are not good. Back in the last century, there were very large catches and even in the early sixties catches in Virginia were sustained at very high levels, and then there was a very sharp decline, a decline year after year after year in all areas of the industry. Seed production has declined. The great James River bed, the greatest in the world, in recent years, in general, has been at rela-
tively low production. In 1978, Virginia landed about 7.8 million pounds. That compares with a 20 year record of 12 million pounds. The 1978 landings are better than some years and last year showed some improvement. My general impression is that while it’s lower than the historic record, there’s some improvement at hand and I have some hope for this year as well. Long term trends have been analyzed by Dexter Haven, Doctor Hargis and others in reference to this very complex problem. They suggest that, in their rather thick volume, it will require leasing of public grounds in Virginia to improve the oyster industry. It will require technical work dealing with the potential of hatcheries; it will require environmental steps to prevent damage. We’ll hear more about that later. It will also require research to learn things we don’t know now. I can’t forecast how well that will be applied, but those are the needs.

Soft clams are almost absent. Virginia has had a small fishery, never commercially strong. Hard clams keep on producing year after year after year. They’re one of our fairly tough populations. They aren’t usually near people and maybe that’s fortunate. They’re within normal ranges. Let me skip down through some other highlights. Blue crabs, short-lived animals, explode and shrink in population size very rapidly. Recent years have been within the natural range. They haven’t been high. Three years ago, landings were quite low. The last two years have been much better than that. Next year may be a bumper crop. Our prediction ability and control ability is very limited.

As for inshore fisheries, the menhaden is the greatest catch in the state by far. It’s an enormous fishery. The record was five hundred fifty million pounds in one year. In 1978 it was four hundred twenty million pounds, well within natural variation.

For some species we have good news. Some flounders, bluefish and croaker are all in good shape. Flounder set a new record last year. For some species we have bad news; alewives, scup and rock are lower than recent years and not at levels that the fisheries hope to see. Some species are within range—sea bass, shad, and spot are all within normal fluctuations but not something either to cheer about or worry about.

In the sea fisheries, scallops set a record last year but that can be misleading. Does that mean more people were out? Does it mean the weather was good, or does it mean the crop was up, or a combination of all three? That’s the kind of thing that must be discerned before you can apply that information. The surf clam is down. Data and studies indicate it was over-fished in this area. The regional fisheries management council has recognized that and established a quota system and limited the amount of fishing for it.

There appears to be potential for improvements in the oceanic fisheries. There are species out there that are underutilized such as the ocean clam, squid, butterfish, and mackerel. I hope it will be done with care. I hope we will learn a lot about them before we start harvesting them.

There are special problem areas. One, the cownose ray, an in-
individual predator of oysters comes into the Bay and does significant
damage. Doctor Merriner and his associates recommended we fence
them out in extreme conditions and they urge we catch as many as we
can, establish a commercial fishery and recreational fishery that takes
advantage of them. Another area of concern is that the environment is
damaged when the submerged vegetation is damaged. Sporting and
commercial species appear dependent on submerged vegetation. Our
problem is that we simply don't know enough.

I'd like to say a few words about the role of science and the limits of
science in these problems because the role of science must be under-
stood. A scientists' careful inquiry, intelligently, and professionally done
improves your predictions—improves your ability to look ahead and say
if you do this, that will happen. That's one of the great benefits that
come from experimental work. Scientists can also make new discoveries.
You can learn things you never knew before. Trends and relationships
between the parts we never had previous information on can be identi-
fied, warnings can be given, and corrections suggested. That's a rare and
valuable capability. Scientists also bring an advantage of scope. They
tend to look at the whole picture more than many other people. They
look at the entire coastal system and see the complex interrelationships
of its component parts. That approach complements the concerns of the
fisherman and the concerns of the management agency.

I think scientists can also communicate. They can bring new knowl-
dge to the attention of the public. They do not and should not select
the policy objective for management. It is not the scientist's job to say
whether it is better to give fish to sportsmen or commercial fishermen
or that it is more important to produce more protein. These are policy
decisions that should be made at legislative or agency levels of govern-
ment.

I think when a scientist becomes involved in these choices, he jeopar-
dizes some of the benefits science can provide.

Well, I have more things I would like to say but to summarize, I think
Virginia is in a good position in many ways in these matters. The legisla-
ture has tightened wetland protection. It has created a bi-state study
commission to look at the Chesapeake Bay for better ways to manage it.
It has developed the Marine Resource Commission. It has created a
bi-state working committee to work with Maryland. It has VIMS. It
also has the Virginia Polytechnic Institute where the scientists are
available in many fields. They're kept out of management agencies and
I think that's good.

My last point is that the fisheries of Virginia are the very best yard-
stick of the health of the Chesapeake Bay. As long as we have a
diverse and rich and abundant stock of the fish we wish, the Bay is in
very good shape. It can be used for all the purposes we want. Fisheries
are the most sensitive indicator of deterioration in the Bay. The Bay
is not only valuable because of the fisheries but because a healthy Bay
means we can use it for recreation, for study, enjoyment, transportation,
for every other use we wish. So I hope the Bay will rank high in the priorities in Virginia as well as other states. Thank you very much.

Moderator Wilson: Thank you, Doctor Cronin. Mr. Fass, will you please tell us now about the status and potential of Virginia fisheries, from a commercial viewpoint.

Mr. Fass: First, let me qualify that I am not going to talk about the Chesapeake Bay, but I am going to talk about the Atlantic Ocean and how it affects us in Virginia and on the east coast of the United States, in particular. The subject, the status and potential of Virginia fisheries or commercial fisheries in the Atlantic Ocean, is my favorite subject; so, it is a pleasure for me to be here today to address the subject.

What we eat in the way of seafood in this country and what they eat overseas is important for us to understand, recognize and address. As you all know, the balance of trade and the deficit balance of trade in the United States last year was approximately twenty-eight billion dollars. Seafood created ten percent of that balance of trade deficit, about 2.8 billion dollars.

What this says is that we in this country eat fish from Canada, Norway, Iceland, Sweden, Denmark, South America and Japan. We eat very little seafood produced in the United States. Three years ago, in 1976, a piece of legislation called the FCMA (Fisheries Conservation and Management Act) was passed. I have many copies of it here in front of me and anyone that has not read this intriguing document ought to read it carefully and understand what your commercial fisheries are up against for the next few years.

There are oversight committee hearings being held in Washington, now, which will continue into next year, to correct the deficiencies in the 200-mile limit legislation. I presume for the best and I hope it will be that way. Eight regional councils were formed under this legislation and they are doing the best they can under the circumstances. The councils consist of environmentalists, recreational and commercial fishermen, and those that do not know anything. As I say, all are doing the best they can under the given conditions.

The seven or eight fishery management plans that have been formulated are rather unsuccessful for the most part, and will be corrected and changed in the near future. But, it is a rather frightening thing for an industrialist or a businessman such as myself with the investments that we are contemplating to think that a scientist can tell us there are no fish when you can almost walk on them out there in the ocean.

I give you the example of the yellow tail flounder which is rather prolific right now off the New England Coast. The scientists say that the specie is almost endangered. Vessels are allowed to catch 7500 pounds per week. Therefore, we paid exorbitant prices and the fish cannot be sold. Our scallop trawlers are catching 20,000 pounds of yellow tails in the scallop dredge per week this year and the vessels could catch more if they could sell them.

What has happened is that we have created an enormous game for
cheaters and the industry right now is being hurt—we recognize the fact that we are in this status. It is a real problem and enforcement becomes the name of the game. But how do you enforce a plan once you put it in writing?

After talking about what we need to do to fill the void, that is to feed our own people first, we have to address the other side of the coin which is the foreign fleets fishing off our coast. I was handed a report this morning by Dr. DuPaul and Dr. Baker which shows that there were twenty-seven hundred foreign vessels off our coast three years ago, and today it is down to six hundred.

I happen to know that there will not be even six hundred next year. It is commercially unfeasible for a foreigner to come over here with the price of fuel the way it is and the limited timeframe, and catch fish and take it back to Europe and sell it. It is not possible. So eventually there will not be any foreign fishing off our coast if the conditions exist as they are today. And certainly fuel costs are going to go up.

If this happens, and it will happen over the next few years, there will be an enormous void created. The Spaniard, the Italian, the Frenchman, and the German want to eat seafood, and the seafood is off our coast. How do they get it? They will have to depend upon us to catch it. We look at the 200-mile limit and we acknowledge that there certainly are underutilized species that need fishery management plans. We know very little about the shark, and very little about squid. How do we regulate and manage these species?

I can only tell you that the answer lies in an enormous quantity of funds which industry and government as partners must give to research for the effort in discovering what it is all about. If the people want us to catch the proper amount of dogfish and the proper amount of squid in the future, they will have to tell us something more about the product than I have been able to discern, read, or understand.

I think that there is a certain position everyone would like to take, and that is that this country has developed over the last two hundred-odd years on the basis of laissez-faire government. And that the supply and demand will take care of many of the problems.

My brother, Arthur Fass, and I are great advocates of the fact that once a product becomes uneconomical to harvest, it will not be harvested, and it will grow back to proper stocks. With the foreign fleets not catching the quantities of fish that they have caught in the past, we will not even begin to touch the quantities that will be available. The species are going to come back. The mackerel stocks are being replenished. It does not take that long. The herring stocks are coming back. Canada today had the greatest herring catches in its history, and the greatest mackerel catches in history occurred in England. Dogfish are quite plentiful. And these are all potentially very economical to harvest, and the markets are already there.

Let me turn back to the question of why we are not feeding the American public properly. Canada, Norway, and Iceland depend upon seafood for a great deal of their economic development, so the govern-
ments have helped to establish the industries. They went through a period of time when they, as an industry, both in Canada and Iceland, lost a lot of money. Their governments supported them, built their vessels for them, and helped to develop their industries. Today, they have captured the American market. For instance, the southern part of the United States enjoys flounder which is produced for the most part by Fishery Products and Caribou in Canada. We are presently converting our vessels from scalloping to flounder fishing in order to compete with these companies.

We are producing more flounder now than we have ever seen, but no market has been established. It has to be developed. Maybe we have to take that market away from someone else. That is not easy and it is costly. We cannot take someone’s market without a fight, and they are not going to give up easily. They are not going to sell their flounder somewhere else. They will continue to sell them in Texas, Georgia, North Carolina, South Carolina and Virginia.

This is the product that is being consumed in most restaurants today. This nation is eating fish that are caught off the Grand Banks, off Labrador, off Newfoundland and off Nova Scotia. We are going to try not to lose money on the way in order to change this, but we may have to. We think that maybe Uncle Sam can help us in some respects.

Something I do not think anyone in this room understands, and I am glad to be here to tell you, is that we are becoming a diversified industry. We are a part of the state of Virginia. We like to think of ourselves as a Virginia industry. Our vessels are called such names as the Virginia Seas, and Virginia Capes; our brand name is Virginia Capes, and we are very happy to be trying to sell Virginia-caught seafood products.

We think this is something the state of Virginia should be proud of and it should be recognized as having a great deal of potential for a quality image.

I would like to address the hindrances that we have come across in the development of our industry. Obviously, the two most important are the tremendous 62% increase in the price of fuel over the past six months, and the rising cost of money.

Both of these issues are tremendously harmful to us. Some point in time, approximately three months ago, we were worried we would not get enough fuel to send our vessels to sea. Fortunately, we had a great effort on the part of those in Richmond, Virginia; the Governor gave us the fuel and we survived that crisis. I will tell you also that the fuel price has not dropped, but continues upward.

Another tremendous problem for us is the type of industry we have in this country. We have a very fragmented, traditional industry. By that I mean the vessel owner/operated type of industry we have lends itself to a non-development where the status quo is the best way. The Carter Administration would like for us to grow as an industry. Let me try to explain this briefly by first saying that the fisherman, if he can spend one day in the Atlantic Ocean as an owner of his own boat and has his crew, can get one dollar a pound for his product and make enough
money to survive—that is all he wants to work. I do not blame him, but the American public will have the highest priced seafood possible on the table if that is the kind of industry we choose to have.

Fass Bros., Inc. cannot exist this way. We were on the way out of the business before we decided to build ourselves a fleet of vessels that we could direct to a certain type of fishery. We built the facilities to accommodate this fishery and perhaps to grow thereby. We built vessels through a syndication method. I do not believe that the FCMA by itself built by itself the fleet of vessels now seen on the Atlantic coast and, more specifically, in the state of Virginia.

Basically, it was the investment tax credit and rapid depreciation that encouraged the investor to think this was a particularly attractive type of investment for the future. Anyway, we have an enormous increase in vessels, not just at Fass Bros.' docks but at the Amory Dock and at other docks in the Tidewater area. These vessels have all been very prosperous up to now and I really cannot foresee their demise.

I can see some slowdown of growth. Certainly the shipyards are not building the same quantities of boats they were a few years ago or last year. The growth rate is going to slow down dramatically, but there will still be some new vessels coming into our industry in the future. What is going to happen is the smaller, underpowered vessels will be phased out.

We are still basically an owner/operator oriented industry. The type of purchasing from vessels that exists in the industry, especially on the east coast of the United States, is a tremendous hindrance to development. We have basically a fresh fish market type of seafood purchase traditionally in New York, Philadelphia, Baltimore, Washington and some parts of the South that dictate the price. We cannot successfully operate as an industrialized seafood industry in this way.

What we must do is guarantee our vessels six months in advance for certain species. I might add, this is what is being done in Europe and on the Pacific Coast. On the east coast, the price fluctuates and changes every day, based on the volume of product that is landed. This does not lend itself to a stabilized industry, one that might spend x number of dollars on a marketing program on a certain specie when we do not know whether the fresh fish market will dictate that kind of investment.

We have to build enormous, expensive facilities to accommodate our industry, and we have to know what type of products we are going to bring into our docks before we can build those facilities. So the way we buy fish tomorrow must be different than the way we buy them today for us to be successful. I will add that the FCMA with the regional councils and the way they are set up today have become somewhat of a problem for us.

We fairly well ignored it in this area because there are no firmly set plans for any of the species that we catch. The yellow tail, the haddock, and the cod plans have been in existence a long time and, frankly, we do not catch those species right now. We will next year or this year, but we will have to look at the plans and live by them—we have not had to
do that before. We have not had a flounder, porgy, or sea bass plan, so we have not addressed the subject. We have not even put a scallop plan in force.

There is in the state of Virginia a surf clam plan, as has been alluded to by Dr. Cronin, and I think for the most part it has created a major problem for those trying to catch surf clams. The result has been to create an industry of high priced surf clams, strips that will not sell in any retail market or any restaurant, and fishermen have been forced into another fishery. It is unfortunate that it ended up that way, but I do not know whether there was any other alternative to it other than a high of $13 a bushel for clams. The end result is just too expensive a product to sell to the American public. There are other substitutes that are much more reasonable, but what has happened to them is that there has been no market available at such a price level.

We also have the other side of the coin. What do we do about filling the void and getting the underutilized species, as they are now called—the dogfish, squid, and butterfish—to European markets where they are traditionally eaten with great fervor? They will pay fantastic prices for ocean processed squid right now. Therefore, Fass Bros. and I can only relate to you what we have found as an answer to the problem.

We hope to be the first on the east coast of the United States this coming January to enter into a joint venture with a partner in Italy who operates and owns a ship called the BOREA. The ship will be off the east coast of the United States and our vessels will be selling that vessel squid from ship to ship, I hope successfully. The price that we are guaranteed is an excellent one, far better than anything we could dream of right now on our market. The price that the joint venture will receive for the squid is fantastic, so the opportunities are there. I am not suggesting to you that this is the only way that we should be getting into this type of industry, but I cannot see a great deal of dollars today going into the building of large vessels on the whim that it will work. I think we must try it this way and see if it works and then determine whether we can make the seven or eight million dollar investment per vessel that will be required.

As you well know, there are federal laws on our books that really are the greatest hindrance to the development of the seafood industry. One in particular says that the U.S. fisherman cannot buy a fishnet from Europe without paying forty-three percent duty for the net. They cannot manufacture this type of net in the United States. They do not have the twine or the ability to build the net here, but I must pay forty-three percent duty to get the net. This is not the proper way to develop an industry.

Congressman Breaux knows this fact. I think that he is trying to address the subject, but our bureaucracy moves very slowly. The Nicholson Act, and many other antiquated pieces of legislation on our books in Washington are an enormous hindrance to the development of our industry in the state of Virginia. For instance, you cannot buy a foreign
built fisher-processor vessel. You have to build it in the United States, and a new vessel is very expensive.

There are literally thousands, maybe as many as three or four thousand of these vessels tied up in Scotland, Spain, France, and Germany and they will be scrapped. The United States will not be able to buy them at any price, on any terms because of the legislation on the books. This is unfortunate because we have the State Department saying to us, "Hey, if you cannot catch the squid, we have to give it to the Spaniards; we have to give it to the Italians." The Italians and the Spaniards cannot come over here with the laws the way they are written and economically harvest that product without it costing them four or five dollars a pound.

The price of fuel and the cost of labor today, plus the short period of time that we are allowing foreigners to fish over here does not make it feasible. At the same time we are doing this, our State Department is trading away some of their rights to the Mexicans. For instance, Mexicans are out there today catching squid because our shrimp industry wants to fish in Mexican waters. This is not the way to operate and it is the wrong approach, but you all know our State Department as well as I do. So I have touched on a few of the major hindrances and problems.

I would like now to tell you that, as far as I am concerned, the recreational fisheries are not a hindrance. They are to be encouraged; the recreational interest in this room is to be complimented for the approach it has taken to commercial fisheries. I hope they appreciate and have the same respect for the commercial fisheries and the commercial fishery people that we have for them. I would like to add one more thing. We have been fishing in the United States with antiquated equipment and still operate with antiquated gear in comparison to our competition in Europe, Japan and Asia.

In the next two years, you will see an enormous change. You will see some enormous catches of seafood products through better methods of harvesting and this will be a big help to us because the price of fuel is not going to come down. It is going to be more costly to catch the product. I am dedicated and I think the industry is dedicated to put reasonably priced seafood back on the table in this country—I want to get seafood back in the right perspective. We are dedicated to that effort. We must produce reasonably caught and priced seafood, harvested properly and give the American public what they began to have ten years ago.

We cannot sell crab legs, flounders and other kinds of seafood at the price we have been selling them. As a result, in the past six months the seafood industry has incurred an enormous recession and depression. We are not selling the seafood we used to sell nor are our Canadian friends. To give you an example, perch which Canada basically produces went from $1.10 down to .80 cents in the last couple of weeks. They do not know how far it will go down. The price of cod is moving down; the price of fuel is going up.
We must explore the potential for squid sales in the United States, for dogfish sales in the United States, maybe the ray, certainly the skate-wings and the other things that come out of the sea for, as Dr. Cronin put it, hopefully we will develop better ways of processing, better ways of catching, and bring the cost down. Then we could fill the void that the Europeans must demand.

Foreigners have to have their seafood more than we as a nation must have it. We are meat eaters, basically, in this country but they are not. I just returned from Spain, and I can tell you that they do enjoy seafood. Forty-five percent of their diet, in Spain, is seafood and they like good seafood. They do not mind paying for it. It is not cheap, but they really do enjoy seafood. They have 17,000 fishing vessels with a tradition of fisheries that goes back many, many years. Right now, nowhere in the world can they fish except off the coast of Spain.

They are making deals with Africa. They are making deals with South America and, hopefully, they are attempting to do the same in this country in some fashion or form. They have an enormous potential for sales and they have the technology and know-how to go along with it, and they are willing to impart that on anyone that wants it—but at a cost.

To summarize, I have great faith in our industry, but we have a long way to go. Although we have grown over the past three years in the catching vessel production, I think that we are just beginning to see the end of the tunnel. I think that the tunnel has a great, attractive light at the end, but we have a long way to go and maybe some hard roads to travel—but I think we are going to make it. Thank you very much for having me. I hope you understand a little more of where we are today.

Moderator Wilson: Thank you very much, Mr. Fass. Doctor Strand, can you give us the perspective of the resource economist, please?

Doctor Strand: The two previous speakers have made very interesting remarks on a number of important issues. I would like to elaborate briefly on some of their remarks and emphasize several areas they were forced to omit because of time. The overall economic status of the industry and some of the economic aspects of its potential will be emphasized. In ten minutes it is obvious that only a few major points can be developed.

First, the relative status of Virginia fisheries within the total U.S. industry is important for people to realize. Based on National Marine Fisheries Services data, Virginia ranks fourth among states in pounds landed and eighth in value of landings (1978). Moreover, a NMFS survey in 1974 showed that one million saltwater anglers, or about 25% of Virginia's population, sport fished in marine waters. This was the highest percent of major states in the Northeast.

The big four in fisheries production in Virginia are oysters, crabs, clams and menhaden. Together, harvest of these four species is worth around forty million dollars ex-vessel and around 150 million dollars
at the retail level. Virginia's processed oysters represent approximately 30% of the national processing of oysters; the blue crab harvest represents about 20% of the national blue crab landings; clams about 16% of the national landings and menhaden about 16% of the national landings. All of these species (with the exception of surf clams) currently run the risk of being affected by environmental degradation simply because of their life cycle. It should be clear, then, that Virginia residents should be more interested in the Federal activities in water pollution control than residents of most other states.

