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REAUTHORIZATION OF THE ANADROMOUS FISH  
CONSERVATION ACT

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HEARINGS

BEFORE THE

SUBCOMMITTEE ON  
RESOURCE PROTECTION

OF THE

COMMITTEE ON  
ENVIRONMENT AND PUBLIC WORKS  
UNITED STATES SENATE

NINETY-SIXTH CONGRESS

FIRST SESSION

ON

S. 838

A BILL TO AMEND THE ANADROMOUS FISH CONSERVATION  
ACT IN ORDER TO EXTEND THE AUTHORIZATION FOR AP-  
PROPRIATIONS TO CARRY OUT THE PURPOSES OF THE ACT,  
AND TO INITIATE AN EMERGENCY INVESTIGATION ON THE  
STRIPED BASS IN ATLANTIC COASTAL WATERS

MARCH 5, 1979—WASHINGTON, D.C.  
APRIL 9, 1979—WARWICK, R.I.

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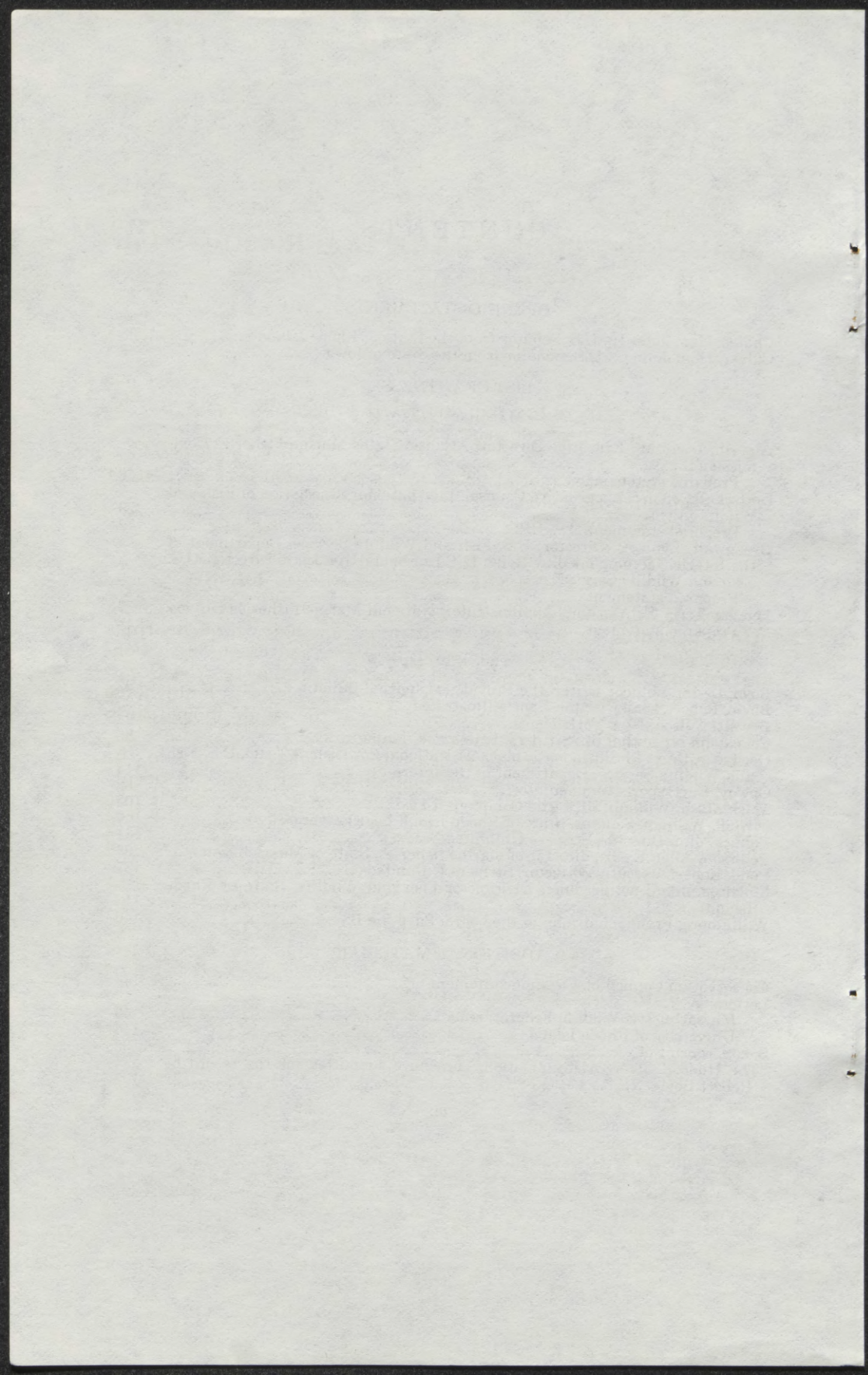
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# REAUTHORIZATION OF THE ANADROMOUS FISH CONSERVATION ACT

MONDAY, MARCH 5, 1979

U.S. SENATE,  
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,  
SUBCOMMITTEE ON RESOURCE PROTECTION,  
*Washington, D.C.*

The subcommittee met at 9:38 a.m., in room 4200 Dirksen Senate Office Building, Hon. John H. Chafee presiding.  
Present: Senator Chafee.