In fact, the potential of Virginia fisheries depends, to a great extent, on whether the political process decides that using rivers, bays and oceans for fisheries production is more important than using them for waste disposal. This decision is clearly not as dichotomous as this implies, but there is a tradeoff between fish production and wastes discharged. If substantial pollution abatement is undertaken, fisheries production will be enhanced.

This will benefit Virginia fish producers and consumers in two ways. First, there should be less natural mortality and hence more natural regeneration. This causes harvest cost per unit to fall. Secondly, consumer confidence in the quality of fishery products will be improved and this should increase demand for the product.

Those that look to economists for economic justification for that political choice in favor of "fish production" (as opposed to waste disposal) may be disappointed in the immediate future. Pollution abatement, as many here understand, is a costly operation. Against the clearly defined cost of abatement are pitted benefits of abatement, many of which are extremely difficult to estimate. Sportfishing is a case in point. It is a difficult problem to measure the benefits of an unmarketed good, especially one that is but an element in an array of outposts of a sportfishing trip. The lack of established effects of environmental pollution is also a major problem. There are a number of technical points that could be raised here but it is sufficient to say that one is comparing clearly defined costs with extremely vague (in an economic sense) benefits.

The implication is that the argument for substantial abatement is better framed as protecting a way of life rather than protecting the value of fisheries production. When the uncertain environmental effects and possible bias or error in benefit estimation is juxtaposed against very precise cost information, a concern is raised that decision makers will discount the gains from pollution abatement and only be concerned about the costs. Thus it might be better to argue on a qualitative basis until the conceptual and estimation problems relating to benefits are resolved. The protection of a way of life is certainly justifiable.

This leads to another aspect of Virginia's fisheries potential, the protection of the fish. Fisheries managers will have to adjust to changing economic and technological conditions in their attempt to protect the resource. Population growth and technological advance, in particular, will create even greater demands on Virginia's scarce fisheries re-
sources. These additional pressures will create a situation in which managers will be inclined to impose greater and greater restrictions to "protect the resource."

It is important to recognize that restraints of all kinds (gear restrictions) are a form of tax on the industry. Restrictions raise costs because, to be effective, the restraint forces the fisherman to do something he otherwise would not do. The challenge is for managers to implement methods of protecting the resource from overfishing and, at the same time, give the fisherman freedom to operate at minimum costs. Economists, and others, have offered some guidance with their proposals for either institution of a property rights system or a direct tax on fish harvested. In actual practice, these methods are in their infancy but may prove useful in time as more is learned about their effectiveness.

Undoubtedly, the newly acquired offshore resources add greatly to Virginia's fisheries' potential. The technical aspects were nicely addressed by Mr. Fass. The only point I wish to emphasize is that the development of new markets for "underutilized" species is very important and that an active role by industry participants with direct support of governments is very critical. "Seed money" will undoubtedly speed the development of these resources.

In closing, it would be remiss not to note that the status of Virginia's fisheries is due to many of the individuals in today's audience. More importantly, the potential of Virginia fisheries may also rest with many of today's participants and it is our responsibility to ensure that Virginia's potential in fisheries is met. Thank you.

Moderator Wilson: Thank you, Doctor Strand. Now, Mr. Herring will give us the viewpoints of the anglers and the sportsman and then we'll hope to have a few questions at the end.

Mr. Herring: Thank you, Mr. Wilson. If you look in your brochure, it seems the only thing I do, really, is fish, sport fish. That's not totally true. I am familiar with research. I taught two years at VPI-engineering. Upon leaving VPI, I went to work for a major polluter, Exxon. I left Exxon after a couple of years and am presently employed with Newport News Shipbuilding where one of my duties as manager is to take a look at the research budget. I'm manager of that research budget and after looking at it for the last ten years, it is reduced to one eighth of what is used to be.

I'll cover this subject briefly and in the synopsis, I think I'll hit on the key points. Mr. Fass and Doctor Cronin, I think, have thoroughly covered it well from the standpoint of how a commercial man looks at the fishing industry and how the research man looks at the fishing industry. If you'll bear with me, I'll cover these points as they relate to the pertinent points Doctor Cronin and Mr. Fass made.

The factors affecting the number and size of finfish are well known—the environment and the harvesting of fish.

An investigation of the extent of which finfish are affected by these factors yields an equation which cannot be solved for exact answers.
Past experience tells us that the natural environment without pollution can provide major changes in fish populations which may last for decades. In a given year, the biomass may remain the same, but significant changes may result in species populations due to the prey-predator relationship. Couple these changes with decreasing wetlands, pollution and the increased harvesting of fish and instantly the questions becomes how much did or does pollution and harvesting have on fish populations?

As our fishing efforts steadily increase, we need data and research information which will allow us to make reasonable laws—laws that will satisfy the user. To effect laws that have any meaning with respect to regulating the harvesting of migratory fish requires a coordinated working relationship with other states.

To effect research that has a meaningful end product also requires the same working relationship. However, such a relationship is meaningless unless we strive for a goal which is determined by users of the finfish resource which have been kept constantly informed of any significant research and data findings. The goal, simply put, would be to coordinate all research efforts in the finfish area towards maintaining or increasing the yearly yield of fish. Naturally, this will dictate some environmental regulations and regulation of fish catches.

Today far too much research is self-serving and uncoordinated. Primary emphasis appears to be placed on obtaining funds, rather than arguing the users’ need for investigation. Few research efforts are coordinated on a state or national level to effect the users’ goal. If the anti-sport fishing groups who find hooking a fish cruel were to have their way, there would be no point in recreational fishermen being represented at this conference.

It is important that the user be represented at the decision-making process with respect to investigation and rule making. Recreational fishing represents approximately 60% of the Virginia marine finfish industry. However, our representation on boards or rule making bodies is practically nonexistent. The recreational fisherman desires to work with, not against other users of finfish; however, we believe that our representation in the decision-making process should roughly parallel our impact on the finfish industry. The marine angler believes that any laws effected by responsible commercial interests to maintain the fishery would also be beneficial to the sport fishermen. We are concerned, as are many commercial fishermen, that some may wish to fish the last fish.

The recreational fisherman has no business dictating the methods to be employed by commercial interests in harvesting fish as long as the total yearly catch does not impair the chances of the same yield being realized in subsequent years. The equipment to be used is a socio-economic question since large farmers have historically put small farmers out of business by being more competitive and thereby reducing the costs to the consumer.

The sport fisherman makes his living in other ways, but it is fishing for which he lives. For this reason, he is extremely interested in assist-
ing to effect rules, hopefully as few as possible, that will satisfy both
commercial and recreational fishing interests.

I thank you. I am Carl Herring, President of the Conservation Coun-
cil of Angling Clubs. We represent four thousand sports fishermen.

*Moderator Wilson:* Thank you very much, Mr. Herring.

We have a little time for questions before the coffee break. I think
you can simply rise from your seats, or for those of you who wish to
speak through a microphone, I see at least two positioned in the
audience.

If you would, please give the name of the gentleman that you're trying
to address your questions to. If there are no questions, I think Doctor
Strand should have five minutes more.

*M. Feinberg:* I don't know if comments would fall within the cate-
gory of questions. If so, I would like to perhaps make a comment.

*Moderator Wilson:* I believe it's Mr. Feinberg, is it not?

*M. Feinberg:* That's correct. I'm Bill Feinberg.

*Moderator Wilson:* We will accept your comments, sir.

*M. Feinberg:* I'm Bill Feinberg. I'm a member of the Mid-Atlantic
Fishery Management Council and I'd like to just address a brief com-
ment to something that Mr. Fass said. I think that Mr. Fass' point of
view is somewhat narrow in a number of respects and in two instances
I noted that that was so.

First, he commented upon the decision of the federal government to
allow Mexicans to fish for squid in tradeoff for the Americans to fish
for shrimp and he indicated he felt that was an inappropriate thing to
do. Believe me, I'm not a defender of the State Department. I have been
at issue with them in many instances. In this instance, I am not.

You have a situation where to Mr. Fass squid is very important but,
from the overall standpoint of the American consumer, shrimp is a much
more important commodity and I'm sure if you ask the people involved
in the shrimp industry down on the Gulf Coast whether they felt it was
desirable to permit them to fish in Mexican waters in exchange for
allowing Mexicans to catch some squid here, they would unequivocally
say yes.

When you look at the dollar value of shrimp in the United States
compared to squid, there is no comparison. I think shrimp is probably
the highest priced commodity and brings the most money into the
United States of any other product. Squid is an underutilized fish.

The second thing I would like to mention perhaps in defense of
the Mid-Atlantic Council is the misconception, with regard to the surf
clam, that as a result of the management plan the price has been
driven up to $12 a bushel. Prior to 1976, because of the absolutely
unlimited fishing, the surf clam resource had reached the point where
it was on the brink of economic extinction. That was before the Fish-
ery Conservation and Management Act came into effect.
In 1976, there was a dramatic fish kill in the mid-Atlantic bight. The surf clam beds, the surf clam population in the state of New Jersey was killed, according to statistics, up to 70%. So you had the fish kill compounding the prior overfishing. The fishery management regime under the FCMA was faced in 1977, when it came into existence, with a situation where surf clams were about to be driven out of existence from the standpoint of the commercial fisherman.

Because of overfishing, even before this fish kill, for about seven years the state-federal board had been wrestling with a management plan that they felt might help to save the surf clams. This was before our 200-mile limit came in. When the regional council, the Mid-Atlantic Council came into existence, the surf clam industry came to this council and said that they dramatically and drastically needed some help. They themselves had tried to impose limitations on their own catch and were told by the federal government that if they did that on a voluntary basis, they would be violating the anti-trust regulations and would be subjecting themselves to criminal penalties. And they actually begged the council to get involved in a management plan. As a result, that plan was made number one priority plan and a plan was put through based on what the industry over seven years had evolved, working with the different state organizations and with the federal government.

Now, we have surf clam representatives on the Mid-Atlantic Council and we have been in touch—we have a surf clam advisory panel made up of experts. And, as far as I’m concerned, except for one or two relatively small operators, there has been almost complete unanimity in the belief that the plan has helped the surf clam resource. You must remember, and as far as I’m concerned, the keynote of fishery management under the Fishery Conservation Management Act is conservation.

No one has the right to take a resource and kill it and say, “I’m going to pocket the proceeds.” These fishery resources belong to everyone of us, not just to a fish processor or commercial fisherman or recreational fisherman. They belong to the American public and we have an obligation to see to it that our children and great-grandchildren are going to enjoy the fruits of the sea as they have been handed down to us.

Moderator Wilson: Thank you, Mr. Feinberg. You wish to respond? Mr. Feinberg is also going to speak this afternoon and you can comment now.

Mr. Fass: Mr. Feinberg, I think you misunderstood me completely. I was only pointing out the fact that the plan that was put in effect by the Mid-Atlantic Council presented that problem that exists today where the product has a very difficult time selling on the American market because of the price. The industry has turned to the quahog as you well know, which is much cheaper in price. I was only pointing out that this can happen to any segment of our industry. I think we
have to develop the industry. I was pointing out only that there are products out there that the American public, I think, will enjoy that are relatively less expensive by a great deal than some of the products that we have spent a great deal of time cultivating, unfortunately to the detriment of the American consumer's pocket book.

I also don't want you to believe I'm against conservation. I am one hundred percent for conservation. It will be the survival of all of us if we can effectively put in plans that are strictly conservation-oriented and are enforceable. I'm sure you'll agree with me that there's no sense in putting a management plan into effect in the future that no one can enforce.

*Moderator Wilson:* Thank you, Mr. Fass. The next item—we're running out of time. The next item on the agenda is coffee. This panel will disband. There's much more these people can tell you and they will be available. Thank you for your kind attention.

(At this time, conference recessed for a coffee break, after which the conference reconvened.)

*Professor Theberge:* Ladies and gentlemen, if you will file in, we will get started with the next panel. This panel will deal with major environmental impacts affecting Virginia fisheries. Unfortunately, Doctor Robert S. Jackson, with the office of Health Protection and Environmental Management for the Virginia Department of Health is ill today and Mr. J. B. Jackson, the Administrator of Virginia's Council on the Environment has been gracious enough to substitute for him today. J. B. Jackson, I might also point out has very good credentials in regards to the fishing industry. He has been involved in the recreational fishing industry for about 30 years as a dealer in recreational equipment and he's very intimately involved with the environmental matters in the State, being administrator of the Council on the Environment. Mr. Jackson.

*Moderator Jackson:* Thank you. This was a very pleasant task I got today to pinch hit Jackson for Jackson. I'm sure many of you will miss the wit and wisdom of Doctor Robert Jackson who is known in some quarters as the loquacious Captain Kepone but I'll do my best to keep things flowing here. I was introduced as a dealer in fishing tackle but actually for the last 20 years before I was named to this position, I was a manufacturer of fishing tackle. I got a very good perspective of the sport fishing world. I also became quite involved in working on water quality—it being good business and a good thing for our way of life also.

It's really a pleasure to be with you. I've served on one committee that Doctor Cronin mentioned. On Wednesday I went to Maryland to the second meeting of the Bi-State Working Committee which was formed after Governor Dalton and Governor Hughes of Maryland signed a resolution for the two states to work very closely together for the welfare of Chesapeake Bay. Working with the Maryland group...
has been a great experience. We’re getting to know one another very well and I think substantive things are beginning to happen.

Without further ado from me, let’s get on with the environmental impact on the fisheries and lead off with Doctor Austin from the Virginia Institute of Marine Science. Doctor Austin.

Dr. H. M. Austin: In 20 minutes, to try to talk to you about the major environmental impacts on marine resources is like trying to tell you what’s written in the Bible in one hour so I can only give you a very broad brush treatment and hopefully stimulate some thinking and maybe some questions. Then our commentators can expand on some of the points that you might be interested in.

One of the problems we’re dealing with, certainly from the scientific and from the regulatory point of view, is that environmental impacts on ecosystems, or the marine resources component of an ecosystem, are as diverse as the environment in which the species live. Generally, what we try to do is categorize the impact by their initiating force, whether they’re natural or man made impacts, their longevity, do they happen once, an event, or are they something that’s chronic.

It would also be worthwhile to categorize them by the degree of control we’re capable of exerting. Man-made environmental impacts are generally viewed as detrimental, generally because of the effects that we can see: fish kills, oil spills, or posted signs that say a shellfish bed is closed. These types of man-made impacts can either be acts of commission, in other words they were done on purpose as an intentional point source discharge of waste, or an act of omission in the form of a non-point discharge of agricultural run-off of herbicides or nutrients due to fertilizer.

The longevity has some bearing on the final result as the effects of an oil spill on a rocky beach, while quite dramatic initially, are hard to discern at the end of a couple of years and the population recovers quite successfully. A case in point is the Ocean Eagle, a tanker that broke open in San Juan Harbor back in 1967. By 1969 and '70, the effects of the spill were no longer discernible.

On the other hand, the daily leakage from a refinery into the environment, while not so dramatic and possibly not even seen, may impact the ecosystem for generations; if not for generations, then in a given year class and yet the effects don’t show up until some time later.

Man’s impacts are not all detrimental. Some of them are on the positive side but, on the positive side, man’s impact on the environment is generally to rectify something he has done wrong. At best then, all he does is help establish the environmental status quo. Man-made environmental impacts are very difficult to control by the management agency that is tasked with managing the resource.

For example, National Marine Fisheries Service is mandated with the management of our fisheries outside of state waters yet it is the Environmental Protection Agency that prepares water quality standards and regulations and enforces them. At the state level in Virginia the General Assembly makes marine resource regulations, but it’s the Marine
Resources Commission that enforces. Yet it's the State Water Control Board and the Department of Health that make up the water quality regulation standards and enforces those. What we're dealing with then is the agency that handles resource management does not manage the quality of the habitat, and this is necessary in order to manage the resource.

A problem has arisen in the case of the Fisheries Conservation and Management Act. We have the regional councils who are charged with managing the fisheries, and the question that has arisen is whether or not they have the mandate to manage the habitat. Again, unless you can control the quality of the habitat, you can't really manage the resource itself.

Another man-made impact, since man is part of the environment, is the effect of fishing, and in some respects and in some fisheries overfishing is probably the greatest man-made impact that is felt. It should be the easiest to control but anybody who has tried to regulate fishing effort knows that it's one of the most difficult, often for political reasons.

My own area of interest lies in natural environmental fluctuations. They pose an interesting dilemma as they really have to be separated from the man-made effects before we can begin to see what causes and effects there are. Nature is remarkably resilient when it comes to natural episodical events such as hurricane AGNES, the cold winter of 1977, or the drought periods of the middle and early sixties. Yet, the ecosystem generally bounces back after a few years, but this is only true when the ecosystem is not stressed by man either due to environmental insult or to overfishing.

We are faced with the problem of identifying climatic changes and how they effect changes in migrations, recruitment, or fluctuations in abundance and availability of the resources. For example, we're now beginning to understand how extremely cold winter temperatures (1918, 1958, 1977-79) caused juvenile croakers to die off in the rivers of the Bay where they over-winter, impacting the availability of the resource two years later. River run-off is also an important consideration for the blue crab and the timing for good survival of the larvae and juvenile is critical.

Essentially, drought conditions during summer provide a large high salinity area in the lower Bay where the crabs release their larvae, but the juveniles need a very low salinity environment so they travel up in the rivers, and if we have a wet fall following the dry summer, we have a good survival for the juvenile blue crabs. Conversely, a wet summer followed by a dry fall would yield low recruitment. Some efforts have shown that wind stress, the direction and strength of the wind, duration of the wind, is particularly important for survival of menhaden larvae. If the wind is out of the northeast in the area south of Cape Hatteras, which provides nasty weather as far as fishermen are concerned, the resultant Ekman transport brings the menhaden eggs and larvae inshore where survival is enhanced.

First feeding fish larvae, when the yoke sac is first absorbed, have to
have sufficiently abundant phytoplankton available or they starve. The phytoplankton have to be large enough to be seen but small enough to fit in the mouth of the fish larvae. The spring phytoplankton bloom occurs about the same time each year as it is dependent upon photoperiod.

The spawning and development of fish eggs, and subsequent larvae are more temperature dependent which means spawning may occur at a different time each year. Consequently, larva abundance, or the peak of first feeding larvae may not coincide with the spring phytoplankton bloom. Consequently there is low survival and recruitment is poor. On the other hand, if the two coincide, there is a strong year class. There is some evidence this may be one of the causes of some of the fluctuation in the striped bass, at least in the Potomac River.

So, we have problems in identifying what the natural environmental fluctuations are, and we have no chance to control them. Generally man is only capable or successful at excluding natural environmental fluctuations. In other words, by building a well insulated home, you can regulate the environment inside but you can't do very much about the outside. Efforts at controlling the environment such as dikes, channelizing rivers or building breakwaters are efforts to control natural forces which work pretty well under normal conditions, but as soon as there is a flood or a hurricane, the dike and breakwaters break down.

Little can be done to control climate on the scale required to impact the resource throughout its range but we are faced now with the real possibility that we may be inadvertently modifying global climate by the release of CO₂ through the expenditure of fossil fuels and wood. How do we separate natural climate changes from changes in climate we may be producing? The current literature does not suggest that CO₂ is a major problem; however, the greenhouse effect may trip the balance for a while.

Twenty years ago, they began to monitor CO₂ in the atmosphere; it has been increasing steadily since 1958. If they extrapolate fossil fuel and wood burning expenditures and project the CO₂ concentration to the point where one percent of the back radiation is filtered by CO₂ in the air, we reach the point at which the global temperature will begin to rise. The forecasts are for about 2020, that is unless we can reduce our energy expenditures that reduce CO₂ in the atmosphere. Insignificant temperature changes of only a degree are of such a magnitude that in higher latitudes the growing season can be shortened by one to two weeks.

The effects of man-made hazards or man's environmental impact can be exacerbated or minimized by natural environmental fluctuations. Consider what could have happened in 1976 if during the ARGO MERCHANT oil spill off Nantucket, the winds had not been out of the southwest. As it was the oil was carried offshore; but consider what would have happened if the winds had been out of the northeast during most of that period. The oil spill would have been carried onshore.

Perhaps the best example that we have of a combination of a natural
climatic fluctuation and man-made impact was the anoxic condition in the New York Bight that Bill Feinberg alluded to earlier. The New York Bight apex, where the Hudson River drains into the ocean has a rather large nutrient load, some of it coming from the sewage of New York City, and some from agricultural runoff further up the River. At any rate, there's a very large man-made input of nutrients to the New York Bight.

You may recall that the winter of 1975-76 was one of the warmest in the recorded history of the Weather Service which goes back to the 1800's. In the area of Washington, D.C., October, November, December, January and February, the temperatures broke the 100 year record. The result of this was that springtime came two weeks early in the New York Bight. The phytoplankton bloom that occurs every spring occurred earlier than usual, and the unusually heavy run-off from the Hudson River produced a layer of fresh water that overrode the denser higher salinity water. The result was stratification took place.

Stratification shuts off vertical circulation between the surface and the bottom. The nutrient load that was introduced initially existed throughout the water column. Phytoplankton in the bottom waters below the thermocline begin to die off and the phytoplankton bloom ends normally after stratification has set in temperate areas. The phytoplankton bloom continued this particular spring, started early and continued because of the heavy nutrient load; this is called eutrophication, an over-production. These phytoplankton, instead of producing surplus oxygen, began to use up oxygen, and soon the oxygen level in the deeper waters dropped to zero, then hydrogen sulfide was formed. This was followed by a massive kill of finfish and surf clams.