## OPENING STATEMENT OF HON. JOHN H. CHAFEE, U.S. SENATOR FROM THE STATE OF RHODE ISLAND

Senator CHAFEE. Good morning, gentlemen, ladies. This morning I am delighted to have the opportunity to chair these hearings which deal with the reauthorization of the Anadromous Fish Conservation Act. Coming from Rhode Island, also know as the Ocean State, I am generally familiar with the coastal New England shores and I am keenly aware of the importance of the anadromous fish to both our recreation and commercial economy.

I hope that this morning's hearing will lead not only to the authorization of the legislation, something I am certainly deeply interested in, but also will give this subcommittee an insight into how the program might be improved. In the research aspect and in management concerns regarding the many important species of anadromous fish with which we are blessed in this country. For Christmas I was given a book with stern admonitions to read it. A book by John Cole, which many of you have seen, entitled "Striper." I have read it with the greatest of interest because I am interested in striped bass fishing. We live right on the shore of Matunuck where there are silent sentinels standing every morning fishing off the Nebraska Shoals there.

In this book, Cole sets forth a historical background of the striped bass which, of course, is one of the most fascinating, hardy, and, vigorous anadromous fish on the east coast. He quotes John Smith who, in 1614, described the striped bass in New England in the following terms:

The bass is an excellent fish, both fresh and salt, 100 whereof salted (at market) have yielded 5 pounds (sterling). They are so large, the head of one will give a good eater a dinner, and for daintiness diet they excel the Marybones Beef. They are such multitudes that I have seen stopped in the river close adjoining my house with a stand out at tyde so many will loade a ship of 100 tons. I myself at the turning of the tyde have seen such multitudes pass out of a pounce that it seemed to me that one might go across their backs drishod.



That is an incredible description. It is followed up by what takes place with the stripers and their entire migratory habits. This description is 350 years old. Some of the things he has to say are as true now as then. The striped bass is one of our Nation's most succulent seafare. But also Mr. Cole goes on further to say:

This fish, once so abundant, it clogged river deltas, this source of such economic importance that its sale helped found the first public school in America, this creature whose poetry has nourished the souls of men since the Indians, this natural preserve of a natural god is being destroyed \* \* \*. I am along with many others, quite certain now that the striped bass is being destroyed by the effects of toxic chemicals which have penetrated every creek and tributary of the Chesapeake and every mile of the Hudson River accessible to the fish.

I might say I will be interested to hear the views of Mr. Alperin, Mr. Greenwalt, and Mr. Leitzell about the striper, and if it is as gloomy as Mr. Cole sets forth. I must say he is very discouraging about what is happening to the striper. Those that are being caught are now 25 years of age, and the new ones are not coming along.

I know Senator Muskie, who unavoidably could not attend this morning's hearing, would be most interested in what we have to say about the striper and other anadromous fish on the east coast and the west coast as well. As a Senator from the State where the Atlantic salmon was once as abundant and important as was the striper, and as chairman of the Environmental Pollution Subcommittee, Senator Muskie, along with the rest of us on the subcommittee, has for years been trying to rectify the damage man has done and is continuing to do to our rivers. In those areas the pollution control efforts that we have mandated have been carried out in coordination with wise fisheries management decisions, there has been some real success stories. We are anxious to hear what you have to say on those two, the Pacific salmon in the Great Lakes and with Atlantic salmon on the Connecticut River. I understand that much of the underlying research and management that has made those successes possible is funded under this act. So I am pleased with the successes of the program, but we have to draw the conclusion that much remains to be done, not only for the striped bass but for the rest of our anadromous fish.

Mr. Greenwalt, Mr. Leitzell, why don't you both come forward. I read your statement yesterday. I think you might go through them. I have some questions. I must say I took your statements that you gave in the House. I suspect you haven't changed them too much.

Mr. GREENWALT. No, sir.

Senator CHAFEE. Which is perfectly agreeable.

I have a statement from Senator Culver which we will include in the record.

[Senator Culver's statement follows:]



STATEMENT OF SENATOR JOHN C. CULVER  
CHAIRMAN  
SUBCOMMITTEE ON RESOURCE PROTECTION  
Washington, D.C.

March 5, 1979

Today the Subcommittee on Resource Protection will consider the reauthorization of the Anadromous Fishery Conservation Act. I would like to thank Senator Chafee for his interest and diligent work in this area. Congress passed the Anadromous Fish Act in 1965 to assist states with efforts to complement ongoing federal programs for the conservation of anadromous fish, including salmon, shad, striped bass, steelhead and other species which live in the oceans, the Great Lakes and Lake Champlain and must ascend streams to spawn.

The Secretary of the Interior and the Secretary of Commerce are authorized to provide financial and technical assistance to the states and other qualified applicants for anadromous fishery conservation projects. Recipients may receive up to 50 percent matching federal funds for the cost of constructing fish hatcheries and other facilities, for conducting research, and for undertaking habitat protection and development programs. Since these fish, while migrating between salt and fresh water, often pass through several states, cooperative action is often necessary to ensure their protection. Therefore, a 1974 amendment to the Act authorized the federal government to pay up to two-thirds of the cost of multi-state projects.

To date, over \$55 million has been distributed under the Anadromous Fishery Conservation Act, enabling 29 states to complete approximately 350 different conservation projects. An additional 125 projects are currently



PAGE TWO

underway.

This has been a notably successful program, generating over \$600 million in sport and commercial fishery benefits. Two of the more successful projects include the restoration of a viable Atlantic salmon fish population in the northeast United States, and the creation of outstanding sport fishing in the Great Lakes. In the Pacific northwest, it has provided the necessary impetus for the state of Washington to begin to implement the so-called Boldt decision concerning Indian treaty fishing rights.

Appropriations under this Act, however, have never approached the \$20 million annual authorization, averaging \$2 million for the Department of Commerce and \$3.5 million for the Department of the Interior. One question the Subcommittee will address during this hearing is whether the currently provided level of funding is required. We will also evaluate how the two agencies coordinate their responsibilities under the Act, and how this program is integrated with other fishery programs such as the Dingell-Johnson Act and the Commercial Fisheries Development Act. The Administration has recommended legislative changes designed to improve the implementation of this law, and these will have to be closely reviewed.

This will be the first time that the Subcommittee has formally examined the Anadromous Fishery Conservation Act, and I greatly appreciate the interest of all the witnesses who will appear today to assist us in this effort.



Senator CHAFEE. Mr. Greenwalt, why don't you start off. I don't think it is necessary to read every bit of your statement. Why don't you summarize it as you go along.

**STATEMENT OF LYNN A. GREENWALT, DIRECTOR, U.S. FISH AND WILDLIFE SERVICE, DEPARTMENT OF THE INTERIOR, ACCOMPANIED BY GALEN L. BUTERBAUGH, ASSOCIATE DIRECTOR, U.S. FISH AND WILDLIFE SERVICE**

Mr. GREENWALT. I shall, sir.

Senator CHAFEE. Any points you want to emphasize—

Mr. GREENWALT. Let me say in the first instance, Mr. Chairman, that Mr. Leitzell and I and our respective services work very closely together on this and other matters, and I would be particularly pleased to have Mr. Leitzell join in at any time he feels he can add clarity to any point I have attempted to make.

As you know, we jointly administer the Anadromous Fish Conservation Act. I think it is important the committee understand that our relationship is a good one and a positive one.

The administration supports the continuation of the authorization of appropriations for this program. The administration has requested \$5,712,000 in appropriations for fiscal year 1980, and we recommend an authorization of that amount for that year. We also recommend that the authorization language read that "such sums as may be required" are authorized for appropriation in subsequent years.

Senator CHAFEE. I don't know what that means.

Mr. GREENWALT. That means that it will avoid the necessity to deal with solid dollar figures and that appropriations of any amount that can be justified and supported by the administration are, thereby, authorized.

Senator CHAFEE. I am not sure this committee likes that language so much. Have you done that before?

Mr. GREENWALT. With other kinds of authorities, yes.

Senator CHAFEE. And that is sufficient authorization for the Appropriations Committee to work within?

Mr. GREENWALT. Yes, and in many programs, within my area of experience at least, it eliminates the problem of a ceiling which may become a difficulty as the years advance. An authorization stated in finite numbers may become an impediment to effective use of the program.

Senator CHAFEE. I suppose this committee could authorize the sums every year, couldn't it?

Mr. GREENWALT. Yes, I think so, without any problem.

Senator CHAFEE. Continue.

Mr. GREENWALT. There are two other amendments that I think are important and useful in the execution of a grant program of this kind. One is to correct the anomaly that exists in section 1(c) of the act wherein there is no provision for providing for Federal cost sharing of operation and maintenance expenses when two or more States join together in a cooperative effort. Said in another way, while there is a provision for operation and maintenance expenses in the case of single State projects, an operation involving more than one State in cooperative efforts which are likely to be very beneficial to the program have no provision for cost sharing of



O. & M. expenses. We would, therefore, recommend that the act be amended to permit Federal cost sharing of up to 50 percent of operation and maintenance costs at multi-State or tribal-State cooperative projects.

Senator CHAFEE. You say that has discouraged States from becoming involved in multistate projects because they can't get the 50-percent operating funds?

Mr. GREENWALT. They can get no operating funds.

Senator CHAFEE. Because they cannot get it.

Mr. GREENWALT. That is right.

Senator CHAFEE. Is that a fact that has discouraged them or it will by logic discourage them?

Mr. GREENWALT. By logic. We have not seen it actually discourage them in any instances of which I am aware of on the Fish and Wildlife Service side.

Senator CHAFEE. I suppose it is hard to get them to do the multistate things anyway.

Mr. GREENWALT. Not entirely. There has been cooperation with respect to the Atlantic salmon, for example.

Senator CHAFEE. Who, Oregon, Washington? You mean in the lakes?

Mr. GREENWALT. The Atlantic salmon, on the east coast.

Senator CHAFEE. Who is cooperating?

Mr. GREENWALT. Connecticut.

Senator CHAFEE. With whom?

Mr. GREENWALT. Massachusetts—all the States on the Connecticut River have cooperated. That is one example that comes readily to mind. I am not aware of any other unless Mr. Buterbaugh—

Mr. BUTERBAUGH. There are three others and one new proposal involving Michigan and Indiana to enhance anadromous fish in the St Joseph River.