So here we had a situation where man's impact or a chronic man-made insult, the heavy nutrient load into a natural system, could be tolerated by the ecosystem until a natural climatic fluctuation occurred. When the two coincided, it produced one of the most spectacular, if not the most spectacular and certainly the most documented example of a fish kill.

Now, let me speak from a scientist's perspective. As I said earlier, man-made environmental impacts are particularly hard to assess, not only because the dynamics of natural systems are not well understood, but also because there are so many inputs. Unless we can identify a chemical or known pollutant from a known source, it is impossible to know what to look for. The EPA Chesapeake Bay Study is funding studies but even when a compound is identified, its biological effects may not be known.

The National Marine Fisheries Service scientists, working in the laboratory in San Francisco, have identified automobile emission hydrocarbon compounds in the tissues of the striped bass as well as elevated levels of heavy metals. These fish have been found to have body lesions, poor gonad conditions and eggs with reduced lipid oil in the yolk. The lipid oils are important as they provide nourishment to the fish larvae before they begin to feed. The question that arises,
then, is this: is it the metals or automobile emissions that are causing this, or is it a synergistic effect between the two or something else we haven’t measured at all?

Similar situations have occurred in the upper Chesapeake Bay and Potomac River where similar effects have been observed. We haven't looked to see what kinds of automobile emission compounds we may find in striped bass here. There is a considerable run-off of herbicides, for example, in the Potomac River, something they didn’t even look for in California. Is that a possible cause? We’re faced with what is apparently man-made environmental damage, pollutant damage to a resource yet there are so many pollutants we can’t determine which it is that may be causing the impact.

Even for known toxic compounds such as kepone, we don’t know what concentrations are chronically toxic. When DDT was first introduced into the environment some 40 years ago, we didn’t know it was going to take 25 years for the side effects to show up. What will be the effects of kepone on man’s physiology or the reproductive capability of the James River oyster another 20 or 25 years from now?

During the mercury scare of the early twenties, we tried to find old frozen or museum fish to study, to see if the mercury level in them was higher or lower than what we were finding in our samples. Yet, the way the old samples were kept in museums it wasn’t possible to analyze them for mercury. What we need to do today is establish a tissue bank. What kind of tissues do we need to save, and how do we have to preserve them so that 20 years from now when some new exotic problem arises, we can go back to this tissue bank, draw the samples out and measure them for whatever the new compound is we’re concerned about.

The National Environmental Policy Act of 1969 calls for an environmental impact statement to be written prior to almost any type of activity that may modify the environment. Effective environmental management requires baseline and monitoring assessments, but what do we measure, how accurately and how often? What degree of sophistication is necessary in a baseline study that later allows a look quantifying the degree of environmental modification. The more accurate we are, the more samples we collect, the more sophisticated our approach, the more it costs. Somewhere there’s a balance that has to be struck between the two.

The reoccurring question by industry and state agencies that are required to pay for the studies is, “how much is enough”. When do we have sufficient studies? When are the studies that have already been conducted sufficient? How much more is it going to cost? The scientist is always saying that we need to do more studies. The agencies are saying we’ve already got enough studies. Somewhere a line has to be drawn.

Just as a scientist can’t study every compound that is dropped into coastal waters, the state regulatory agencies can’t develop, or if you prefer, promulgate regulations for every single contingency. The fed-
eral government maintains a list of toxic “bad guys”. Kepone, for example, was only added to the list in 1975, but we can’t put every potentially toxic compound on this list. Yet we have compounds that should be on the list, but scientists can’t measure everything that goes into the receiving waters, the sediment, the fish, or the shellfish. If we did, if we began to measure everything on this toxic list we might find more species removed from the market, more fishermen from their livelihood, and more scientists from productive work. Regulations are generally drawn up to cover either average or hazardous conditions. Health regulations cover those situations that pose a health hazard. Fishing regulations, like minimum size regulation, are designed to cover average conditions.

The problem here though is that the natural versus the perturbed environment or the fluctuating environment creates a problem. The blue crab, for example, can’t be taken until it reaches five inches. This is the size reached by most of the stock of a given year class under normal conditions. However, if the spring and summer are cooler than normal, a percentage of the population, even though mature, never reach legal size, although they complete their life span. Consequently, they’re lost to the fishery and this poses an economic loss to the fisherman and Commonwealth.

Aside from the problem of increasingly complex toxic compounds being injected into the environment, we have the problem of sewage, which will be addressed further by this panel. One problem that I’d like to mention is that by adding sewage to our water we reduce the salinity.

It has been suggested in discussions with Doctor Huggett that 25% of the fresh water flow coming out the mouth of the James River may be coming from sewage outfalls, and an oceanographer at New York University has suggested that between nine and five each day, as much as 50% of the volume of the Hudson River may be coming from the toilets of Manhattan.

We can’t always control the hazardous inputs to the environment by man. What are we going to do about it? From the scientific point of view, and perhaps from the regulatory point of view, the scientist has got to be willing to come forward, even when he has incomplete results, and he has to assist the agency decision maker. Conversely, the decision maker must seek out the best scientific information. Often a communication problem exists in that the scientist wants to do more or wants to be too precise or isn’t willing to comment until he has done further studies. Sometimes this can be helped if the decision maker will carefully word his questions and frame them in such a way that the scientist can answer them. Further, if the decision maker, who has political considerations, can advise the scientist as to what some of the political considerations are, he can come up with, if not the best solution, then certainly a biological fall back position that will be politically expedient for the decision maker.

We control the taking of the resource from the water; we have
standards that control the quality of water, and yet what is really needed is to come up with standards that control the number and the activities of people who live along the edge of the water. We know the carrying capacity of the water, both for resources and many chemical compounds, but we don’t really know the carrying capacity of the land along the water’s edge. Maybe this is what we really need to regulate, not so much what’s getting put into the water or what’s being taken out of the water, but who and how many are living along the edge of the water. Thank you.

Moderator Jackson: Now we have listed Doctor James Chambers and Doctor Chambers reached over and scratched out “Doctor” and put “Mr.” so I introduce to you Mr. Chambers who will talk to us about the impact of the environment on Virginia waters.

Mr. Chambers: Thank you. I’m with the National Marine Fisheries Service (NMFS) in the Washington office and I represent the Office of Habitat Protection. I’d like to talk about the problems affecting Chesapeake Bay and describe NMFS’s role in the assessment of environmental impacts on Virginia fisheries. NMFS is the Federal agency responsible for managing and protecting the Nation’s fishery resources and their habitats. It does this by evaluating factors which affect fish populations and by assessing the impacts of proposal projects and providing recommendations to Federal agencies which construct or authorize construction in waters of the United States. NMFS reviews such proposal projects and provides comments on ways to protect fishery habitat which might otherwise be degraded or destroyed in connection with construction of dams, reservoirs, channel dredging for harbor projects, and permit applications for such projects as marine bulkheads and the like.

NMFS was formed in 1970 by splitting the U.S. Fish and Wildlife Service (FWS) in half. The former Bureau of Sport Fisheries and Wildlife remained in the FWS while the Bureau of Commercial Fisheries became NMFS within the newly-created National Oceanic and Atmospheric Administration (NOAA) in the Commerce Department. About one year ago, the Office of Habitat Protection was formed by the Administrator of NOAA in order to give high visibility and importance to habitat protection within NOAA. Our office is divided into two divisions, a research and an impact assessment division, which I lead. NMFS’s research program provides the basis for the scientific recommendations which our assessment division and its field organizations located throughout the country, make on various projects that are analyzed. Our field structure is composed of five Regional Offices composed of approximately several hundred scientists in each, and four Research Centers, which are themselves composed of 22 major research laboratories. So we have extensive scientific backup for our recommendations on habitat protection. The goal of our office is to reserve the downward trends in quantity and quality of our Nation’s fisheries by minimizing further losses and degradation of their habitats.
The activities we're involved in include (1) participation in state coastal zone management planning and development of implementation plans, (2) analysis of Outer Continental Shelf (OCS) oil and gas leases, (3) review of Corps permits (approximately 15,000 annually on a nationwide basis), and (4) participation in the planning of federal projects such as navigation projects for harbors.

The mandates for our activities stem from about 20 federal laws. The most important are the Fish and Wildlife Coordination Act, the Fishery Conservation and Management Act and the National Environmental Policy Act. It is important, I think, to point out that we have jointly published with the Department of the Interior, draft regulations to interpret the intent of the Fish and Wildlife Coordination Act. This act requires federal agencies proposing work in waters of the U.S. to seek the views of the NMFS, FWS and state fish and wildlife agencies on the effects of such construction. Wildlife conservation shall be given consideration equal to other project purposes. However, the act has been interpreted and applied by various federal agencies in their own manner. There has not been consistency. As a result, valuable fish and wildlife resources have been permanently lost. We now have firm interpretation of the act which means that fish and wildlife resources are now going to be given adequate consideration in decisions on federal projects and federally approved permits.

Our relationship with other federal agencies concerned with Chesapeake Bay and Virginia's waters revolves around review of federal permits. A model approach has been developed in Chesapeake Bay by all the federal and state agencies and it's known as Joint Processing. It's an excellent system consisting of monthly meetings at which a group of permit applications are considered and final agency positions reached. Individual agencies will report on the findings of their field inspections and non-controversial permits can be disposed of or decided upon at the monthly joint processing meeting. Controversial projects are handled by letter reports to the Corps of Engineers. This system has been so satisfactory in reducing habitat loss and developing trust and respect among the agencies that it's being applied in other areas of the country, notably the northeast.

Now, I'd like to discuss the role played by various federal agencies in Chesapeake Bay. Congressional hearings were held recently on House Resolution 4417 to consider appropriate coordination of federally supported and conducted research on Chesapeake Bay. EPA has been involved through their Chesapeake Bay study program. This is a five year program started in '77, and funded at five million dollars per year. It contracts with VIMS, the Smithsonian Institution, and the Chesapeake Biological Laboratory. It is primarily intended to assess the factors impacting the environmental quality in the Bay but also involves coordinating research and abatement programs.

The National Science Foundation provides a clearing house for research coordination and it functions through the Chesapeake Research Consortium.
Other NOAA programs include (1) the Office of Coastal Zone management which provides funds for states to develop and implement their coastal zone management programs; (2) the Sea Grant program which supports applied research programs in Maryland and Virginia including efforts directed toward solving coastal shoreline problems; (3) the Environmental Data and Information Service which maintains an oceanographic and atmospheric data repository for the Bay; (4) the National Ocean Survey which conducts an ocean dumping program and funds physical oceanography and physiological studies of the effects of disposal of dredge materials from areas such as the Elizabeth River and lower Chesapeake Bay.

New legislation which is pertinent includes Public Law 95-273, the National Ocean Pollution Research and Development and Monitoring Planning Act of 1978. The Act requires the development of an interagency pollution research and monitoring plan that will provide comprehensive and coordinated research in important estuaries such as Chesapeake Bay.

The Bay is suffering from a variety of problems. But fortunately, it is generally unpolluted compared to the other east coast estuaries such as Raritan Bay, Delaware Bay and the Hudson River. However, there is growing concern. As evidenced by this conference, we're all interested in this.

Man's impact on the Chesapeake Bay is concentrated in the urban areas: Baltimore, Washington, Norfolk. Urban stresses such as sewage discharge, sedimentation from storm drainage and construction are further aggravated in Baltimore and greater Norfolk area because of intensive port development and heavy industry.

The major Bay problems can be grouped into five categories. In a bi-state conference in 1977, it was recognized that major environmental problems were sedimentation and shoreline erosion. A second major problem has been the influx of toxic substances. A third is nutrient enrichment and eutrophication. Fourth, widespread changes in marine life have occurred with a drastic decline in some species including oysters and striped bass. Fifth, has been the loss of aquatic vegetation throughout the Bay.

Shellfish harvesting has been banned in locations throughout the Bay because of bacterial contamination as a result of sewage discharge. Thermal pollution is another problem. New power plant construction along the Susquehanna River and other tributaries during the 1980's will cause one of every three gallons of Chesapeake Bay fresh water to be warmed by electrical generators. Radioactive waste is another problem. The lower Bay is actually downstream from ten nuclear power reactors with multiple units at the site.

Natural perturbations have been mentioned by previous speakers. These include temperature anomalies (including freezes), hurricanes and tropical storms, and floods—all of which affect the Bay. Miscellaneous problems include species introductions, population explosion and die-offs, diseases and epidemics such as MSX, the oyster pathogen.
The major problems, however, are sedimentation and erosion. The sources of sediments vary along the estuary. The Susquehanna River is the major source in the upper Bay, while erosion is a large contributor in the mid and lower Bay. It is estimated that one million tons of sediment per year wash into the Potomac River from the Washington metropolitan area. The Bay requires continuous dredging to maintain existing navigation channels. It is estimated that 600,000 tons of silt and clay are eroded from Bay shorelines each year and over the last one hundred years, approximately 25,000 acres of Maryland shoreline and 20,000 acres of Virginia's shoreline have been lost to erosion.

Wetland areas continue to be degraded from construction activity, sedimentation and fill. However, in Virginia, wetland losses have been reduced from a rate of 100-450 acres per year which were being lost in 1955 to 1969, down to 10-25 acres per year since 1972.

Although the open Bay is relatively unpolluted, many tributaries have been seriously degraded. Impacts are due to industrial discharges, non-point source contamination from heavy metals, pesticides and PCB's, and oil and marine transportation spills. The highest metal levels are found in Baltimore Harbor. Zinc and cadmium levels in the Baltimore Harbor sediments are twice those found in the Elizabeth River.

Striped bass from the Virginia portion of the Bay show PCB levels somewhat higher than those in Maryland waters but still comply with FDA allowable levels. Oil is transported not only the length of the Chesapeake Bay but also in most of the larger tributaries. Therefore, the potential for damage to marine life of the Bay is widespread. Kepone pollution presents a special problem. Kepone was dumped illegally into the James River over an eleven year period from a manufacturing plant at Hopewell. Because of contamination levels in fish and shellfish, fishing was prohibited in 1976. Nutrients have been mentioned earlier as a threat to Chesapeake Bay. The decline in striped bass which has been heavily fished since 1960 is another problem. A recent decline in abundance of striped bass in the Bay and along the mid-Atlantic coast has been attributed by some to a severe failure of reproduction and success of larvae forms. Similar findings by NMFS scientists conducting research on striped bass in San Francisco Bay support this.

A serious decline has occurred in the American shad and herring populations which were historically abundant in the Bay. Oyster production in the lower Bay has trended downward since 1890. Rooted aquatic vegetation has declined throughout the Bay. Many plant species have declined in the upper Bay and by 1972 had almost disappeared. The decline is attributed to several environmental factors, including storms, turbidity, salinity and disease.

I would like to take a couple of minutes now to mention yet another threat which has consumed our attention for the past two years. That has been the proposed Portsmouth Refinery which threatens the entire Chesapeake Bay in addition to all the stresses that are already imposed upon it.

In 1976, the Hampton Roads Energy Company applied for a Corps
permit to build a marine terminal and oil refinery in Portsmouth, Virginia. The proposed refinery would be supplied by very large crude oil tankers and most of the refined products would be distributed by waterborne means. The refinery would be located at the mouth of the Elizabeth River which empties into Hampton Roads at the mouth of the James River. Two critical resources are located in this area. Just upstream in the James River are the world's largest seed oyster beds, covering 21,000 acres. Just outside Hampton Roads, in the mouth of the Chesapeake Bay, is the over-wintering and spawning area for virtually the entire Chesapeake Bay population of female blue crabs. Both these two very valuable marine resources, which represent 30 to 50 percent of the U.S. catch in both species, are concentrated in a relatively small area where they are extremely vulnerable to oil pollution in the area.

The major impacts of such a refinery to resources in the Chesapeake Bay include potential oil spills, emissions of air pollutants, discharges of toxic chemicals in the refinery's waste water effluents on an already stressed system. Other impacts include dredging and re-suspension of contaminated sediments, rapid filling of the harbor's only existing disposal site, and withdrawal of two million gallons a day of potable water from an already stressed regional ground water system.

Our concern over the risk of oil spills is primarily directed at spills in transit-ships coming in and out of the Hampton Roads area. Hampton Roads is by historical data, three times more accident-prone than the average world wide port. However, with much larger and less maneuverable vessels coming in as proposed, the risk goes up to nine times the world average. A spill of 5,000 barrels of petroleum can be expected to occur approximately every five years. The significance of those figures is that the concentration of oil which has been demonstrated to be toxic to oysters and other marine life is approximately one part per million. A spill of only 1,000 barrels could produce that lethal concentration over the entire seed bed. A spill of that size could be expected to occur approximately every three years. Estuaries don't recover from oil spills rapidly. Previous spills have shown us that more than ten years is generally required. So the threat to both the blue crab and the oyster industry is a very significant one. The Secretary of the Army now has the final decision and we have presented, as has the Secretary of the Interior, detailed analysis and comments, including new information which we are hopeful will dissuade him from permit issuance in order to protect the public interest.

*Moderator Jackson:* Thank you, Mr. Chambers. Now we'll have our commentators. One of the commentators, Cranston Morgan, my old friend, is ill. I understand that his address will be included in the Conference proceedings. In his place we have Ron Gregory from the State Water Control Board.

*Mr. Gregory:* This is an unexpected pleasure and please bear with me. I'm getting over a case of laryngitis. If you can't hear me, let me
I'll try to speak up. I'm going to address my comments more to
environmental effects.

I think it's important to note that roughly fifty percent of Virginia's
land area drains into the Chesapeake Bay and this same land area con-
tains most of the urban areas, most of the industrial areas in the state,
and most of the population. Anything that goes on within this land area,
within this region of the state, affects the water quality and in turn
affects the fishing of the Bay.

Any time we build a road, build a shopping center, build a house,
any time a farmer plows his field, fertilizes it and then uses pesticides,
and herbicides, any time one of us turns on the tap, washes the laundry
and flushes the toilet, we affect the water quality of the stream of water
going into the Bay and affect the water quality of the Bay and this in
turn, affects the fisheries.

I don't think we have to tell this group what a great fishery we have.
I read that up to 70% of the striped bass population for the eastern
coast of the Atlantic spawns in the tributaries inside the Chesapeake
Bay so it's important; the Bay is important not only to those in Virginia
but also to the entire Atlantic fishery.

Of course the oysters and clams, the species that live on the bottom,
have to sit there and take whatever comes along. I think over the last
couple of decades the regulatory agencies in Virginia have made great
strides in controlling the gross pollutants, the conventional pollutants
that affect water quality. The actual poundage of waste going into the
Bay has been reduced dramatically over the last ten or fifteen years.
However, as was pointed out, the actual flow of sewage is up.

We have the technology now to control the nutrients, the phosphates
and nitrate compounds that act as fertilizers to the plankton that live in
the Bay. And we found, however, a paradox in that the cost of this
technology is very expensive. It's so expensive that we've got a situation
now where we can find the capital outlay to build new treatment plants
around the Bay region. Seventy-five to ninety percent of the cost of the
treatment facility for a community can be supplied by federal and state
funds.

However, because of the increased cost of energy and the general
rate of inflation, the communities have a problem of running the
plant—operating the plant on a day to day basis. Are they willing
to accept a dramatic increase in their water bills? Very important politi-
cal issues are created when you start talking about this sort of thing and
the trade-offs I mentioned earlier.

In spite of this fact, I think we're doing a very good job of controlling
the pollutants from point sources. But we find this is not enough. We
have a problem with toxic compounds and we have a problem with non-
point source pollution. But I see the federal agencies and state regu-
laritory agencies making progress.

In talking about toxicity, it is important to look at it in three different
ways.

You can look at acute toxicity. This is the type of toxicity that pro-
roduces blights. Dead fish are very visible to the public, to the fishermen, and whoever is on the water. Now, in the nine years or so that I have been with the Water Control Board, I believe we have investigated 100 fish kills a year on the average, I would guess, around the state. Very few of them have been in salt water. Maybe only ten percent of the overall hundred have actually been tied to some point source of pollution. I don’t think that there has been a large or acute kill in the Bay or the tributaries in the Bay to impact the fishery.

A second way we have to think of toxicity is in terms of chronic pollution and its effects. It may not be the big oil spill but the hundreds of little oil spills that affect the fitness of the environment. It’s well enough for an organism to survive and not be killed by an acute toxic compound. However, what happens when the reproduction potential is harmed, through the assimilation of some toxic compound? For example, we know that kepone has estrogen effects in male mammals and male birds. It suppresses sperm production and hurts their reproduction. There’s some laboratory evidence that kepone in levels approaching those found in the James River estuaries suppress the reproduction of certain species. If natural fluctuation is dramatic, it’s difficult to show an impact on any of these compounds at the present time.

The third type of toxicity associated with toxic compounds is bioconcentration. Here we do have a very good example in kepone. Here again the population—fish, crabs, and oysters—are still living in the James River estuary. However, the loss of resources to man through the uptake of possible cancer causing chemicals is present. We’re faced with three types of toxic pollution.

Getting a handle on toxic pollution has proven to be very difficult mainly because of the tremendous cost of analysis. The cost of analyzing for these chemicals versus conventional pollutants is greatly magnified, as there are many more of them and they are more expensive to run. And once you have identified them in a discharge, for example, the control technology is also enormously expensive so we have many socio-economic questions to answer.

The other thrust the agency is taking is toward non-point source pollution. We have some “best management practices,” outlining their voluntary action, not being implemented through laws or legislation at the moment. I think, faced with these problems, it’s very important, especially with working with the Chesapeake Bay program, to go to the citizens. We see the need to educate the public about the problems; we see a very strong need for citizen involvement. I think you will see the agency soliciting much more citizen involvement in the future to help us solve these problems.

They all have political implications and we need to find out what you want and what trade-offs are acceptable to you. Thank you.

*Moderator Jackson:* Thank you very much. The last speaker on our panel is Doctor Robert J. Huggett from VIMS.

*Dr. Huggett:* Thank you. My specialty is toxic substances and the
chemistry of toxic substances. Therefore, my talk will be along these lines. However, I would like to add to what Doctor Austin said relative to sewage plants. Indeed, we learned last week that approximately 25% of the fresh water entering the James River is from sewage. Several years ago we found that of the total amount of fresh water entering the Chesapeake Bay, the second largest estuary in the world, approximately two and a half percent is sewage. So sewage input to the Bay is a major problem, I think.

It's a major problem in that sewage is often thought of by decision-makers and regulators as being domestic waste. That is not true at all. Certainly a great deal of it is. Sewage plants are handled separately under federal laws. I dare say that if sewage plants had to operate with the same strict control that industry must operate relative to their discharges of toxic substances, we wouldn't have any sewage plants in the United States or very few.

We find, for instance, in the Chesapeake Bay that as much or more of many of the toxic tract metals, such as copper, cadmium, and zinc come in via sewage, as from the natural weathering of rocks or what we call the fluvial supply. We also find that almost any synthetic organic compound that we use in our nation ends up in the sewage treatment plant. The pesticides that are used on the corn crops in Iowa, that are fed to the cattle in the feed-lots in Chicago—the beef that we eat—ends up in our sewage plants and therefore in our Bay. We also find that we create many compounds in our plants via disinfection practices. For instance, the use of chlorine to kill bacteria before we dispose of the treated sewage into the estuary creates halo organic compounds, such as chloroform. So I think, from the sheer volume alone, sewage is one of our biggest problems in the Bay.

Relative to toxic substances in the near future, I see our predictive ability getting better. Right now we're not very good. We tend to experiment in the laboratory with animals that are very hardy and easy to work with, not necessarily those which are more important to the Bay. This is changing as our ability to hold sensitive animals improves. I also see our chemical analytical ability increasing greatly. If you look at what has happened in the past, you would see the impact of the development of such things as the electronic capture detector. This almost single handedly resulted in our being able to determine the problems of compounds such as DDT. The development of the flameless atomic absorption technique for mercury brought to light the mercury problem or non-problem, depending on whether you're a consumer or producer. Now mass spectrometers are coming into being and we can study a much wider range of substances.

Our federal laws and our state laws make it more difficult to add new compounds into the environment without a lot of testing. But with this new instrumentation, I predict that in the next few years we will discover many of the sins of our past—things such as kepone which was in the James River for seven or more years before it was discovered. Now, when these things are found, it will be the scientists that
are blamed for them. We will be asked, "Why did you let this happen?" Well, many times scientists aren't asked before environmental decisions are made and when we are asked, we often don't have much impact because we don't really have a very good ability at predicting. The scientists are also going to be blamed because, as an editorial in our local newspaper recently suggested, if we didn't use such sophisticated equipment we wouldn't be able to detect all the compounds. This is equivalent, in my own mind, to blaming a physician for your broken arm because he used an x-ray to find it. And some people would like to still use the practice of killing the messenger who brings bad news.

In order for our state to keep up-to-date with pollution control, it must review the state salary systems. That may sound funny, but the new types of required instrumentation are so sophisticated that it takes very sophisticated scientists to run them. A recent review of state chemist salaries in the United States indicated that less than one percent of the state chemists made in excess of $20,000. Just recently at a mass spectrometer symposium in Washington state, a friend of mine tried to hire a mass spectrometer operator. He was offering a salary of $33,000 a year. They laughed at him. I dare say there isn't a chemist in the state that is making thirty-three thousand per year. Those kind of things will have to change. My time is up and I'll answer questions if I might.

Moderator Jackson: Doctor Huggett ended up with a couple of minutes to go. It's been my pleasure being time keeper for these gentlemen and—we do have a few minutes for questions. About seven minutes before we go to lunch. Are there any questions or comments at this time?

Mr. DeMaria, Jr.: I've got several questions, one for Herbert Austin. What concerns me is that 25% of the fresh water coming down the James is from sewage treatment plants. I was wondering if perhaps they might be able to treat this water coming out of these plants. In other words, put salt in it. And Mr. Chambers, with regard to habitat protection—I heard you mention you were concerned about the public welfare and with the oil refinery. What I'm concerned about, being involved in a commercial fishery in the inland waters, is, if they do see fit to put the refinery there, what in the world is going to happen to the people that make a living out there on the water.

Mr. Gregory, I heard you mention some of the problems we have. I guess the State Water Control Board noticed the problems we have out in the Bay with chemicals going in there, but I don't recall hearing you mention anything about chlorine. It's my understanding that it does kill some oyster larva. If you gentlemen can come up with some of the answers to some of these questions, I would appreciate it.

Dr. Austin: According to my coach, Dr. Huggett, here on the right, most of the added fresh water input to the James River is coming from well upstream where the water is already significantly fresh. To add salt to it would be to change the distribution of the salinity in the river
in a way that wouldn’t necessarily be beneficial. We would be adding salt too far up in that case.

Mr. DeMaria, Jr.: That’s not what I am saying. That water coming out the pipe—why can’t it come out the same salinity as that of the water that’s around the sewage.

Dr. Austin: Something like that could be done but I think you’ll find that would create a real problem in trying to add the right amount of salt, the right type of salt. I have absolutely no idea what that would do.

Moderator Jackson: Mr. Chambers, would you like to respond to the questions addressed to you?

Mr. Chambers: Depending on the severity of the spill and it could be very severe as I indicated, 25,000 people would be directly impacted, their livelihood. Fifteen thousand are directly involved in harvesting and processing the blue crab resource; ten thousand approximately for the oyster industry, the same type of people. The Chesapeake Bay waterman and his way of life is threatened, I believe.

Mr. DeMaria, Jr.: Maybe I didn’t explain myself correctly. We have already been subjected to some undue displeasure because of the kepone. We no longer have the opportunity to go out and make a living in the James River like all our forefathers have done for generations and—you know, what the hell happens next. You come back here and ruin everything with oil. Then what are we going to do? I mean what is the government going to do? Are they going to train us in some other type of work if we’re going to discontinue the inland seafood industry? You know, that’s all these people have; they don’t have an education in any other type of field. What’s going to happen to them?

Mr. Chambers: They’ll be hurt.

Mr. DeMaria, Jr.: You don’t have to tell me that. I already know that. What I would like to know is what’s the government going to do for us. They’re going to allow industry to come over here and ruin everything. How are we going to support our families?

Mr. Chambers: We hope the government will not allow the refinery in. We have been arguing that for a number of years. We hopefully are going to turn the Secretary of the Army around.

Mr. Gregory: The agency, the regulatory agencies in Virginia recognize since 1975, 1976, there were some problems about chlorine. We have a problem in that we have to disinfect the sewage out there and we have to kill the bacteria. The problem is how to do it. The conventional method, used by practically every sewage treatment plant in the nation, uses chlorine. We have looked into changing to another technology but each one has a problem. Everyone of these has its own environmental impacts and own problems. It is also much more expensive than chlorine. We have a capital problem in going back and
fitting the plants for this. I was involved in this up to 14 months ago. Doctor Huggett, have you been involved in this chlorine problem?

*Dr. Huggett:* No.

*Mr. Gregory:* We did look at the possibility of using chlorination followed by dechlorination. Using dioxide gas and sulphates to remove the effluent before it goes out there. Other than that, I don’t know what to tell you. If I could have your name, I would get back to you and get you in touch with somebody who has been working with that committee and find out what they are doing now.

*Moderator Jackson:* I’m afraid our time is up. If there are any further questions, I’m sure that the panel will be available during lunch. Thank you for your attention and bon appetit.

The Address of *Mr. Cranston Morgan*:

I have been asked to briefly give my opinion about the Marine Environment in relation to my industry—the shellfish industry. We have heard state officials charged with fisheries, health and water quality talk about how clean our waters are. I agree that the appearance of our waters has changed toward the better over the past three decades. The state agencies, industry and the citizens of these states are to be congratulated for this change. I will refer to this later. Right now, however, I would like to talk about the Chesapeake Bay from my viewpoint.

To begin, I would mention how it was. When I was a boy, I went dredging with my father on a Chesapeake Bay skipjack sailing vessel. The “Susie Dryden” was 72 feet in length and would carry about 800 bushels of oysters conveniently. She was one of over 2000 such boats and to see 5 or 6 hundred working an oyster bar in close proximity was very colorful to watch. But for the captains it was a masterpiece of maneuvering to avoid collision or entangling of dredges; and still make your catch before your competitors. Selling your catch was very difficult. The availability of oysters was unlimited. The quality was the main goal so that the “oyster buyers” would desire your catch rather than your fellow dredgers. When these vessels completed their harvest, they hoisted all the sail they could stand up to—according to wind velocity—and headed for the markets. This was an unforgettable thrill to me to be a part of a race to the harbors. After discharging the oysters it was a requirement that the sail boats take back a load of shells and plant them. Probably aquaculture, as practiced in those days, was carried out more effectively than planting programs today. The captain planted these shells where, in his judgment, he could reap a harvest that only he knew the location of. Also it was planted where he had knowledge of previous successful plantings.

In reference to our clean waters mentioned at the beginning, I would

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*Mr. Morgan was taken ill on the day of the Conference and was unable to participate, but has graciously allowed his address to be published in the proceedings.
point out that Virginia alone has 166,000 acres closed to oyster harvesting because of pollution. We have 93,000 acres of know productive grounds closed out of 235,000 acres designated as public oyster bottoms. During the 1950's, we harvested in excess of 3 million bushels of adult oysters per year with a 1958 production of 5½ million bushels. In 1978 we dropped below ½ million bushels. In 1958 we had licensed 4600 tongers, but in 1978 we only have 1900. Now Virginia imports over 2 million bushels per year to supply their needs. The James River nursery area for seed oysters used to produce a reported 2 million bushels of seed per year (because of cheating on taxes this was very likely in excess of 4 million). In 1978 it was 600,000 bushels. This was clearly a drop through lack of ability to harvest the James properly.

Because of present conditions, our scientist at the Virginia Institute of Marine Science did an in-depth analysis of the oyster industry and made recommendations for improvements. The General Assembly created a Shellfish Advisory Committee that has held hearings around the Tidewater area with the hope of formulating legislation that will improve the industry. The two General Assemblies also created a Maryland-Virginia legislative commission to recommend legislation to help solve Chesapeake Bay and tributary bi-state problems. In addition, the two Governors created a bi-state commission to work for a better and more productive Bay. I am very pleased that we are receiving this concern about the watermen of the Chesapeake and his supporting industry. I would like to paraphrase the General Motors statement, "What's good for oysters, is good for the waters of the Bay." This is a true fact. Oysters are filter feeders and strain great quantities of water through themselves. They are little sewage treatment plants. It is my belief that water quality would degrade rapidly without oysters.

I would like now to mention our clean water. After Rachael Carson's *Silent Spring* a great number of sewage treatment plants were built in many places on the Chesapeake's tributaries. A study produced the alarming fact that 29.2 million tons of chlorine were being discharged into our streams. In fact there was enough chlorine being discharged in the James River for VIMS to record as high as 5 parts per million adjacent to the James River seed beds. Virginia Marine Resources Commission asked the dischargers to curtail these discharges during the months believed to be seed setting periods—with remarkable results. It is my belief that we must change our philosophy about sewage and waste. We now chlorinate and dump sewage in our waters. We now dump solid waste in landfills and waters of the oceans. The combinations of compounds coming through discharges, chlorinated sewage, oil and grease, detergents, etc. are many. Analysis will come up with many as yet unnamed chlorinated combinations. We will find these harmful to the marine resources. The Orient for 1000 years has treated their waste as an asset and used it in soil rejuvenations; and Europe, we are told, is about 60% converted to utilizing their sewage and wastes for soil replenishment and reforestation as well as fuel for electrical
generation. With the oil situation as it is, it is imperative that we begin to change our way of mistreating our wastes.

The last thing I would mention is that the forecast for the doubling of our population by 2020 A.D. makes it imperative that we plan for the location of these people and their industries if the natural resources and waters of our Bay are to remain viable. The hit and miss methods of the past have resulted in heavy concentrations of people in one or two places such as the Hampton Roads area. I do not believe in the “no-growth” philosophy—it is not the American way. I would point out there are many low population, low industry areas that could be used instead of proliferation in the same heavily populated areas.

I would conclude with an excerpt from Larry Simms' publication to the Citizens Program for the Chesapeake Bay: “Our responsibility as citizens concerned with the health of the Chesapeake Bay lies not in protecting this most economically valuable fishery, but in providing for the restoration of this great natural resource and reversing the damage that has already occurred.”

(At this time the conference retired to the Virginia Room where lunch was served, after which the following occurred.)

Professor Theberge: Ladies and gentlemen, if I could have your attention, please. Several of you have asked me what lunch was. I have to confess it's something specially prepared for us by the chef. It's crepe Chesapeake. I hope you enjoyed it.

I'd now like to introduce a man I have had a long and fruitful relationship with. I'm not quite sure that's the appropriate choice of words but this gentleman will introduce our speaker for today. I'm forced to say something good about him since, unfortunately, I ran him around the campus of William and Mary for most of the morning. I forgot to tell him where the conference was. That was a serious mistake since he was instrumental in helping us put the conference together.

Jim Douglas of the Virginia Marine Resources Commission has been Commissioner for eight, going on nine years now, and it gives me a great deal of pleasure to introduce him today. Thank you.

The Hon. J. E. Douglas, Jr.: Thank you, Bart. I can forgive you for the oversight as to where the meeting was held, but “crepes Chesapeake” with scallops and shrimp? Come on!

I'd like to add briefly my welcome to you on behalf of the Marine Resources Commission and to echo the words of Dean Spong this morning who welcomed you on behalf of all of us who have been instrumental in putting together this program.

I must say that Dean Spong, the College of William and Mary, and particularly Bart Theberge, are the ones who have done all the work. We are glad you are here; and we do think the topic of fisheries and environment are particularly important today, and so far I don't have any reason to believe that we are not going to continue to have fruitful discussions concerning this issue.

It is my pleasure to introduce our speaker at this lunchtime. I
have known who John Wedin was, but I had not met him until today. I asked if he would supply me with a little background as to his credentials and he's given me a most interesting introduction and I'm going to read it for you.

He's not a lawyer. I thought there was something prophetic as to why he put that in. Although he has written briefs, drafted fishery legislation, posted bail for cooks so a fishing vessel might sail on schedule, and even been mistaken for a legitimate counselor at times.

He is not a scientist, despite having taken a few biology and physiology courses in college. He is not a former member of Congress, although he served for about ten years in the United States Senate as a staff person assigned to the fishery area.

He is not a long time civil servant. For about four years since leaving the Hill, he has been employed by NOAA. In fact, he has a record of more than 20 years in the private sector with social security records to prove it.

He is not a basic environmentalist. This despite the fact that he was an officer in the West Coast organization Citizens for Clean Waters, dealing primarily with damage to oysters in particular from the outrageous dumping of sulfite waste liquor from pulp mills.

He is not a professor from academia, although he has spoken with what appeared to be wisdom at the time before fishery and ocean oriented students and even did some night school lectures on what fisheries was all about.

He is not a fish buyer or processor, but he made a living filleting fish, butchering salmon and picking livers, back in the days when they were in great demand. This career, along with operating a one man newspaper, provided partial support for college after World War Two, where he found himself equally unwelcome at university classes as well as his apartment, where the manager insisted that his clothes be hung on the back porch to air.

He is not a state or federal fishery manager. This despite the fact that he served for a number of years as chairman of the Advisory Committee for the Pacific Marine Fishery Commission and was later Chairman of the Commission.

He is not a diplomat although he served as an advisor to the International North Pacific Fishery Commission, was an observer at the Law of the Sea deliberations in Geneva in 1960, and served for nearly 20 years as a member of the State Department's advisory committee.

Now it was at this point that I said, "John, what the hell are you? We know what you're not and the folks here are going to wonder why we invited you!" John is the director of the Office of Congressional Affairs at the National Marine Fisheries Service under NOAA, and he founded and published the Fisherman's News for 20 years and did a live radio broadcast from Seattle's Fishermen's Terminal every morning for about 15 years.

I guess the best way to introduce John to you is to say that he is a journalist turned public servant with a strong interest in fisheries; so,
ladies and gentlemen, let’s welcome, from our nation’s capitol, John Wedin.

Mr. John Wedin: Thank you very much. It is a very real pleasure to be here today. I have been renewing some old acquaintances, particularly with Senator Spong. You, of course, refer to him as Dean Spong, but his good work for fisheries in the United States Senate has not been forgotten.

One of the major problems on the Senate side has always been the difficulty in securing a chairman for hearings, particularly for legislation which does not appear to have national prominence, but is vital to the welfare of the fisheries. In those days there was a fisheries subcommittee, chaired by Senator Magnuson from Washington, but on many occasions, in his role as chairman of the full Commerce Committee, it would be impossible for him to sit as chairman. In those cases, Senator Spong very willingly stepped in and allowed the hearing to go on. Often the issues weren’t of great importance to Virginia, but his general interest in fisheries was such that he would forego other assignments to chair. On one occasion, I remember he had just returned from a conference in Brussels, had arrived in Washington during the night, with jet lag and all, but appeared for the hearing at 10 in the morning.

I first came back to Washington in 1965 to work as the fisheries staff person for the Senate Commerce Committee. This all came about at a meeting in Juneau, Alaska where Department of State Undersecretary Thomas Mann was attempting to help us with the perennial problem of the Japanese high seas salmon fishery, intercepting the stocks from the huge Bristol Bay fisheries before they could return for the American harvest. One evening during the sessions, Senator Magnuson leaned across to the late Senator Bob Bartlett of Alaska and asked if he might have his proxy. Senator Bartlett agreed, and the Chairman said he would like me to come back to Washington for a few months on a consultant basis to help with fisheries matters. I put my affairs in order within a month or so—no easy task, as I was editing the Fisherman’s News, had a daily morning radio fisheries broadcast, and was managing the 65-boat Washington trawl fleet as well. In more than 20 years association with the fishing industry I had come to believe that the only place where problems might be solved was in the nation’s capitol, and I leaped at the assignment.

The two months assignment turned out to be nearly a ten year one, and for the past four or five years, I have been associated with NOAA, most recently as the Director of Congressional Affairs for the Office of Fisheries.

As noted earlier, I am not a lawyer nor a fisheries biologist. But the twenty years in the newspaper business had trained me to find the answers to questions and know exactly who to talk to when difficulties arose.

I began The Fishermen’s News in January 1945, with a total capi-
talization of a $40 fish check. The beginning was to fill a need which I perceived, the lack of a fishermen’s journal. There were several dealing with canners and processors, and many very good ones, but none that, I felt, dealt directly and specifically with the myriad of problems which faced fishermen. At that time, incidentally, the National Fisheries Institute was being formed, and I often had the opportunity to compare notes with Bill Eardley, a Seattle fish dealer who had been NFI’s first secretary. His office was just across the hall from mine, and though their beginnings were a bit better organized and financed than my own, our problems were not dissimilar.

The National Fisheries Institute has come a long way, and has become a very important part of the fishing industry and the lobbying industry, particularly in Washington, D.C.

One of the activities which I had become involved in was the Pacific Marine Fisheries Commission, a compact not unlike your Atlantic States Marine Fisheries Commission. Our problem on the West Coast was a simple one; we met yearly, passed resolutions, but had no authority. We were a recommending body and, in order to make progress, it was essential that the States take the necessary action to make the recommendations binding, not an easy task. This problem, incidentally, still exists. One in particular on the West Coast was California, where fishery regulations could only be accomplished by an act of the Legislature, a very time consuming and often fruitless venture. In Washington we could accomplish these things by directive order. California members of the Commission might be in full agreement with the other States, often the resolution was introduced by that State, but there was always the one to two year delay in legislative action. These same problems still exist with States and NFMS has worked to assist in developing a system whereby action might be taken more quickly with fishery regulation and I am told some Atlantic States are now moving in this direction.

Despite some threads of similarity, fishery problems around the nation differ markedly, and the solutions are often equally dissimilar. When I came to work for the Senate Commerce Committee some 15 years ago, one of my first projects was to question fishery leaders as to what ought to be done at the federal level. What kinds of legislation should we be considering. I sent letters to all kinds of people: fishermen; processors; State leaders; academicians; anyone who we felt might contribute. The response was unusually large and Senator Magnuson was pleased. We then began to categorize the suggestions, by regions, by gear, by fishery. It turned out to be an impossible task. Even from the same area, the perception of the problems varied, and the proposed solutions were of an equal mix. It was not a waste, however, and there were some trends which turned out to be useful. One thing was clear, the treatment of the nation’s fisheries problems must be done on a regional basis, and with the FCMA’s regional councils, that’s pretty much how we are doing it today.