Senator CHAFEE. What is the justification for the Federal Government to fund 50 percent at all? Why do 50 percent of the States have operations?

Mr. GREENWALT. In one sense, to encourage the States to cooperate—

Senator CHAFEE. Set that aside. I am saying what is the justification for the State paying 50 percent of the operation maintenance—

Mr. GREENWALT. In any event?

Senator CHAFEE. In any event of a State operating—you run uphill here a little bit.

Mr. GREENWALT. I see. The justification is basically that there is more than simply a State responsibility for the resources involved. These are interstate resources, as you know, sir, which by their very biological nature are not likely to be restricted to the confines, either administratively or legally, of any one State. And I see a real responsibility of the Federal Government in that anadromous fish originating in Connecticut or Massachusetts may very well be taken by Greenlanders as an international resource. I think there is a rational, a very strong reason, for Federal involvement in these programs, even though a part of the resource benefit may accrue to the river of origin or the State of origin.



The resource itself, for a greater part of its life, is an international resource, is one that transcends any one State or set of States.

Senator CHAFEE. Does the Federal Government, under the Fish and Wildlife Service, do anything for the anadromous fish just through your regular research activities and through solely federally funded research?

Mr. GREENWALT. Yes, to both questions.

Senator CHAFEE. So it isn't quite fair to say we ought to have these activities helped by the Federal Government because it is more than a State activity; we are doing things at the Federal level.

Mr. GREENWALT. I agree, we are doing a great many things. I think that that same concept could and should extend to Federal involvement in fish production or habitat improvement because the benefits accrue to people and interests beyond the State, and I know of no way to determine which part is limited to that State alone.

#### STATEMENT OF TERRY L. LEITZELL, ASSISTANT ADMINISTRATOR, NATIONAL MARINE FISHERIES SERVICE

Mr. LEITZELL. If I can add a comment, Mr. Chairman, I would second Mr. Greenwalt's statement there really is a natural resource we are talking about. Many of the fisheries, for example, in the Pacific Northwest actually take place in the open ocean. There is an ocean troll fishery that takes place beyond State waters and there is a recreational fishery that takes place beyond State waters. There is international cooperation necessary on the west coast as well because many of the salmon, in particular, pass through Canadian waters on the way to the United States. We are involved in negotiations with Canada. I think from our perspective, we feel that for effective conservation and management of these species, we need not only Federal activity and Federal capability, but also State capability. I don't feel that we can effectively manage anadromous resources unless there are effective State agencies that can cooperate in these activities with us. It is partly a question of manpower and personnel available to work on these programs as well as funding. I think this particular grant does enable the States to be able to increase their personnel available to work on these programs and consequently provide a complementary resource in terms of people to our resources at the Federal level.

Senator CHAFEE. Mr. Greenwalt, why don't you continue?

Mr. GREENWALT. The second mandatory change we recommend in the act would increase the amount any State may receive in a given year to \$1 million or 20 percent of the appropriation for that year, whichever is greater. With a large capital investment in construction projects, we believe it may be advantageous in the future to provide more than \$1 million to a State in a given year.

Mr. Chairman, you have alluded to some of the problems that have confronted anadromous fish—

Senator CHAFEE. Let me just talk to that 20 percent or up to \$1 million. What is the limitation now, \$1 million?

Mr. GREENWALT. Yes, that is the limitation at present.



Senator CHAFEE. There is no question but what under this program a few States have been getting most of it. I think it is fair to say that five States have been getting well over half, if you take Washington, California, Oregon.

Mr. LEITZELL. Alaska.

Senator CHAFEE. Let me take the history of the program here a minute. Let's just take a year. Let's take the last year. All 50 States do not participate. It just seems to me a few States are getting it all or a lot of it. Is that accurate?

Mr. GREENWALT. Yes; there is no question.

Senator CHAFEE. Twenty percent under the \$5 million that they have been receiving annually comes to \$1 million in any event, wouldn't it?

Mr. GREENWALT. That is correct.

Senator CHAFEE. Give me a little better reason why we should change it from \$1 million to 20 percent.

Mr. GREENWALT. One of the reasons is that in certain circumstances, and I think these circumstances may arise if they have not already, the needs of the anadromous fish resources may reach a level at which a percentage of the grant, that is to say the 20 percent, may be, and indeed will be, more in keeping with the intent and purposes of the Act.

We have seen a plan for a hatchery in Vermont that would run to \$8 million in capital investment, which is a substantial sum, quite obviously. And if that were arrived at and granted, then the contribution of the Federal Government ought to be, in my judgment, greater than the limitation presently imposed.

Senator CHAFEE. That is some large fish hatchery, isn't it?

Mr. GREENWALT. If built at that level, it is a large fish hatchery, and they are very expensive these days. Cold water fish hatcheries are very, very expensive.

Mr. LEITZELL. We have pending projects which have not been funded for lack of available moneys from Alaska and the State of Washington which would put them over the \$1 million level. One of the Alaska projects is over \$1 million itself. Our feeling is not so much that there shouldn't be equity in the program, but that in analyzing program proposals, we should be able to analyze them more on the basis of the worth of an individual program.

In that sense, we would like to see a less stringent limitation on the amount of money that could go to individual States if they have matching funds and a value in their program.