One of the early 200-mile limit bills was introduced by Senator
Magnuson, although there had been a number of similar measures in the House, the general feeling on the Senate side was that 200 miles was not a reasonable claim for fisheries jurisdiction. That early bill, as I recall, was probably four pages long and simply asked that the foreigners be removed and that U.S. fishermen be allowed to move in to the fisheries as they were able and saw fit. The proposal, though popular with many of the coastal fishermen, ran into all sorts of opposition, primarily that there could not be resource banks, or fisheries which might lay dormant until the U.S. either developed the harvesting capacity or markets developed.

The extended jurisdiction bill finally enacted into law was a lengthy and somewhat complex document, and we are still sorting out problems with its implementation. But it does have the regional flavor which appears necessary, and it solves the problem of resources not being utilized by first allowing U.S. fishermen to take all they are capable of harvesting and permitting foreigners to harvest the remainder. U.S. fishermen also have the ability to replace foreign fleets just as soon as U.S. harvesting capacity increases.

Underutilized species are the principal topic around the coasts of the country these days. Often they are adjacent to the higher-priced species which American vessels are presently harvesting. It is not hard to imagine the difficulty of a fisherman, who is presently catching a species which sells ex-vessel for 50 cents to a dollar per pound, to suddenly shift gears from the poundage principle to tonnage thinking, particularly when the target species may be pegged at less than 10 cents per pound.

Many of the vessels in the Alaska king crab fishery were built with stern ramps so that conversion to the huge pollock fishery might be relatively simple. The conversion, however, to the different kind of fishery economy—the goal of harvesting vast tonnages of fish instead of the relatively limited catch of high priced crab will be more difficult. Processing and marketing problems are ahead also, but none of these things are insurmountable. The important factor is that we now have the jurisdiction, FCMA is working, and the moment we can make the breakthroughs, the foreigners will be removed and the end goal can be realized.

I mentioned the Japanese high seas net fishery which came back to haunt our salmon industry following World War II. It is diminishing rapidly and the results are becoming evident. The Bristol Bay harvest last year—despite the normally low cycle year—was virtually unprecedented. Suddenly, we are faced with marketing problems for salmon, with the primary exports going to Japan.

The future of the American fishing industry, however, is my view, will lay with the trawlers, bottom or mid-water, some seiners perhaps, but at least with the kinds of gear that will produce volume catches. With fuel shortages and high prices, the tonnage thinking becomes even more important. I find the prospect exciting, with no thought to minimize the kind of difficulties which must be surmounted.
This conference has been looking at environment and I have found the panel discussions this morning of tremendous interest. We are talking with the Congress now about development, but some of the staff people and members are also looking at the resource, its future, and its habitat. Estuaries were the subject of a recent briefing which NMFS held in the House, and the thrust was whether the spending of relatively large sums for development might not be premature without some kind of assurance that the resource would be healthy in the long term. NMFS is also strengthening its habitat protection division under the leadership of Jim Rote. A member of his staff, Jim Chambers, is participating with your panel discussions. We are sharing the concern expressed by the Congress and emphasized by this Conference. The oceans are not inexhaustible and the world is coming around to the thinking that the lack of inexhaustibility not only applies to the resource but there are limits for disposal as well. The coastal zone is getting increasing attention, and it must, for many reasons, among which is the welfare of our ocean species. The ocean is supplied by the estuaries to a very large extent and the fragile balance of nature must be maintained.

At Congressional Affairs we are privileged to observe the Congress on a daily basis and it is interesting to note the change that has come about in relation to FCMA. A year or so ago, there were a lot of second thoughts in evidence in relation to FCMA. Some were even saying that perhaps a mistake had been made as complaints came in from industry around the country, from the fishery management councils. Congressmen were saying, for example, that when they supported the 200 mile limit, they were unaware of some of the provisions. Many felt that the federal government had too heavy a hand in the approval of management plans, others felt that the councils had been organized in too weak a fashion. Today, the FCMA oversight hearings may not be all sweetness and light, but there is a noticeable trend toward looking at the more positive side. People are beginning to learn to work within the framework of FCMA and the spirit of cooperation between the federal government and the councils has increased immeasurably. Not everywhere, but in a significant number of areas.

One area appears to be in need of further and more concentrated effort, that of state-federal cooperation in fishery management. Assistant Administrator for Fisheries Terry Leitzell has spoken out on this subject several recent occasions. Many of the stocks are interjurisdictional, and a management plan put forth by the Councils which does not have a form of state cooperation is doomed. Evidence of this kind of shortcoming has been particularly noticeable in the New England area, but again, I have confidence that the necessary spirit of cooperation will be forthcoming and we will move forward. NMFS has been working hard on the streamlining of the management plans, a complex and tedious process which federal laws and requirements has stretched almost to a year before operation. Bill Gordon
and others in the fishery management division at NMFS have been holding workshops around the country, and again, the situation is far from hopeless.

There are two areas which I consider of utmost importance to the success of the American fisheries. One is a better unity of purpose, cooperation, as I mentioned earlier between the federal government and the states; between fishermen and the management councils, in fact between every facet of the fishery community. There are goals to be achieved and they will be met when we work together. Meetings such as this serve well to bring together the thinking from many areas and in the exchange of views today many of us will understand each other's problems a little better.

The second need which has always been with us, at least in the nearly 40 years I have been associated with the fisheries community, is in the field of communications. We've come a long way in this regard, today's fishery trade journals provide us with a good insight in what is happening throughout the nation. Today there are many associations which serve the interests of processors, canners, fishermen, meal and oil producers, recreational fishermen, as well as states and local governments. They in turn, provide regular newsletters and opportunities for their members to know what is happening in fisheries, often on a world-wide basis, in order that the decision of today may be better made.

We've made a lot of mistakes in the conservation and management of our fisheries, but we've made a lot of progress too. I'm proud to have been associated with this industry, and I am proud of the agency with which I am associated today. There will always be complaints about the National Marine Fisheries Service, but I see good leadership there today, and further I see a lot of good and dedicated people with a will to see the FCMA work and America's fisheries play the role which it deserves. Thank you.

Professor Theberge: Thank you very much, John. Let's try to reconvene in the auditorium at five after two. Thank you.

(At this time the conference recessed after which the conference reconvened in the auditorium.)

Professor Theberge: Our first panel of the afternoon session is entitled, "Fisheries, The Environment and Management." Acting as moderator for this panel is Turner T. Smith, Jr., who is a partner in the firm of Hunton and Williams in Richmond, Virginia. He's also Visiting Law Lecturer at the Marshall-Wythe School of Law and he has been a lecturer in the same capacity at Washington and Lee University. He has an LLB from Harvard Law School. Turner will introduce the members of the panel.

Moderator Smith: Thank you. We turn this afternoon now from the status and potential of the fishery itself and the nature of the major impact on it to the central question of management, management of the fishery and our first speaker is Doctor Jackson Davis, formerly
head of the Division of Fisheries, Virginia Institute of Marine Science and now Chief Scientist, South Atlantic Fishery Management Council, and an advisor to state, national and international fishery organizations.

Doctor Davis is going to give us a brief address entitled "A Cynic's Primer on Fishery Management."

Dr. Davis: Thank you. Good afternoon, ladies and gentlemen, I'm certainly pleased to be here.

The number of people desiring to harvest fish and the technological capability of these people to do so have outstripped the biologic capability of the fishery resources to yield fish. If unchecked, this phenomenon will diminish the benefits the resources yield to society. This is, in simple terms, the reason that fishery management is needed. Stated differently, the reason is that there is no inherent feedback mechanism linking economic or esthetic demand by people with reproductive capability of fish. As demand for a resource increases, the reproductive capability does not. It either stays the same or, worse, declines as a result of overfishing. It is an unfortunate quality of common property resources that strong demand for them diminishes their ability to supply that demand.

In the absence of any mechanism inherent to fishery resource utilization systems that balances or equates use with biological potential, some control external to the system must be imposed if society is to experience the benefits potentially available. Application of this external control is what we call resource management or specifically in this discussion, fishery management.

Since the resource is common property rather than private property, a governmental unit which has stewardship over it must exercise the managing control. History has shown repeatedly that without external regulation, the users of common property natural resources drive themselves into unstable situations. In the case of commercial exploitation an unregulated system drives itself toward poor return to invested capital and to labor and toward a high-risk business climate. The quantity of product is diminished also. In the case of recreational exploitation, an unregulated system drives itself toward a small number of participants and poor quality of esthetic experience. The supporting businesses suffer accordingly.

To reiterate, the problem is diminution of benefits because too many people attempt to use a limited resource.

Statement of solutions to the problem is really quite simple. There are only a few. I have chosen to discuss five, as follows:

1. Limit or reduce the technological capability to harvest fish.
2. Limit or reduce the economic and/or esthetic incentives to harvest fish.
3. Limit or reduce the number of fish harvested.
4. Limit or reduce the number of people harvesting fish.
5. Increase the biologic capability of the fish stock.
Effecting solutions has proven to be vexingly elusive although all of the above have been employed.

Let us first consider the fifth theoretical simple solution, increasing the number of fish, because it can be dispatched rather briefly. This approach has considerable popular appeal, because, as you may have noticed, it is the only solution that requires no restraints on people. It is directed at the resource. Therein lies much of its weakness. People have proven only moderately successful at increasing the fecundity of fishes.

More important, however, than our lack of scientific knowledge to undertake a hatchery program for most stocks and more importantly even than our lack of money to finance one even if we knew how is a fundamental flaw. Competition for a resource will not be lessened by making the resource larger. A useful analogy is the contention and competition that sometimes occurs among the heirs to an estate. A cynic would not assume that the contention and competition would be lessened by increasing the amount of the estate. Who knows of a resource-use controversy which would be settled by doubling the resource base? Thus the fifth solution turns out, upon examination, to be a non-solution. This is not to say that we should not attempt to enhance resources. Whenever it is technically and financially practical to do so, we should enjoy the additional benefits that would be provided. We must, however, recognize that enhancement is not a substitute for management.

Before we turn to the other solutions, a digression to examine the perspective from which resource management has proceeded will help us to understand some of the problems that confront us.

A fundamental weakness of resource management has been our concentration on the resource itself rather than on the benefits to be derived from using the resource. After all, it is to assure the continued enjoyment of these benefits that we undertake management. To be sure, the benefits would not be available without the resource base, but to focus on the resource rather than on the benefits is to misplace our emphasis.

As an example, consider the following objective recently stated by one of the regional fishery management councils.

"The objective of the fishery management plan shall be to manage the... resources so as to minimize the possibility of recruitment failure while allowing maximum utilization when and where possible. In its efforts to accomplish this objective, the management effort should consider the need to minimize social, cultural, and economic dislocations which may result from provisions of this fishery management plan."

A cynic might paraphrase that objective as, "While we will try to avoid undesirable side effects, we do not plan to attain any desirable goals." The cynic would be only partially justified because the objective does specify maximum utilization, whatever that means. Utilization by whom for what? Also part of the objective is to minimize the possibility of recruitment failure. Unsuccessful recruitment, in and of itself, is not
the important point. What benefits are being striven for that would not be available if recruitment were to fail? Shouldn't the plan focus on those unstated benefits rather than stating as an objective what is really a means of attaining an objective? Preventing recruitment failure is a means, not an end, but what is the end? We are left to wonder or to draw our own conclusions.

As another example of misplaced focus, we have a news release from one of the fishery councils which states that a management program will "protect small fish." Protect them from what? Further reading discloses that protection is afforded only until they attain a larger size at which time they are made available for harvest. "Protecting small fish", it develops, is a euphemism for maximizing yield, a perfectly legitimate objective, but one which must be stated in the context of economic rather than in the context of the resource. We subconsciously focus on the resource-oriented means rather than on the economic end.

In the early days of resource management, our predecessors were making the transition from the idea that the resource base itself was essentially infinite to the recognition that the combination of burgeoning population and sophisticated technology made the resource, instead, finite. Now, however, the fact that the resources are limited is largely accepted, at least as an average opinion (indeed with religious fervor in too many instances).

Now we must concentrate not on the resource itself, but on the social and economic benefits that the resources can provide. We have for so long focused on the resource, that we seem now to lack the breadth of vision to see the real problems for what they are.

A reasonable first order approximation of the social and economic goals that fishery management should strive for can be formulated from the objectives of the primary users. The objective of commercial fishermen is to sell fish for rather more than it costs to catch them. The objective of recreational fishermen is to have an esthetically rewarding experience. Note that in neither case is catching fish the primary goal. When these objectives have been modified by considering the interests of secondary users and the interaction of these groups of users with the overall fabric of society (admittedly only vaguely definable, but nevertheless important), a statement of goals will have been achieved. Resource managers have for years misled themselves by focusing on fish rather than fishermen.

Now let us return to the remaining four of my five simple solutions. All have been employed in the past. We can examine them in the light of experience.

1. Limit or reduce technologic capability to harvest fish.

The imposition of limits or restraints on efficiency is a time-honored regulatory measure. Our cynic would question whether it should be honored by anything other than time. The underlying theory would seem to be that if the cost of fishing is driven high enough, the fishing effort will come into balance with the productive capability of the resource. To function effectively, this method must adjust the degree of
inefficiency to compensate for changes in the price of the product. In practice, such adjustments have rarely, if ever, been made. As prices have climbed, additional units of gear have entered the fishery and reduced the total yield.

The original appeal of this regulatory measure is readily apparent. As a fishery slowly expanded from its original virgin condition to a status of saturation, the harvesting techniques usually increased in efficiency through a series of technological changes. At the time at which saturation was recognized most of the fishermen would have been using the most modern harvesting technique developed to that date. The first innovator who attempted to bring a more efficient gear into a saturated fishery was opposed by the rest. Since the regulatory body was a state legislature, which was driven by the forces of politics to attempt to please the majority in the short run, the usual response was to prohibit the use of the innovation, thus freezing fishing technology at a particular point in what otherwise would have been a continuing evolutionary course.

This sort of attempt to balance harvest with productive ability of the resource has some shortcomings. Perhaps foremost is that it runs directly counter to the fishermen’s objective of maximizing the difference between the cost of catching fish and the price received for them. In most situations, the fisherman has little or no control over the price he receives for his catch and, therefore, to be successful must reduce costs. If the fishing method is legislated, he has little control over costs. With little control over either price or costs, the fisherman becomes somewhat of a captive of the system in which he operates.

Those who would restrain technology seem to take the position that seafood producers are not in competition with other producers of protein foods. This is, of course, not the case. Therefore, we find fishermen operating under imposed inefficiency competing with poultry producers who have lowered production costs through unrestrained technological innovations.

If these things have happened or are happening under technological restraint, why do we continue it? It holds employment at a higher level that would exist otherwise. To the extent that high employment in fisheries is desirable, restraining technology contributes to attainment of a goal. Another reason that restraints have continued in place is that it is politically difficult, if not impossible, to remove the restraints once they have been imposed. How do the social and economic structures of an industry which has been isolated for, say, 50 years cope with the shock of suddenly entering the modern world? It is with that last point that I would like to leave the discussion of technological restraint. Those who would take comfort in imposing restraints as a politically popular solution to a problem of today should have compassion for those who tomorrow will be confronted with the difficult task of abandoning it, and for the fishermen who will be subjected to culture shock.

2. Limit or reduce the economic and/or esthetic incentives to harvest fish.
Catch limits are the most frequently employed dampers on incentives. Catch limits have been imposed historically in response to the same situation that has led to technological restraint. In fact, the two often go hand-in-hand. Our cynic might say they make a nice couple: they deserve each other. In the past, as a fishery has reached saturation, (actually when it has gone far enough past saturation that the participants have become sufficiently concerned to attract the attention of the political system) a daily limit has been imposed. Another way of restraining economic incentive has been to limit the number of hours per day that fishing can take place or to prohibit fishing during a part of the year.

These restraints have effects similar to those of restraining technology. If they are to be effective in bringing harvest into balance with production, they must increase the cost of harvesting and/or decrease the level of enjoyment to the point that the number of users in each sector is in balance with the productive capability of the resource. Since the objective of a commercial fisherman is to increase the difference between the cost of catching fish and the price he receives for them, this regulatory mechanism runs directly counter to his desires. The objective of the recreational fisherman is to have an enjoyable recreational experience. A very important ingredient of enjoyability is the catching of fish. Success is measured, to a considerable extent, in numbers of fish. However, one should not overlook the enjoyment factor of catching a limit. A fisherman who catches 10 fish when the limit is 10 has had a more enjoyable experience than the person who catches 10 when there is no limit. One has attained a certain standard, the other has not.

By imposing restraints on the earnings or enjoyment of each participant, disincentive schemes spread the resource among a larger number of users than otherwise could be involved. Thus these schemes maintain high employment or participation (prevent decline in employment) although they are probably more frequently looked upon as maintaining the resource.

3. Limit or reduce the number of fish harvested.

The number of fish harvested is limited by imposing a quota. This technique has rarely, if ever, been applied in a marine recreational fishery. Therefore, I will consider quotas only in the context of commercial fisheries. A quota successfully addresses one component of the problem. It can balance removals with productivity. However, imposition of a quota usually encourages the users to "get while the getting is good" with the result that the getting turns bad for almost all. As each fisherman fishes harder and increases his efficiency in order to increase his share of the total allowable catch, the catch is attained in a shorter and shorter time. Thus we have seen a tuna fishery that originally required about nine months to take a certain quota reduce that time to only two or three months. It has become axiomatic that quotas lead to overcapitalization and unsatisfactory financial returns. Quotas also lead to equipment being idled part of the year if no alternative fishery
is available. Inefficiencies also are forced upon the processing and marketing sectors because all of the product comes ashore in a short season requiring large processing and storage capacities. Fresh product is not available to the consumer for part of the year. Thus quotas are resource-oriented schemes which give inadequate attention to the social and economic aspects of fisheries.

4. Limit or reduce the number of people harvesting fish.

Limiting the number of people who may participate in a fishery is based on the idea that a limited resource can provide an adequate level of benefits to only a limited number of people. This approach is the only one of the five that is oriented toward benefits to society or to the participants rather than being oriented toward the resource. It has been little used in fisheries but is widely used in other sectors of society. Two generic approaches exist:

1. Direct specification of the number of participants.
2. Reliance on private enterprise economics to determine the number of participants.

In the first case the manager, be that legislature, commission, council, or other entity, decides on an appropriate balance between benefits that should accrue to the average individual participant and benefits that should accrue to society at large and makes available a corresponding number of licenses. Individual benefits would include level of return to capital, management and labor, degree of freedom in business decisions (when and where to fish with what gear), and stability and predictability of the business climate.

Societal benefits would include such things as maintenance of options for future uses and level and means of return to the owner of the resource, presuming that society is considered to be the owner. Society can experience the returns as taxes or fees on the user, as employment and recreation opportunities, by adjusting international trade balances and by other means.

In the case of relying on the private enterprise system to adjust the number of participants, the manager would convey shares of the resource to each of the participants to be used as his personal property subject only to such rights as the manager might retain on behalf of society at large.

As time passed, each person who originally came into possession of shares would decide whether to sell some or all of them or to buy more, thus the private enterprise system would determine the number of participants at any point in time. We should note here that the laws of private enterprise economics do not apply in any of the other schemes that we have examined because the participants have no property rights in the resource. In all of the other schemes the resource is held as common property.

Benefits would accrue to society as taxes or fees, and as opportunities for employment and recreation. Future options would have to be preserved by retention of certain rights, for example, the right to buy back all shares. The fishermen themselves, rather than government managers,
would be expected to make their own decisions about where, when, how to fish. Some governmental restraints, such as size limits, might still be desirable.

Our cynic might say that the property rights scheme is a managerial copout in that those who are supposed to manage the resource in the best interests of society, merely turn it over to private enterprise. Our cynic would be partially correct, but then what is wrong with the private enterprise system? True it has certain ills, but is living with the ills as bad as living with the cures?

All of the schemes, except quotas, seek to limit participation in order to balance harvest with productivity. Limitations on technology and on incentives do so indirectly.

In order to be effective, these schemes must maintain the harvesting sector as a whole in marginal condition economically. If the average harvesting business is profitable, additional participants will be attracted to share in the profitability. This approach of having to flirt with failure in order to be successful might be characterized by our cynic as dismal theorem management. Probably the proponents of these sorts of regulatory schemes were not consciously trying to limit participation. However, analysis of fishery systems discloses that unless the scheme does limit participation, it will not bring harvest into balance with production. No matter how inefficient they are, a constantly increasing number of harvesters will exceed the productive potential of a resource. The question then is, what method of restricting participation is most desirable or, stated more honestly, what method is least undesirable? We should keep in mind that the schemes are not mutually exclusive. Some combination may provide the most satisfactory solution.

It is worth noting that most of the common property resources of this country are managed under some form of assignment of property rights to the private sector. Consider, as examples, timber rights, water rights, grazing rights, communications medium rights, etc. Land passed from public ownership to private so long ago that most societies have forgotten that any other system ever existed.