Senator CHAFEE. But tell me why you want this when you have come in with a program this year that is only, as I understand it, \$0.7 million more than the program was when it started in 1965.

Mr. LEITZELL. I think it is more a question of looking to the future, Mr. Chairman, certainly not under the present program.

Mr. GREENWALT. I agree.

Senator CHAFEE. Can you look down the road at all and tell us what you think you might be coming in for and asking in the future? When you come in with a request that such necessary sums be authorized for the next 4 years, what justification would you have that Congress give up that right of keeping the authorization power and turn it over to the administration, in effect, and to the



Appropriations Committee which, of course, would do the appropriating?

I am not sure I follow your rationale.

Mr. GREENWALT. I can speak to our projections, that is the U.S. Fish and Wildlife Service projections for the next several years with a clear understanding, as I am sure the chairman knows, that these are dependent upon the state of the national budget and so on. We anticipate that there will be nine new projects and 60 ongoing projects in 1981 for which we would request \$4 million. There would be an estimated 10 new projects, as well as the ongoing projects, in each of the years 1982, 1983, and 1984, and in that case, we would request \$4,500,000 in fiscal year 1982, \$4,800,000 in fiscal year 1983, and \$5 million in fiscal year 1984. This would, at the same time, support ongoing projects in the number of 57 for 1980, 60 in 1981, 65 in 1982, 68 in 1983, and 70 in 1984. These projections are not dramatic increases but are realistic with what we have experienced in the past.

Mr. LEITZELL. I might comment, Mr. Chairman, that we are looking at the possibility in the same time frame and with the same constraints, obviously, of a potential increase from our present level approximately \$2 million to about \$4 million.

Senator CHAFEE. Mr. Greenwalt was talking solely about fish and wildlife?

Mr. GREENWALT. That is correct.

Senator CHAFEE. Currently you are getting about \$5 million a year total?

Mr. GREENWALT. That is correct.

Senator CHAFEE. Three and two. It comes to \$5.7 million that Mr. Greenwalt is saying for fish and wildlife alone. You envision requests in the neighborhood of five-plus for fish and wildlife alone.

Mr. GREENWALT. That is correct, sir.

Senator CHAFEE. Mr. Leitzell.

Mr. LEITZELL. Further into the future, we envision possibly as much as four, although we are finding it very difficult to make solid predictions, not just because of the Federal budget process, but also because of the potential availability of State funds. We do have a number of backlogged projects, however, which on their face are of good merit and for which matching funds are available so there would be potential from our point of view for expansion of the program rather quickly if funds are available.

Senator CHAFEE. In this current year, what percentage of your money is for operation and maintenance, and what percentage are you giving to the States for construction?

Mr. GREENWALT. Mr. Chairman, as far as the Fish and Wildlife Service is concerned, 15 percent goes for O. & M. and 20 percent for research and management. The rest goes for construction. There are in fiscal year, 1979, 65 ongoing State projects funded by the Fish and Wildlife Service.

Senator CHAFEE. So most of it is construction.

Mr. LEITZELL. Ours is not quite the same balance. We have 47 ongoing projects, 6 of which are joint projects we both administer. We have about 35 percent directly for construction, about 50 percent for research, and we have 11 percent, I don't have the figure



broken down, which includes some O. & M., but not the full 11 percent. Half of our program goes directly into research.

Senator CHAFEE. Yes, I notice that in your statement, but, Mr. Greenwalt, you don't do research?

Mr. GREENWALT. We have about 20 percent for research, Mr. Chairman.

Senator CHAFEE. So both basically a very small proportion you give out is for O. & M.

Mr. GREENWALT. That is correct, sir.

Mr. LEITZELL. Yes.

Senator CHAFEE. Why don't you go ahead and finish your statement, Mr. Greenwalt.

Mr. GREENWALT. I think the statement is self-evident as to things that have been accomplished with the program within the Fish and Wildlife Service, Mr. Chairman. I think one of the points I should like to make is that the effect of the program over the years has been positive, and as my statement indicates, recreational fishing for anadromous fish has been increased by an estimated 8 million angler-days annually. The economic value of this is conservatively estimated at \$72 million per year. In a word, it does pay off.

I think another point should be made, and that is one you alluded to earlier. That is, that there are a variety of problems that confront anadromous fish. Some of the cycles, that distress people are, in fact, natural population cycles. However, as you have pointed out, there are many inhibitions to the successful life cycle of anadromous fish. Almost all of those are imposed by man, and while it has been suggested that the future is rather bleak as it relates to at least the striped bass, I can refer you on the positive side to the kinds of results that have occurred with the Atlantic salmon because of the efforts taken by the Federal Government and the States and which have revealed some reason for optimism about the future of this magnificent fish.

Senator CHAFEE. Let me see if I can get the jurisdictional lines drawn here. Begin with the Fish and Wildlife Service, your jurisdiction would remain with the anadromous fish that are in the Great Lakes, would it, or would you go into the—how far would you go with the coastal fish and the rivers, too? Does this get so you can't define it?

Mr. GREENWALT. Jurisdiction is so vague that it cannot be readily defined.

Senator CHAFEE. You take the Connecticut River how far down?

Mr. GREENWALT. We ordinarily go to the mouth of the river. Quite obviously, Mr. Chairman, the art of describing a legal distinction for a thing which has no biological distinction is very difficult to accomplish, one of the reasons Mr. Leitzell and I have come to know each other so well over the past year or two.