None of the schemes for dealing with common property through private enterprise is perfect. But weaknesses are readily apparent in traditional government fishery management also. These weaknesses are especially notable in social and economic areas. Our cynic might note that few governments have outstanding performance in manipulating these areas.

Winston Churchill, who could sometimes be cynical, noted that democracy was the worst form of government, except for all of the rest. Fishery managers need to heed Churchill. Much of the weakness of traditional fishery management can be traced to the managers' search for a good form of government, the measure of goodness being that the people are pleased. Thus we introduced dismal theorem management, frequently at the request of the fishermen, only to find that the cost of being immediately pleased was to be ultimately dismal. Fishery management is fundamentally a negative or restrictive activity. It restrains
people from doing things that they want to do. Fishery managers need to face up to the fact that there is no good management system in the sense of one that will please the people affected by it. Alas, managers will never win popularity contests.

Traditional management has not been notably successful when measured against practically any reasonable criteria. Rarely has the productivity of the resources been maintained. Rarely have the users attained the status of a dynamic element in the modern socio-economic scene. Rarely has management anticipated and prevented problems.

We must redirect ourselves from a search for that which will please to a search for that which will work and from solving yesterday’s problems to preventing the occurrence of tomorrow’s. Above all else we must direct our management systems at economic, societal, and biologic goals. The three areas are inextricably interrelated. No management system can manipulate one without affecting the others. No management system can succeed without recognizing the importance of each and the necessity to deal with all.

**Moderator Smith:** Thank you, Doctor Davis for that provocative analysis. The next speaker is Mr. William M. Feinberg, a lawyer with the firm of Feinberg, Dee and Feinberg in Bayonne, New Jersey. Mr. Feinberg is a member of the Mid-Atlantic Fishery Management Council and note in your program, there are several errors in the way his credentials are listed, as there were in mine. I was a visiting law lecturer as Professor Theberge indicated. Mr. Feinberg is a past member of the International Convention for the North Atlantic Fisheries and a member of the Mid-Atlantic Fishery Management Council and he took his law degree at Cornell University with an LLM in taxation at NYU, not at Cornell. Mr. Feinberg, I expect will not have very much more in the way of good news than did Doctor Davis and he’s speaking on the legal difficulties and impediments in marine fishery management in the U.S.

**Mr. Feinberg:** Thank you. I’d like to say at the outset, I think I’m here today in spite of the fact that I’m a lawyer. I really am here because I’m on the Mid-Atlantic Council and I think I’m on the Mid-Atlantic Council because I have been a sport fisherman for the best part of my life, in all ways, and I have been an active environmentalist working with groups like the American Littoral Society.

I was asked to speak, as Mr. Smith indicated, in regard to some questions involving jurisdictional problems and impediments to marine fishery management and I thought that perhaps before we got to where we are today, we might give a few minutes to think of how we go there. Marine fishery management is inextricably a part of the law of the sea which itself, of course, is an aspect of international law. Most of us who are involved in the law are inclined to think of a Dutch lawyer back in the seventeenth century by the name of Hugo Grotius as the father of international law.
Grotius, coming from a sea power nation, Holland, in those days, exposted on what he thought that the law of the sea should be. His philosophy which really has dominated the world's thinking on the law of the sea and continues to a large extent today to do so, emphasized freedom of the seas and, as part of that philosophy, he felt that the living resources of the sea belonged to nobody. They were common property and they were available to anybody who might be able to capture them.

Now, the thought of freedom of the seas in the abstract sounds like something that all of us would agree to as being a very desirable end and in some aspects that's true. But, as far as the fisheries were concerned, freedom of the seas was not a desirable end because the fisheries belong to everybody, belonged to no one and they were subject to unbridled over-exploitation in certain areas, to serious depletion as years went by and before too long the nations of the world began to realize that this aspect of the law of the sea was in need of some modification.

So that some time, not too long after Grotius' death, we began to notice a change. That change involved the adoption, for the most part on an unilateral basis, of something called the territorial sea. The nation that had a coast line would exercise its jurisdiction out beyond the shore and would claim the right to govern such things as fisheries in that belt that ran along the seacoast.

The concept of a territorial sea became almost universal and, in fact, I don't know of any coastal state today that doesn't exercise some territorial jurisdiction out in the water. The size of this coastal jurisdiction, the territorial sea, varies from country to country. In the United States, Thomas Jefferson back in the eighteenth century declared a three mile territorial sea which persists today.

Oddly enough, the three mile limit was based on the distance to which a cannon ball back in the eighteenth century could fire, and it was felt that for security purposes, if you could keep enemy ships out beyond the distance to which their cannons could fire, you had enhanced the national security. So the cannon shot rule of the three mile limit was the one that came into favor though cannons, of course, have long since stopped firing only three miles. We have never extended the territorial sea beyond this limit.

As technology increased and nations began to roam further and further in search of such things as marine resources, it became apparent that the doctrine of freedom of the seas to which the only inroad of the territorial sea was made, was really inadequate as far as protecting marine resources and before you know, we got to the twentieth century and nations began to think in terms of entering into agreements with each other to govern certain marine resources.

The first of these agreements was signed in 1911 and it governed the taking of fur seals in the north Pacific. By the time 1921 rolled around, a different type of agreement had been entered into and this one provided for the establishment of an international regulatory body to govern fishing in the Adriatic Sea. By 1975, there had been a substantial number of these agreements signed so that we had more than 20 such in-
ternational regulatory bodies regulating one aspect or the other of the harvesting of marine resources.

There have been numerous multilateral and bilateral fishery agreements entered into since World War II. The United States has been a participant in many of them. There are such things as the International Convention for the North Atlantic Fishery, the old ICNAF of which the United States is no longer an active member, the International Convention for the Conservation of Atlantic Tuna, ICCAT, the Inter-American Tropical Tuna Commission and many others as well. These treaties and the bilaterals, to a very large extent, unfortunately, relied upon voluntary compliance by the signatory nations and one of the problems we had with these treaties, particularly ICNAF is the fact that we were frequently voted down as far as our estimates of the optimum yield of the fishery. The foreign countries who came to fish off our shores had much more optimistic points of view than we did and the quotas that were set were far in excess of what we felt should be. That was coupled with the fact there was absolutely no way we could enforce the quotas. The only recourse we had, if one of the foreign nations exceeded the quota, was to complain to that nation itself and we were getting nowhere. The fish stocks were being sadly depleted. The United Nations played some role in this. There was an effort made to bring some uniformity into the disarray and in 1958 the UN sponsored the first law of the sea conference. There was another such conference in 1960 and in 1973. There were a number of treaties that the participants agreed upon, informally though. Actually, they have never been adopted by the various countries of the world. Some of these treaties established a 12 mile territorial sea and a 200 mile economic zone and incidentally, in considering the 200 mile economic zone, it was estimated that this zone would account for about seventy-five million metric tons of fish annually.

The United Nations law of the sea conference also was responsible for another treaty, again not adopted, which would protect such things as the right of free passage, fisheries, the right to lay cables and pipelines in the high seas and there was another very significant treaty which hopefully might be adopted and that's the Convention on Fishing and Conservation of Living Resources of the High Seas, which recognized the special rights of coastal states to unilaterally adopt conservation measures off their shores and even extend them to the high seas.

Now, international law is shaped by a number of different means. One of them, as we have just referred to, is by treaty. Another one by custom and another method is by unilateral action of a coastal state which isn't met with some serious objection by the community of nations of the world, and the United States has participated in this type of unilateral action as we're all aware.

The territorial sea declaration by Jefferson was one of them. More recently in 1945, President Truman extended jurisdiction by proclamation over marine resources, both living and mineral, out to the continental shelf. Now, the continental shelf does not mean the geographic
or geological continental shelf. It means out as far as exploitation is possible and incidentally, the continental shelf approach was subsequently codified by the Geneva Convention in 1958 which did recognize the right of coastal states to explore and exploit resources on the continental shelf.

Although only a minority of the states of the world have adopted this position, no one has actually seriously contested it. The United States still does exercise continental shelf jurisdiction, and that jurisdiction was exercised before our present 200 mile limit. In addition to that, the United States in 1953 adopted something known as the Submerged Lands Act, pursuant to which it gave to the states the right to exercise jurisdiction over the territorial sea, the three mile limit. There have been a number of court cases in that area and although the states have rights under that act, the United States still has underlying paramount jurisdiction so it can nullify certain actions of the states. And there is a—a good law review article in the pack of materials you received today that goes into that question.

In 1966, the United States further moved out its jurisdiction by adopting what was known as the nine mile contiguous zone and that stood until 1976, when we adopted our 200 mile limit. Incidentally, during the same formative period when the law of the sea was changing, many nations were beginning to exert an effort to establish jurisdiction even further out and we had claims to 200 miles for fishery jurisdiction which in its early days was not backed by the United States and, in fact, contested. Most of those contests involved our tuna fleet down off the coast of South America. There were other jurisdictional problems in the world. You’re all familiar, I assume, with the “cod war” between Iceland and Great Britain and there have been a number of others as well. After all of the growing pains in 1976, we adopted as you know the Fishery Conservation and Management Act pursuant to which we formally abrogated our old nine mile contiguous zone and adopted a fishery conservation zone which extends for 197 miles beyond the territorial sea.

The FCMA, as it’s known, not only gives us the exclusive right to manage fish within this conservation zone but it gives the United States control over anadromous fish, that is fish that spawn in fresh waters and go out to sea, control over these fish throughout the migratory range beyond the fishery conservation zone so that we can control anadromous fish even beyond the 200 mile limit except when they enter into the jurisdiction of other states. And as I mentioned before, we also control the continental shelf resources which extend beyond the 200 mile limit as well. These include such things as shellfish, primarily shellfish, lobsters, things of that sort which are not available to foreign fishermen for harvesting. Now, as far as the conservation and management of the fishery resources is concerned, the FCMA does not change the existing territorial or other U.S. jurisdiction over the high seas and there’s something else that should be borne in mind. The FCMA when adopted was considered, in a way, an interim measure so that if the United States becomes a signatory to a comprehensive law of the sea
treaty, the provisions of the FCMA which fix the fishery conservation zone will self-destruct and the only part of the FCMA that will remain will be those portions which deal with conservation and management measures. The zones will be governed by the treaty which we would sign. Now, at the present time, in review, we still have the concept of the high seas as Grotius had expostulated on some 300 years ago, but there have been inroads made. We have in the first instance what are known as internal waters—those are the waters that are entirely within a nation's boundaries and include such things as lakes and rivers and certain aspects of the ocean. And in regard to these waters, the state has total authority, regulates everything and for another state to enter those waters, it is incumbent upon it to obtain permission in advance.

Going further out, we have the territorial seas which vary in width. The United States will not recognize one greater than a distance of 12 miles. Incidentally, most of the states have a three mile limit. Within the territorial sea, the coastal state exercises complete jurisdiction over everything, subject only to the so-called right of innocent passage which does not require prior permission from the coastal state. A non-coastal nation can sail through that zone without getting permission to do so. Except for the right of innocent passage, the territorial seas are considered the same as the land mass of the coastal nation.

Beyond the territorial sea, some states still have the old contiguous zone which we have repealed and these again vary in distance. Jurisdiction conferred under the 1958 Geneva conference in these contiguous zones, allows the coastal states to regulate such things as customs problems, pollution problems, immigration problems and to punish violations of the law that have occurred within their territorial sea.

We then have the fisheries zones beyond that, which extend out into what is the—actually the high seas, and the width of the zones vary from nation to nation. We have some fishery zones that are only three miles wide and we have the widest which, as far as I know, extends to 200 miles. Except for the management of fisheries in these zones, the conservation zones are, in all other respects part of the high seas.

And then going beyond that, we have the high seas. They belong to no one and they do include the fishery conservation zones and are still subject to the old principles of freedom of the seas. The last area we have is the continental shelf and—the outer boundary of this zone really hasn't been precisely fixed. In the continental shelf zone, the coastal state is able to explore and exploit the sea—the seabed resources, including the living and mineral resources utilize them for their own purposes.

Now, the FCMA has settled at least for the present time, the question of geographic extent to which the United States can manage its fisheries. However, while settling that problem, it has opened the door to a number of other problems. The FCMA has created a new form of government in the form of the management councils which constitute a new management regime. There are eight councils and they have a great deal

of autonomy. They represent an attempt at grass roots regulation. They are composed of people who are supposed to reflect a broad spectrum of interest in fisheries and a cross section of the American public.

However, the councils find themselves so to speak in the middle. In the first instance, they're in the middle as far as the federal government is concerned. And there have been certain give and take problems between the councils and the federal government. The federal government, under the FCMA and through the Secretary of Commerce, in the last analysis has the right to veto the work of the management council. The management council can only act through fishery management plans which must include whatever regulations they want to impose on the fishery and the Secretary of Commerce has the right to veto these plans.

As a matter of fact, the right to veto has been exercised by the Secretary of Commerce. The Mid-Atlantic Council has adopted management plans which have been vetoed. In one instance, the Secretary of Commerce didn't agree with the figures that were set on fish. And in another instance, the Secretary of Commerce didn't agree to the closure of certain areas we considered a pollution problem and the Secretary of Commerce felt we didn't have adequate scientific information on which to base those closures. It is hoped that the veto power will be exercised rarely and that in effect, the councils and the Secretary of Commerce will act as a check and balance on one another.

Of course, there are many other problems between the councils and the federal government. There are many competing uses of the sea. The sea, for instance is used for exploitation of mineral resources which have the potential of creating pollution problems and taking areas out of the fisheries. The sea is also used for marine transportation under which the Coast Guard has set up certain sea lanes and has attempted to limit the method of fishing and has also, the sea lanes are also an area of potential pollution.

Mining of seabed resources which is something we can look forward to, will also impact on the fisheries. Waste disposal both deliberate and accidental, also has an effect on the fisheries. Now, the federal government has many agencies that deal with many of these problems and there is a very serious question as to how far the management councils can go in regulating some of these incidental activities that impact on the fisheries. Pollution is one of them and there have been two different adverse points of view coming out of the Commerce Department. One point of view says that the management councils can only govern the fisheries. Terry Leitzell in a recent legal position paper has indicated that at least when the question involves such things as public health, the councils can interpose themselves. The Mid-Atlantic Council is very much concerned with marine pollution, with such things as the dumping of sewage sludge and the dumping of chemical wastes and we are attempting to feel our way and see if we can do something about this without coming into conflict with the Corps of Engineers, with the United States Coast Guard, with the Environmental Protection Agency and with the Food and Drug Administration.
We feel we have the jurisdiction and the right to do it. I think that only time will tell whether in fact we do. We’ve also had our problems on a federal level with the Secretary of State who, on occasion, has felt that we haven’t been treating the foreigners right and that our feelings with regard to surplus have been too small, and the Secretary of State has tried to exercise his influence with the Secretary of Commerce to see if the council could be made to back down.

The Secretary of State has no direct rights as far as influencing the fishery management plan but obviously for political reasons he does have influence when it comes to talking to the Secretary of Commerce. The councils have had their problems and probably will continue to have problems with the state governments as well. Section 306 of the Fishery Conservation and Management Act is a preemption clause which gives the federal government, Secretary of Commerce, the right, if the Secretary determines that a fishery which is predominantly in the FCZ, the conservation zone, is being substantially and adversely effect by the state’s action or inaction within the three mile limit, to give the states notice to correct that. If the state doesn’t correct it, the Secretary can take over the management of that fishery within the three mile limit.

There are other problems with the states. The states don’t agree with the council necessarily in enforcement. Some states have no enforcement regulations. It makes it difficult for the Coast Guard to decide in those areas whether the fish have been taken in the state waters or FCZ and enforcement becomes difficult. We have problems with our sister councils in determining where our boundaries lie, which fish should be governed by which council. Certain councils don’t agree with other councils on certain things such as the closure of areas and the quota given to their own fishermen. We also have conflicts with the fishermen themselves due to many reasons, such as the lack of appreciation of the objectives of the FCZ or resentment of regulations and a general distrust of bureaucracies.

I think in conclusion, I can say that although theoretically the FCMA is an interim measure, from the looks of things, realistically it appears that our unilateral regime will be with us for a long period of time. There will undoubtedly be conflicts. With better understanding and communication, I’m sure they can be resolved for the betterment of the resource and for the protection of the American public. Thank you.

Moderator Smith: Thank you, Mr. Feinberg for that excellent, comprehensive discussion of the legal framework that applies to these problems and some of the difficulties being encountered with it. We now have two commentators on the papers you just heard. The first is Mr. James F. McHugh who is a sport fisherman with considerable credentials. He has been Chairman of the Virginia Citizens Advisory Committee on Striped Bass Management Plans and Virginia delegate to the Regional Advisory Committee for such plans; Member of the Board of Directors for the Citizens Program for the Chesapeake Bay; Vice-President of the Conservation Council of Angling Clubs, chairman of the Chesapeake Bay Marine Resources Users Committee, member of
the Bluefish Advisory Committee of the Mid-Atlantic Fishery Management Council, and a member of the Sports Fishing Institute. Mr. McHugh is a past President of the Peninsula Salt Water Sports Fishing Association and past director and treasurer of the U.S. Atlantic Tuna Tournament.

Mr. McHugh will comment on the papers from the point of view of a sports fisherman. Mr. McHugh.

Mr. McHugh: Thank you, Mr. Moderator. Fraternity brothers on this very important panel, ladies and gentlemen, I didn’t realize that it was me that Turner Smith was talking about. I want to take this opportunity to express my appreciation and particularly to Bart Theberge for having included us in the course of today's discussions. You heard technical references to underutilized species. We are unrecognized and we say this with no embarrassment nor with any feeling of inferiority but we do appreciate the opportunity to participate.

We have just had the benefit of the thinking of two very able veterans of this developing process of fisheries management. Since they have both been involved with regional councils, which is where I visualize the action should be, I have no doubt that their thoughts are well seasoned with practical experience, and therefore, doubly significant. Rather than attempt to address specific points and, in so doing, miss others equally significant, I thought I might contribute a few thoughts in response to Jack Davis' timely questions, "How do the social and economic structures of an industry, which has been isolated for fifty years cope with the shock of entering the modern world?"

While Bart Theberge has oriented this conference toward Virginia fisheries and environment, we will not be negligent of these concerns in measuring our thoughts against the Fisheries Conservation and Management Act of 1976. Indeed much of the structure and philosophy of the FCMA it seems to me have been pioneered with the organization of the Atlantic States Marine Fisheries Commission in 1942, and NOAA’s State-Federal Management Program in 1971. To my mind, a dynamic ASMFC, using the decision making formulas contained in the FCMA, is the path to follow in coping with our fisheries problems as they pertain to our local waters and the territorial sea.

Basic to any successful entry into Jack's new world is an overwhelming need to defuse the explosive connotations which have accrued to the simple word, "management". Simply stated, everyone perceives the meaning as something different. Strangely enough, the degrees in business management and responsibilities as corporate general managers are respected accomplishments but when applied to concerns for a resource, the word immediately becomes as volative as a gallon of nitroglycerine. Perhaps a working vocabulary employing such words as "control", "limit", "reduce", "minimize" when employed in connection with matters of interest to notoriously independent fishermen should be re-evaluated. What seems needed is some basic agreement on a positive meaning for the word, some common language, and a major educational effort.
Webster's simple statement that it is "The judicious use of means to accomplish an end" is a likely point of departure. Congress seems to endorse this definition in stating the purpose of the FCMA is "That the fisheries can be conserved to provide optimum yields on a continuing basis." To me, none of this implies a straightjacket of restrictive controls. What need for "optimum yields on a continuing basis" except for continuing profit, or continuing enjoyment, according to the user's desire? That "management" needs rules is not debatable but the rules should be acceptable guidelines which become second nature to all of us. A meeting between the Redskins and Cowboys without rules would be something to behold but I submit that in the orderly chaos we see on Sunday, the rules are second nature to the players. If they need the force of law to effect the sanctions, so be it but neither rules nor laws will, of themselves, provide the optimum yield on a continuing basis. Bill Feinberg will document the fact that we already have a million laws to enforce ten commandments.

In the area of our immediate concern, we are dealing with a resource which we must understand to be finite, yet one which we may reasonably expect to be renewable. Natural resource problems cannot be solved by creating or expanding government agencies. Hence, we must conclude that the responsibility for the ongoing viability of the fisheries rests with the users. In its FCMA mandate that the regulations for the fisheries be developed by a consensus of the regulated, Congress has provided the method by which this responsibility can be exercised. I am willing to agree that there is no broad highway into the new world. Problems involving gear restrictions, creel limits, short seasons, limited entry and allocations must be addressed but my confidence in achievement of these goals lies in my long time appreciation of the underlying good common sense of fishermen, and my conviction that they have a continued interest in preserving their admirable independence.

While I agree with Jack in his observation that "No single group of participants has a property right in the resource" I have problems, obviously, with his perception that it follows that a governmental unit must exercise the managing control. Objective, unbiased scientific support? Certainly— Day to day administration? Absolutely! But it seems to me that effective and acceptable "managing control" will only derive from that combination of scientific data and socio-economic need which is mixed by the fishermen themselves. Reference to groups of participants raises the additional question of the position of the recreational fisherman in the emerging pattern. This group, in its proper context, should be recognized as a multi-million dollar activity, every bit as important to the economy of the State of Virginia and to this region as is any other group of users. Although the Congress, in the FCMA, has recognized both the resource and their significance to the economy, I have some grave concerns that the full impact of this recognition has been fully appreciated at the operational level.