The dividing of responsibility has never been very skillfully done except by agreement between the two agencies. As a practical matter, many of the things that the Fish and Wildlife Service does, for example, in the way of research, is extremely valuable wherever anadromous fish occur, as is the research done by Mr. Leitzell's agency.



Senator CHAFEE. I see we have some schoolchildren come in. We are glad to see them. Since this is a relatively informal hearing, why don't you tell us where you are from?

[FROM THE FLOOR]. Sidwell Friends School.

Senator CHAFEE. We are glad you are here. This is a hearing dealing with the Conservation Act which pertains to anadromous fish. Anadromous means a fish that has to go up into fresh water creeks to spawn. Most fish live in the sea or they live in ponds.

There is a certain group of fish like the salmon, the striped bass, the shad, the cutthroat trout, and the Arctic shad which go up into streams to spawn. They return to the same stream every year. Is that right, Mr. Leitzell?

Mr. LEITZELL. Yes.

Senator CHAFEE. If a fish was originally born in the Connecticut River, it goes out into the ocean, spend a year there, and comes back to the Connecticut River to spawn. We have two witnesses today. One who represents the saltwater side of the Government, Mr. Leitzell, from the National Marine Fisheries Service, and Mr. Greenwalt who represents the U.S. Fish and Wildlife Service which deals with the freshwaters. What they are here seeking is continued money for the Federal Government to help the States construct fish hatcheries; not only construct fish hatcheries, but to provide for the maintenance of those fish hatcheries.

In addition, they are asking for some changes so that we encourage States to work together on fish hatcheries, not only build them, but operate them together.

New Hampshire and Vermont are on opposite sides of the Connecticut River; it seems foolish for both of them to have a separate fish hatchery. That is where they are. They are just telling us about some of the successes and some of the problems of these anadromous fish.

Mr. Greenwalt was just saying that a lot is involved besides just providing the fish themselves to spawn. He is about to tell us about the conditions of the waters themselves due to environmental effect and toxic chemicals. I suppose you are getting into that.

Mr. GREENWALT. My colleague indicates he would like to interject something.

Mr. LEITZELL. If I could make a brief comment, both of my children attend the same school as these children. I am only sorry that one of them is not here because having heard that explanation, they might—

Senator CHAFEE. Know what daddy does?

Mr. LETIZELL. Also why daddy comes home very frustrated sometimes.

Senator CHAFEE. Go ahead, Mr. Greenwalt.

Mr. GREENWALT. I will be pleased to.

Senator CHAFEE. Tell us a little about the habitat.

Mr. GREENWALT. I must say parenthetically, Mr. Chairman, that you, in this forum or any other, would get very high marks for your description of anadromous fish. I have worked for years with people who cannot even say the word let alone define it.

Senator CHAFEE. I couldn't pronounce it until Friday.

Mr. GREENWALT. Among the things that confront anadromous fish are various kinds of frustrations, to put it mildly. Polluted



water is one of those, an incredible array of curious and largely unknown chemicals that are dumped into the rivers and streams of this country.

It is a surprise to me that many fishery resources survive. Many are not doing well as a result of this. Combine that, as has been the case particularly in the Northeast which has been developed for many years, with the multitude of dams, large and small, that have been built over the years and the deterioration of the habitat necessary for the spawning of these creatures through sedimentation and other kinds of physical changes that have occurred and it is extremely difficult for these fish to survive and multiply.

The array of difficulties they confront, of course, vary from place to place and while it would seem almost insurmountable, I am pleased to say there are things that can be done.

Senator CHAFEE. Could you tell us briefly about what has happened in the Great Lakes in the last 10 years? I understood the lamprey was wiping out the fish. What fish in the Great Lakes, besides the salmon did the lamprey affect.

Mr. GREENWALT. The sea lamprey has had the greatest effect over the years on the lake trout. As I am sure you know, the sea lamprey, which did not occur naturally in the Great Lakes, made its way to the Great Lakes with the connection of the Welland Canal.

Senator CHAFEE. Came up through the canal?

Mr. GREENWALT. Yes, and found its prey, primarily the lake trout, to be in great abundance. The sea lamprey for many years increased to the point that it was in danger of extirpating the lake trout from the Great Lakes.

In recent years, the Fish and Wildlife Service, funded by the State Department, largely, and in cooperation with Canada, have managed to control the sea lamprey so that it alone is now not the limiting factor for lake trout.

There have been a number of other kinds of problems in the Great Lakes. One has to do with Lake Erie, the so-called dead lake, which has revived and has been made whole again because of some very advanced and stringent laws governing pollution in that lake. We have been able to reestablish populations of lake trout in the Great Lakes, and in some cases we have established self-sustaining populations. These populations are insufficient to support extensive commercial fisheries or extremely heavy sport fisheries on that resource, but the effort has, in fact, been rewarding.

Senator CHAFEE. That is not anadromous fish, is it?

Mr. GREENWALT. No, it is not. Anadromous fish in the Great Lakes insofar as the act is concerned, include all species that ascend streams to spawn.

The States, in recent years, began stocking salmon and this produced a bonanza for sport fishermen because the fishery increased readily through stocking. It grew rapidly and it has produced an incredible opportunity for sport fishing.

Senator CHAFEE. Where?

Mr. GREENWALT. Largely in Lake Michigan, as well as in lakes Superior, Huron, Erie, and now too, Lake Ontario.

Senator CHAFEE. Pacific salmon?

Mr. GREENWALT. Yes, and some Atlantic salmon too.



Senator CHAFEE. That has been a success.

Mr. GREENWALT. It has been a resounding success. It is clearly an anomaly however in the sense that this does not represent the natural situation of the Great Lakes. The Great Lakes have suffered a number of biological phenomena that have caused, for example, extraordinary production of alewives; 10 or 12 years or so ago there was almost a disastrous excess of alewives—so much so that it threatened briefly the water supply of Chicago because the alewives increased to where they could not be supported by the environment and started to die in great numbers. These kinds of ecological extremes are not altogether uncommon in the Great Lakes, or any system that has been altered and modified as much as the Great Lakes have for a variety of reasons.

The point is that none of these things is simple, and no simple answer will suffice to insure the preservation of a resource we are all interested in.

Mr. LEITZELL. Can I add a comment, Mr. Chairman, going back to your original question of the jurisdictional issue? There is another complicating factor which we deal with because of the passing in 1976 of the Fishery and Conservation Management Act. Under that system, the Regional Fisheries Management Councils, which are public bodies but made up of individuals from the fishing industry and from the interested public, have the authority to develop management plans for fisheries in the oceans beyond 3 miles. As I mentioned earlier, there are a number of salmon fisheries in particular that do take place in that area. So there is another body involved, subject to the oversight of the Secretary of Commerce, in dealing with at least the salmon, and potentially with other anadromous species.

We have been working with a number of the States to try to get them to orient their research programs more toward support of the activities that are being undertaken by these councils so the management can be done better and in a completely coordinated fashion. It is a very complex jurisdictional system that is brought about largely because of, as Lynn has said, the nature of the fish we are talking about.

Senator CHAFEE. Is there duplication between the research efforts? I am not saying that is wrong. I think oftentimes separate small units working vigorously can do better than one monstrous unit. The list of projects that each of you has seems very substantial. When you are talking fish hatcheries, I don't know how many fish hatcheries the State of California would have. How many would they have that you would be involved in?

Mr. GREENWALT. That we would be involved with, related to anadromous fish as a matter of fact, we have one funded through this program. In addition the Fish and Wildlife Service is involved with anadromous fish programs in California through its regular fishery resource management appropriation.

The point you are making, Mr. Chairman, is a very germane one. Everybody is in some way involved in fish production or fish research and various facets of it, such as fish production to enhance commercial fisheries, Terry's domain. Mine is directed primarily toward fishery enhancement for recreation, but the individual fish



may be taken by the commercial fisherman or by the sport fisherman.

It clearly presents a problem. We do work very close to avoid duplication where we can, recognizing that a fish produced on the Columbia River in Washington may be taken by a sport fisherman, it may be taken by an Indian fisherman, it may be taken by a commercial fisherman, who may not be a U.S. citizen, and he may take it on the high seas.

Mr. LEITZELL. I think Lynn would probably agree, for the Fish and Wildlife Service, certainly the National Marine Service fisheries, we have so many projects in our total program dealing with anadromous fisheries that we would like to be able to undertake, we can't afford the duplication. In that respect we coordinate very closely, not just on this program, but our entire anadromous fisheries program, so we can undertake as much as possible between the two of us.

Senator CHAFEE. Why don't you go ahead and finish up?

Mr. GREENWALT. Mr. Chairman, I have very little more to offer at this point. I refer you to my testimony as it relates to some of the things that have been done, such as removing dams from rivers and constructing fish ladders, things of this kind which address at least one facet of the problem that confronts anadromous fish generally.

Mr. Chairman, it is important to know that act, this grant program, has been extremely effective. I think its potential is very great. Its opportunity is compromised to some degree by the ability of the States to match the funds, and this is the thing that I am not sure how to address at the Federal level. I think there may be some merit in considering how it might be useful to help the States to continue to participate in a program like this in spite of the problems that may exist fiscally at the State level.

Frankly, I have no clue as to how the Federal Government can help with that, except to encourage States, by virtue of the Federal Matching funds that may be available, to continue to participate effectively in this very important program.

Mr. Chairman, I will be glad to answer any questions you may have at this point.

Senator CHAFEE. In your statement, you talk about some of the projects that are underway. You discuss "Atlantic salmon restoration in New England has been extremely encouraging on the Penobscot River," 11 fish ladders in the Connecticut River. Could you tell us a little bit more about that? Has this been the success that some of us have been led to believe it is?

Mr. GREENWALT. I think it is fair to say biologically it has been a strong success given the fact that, for a long time, it seemed unlikely that any fish would return. Referring to the Connecticut River, over 90 Atlantic salmon returned in 1978. The fact that over 90 such fish did return is a clear indication that the Atlantic salmon fishery can be restored. I say that for this reason, Mr. Chairman. Consider the fact that these individual fish have faced all manner of problems in the open ocean where they may remain for 2 or 3, perhaps 4 years, before they return to the river, to the point at which they were released, there to spawn, and in this case taken to a fish hatchery and spawned artificially. It is one of



today's minor miracles that this many fish survived in a single run. These represent fish that are essentially the same age class, that is to say, they are brothers and sisters of the same age. They are from the same general family, and to have returned—I am not sure how many were released in that particular instance, but to have 90 return is an extraordinary achievement.