Now, more than ever, it seems to me, the common problems of the commercial and the recreational fishermen are far greater than their
historic and frequently fictional, differences. I might observe, in passing, that I do not consider that everyone who goes fishing is a fisherman, nor do I make my judgments solely on the basis of apparent skill or success measured in pounds, numbers, or dollars. To understand that the recreational fisherman is beset with many of the same problems of abundance, fuel costs and increased fishing effort would be to make a substantial contribution to answering the question of how to cope with the shock of entering the modern world. A mutual, good faith acceptance of the precept of "common property" it seems to me should be the foundation of innovative thinking in the developing of future plans. Equality of representation and mutual respect would seem to be particularly desirable during these formative years of emergence into Jack's new world. For indeed these plans should contain the seeds from which new traditions will sprout and acceptable customs blossom. In this atmosphere, I have confidence that the marine fisheries will emerge into this modern age with a minimum of cultural shock.

To summarize these thoughts in terms of their application to the needs of Virginia would be to suggest a complete review of Section 28 of the laws of Virginia. To provide the Marine Resources Commission with greater flexibility in the application of modern, acceptable management tools, particularly in the fin fisheries, seems absolutely necessary. Increased awareness of and attention to the economic significance of the fin fisheries in the legislative, administrative and scientific communities of the commonwealth is another essential need.

I firmly believe that as constructive and supportive as the FCMA formulas may be, when accepted and implemented, so do they contain ominous possibilities when ignored or avoided. And I say this with great concern for our appreciation of the principle of state rights and our repugnance of federal intervention.

In closing, I would like to add one additional thought. It seems to me that the community of effort I advocate is as necessary a defensive measure as it is the essence of constructive progress. In my view, the FCMA has been under attack since it became part of the federal code. This gives rise to great, personal concern, for only through the FCMA formula can I see the long range economic stability and asset protection necessary to an industry emerging into the modern world.

It must be the source of some encouragement to those not particularly interested with the stability of our fisheries to observe the internal wrangling and the subversive lobbying of polarized interests. The proposed Canadian Atlantic Maritime Treaty, the Murphy-Forsythe Omnibus Bill, HR-4360, the Underutilized Species Bill, and the NOAA directive that regional councils file work plans as a preliminary to the preparation of management plans, come quickly to mind as attempts to smother the baby in the cradle.

State Department tinkering with council recommendations for allocations and reserves, notwithstanding the provisions of Section 201 of the Act, is another. If the integrity of the Regional Councils as provided for in the FCMA, is to be considered a valuable basic asset on which
we can build a reliable and promising future, then care should be taken to see that self-seeking attempts to dilute or even liquidate that asset should be frustrated. Thank you.

Moderator Smith: Thank you, Mr. McHugh. Our second and final commentator is Mr. John M. DeMaria, Junior. He is a waterman, retail seafood stores owner, member of the Virginia Watermen's Association, member of the Virginia Marine Products Association, Past President of the Virginia Watermen’s Association and a member of the Virginia Legislative Shellfish Advisory Committee and a member of the VIMS Advisory Committee.

Mr. DeMaria will comment on the two prior papers from the point of view of the commercial fisherman.

Mr. DeMaria: It will be a difficult task for me to comment on their papers. My offshore fishing experience has been limited to pleasure. My commercial fishing experience has been inland, tidal waters, and I'd like to start off with a remark this entire conference was started off with and it was something like this. If a fisherman is smart and works hard, he can make a good living on the water and I guess from most of the old timers I talked to, that are in the seafood business now, the smart thing to do is tell your children to stay away from seafood and get into another field.

It seems we're being confronted with so much pollution, it's getting terrible. We don't have a place to go out there. The areas we can go where we can catch seafood or good amounts of seafood are getting smaller and smaller all the time. You've got chemicals being introduced into the streams all the time which are killing larva. It seems that perhaps some of the priorities that the bureaucracies should be using is enforcing what should be done rather than concentrating so much on how much of a particular species should be caught. There should be more concentration on the industrial as well as municipal polluters. It seems to me that this has a heck of a lot more consequence on the fishing industry than management.

Now, please be aware that I'm speaking of inshore. I know this is probably a completely different situation off-shore but these sewage treatment plants we're being confronted with are using chlorine, for example, which has to be used to protect the public from getting sick. It has the same effect of putting a poison in the water and that kills the baby fish, and of course that's what we make our living off.

The people who put the plants on the rivers, have hearings to tell whether the plants are going to be detrimental or not to the environment. You hear that the water coming out will be clean enough to drink and it can't hurt you and will not effect you. As soon as they put it there, they close the area. You can't take seafood or anything of that nature.

I think one thing would be extremely helpful for the seafood industry, as far as the inshore fishing goes. If a municipal or industrial polluter does something which is detrimental to our industry, which hinders our being able to make a living and supply the consumer with seafood, they
should be fined exorbitantly—a fine which will more than cover the cost of replacing what stock is damaged, cover the cost of the people who have made a living out there for generations and generations.

These watermen I'm talking about—you've got families that go back five generations—are still out there doing the same thing to make a living. You have problems like kepone which has been brought up several times. I'm kind of surprised it hasn't been brought up more. One thing I might mention, along with having DDT and mercury and lead and other chemicals in my body, I now have five parts per billion kepone. People checked in Hopewell directly associated with kepone, having any kind of Kepone poisoning, had two point five three parts per million.

I've got a thousand times less than what they have. They say I'm going to be safe but here you've got a whole river system that's closed up and the place where I used to make a living along with hundreds of other watermen is now dead to us, but it's just thriving with seafood, completely abundant. Of course none of the watermen in the state want to see any bad seafood get out on the market. We hope that the bureaus will do something to correct it but then again, the watermen wonder about that.

They talk about how concerned they are about something like kepone and how they want to correct the problem, how they want to rid the system of kepone and you look—look across the river a little way and you've got a place that becomes polluted every time you have a heavy rain and it looks like to me the same people will be smart enough to figure out if they're having a heavy rain, you're having excess water going into the river which is causing pollution. You could spend the money putting a bigger pump there and correct that problem and I say, "Well, gosh, you know if they can't spend the money to place a pump to take care of that pollution, how are they going to figure out something with kepone." It just baffles the heck out of me, and I guess maybe I don't have as much education as some people do, and I'm not smart enough to understand it. I think one of the problems of most watermen in the State of Virginia is that it hasn't been necessary for them to get a real elaborate education. What they do is hard work, just like the man said when he started this meeting off, smart and hard work, you can make a good living.

Some of the laws that are on the books, for example, one in particular I think would exemplify one of the problems we have. The state is very concerned about oysters—the oyster situation in the James River or throughout the state. They want to make sure we have a continuing supply of oysters just like everyone here. To protect that supply you're allowed to catch oysters but you're supposed to throw the shells back overboard. As a matter of fact, if you catch a bushel of oysters and you've got six quarts of shells in that bushel of oysters, you get to pay a fine plus you get to throw the oysters overboard which is the way it should be, but it seems to me it would be more detrimental to the oyster industry to allow somebody to do some heavy polluting of those oysters which you know certainly does more damage.
You can have a ship negligently run out of the channel and run into an oyster bed and destroy thousands of dollars of oysters, and I have seen this happen out in the river and nothing is done about that. But I've also seen me catch some shells and you know, I have to pay a ticket which I'm not saying that what I did was right or anything like that but perhaps we're concentrating in some wrong areas.

One other thing that concerns me too, I'm very alarmed about the fact that Doctor Jackson was not here to speak. I don't think there's anything that has ever happened that's been any worse to the seafood industry in the State of Virginia than the contamination by kepone. And I'm so concerned about that, I just hope that something is done to stop anything like that from happening again in the future.

And we're talking about allowing an oil refinery to come into this state, to the Chesapeake Bay, Hampton Roads. Oil refineries have been put all over the world and you always have some accidents. We've all sat here and heard some statements saying you're going to have a spill sooner or later and you know just one little spill is going to wipe out, you know, hundreds of people from their employment and—I'm just glad this won't happen off-shore too, but I don't know what to think.

I guess it all comes down to this: The smart part of what watermen should do is advise his children to go into another industry. Unless something is done, unless something drastic is done quickly, we're just going to be completely phased out. That good seafood you get on your tables from inshore, I don't know where you're going to get it. That's about all I have to say.

_Moderator Smith:_ Thank you, John. We are now at the point in the panel where it's the audience's turn to fire questions. There are microphones in the two aisles. It may be simpler to come up to the microphone so everyone can hear the questions. We'll take questions on this topic which I know is one—which is one of vigorous debate among many of you.

_Mr. Prow:_ Wolf Prow, Christopher Newport College. The first question is directed to Mr. Feinberg. I'm somewhat confused by the distances involved. Are we talking about nautical miles or statute miles? I know in this country, some of it goes by leagues but I still have not been able to figure out what Ecuador does or what Peru does in extending their limits and what mileage they're using. I have looked but I could not find a decent answer on that.

For Doctor Davis, I have also a question relating to your proposal to limit the number of participants. How are you going to select these participants, on what merit, and what basis?

For Mr. DeMaria, I have one question. Is the disproportionate punishment of oyster fishermen as great as you say? Do you get severely punished for failure to throw oyster shells overboard whereas the large offender, the ship that destroys thousands of dollars worth, gets away with murder? Thank you.

_Moderator Smith:_ Well, let's take that one by one. Are you ready?
Mr. Feinberg: Section 101 of the FCMA specifically says 200 nautical miles from the base line. I guess that takes care of that question.

Moderator Smith: —Doctor Davis.

Dr. Davis: You have indeed addressed the most difficult aspect of limited entry. That is how to get it started. I think one should not give up in discouragement because starting something is difficult when the alternatives are as distasteful as they are. The scheme has been implemented in this country, most notably Alaska and the State of Washington; to somewhat lesser extent in some other places and is very common in some other parts of the world as well.

So there is some history of the means of selecting the participants. Probably the simplest method, simplest politically workable method, the simplest method would be merely to put them on the auction block. The simplest politically workable method would be to convey to those people who are now fishing, a share in the resource in proportion to their historic performance in fishery.

Now, I grant you that it's much easier to sit here and say that than it is to put it into effect. But, it's not impossible to put into effect. It's difficult to put into effect—but it's not impossible and the long term benefits will be worth the short term pain.

Mr. DeMaria: Well, if you have over six quarts of oyster shells in your bushel of oysters and you just happen to have a hundred bushels of oysters on your boat, not only do you throw those shells back overboard but throw that hundred bushels overboard too, plus, you get about a $40 fine so I have to say that's adequate punishment. As for the ship, well, looks like to me he ought to be responsible to restock that particular area with oysters like it once was. Because, I would certainly, along with the rest of the watermen work that area, like to have the opportunity to catch oysters there when the area I'm presently working in is completely caught up.

Moderator Smith: Do we have some questions from the audience?

Mr. Montague: Bob Montague, Conservation Council of Virginia. Is it at all realistic to hope that the kepone mess at the bottom of the James River will ever be cleaned up or can we predict how long it will last if we leave nature to take her course? I don’t know whether anyone knows the answer to that.

Moderator Smith: Does anyone know the answer to that question?

Mr. DeMaria: I would attempt to say something on it. I'm sure it's not exactly right. Maybe some one else can jump in but what I would like to say, I fished commercially in the summers between my high school education and college education and, of course, caught good fresh fish every day. We ate fish every morning, some times in the afternoon and evening too. I ate fish every day except for Sundays in the summers. That's for a period of about ten years. Of course eating sea-
food that often, I think, is far above normal. I probably ate more sea-
food in one summer than most people eat in a decade and yet I have
a level of kepone in my blood that's a thousand times less than what is
shown to cause problems in people that were actually directly connected
with it. And from that information, I'd like to think perhaps that the
scientists, not knowing very much about kepone, adopted a level that
was going to definitely protect the public and that perhaps that level
was set higher than it needed to be and that perhaps soon they'll re-
evaluate their findings and come up with a solution or figure out that
perhaps the river doesn't need to be closed at all.

*Moderator Smith:* Is there anyone here from the morning panel, the
second panel who wants to address that question?

*Mr. Feinberg:* I think the Kepone problem is pretty much the same as
a number of other problems that we're confronted with. You have the
mercury problem and the swordfish and PCB problems in other fish.
Where to draw the line is extremely difficult. As John just said now,
and of course he's looking at the situation from the standpoint of the
fisherman, the pressure on management regimes such as the fishery man-
agement council to push levels up higher than are permissible is quite
substantial, particularly from the commercial area of our country. On
the other hand, you get consumer organizations that are constantly trying
to push levels that are lower so that a smaller amount will contaminate
the fishery and keep it off the market. So how long anything is going to be
closed, to a very large extent is not only scientific but is political and
depends upon the kind of muscle that the regulatory agency is being
subjected to and it's a very, very difficult question to answer.

*Moderator Smith:* Do we have other questions? This gentleman down
here.

*Mr. Jenkins:* Douglas Jenkins, President of the Virginia Watermen's
Association. This summer we had a conference with the Governor and
Secretary Rowe on the closure of the James River and kepone and the
level it was safe and at that meeting the indication was it would be
centuries before the James River would be safe to open and like the
gentleman here, the lawyer here, I think it's more political thing than
as far as the health hazard. Also, while addressing you, I'd like to com-
ment on one thing about the 200-mile zone that Mr. John Wedin com-
mented on during lunch hour. I was wondering how many here really
realize or know how that came about. I mean on the surface it looks like
the fishing industry enticed this law or got it moved along, but I think
a lot of us missed the point. That law never would have been in effect
today if it hadn't been in effect for the oil industries for drilling rights
on off-shore so they would be protected. I know that for a fact how that
got legislated.

While I'm addressing you, I would like to recognize the congressman
or the senators from our state in the federal level here today or were
they given an invitation to come?
Moderator Smith: I'd have to retreat and ask Professor Theberge that question. I don't know what congressmen or senators we have here and I don't know who—

Mr. Jenkins: Could we have a count on that?

Professor Theberge: As I recall our registration, we did have a representative from our Republican Senator. I don't know if he's here today or not.

Mr. Jenkins: Would you ask the question?

Professor Theberge: Do we have any representative from the U.S. Senate here today?

(There was no response from the audience.)

Mr. Jenkins: Sir, I think that says it all. You know—I think that says everything, how the fishermen are being represented at the state level and federal level.

Moderator Smith: I don't know—Bart, are there state legislators here?

Professor Theberge: Yes, there are state legislators here.

Moderator Smith: I see your point. Are there any other questions before we break for coffee? If not, those of you who have specific questions can see the panel members afterwards and at 3:45 the next panel will begin. Thank you very much.

(At this time the Conference recessed after which the Conference reconvened.)

Moderator Theberge: The final panel for today is one of those difficult assignments. As you see, it's entitled "Additional Comments or Conference Overview." It's an opportunity for these very knowledgeable panelists to contribute things they see of importance, things that perhaps have been overlooked during the course of the day. On my right I would like to introduce Mr. Allen Haynie. He's the Chairman of the Board of Zapata Haynie Corporation, a member of the executive committee of the National Fish Meal and Oil Association. He's also a member of the Gulf and Caribbean Fisheries Institute and he's a member of the Department of State Ocean Affairs Advisory Committee and a member of the Virginia Marine Products Commission as well as a past member of the Mid-Atlantic Fishery Management Council and I probably left out quite a few other things along the way.

Immediately on my left is Delegate Evelyn Hailey, a member of the Virginia House of Delegates. She is a member of the Committee on the Chesapeake Bay and Its Tributaries and has been the Chairperson of the Shellfish Subcommittee and has held a series of very interesting meetings across the state in regard to shellfish industry and she's also the sponsor of legislation regarding the oyster industry and the Virginia Wetlands Act.

Next on my left is Thomas J. Schoenbaum. He's a professor of law
Delegate Hailey: Thank you. It has been a most interesting day and bore out a lot of my suspicions. I found it interesting that this week in our newspaper there was an article that started out this way. “Give a man a fish and you feed him for a day. Teach a man to fish and you feed him for a lifetime. As long as we have the Bay, my family will not go hungry.” And I'm reminded if people like Jacques Cousteau and Anne Simon are right, we had better do some hard thinking about that Bay as well as our water resources and other resources and land resources.

For the past 20 years, at least, Virginia has had her total attention riveted on industrial development. That has been true in most of the southern states in what we're calling the Sun Belt. I think the pressures for southern growth have caused policy makers to overlook the opportunity we have had to avoid some of the mistakes that have been made in our Northeastern section of this country.

While we do have knowledge at our fingertips to plan for the best use of our resources, we have given in to the fast buck. I believe we are being irresponsible and it is not too late to mend our ways. We've killed one river in Virginia and we aren't doing the others any favors.

We've turned our back for the time being on coastal zone management. I hope that will be rectified this coming session. We only give lip service to environmental concerns. There are some people that I hear say quickly, “I'm not an environmentalist” when I know darned well they are. I have found that states tend to practice conservation as a hobby and development as a full time vocation. I do wonder, though it's been mentioned today, the problems of world hunger and the problems of inflation are not signals that we cannot ignore.

The cost of living and energy costs, as Mr. Fass has pointed out, must tell us something. The wasteful destruction of natural resources cannot be tolerated. The time may be at hand when the mood for conservation will spill over into more respect for our environment. I was sent a paper that Cran Morgan was going to present today. I like his thinking and in that paper he said, “We must view our problems of solid waste and sewage as an asset rather than a liability.” It does remind me of that old saying that I used to hear when I was a child that dirt was only misplaced matter.

What if we could really turn our attitudes around and prove the truth of “waste not, want not”. We know that we can use our waste as fertilizer. We know we can turn it into methanol, steam production, and road building materials, just a few of the things we can do. I've read recently of how we can reclaim heavy metals, particularly gold and silver, if we want to, instead of flushing them down the drain. It may be that other heavy metals can be reclaimed the same way. I know we can recycle steel and aluminum and put them to use.

I have a few other “what ifs”. What if this state could pass that bill
that provides for a Secretary of Natural Resources. What if, like Maryland, we created a Fishery Extension Service in the office of the Secretary of Natural Resources and thereby established the idea that fisheries were every bit as important to this state as Agriculture. A clear directive to the Marine Resources Commission might achieve some of these things.

What if we could pass a Key Facilities Siting law that set as its goal a concern for our environment. What if we could look seriously at the mandate described for clean air and say that it shall be the policy of this state to achieve this goal rather than let it be the policy of this state to promote industrial development at all costs.

And finally, what if we behaved as if we really meant what Article XI of our Constitution says, and that is: To the end that the people have clean air, pure water, and the use and enjoyment for recreation of adequate public lands, waters, and other natural resources, it shall be the policy of the Commonwealth to conserve, develop and utilize its natural resources, its public lands, and its historic sites and buildings. Furthermore, it shall be the Commonwealth’s policy to protect its atmosphere, lands and waters from pollution, impairment, or destruction for the benefit, enjoyment and general welfare of the people of the Commonwealth.

But let me move to practical politics. In the political world, nothing much moves unless the dollar speaks or the taxpayers squeal. Philosophies are fine campaign rhetoric but it’s hard to translate ideals into laws that will stand up in court in the face of property rights and dollar values.

In 1977, the Joint Legislative Audit and Review Commission (JLARC) released a study on the Marine Resources of Virginia. They came down especially hard on the woes of the oyster industry. Let me quote from the overall conclusion of that group. They said that marine resources are an extremely valuable asset of the Commonwealth which have been threatened in recent years by natural and man-made disasters, overfishing, and urbanization. State programs for managing marine resources are fragmented, uncoordinated and inefficient. We have been hearing that all day.

Research and education activities are not sufficiently integrated into the marine resource program and there is no definition of Commonwealth needs and priorities for the use and development of marine resources. The preparation of a Coastal Resources Plan is a positive step toward establishing a uniform marine resource program in Virginia.

On the subject of the oyster industry, the antiquated laws that constrain production methods join the problems caused by Hurricane Agnes, the disease MSX and pollution. The JLARC report claimed there is a demand for oysters and that it’s growing. My curiosity was pricked. Why should Virginia be willing to sell such a potentially valuable resource for an oil refinery? Why were the people involved in the fishing industry not being heard? Conferences pointing out the dangers to the environment, the Bay, the Coastal Zone and the fishing industry abounded but beyond the comments being made, nothing was happening.

A study done in 1961 made recommendations that did not develop.
Some of the same recommendations have been made by Lieutenant Baylor at the turn of the century. Essentially those recommendations encouraged the free enterprise system. Lease the grounds as far as possible and let the industry grow through the incentives of the industry.

I put in a resolution to study ways to revitalize the oyster industry. At the same time, a big fat study came out of VIMS, entitled “The Oyster Industry of Virginia, its Status, Problems and Promise.” That was by Dexter Haven, William Hargis and Paul Kendall’s efforts. The subcommittee consists of three Delegates, three Senators and six experts from the industry that included watermen, processors and planters from all areas of the State. We have presented recommendations. I can make a long story short by saying we haven’t gotten very far.

I think some of the answers to the problem can be addressed through legislation. I’m beginning to realize that the oyster industry would put to shame the problems that they had with the Tower of Babel and I’m hearing today that’s not just confined to the oyster industry. I have found the answer to why the people involved in the fishing industry—well, the oyster industry anyhow, were not being heard. No one agrees with anyone. In the four public hearings held in different areas of the state, there was agreement about one thing and that was that something should be done about pollution. They agreed that government should stay the heck out of their business except where it benefitted their special interest. Each person was a delightful rugged individualist. The meetings were lively to say the least. Every area has another axe to grind. There is no agreement between watermen, planter or processor.

Watermen on the James want the seed oysters to bring high prices. Labor intensive methods keep that price high. Private planters want low priced seed so that their risks will be reduced. Modern harvesting methods that would lower seed prices are vigorously resisted by the tongers in the James. One of the watermen on the subcommittee put it this way: “We are being led to believe that hand tonging built the oyster industry as the mule built the farm industry. That may be but I don’t see anyone buying mules any more. There are many acres in the James that cannot be worked by hand tongs. The oysters on those bottoms are lost until we find a way to get them out. $200,000 in taxes have been collected from the watermen and packers and now we pay more but get less. We need to get into the James and harvest the seed and put down more shell for strikes. Until we do that, we can hold hearing after hearing and we’ll be right where we are now, nowhere.”

What if all the people who had an interest in our fisheries, including the seafood restaurant owner, the sports fishermen, watermen, processors and environmentalist joined forces to form a lobby to speak on behalf of wise management and a healthy environment for our coastal resources? What if communication began to develop between all the factions and we discovered that on some things we can work together, on some things we can actually agree.
What if one of these conferences actually resulted in some action? Wouldn't that be great.

Moderator Theberge: Thank you very much, Delegate Hailey. Next, our speaker is Mr. Allen Haynie.

Mr. Haynie: Thank you, Professor Theberge and thank you also for the opportunity to participate in this conference. As you stated, I am connected with the Zapata Haynie Corporation which produces fish meal, fish oil and condensed fish solubles from menhaden on the Atlantic and Gulf Coasts and from Anchovy in Ensenada, Mexico. We also catch and process tuna and we can sardines in Maine.

Fish oil, industrially, is used in the United States in protective coatings and for other things, such as high pressure lubricants. Meal is an ingredient in broiler feeds and the peak consumption in the United States in the peak year was about 900,000 metric tons. Solubles are used in the production of swine feed and also they're spray dried for some speciality purposes.

The fish meal industry is the largest producer, tonnage-wise, of all U.S. fisheries, accounting for about 42% of the total shell and finfish landings. Although much of what I say today deals with the development of commercial aspects of fisheries, that's about all I know about fisheries, we must never forget that under Public Law 94-265 the true needs of all U.S. user groups must be met and they must be met in a just manner. I cannot, for example, over-estimate the importance of the recreational users.

One must not forget that the great majority of the recreational catch does enter into the human food chain. This will increase as we develop the necessary scientific and statistical data to permit proper management and conservation of recreational species. Figures are not available but the primary and ripple effect of the recreational fishing community on our economy is a contribution which can be measured in the billions. Only when the needs of each group are satisfied, can there be any legitimate surplus to share with our foreign neighbors and this is not only the way it should be, it's the law.

This conference was made possible, in part, by a grant from the Virginia Environmental Endowment Fund with its purpose to deal with the future of Virginia's natural resources, including fisheries. It is quite difficult to focus specifically on the future development of Virginia's resources inasmuch as their success or failure is so closely tied to the total resources of the United States.

As you have often heard, nothing is more important to the well-being of the fisheries of the Commonwealth than protection of their habitat and much of what we hear concerning the environment is the view dealing with certain acts of commission which tend to harm specific facets of the environment. I would prefer to examine this subject, recognizing that there is a broad view of environment and while we hear more about the seas and atmosphere, we really should consider the
total system which would then focus on additional segments including, but not limited to, land and sea animals but in fact, the total composition of this planet, and our total environment may be affected either positively or negatively by acts of omission just as easily as by acts of commission.

It is obvious that humans can significantly affect their environment. Therefore, man, as the highest form on our planet should receive top priority in a balanced management of the total environment. I hasten to add, in referring to management, I do not hold to the theory that our government necessarily knows more about the subject than those in industry or for that matter, than just ordinary, average individuals.

Simply stated, I believe proper and effective management of the more important facets of our environment would be to enhance all aspects available to us for all types of human needs. This enhancement would include the development and production of new, better and more useful items which would improve life for all of us.

America became the greatest nation on earth by following the principles of capitalism. We waged economic competition with all nations who challenged us, working to benefit the American standard of living. Our philosophy seems to be changing. We're slowly becoming a nation of complacent “fat cats” with but slight reluctance permitting countries such as Russia, Japan, Korea and others to surpass our own productivity rate by meaningful margins.

This brings me back to sins of omission and to the case of fisheries as a particular example. In 1976, the United States became legal custodian with first preference to the harvest of about 17 to 20% of the world's fishery resources when the Fishery Conservation and Management Act created the 197 mile conservation zone. We all know, since 1960, our nation's production of fishery products has declined gradually to the point we're no longer one of the leaders in this field.

Today, America imports about 60% of all the edible fishery products we consume. At the same time, we are giving away as we must under the law, tremendous tonnage of surplus fish to foreign countries. For example, Japan alone is allocated about one million metric tons annually from U.S. surpluses. Increasingly, fish are caught in waters of U.S. jurisdiction, processed and exported back to the U.S. by foreign entities for domestic American consumption.

The U.S. must concentrate on its volume resources such as pollock, sea herring and others. We own substantial tonnage of certain species such as pollock which are classed as underutilized. Underutilization means to me that we simply do not yet have the initiative to develop products of nearly perfect amino acid balance to feed our own country and a world starving for high quality protein. Remember for a moment that prior to 1941 and the beginning of World War II that chicken was an underutilized species and today I believe that Frank Perdue's firm alone probably produces more chicken in 30 days than the entire United States consumed in 1941.
Japan, for example, uses all available fish. They do not know the meaning of the word "underutilized." The Japanese freeze pollock as well as use it in the manufacture of surimi, and surimi is yielded by defatting and deboning surplus fish products. This process creates fish flakes to which are added color, flavor and some sort of binder. The coloring and flavoring depend on the end product desired which can be substituted for ham, turkey, weiners or other meats. Bear also in mind that Japan is an island with a land area approximately equal to California but it is inhabited by a population of 120 million people. There is not enough land surface to raise land animals for consumption or is there even surface to raise grain for these animals should they exist. Japan has got to have fish.

Continuing with our example of pollock, let's look at the present state of this resource. I'm talking about the Bering Sea and the Gulf of Alaska. The yield annually is four and one half million metric tons. Of this amount, humans consume two million tons but other mammals consume two and a half million. Shouldn't we manage this total so that the allocation for human food is greater than 45%? By our own acts of omission then, we're failing to live up to our moral responsibility to our own country and secondly to that of the world, in not fully utilizing the resources America has. We now have an imbalance of two and a half billion dollars in the world trade of fishery products alone. This condition results from the fact that the United States harvests only 28% of its own resources while at the same time permitting the importation of 60% of all edible fishery products that we consume.

Thus, in the broad view we're not achieving the most balanced use of our environment when we omit those activities which would improve man's life. To help remedy this imbalance, we should, in my opinion, increase the freezer vessel and shore based processing capacities both in the Commonwealth and in other coastal states to the point where we are catching and processing finished products and I stress the words finished products, from the greater part of the resources which we own. We should recapture a large part of our domestic market and share our surpluses with our foreign neighbors through the export of finished goods.

I think that the best means to achieve maximum results for American fisheries and I'm speaking now of the commercial species, is through the vertical structuring of our commercial fishery operations. In my opinion, only larger corporations or cooperatives are capable of helping to eliminate the fragmentation of a substantial part of today's U.S. fishery, and are best equipped to conserve a vital resource.

We need organizational units which are vertically structured which enable them to perform the following activities. The catching of the fish, the freezing, the processing, and the achieving of proper quality control which we don't have today associated with a brand name, effective merchandizing including service to the customer on a year round basis. Any quality product which is functional can be intelligently mer-
chandised and I might say in passing that the menhaden industry is 100 years old and we never really succeeded nor did we make any substantial contribution to our country or to the world until we became vertically structured. We were—single units at the mercy of whomever chose to buy our product.

I think that this can be accomplished much easier—the vertical structuring and the proper utilization of our fishery resources—by concentrating on the volume species such as pollock, menhaden and sea herring. It could be accomplished much easier by amending Public Law 94-265 to require those nations sharing our fishery surpluses through fisheries agreements (GIFA’s) and allocations, to open their markets to United States produced finished fishery products. The door is barred to our finished fishery goods by most of the nations exporting to us, and Japan is the very prime example. It’s going to mean the elimination of certain trade barriers, duties and quotas and I think that the best way to accomplish this relief is to put a lock on the surplus that we give them until they see fit to let our products flow competitively into their countries. Right now we’re just letting them fish our resources gratis. I think we should stop this give-away program and we should contribute toward a surplus in our fishery foreign trade rather than continue to endure the present two and a half billion dollar level of trade deficit annually. One of the important features of fishery management under our new law is that those depleted stocks will be allowed to replenish themselves for optimum long-term utility and I don’t think American fishermen really need to be reminded of the importance of conservation. Their future really depends on it.

These resources are important to the broader view of environment management. There is one area where significant progress can be made through improved utilization—using present technology to enhance nature’s bounty. What better goal than the efficient production of food for the sustenance of people all over the globe.

The humble fish has been used by man since before recorded history and it remains today one of the bright hopes for yielding new means to help feed the world of the future.

Moderator Theberge: Thank you very much, Mr. Haynie. His closing comments reminded me that Doctor Hargis is not here today. I should perhaps explain that. He had to leave somewhat earlier for Russia than he anticipated. He’s going over there for a scientific conference on the world productivity of the ocean. Evidently he’ll be over there for some time. He sends his regrets and we will miss his comments. Our next speaker I should also point out is the author of the law review article that was in your packet, Professor Tom Schoenbaum.

Professor Schoenbaum: Thank you very much. I have enjoyed sitting here and listening to the other speakers. I bring up the rear here today and I have been told that my job was chiefly to sum up what the other experts have said but I think in view of the hour, I probably have a more modest duty and that is to simply keep everyone awake during
the rest of my speech. But let it be said I’ll probably fail in both of my objectives but—here goes anyway.

If there is anything that has come across to me sitting here listening to the papers, it is that we can’t afford in discussing fisheries to merely concentrate on legal and policy issues relating to the FCMA and even state marine fishery laws. There are simply too many other important legislative issues and policy issues than those and I don’t mean to denigrate the excellent presentations we heard by Mr. Feinberg and by the other speakers but one thing, for instance, there are several other legislative enactments that come to mind that we need to worry about.

First of all, I think we need to take another look at the water pollution control laws. Historically, these laws were more concerned, I think it’s fair to say, with streams and with inland waters. I think we’ve seeing now a reversal of the importance at least with respect to what waters we should worry about. Certainly the estuaries are more fragile and harder to take care of and probably more important to us and more difficult to deal with than inland bodies of water or at least streams.

Another aspect of the presentations that comes to mind is that we need to look more closely at the relationship between coastal zone management laws and fisheries. We have seen the connection, I think, drawn today by the panel this morning. Doctor Austin, for instance, spoke about the need to adopt some standards with regard to land based activities. What can be done on land and what kind of activities can be carried out on land? This is exactly the function of the coastal zone management laws and in most states, coastal zone management laws basically accomplish two things. Number one, they protect vital areas and obviously if you’re dealing with protection of marsh land, wetlands, there is a direct relationship with fisheries.

Secondly, these laws commonly require some land use standards in the coastal area, and obviously this, as Doctor Austin pointed out, is important with respect to fisheries. Another point also related to coastal zone management that was brought out several times during the day: We need to look carefully at the siting of energy facilities in the coastal zone and what they’re going to do with our fisheries and what impact they’re going to have, and we need to be prepared, as much as we need energy, to turn down energy facility siting or at least move it to another area where it would have less adverse effect, to protect our fisheries.

Another point that I think was brought out by the speakers, that needs to be emphasized is that in the future we’re going to see a host of legal issues come up with regard to federal and state legal conflicts. We’ve evolved a management scheme that embodies a double barrier approach in the cooperative work between the federal and state governments. This is fine. This is a shared system of authority which we apparently approve and we would not want to change but we are on the frontier of a number of legal issues.

For instance, what mechanisms exist for reconciliation of opposing federal-state views? Who should prevail in controversies between the
federal and state governments? How do we coordinate the various permit requirements between the federal and state governments? We have some legal tools; as you know, some of you know, there is the so-called consistency requirements in the Federal Coastal Zone Management Act. Lawyers talk about preemption analysis also as a legal tool to resolve federal and state conflicts, but these are legal tools which in the area of resources and fisheries have yet to be widely applied.

I did have some prepared remarks which I will go over. I'd like to speak about some legal problems that have not been addressed yet and that I think are important. Specifically, one problem, the issue of access to marine fisheries by the citizens of other states. Many states have fishery laws which discriminate against the citizens of other states. Although the FCMA, in one of its national standards, mandates that conservation and management measures shall not discriminate between residents of different states, this applies to the federal fisheries management plan.

And, as you know, the FCMA preserves state jurisdiction, although there is a federal preemptive mechanism that may be employed. Nevertheless, states continue to discriminate; in some cases they do so consciously. Many actions cannot be legally sustained. For example, we have had a lobster war up in New England and conflicts on the North Carolina-Virginia border; North Carolina continues to refuse access to Virginia commercial fishermen so I would like to briefly review the signals that the U.S. Supreme Court has been giving us, bearing on that problem.

The Supreme Court's jurisprudence has not been a model of clarity and so the law is confusing and the Court itself has changed its position several times. The first case I know of where the Supreme Court faced the discrimination issue was the case in 1877, still cited, believe it or not, the case of McCready vs. Virginia. There the Court approved a Virginia statute which granted the right to plant oysters only to citizens of the state. It reasoned that this principle followed from the fact that the state owned submerged land within its jurisdiction and the right to plant oysters is not a privilege of interstate citizenship.

The modern jurisprudence of the Supreme Court has backed away from these two principles, but there have been several twists and turns along the way. In 1947, the Supreme Court faced two state fisheries laws that discriminated in various ways. One case was called Towner vs.
Wittell. It concerned a South Carolina statute that charged residents $25 for a license to fish for shrimp while non-residents were charged $2500, a hundred times as much. The Court considered the validity of this law in the light of two clauses of the U.S. Constitution, the privilege and immunities clause and the equal protection clause.

South Carolina, in order to justify the discrimination against non-residents, argued both of the prior principles, the McCready case and the Geer case. The Supreme Court refused to buy the argument, stating that free swimming fish could not be in the state's possession and that the ownership theory did not apply. It said the business of shrimping furthermore was a privilege of U.S. Citizenship and that the disparity in license fee could not be justified.

In the second case, Takahashi vs. Fish and Game Commission, a 1947 case, the Supreme Court struck down a California law which discriminated against Japanese fishermen lawfully in the country. It held that the equal protection clause of the U.S. Constitution prohibits discrimination against alien fishermen lawfully in the country. The Supreme Court took a more ambivalent position with regard to state law discrimination in the next case, the 1977 case called Douglas v. Seacoast Products. This case involved yet another Virginia statute. By law, Virginia prohibited non-residents from catching menhaden in the Chesapeake Bay and used citizenship requirements as a basis for granting licenses in the offshore fishery. The Supreme Court invalidated both laws.

In doing so, it used a completely novel ground for combatting discrimination. It said that the vessels seeking permission to use the fishery were enrolled, properly enrolled under the federal Enrollment and Licensing Act, and these vessels thus have a federal right to use the fishery that cannot be denied by a state because federal law had preempted conflicting state law.

The Court struck down the discrimination but one wonders why it used the preemption analysis and not the more straight forward privileges and immunities argument of Toomer or the equal protection argument of Takahashi. In making the prohibition of state discrimination dependent on the presence of a federal law, the Court refused to deal with discrimination on a definitive basis and the other side of the coin was that discrimination is all right unless you can find a conflicting federal law. And the Court furthermore refused to deal with the seemingly inconsistent theory on the one hand the state owns the fish and wildlife within its borders and on the other hand, the state cannot deny these resources to non-residents, at least as far as free-swimming fish are concerned.

The Supreme Court dealt again with the issue in 1978 in a case called Baldwin v. Fish and Game Commission. This case challenged Montana's law discriminating against non-residents who wanted to hunt elk. Non-residents had to pay from seven and a half to 25 times the price paid for a license by residents. This time the Supreme Court said the discrimination was justified. It said that hunting elk was not like fishing for shrimp and hunting elk was not a means of livelihood and was
a sport and recreation and was not like the *Toomer* case where shrimp fishermen cannot be denied the right to make a living.

In April of this year, the Supreme Court dealt with yet another discrimination case in *Hughes vs. Oklahoma*. This case involved a state law that prohibited minnows caught in Oklahoma from being sold outside the state. In striking down this statute, the Supreme Court finally faced the issue and overruled the *Geer* case and the 19th century theory that a state owns the fish and wildlife within its territory. It finally said definitively the state ownership theory is simply wrong and states can no longer justify the discrimination on the ground its own citizens own the resource and that its citizens have a monopoly on the resource.

So where does all this leave us on the issue of state marine fisheries law and discrimination against non-residents. First of all, I think states have the power to enact laws directed toward conservation and limiting access to the resource. Secondly, states can, to a certain degree, treat non-residents differently if there is some legitimate reason for doing so, one that is not based on economic protectionism, and this means that states will not be able to use discrimination against non-residents as a conservation tool, if some alternative is available.

In summary, it would seem that this recent jurisprudence should have an important effect on state marine fisheries laws. In order to comply with the constitution, states should amend their laws and regulations to rid themselves of acts of barriers to access to fishermen from out of state, and it would even seem doubtful whether they can continue to restrict oyster and clam leases to residents.

There will be some difficult political decisions involved in making these decisions but it would seem necessary in order to avoid constitutional attack and perhaps ultimately even federal preemption. Thank you.

Professor Theberge: Thank you very much, Professor Schoenbaum. Are there any questions from the audience? Since there are no questions, I would like to make a few comments.

Sitting through the panels today, it's obvious that Virginia fisheries hold great potential but they also face great challenges. There have been many problems identified during the course of the day, problems with certain federal laws, "buy American" laws as they are sometimes called, requiring the purchase of U.S. made boats and taxing the purchase of foreign made nets or equipment.

There have been problems identified with state laws. There was a suggestion that perhaps we ought to review Virginia fishery laws. The problem of the land water fisheries connection has been raised and raised in the context of coastal zone management offering some method of control in regard to that particular relationship. Also, the issue has been put rather squarely that fish production is often in competition with other uses, whether these are land related uses or water related uses.

The problem of the great cost attendant in controlling pollution; in fact, even hiring the people to operate the equipment has been brought
up today. The data problem, the problem of always having insufficient information on which to base management decision has been identified. Research problems have been brought up here, in the context of these panels. Research has been described as self-serving and uncoordinated. I'm not so sure I'll go along with that completely.

Being one of those that seeks out research funds has given me a different perspective, particularly from the point of view of someone who is involved in state operation. Usually, to get funds, you find yourself often dancing to the tune of someone from the federal government and what their interest happens to be. Your interests are subservient to federal legislation and programs providing federal monies. The avenue to correct this particular problem, it seems to me, as far as fisheries interest and user interest are concerned, is to go to the political process at the federal level and perhaps at the state level in order to have more input into the structure of funding programs.

Sewage has been identified as a significant problem as far as fisheries are concerned and then of course the problem of interstate cooperation or coordination has been identified. This has been a longstanding problem as far as fisheries are concerned. Even though we now have the Fisheries Conservation and Management Act which I believe represents a great step forward, we're still faced with some very real and significant problems of interstate cooperation.

I think, although that it's still fair to say that Virginia is a leader among states involved in fishing and its potential is great, it must be pointed out, and must be remembered that, at present at least, those species of which we are dependent upon economically are primarily inshore species, species that are particularly subject to environmental degradation or pollution.

We have here today a broad mix of people. We have commercial and recreational interests. It seems from the evidence that was presented here today, that the commercial and recreational interests are roughly balanced. I share the concern expressed here today that perhaps recreational interests are not given their due, but I think fisheries also suffer from another problem and this is one that's been identified many times here today. Fisheries has no one voice. But in many instances, I don't think we should realistically expect that it should have one voice. Again, to reiterate something that another speaker has brought up or perhaps several have brought up: Fishing interests need to recognize common ground and common interests and unite along those interests and build an effective political voice.

In relation to a key legal point, fisheries are common property and they should be managed for the benefit of society. Admittedly, that's a very complex concept subject to many pressures. What we need, I think, is increased education and communication not only among identified fishing interests but also among many other interests, the general public, legislators, politicians, various academic interests that exist and are represented here today and in many respects this conference today is a positive step in that direction.
I would like in closing to extend my appreciation to those of you who have acted as staff for this conference, you the audience and special thanks to the speakers, the commentators and the moderators who have given so freely of their time and effort today. Thank you very much.

(The conference was then concluded)