Senator CHAFEE. How far up was that on the Connecticut?

Mr. GREENWALT. Holyoke Dam is about 65 miles upstream from the mouth of the Connecticut River. There were about 65,000 salmon smolts released to produce this run. These would be fish that were prepared to go to sea when released from the hatchery. In the ordinary scheme of things, that's a very small number, and to have this many return from the number released is most extraordinary.

Senator CHAFEE. You mean it is extraordinary when you release 65,000 to have 90 return?

Mr. GREENWALT. From a release of that relatively small size. These are fish just prepared to return to the ocean and begin a physiological acceptance of saltwater as opposed to the freshwater to which they have been accustomed. Destruction by various means is rampant, of course, and as the fish go out to sea, they are subject to many forms of predation and mortality and few of them live long enough to come back to the original river. This return, while minuscule in total numbers, is extraordinary, given the circumstances.

Senator CHAFEE. In that particular instance, is that a Connecticut-run hatchery that you participated in the construction and maintenance of?

Mr. GREENWALT. The eggs came from Canadian Federal and provincial sources. Most were hatched and raised in Federal hatcheries, but some were reared in State facilities not constructed under the Act. None of these eggs was available from U.S. sources. The Atlantic salmon, as you know, is much more common as you move northward along the coast, where these things like dams and habitat destruction are not quite so prevalent. We exchanged trout eggs and fingerlings for the salmon eggs.

Senator CHAFEE. When you raise or hold young salmon in Connecticut River water, does that put the imprint of the river on them?

Mr. GREENWALT. Yes.

Senator CHAFEE. For their return?

Mr. GREENWALT. Yes.

Senator CHAFEE. Tell me a little bit about the striped bass situation.

Mr. GREENWALT. I can speak in general terms.

Senator CHAFEE. We will get Mr. Leitzell on this later. I would like to hear your views, since you deal with the Chesapeake and the Hudson part of it.

Mr. GREENWALT. The striped bass is, as you indicated earlier, one of the most sought-after fishes in the country. The potential of this species has been explored for a good many years, including the establishment of anadromous fish runs in the extreme southern edge of its original range.



The striped bass is one whose precise biology is not clearly understood, and I say that in this sense: That we are not absolutely sure what causes problems with striped bass runs, therefore, the vacillations in the populations are not clearly understood, although we know some of the obvious things can be a problem, such as pollution, and so on.

Mr. Chairman, I think in order that you get the best biological information about striped bass, I will ask Mr. Buterbaugh to speak briefly on the subject. I must tell you my forte is not fishery biology. I love striped bass and I love to fish for them, but I take them on faith largely because I am not a fishery biologist.

Senator CHAFEE. Fine.

Mr. BUTERBAUGH. The Fish and Wildlife Service has not yet a large involvement in the Chesapeake Bay problem of the striped bass. The States have really not requested funding through the anadromous fish grant program in any large amount to help out in this problem. As Mr. Greenwalt stated, there is some question as to whether this is a cyclical problem or whether it is a problem of weather or pollution that is causing the situation we have presently in the Chesapeake Bay. We are working on striped bass to a much greater extent further south in the Carolinas, Georgia, down in the Gulf States where they have requested funding through the grant program. There has not been a great increase in requests from around the Chesapeake Bay.

Senator CHAFEE. That bothers me. It seems to me as I look at the funding in the Northeast States, the amounts given out are, of course, minuscule, very modest. Is it because they don't request the funds, they are not prepared to come up with the 50-percent contribution? Does that seem to be the difficulty?

Mr. BUTERBAUGH. Generally on the east coast that is the problem. There are very few projects on striped bass or Atlantic salmon that we have rejected. It is because they are not requesting grants. They have a problem coming up with matching funds. That is not the case, however, with the Great Lake States, Alaska and the Pacific Northwest States.

Senator CHAFEE. Do you believe there is a potential need in those Northeastern States for these fish hatcheries to use the funds in a judicious manner?

Mr. GREENWALT. I might interject for a second, Mr. Chairman. I think it is fair to say that there is a need for increased emphasis in the Northeast. It may not, however, be for hatcheries alone. It might be for a variety of things.

Senator CHAFEE. Ladders?

Mr. GREENWALT. Ladders, basic research, for pollution control devices or some other thing.

Senator CHAFEE. Do you go as far as pollution control devices? You wouldn't fund that.

Mr. GREENWALT. We wouldn't fund that. We would do research which would identify that which needs to be controlled. The point I am making is simply this: We should not ever assume the solution can be arrived at through hatcheries alone.

Senator CHAFEE. I think that is a good point. As far as the funding goes, would you fund, and research—you mentioned research and I think you said some 50 percent of the funds you give



out under this program, or Mr. Leitzell gives out is for research. Would those go to universities? Is that a logical place, assuming your 50 percent and the university or State, whoever it is, comes up with the 50 percent? How do you do research? How do you do it? It must be through grants—is it—to universities?

Mr. LEITZELL. Under this program, the grants go to the States. The States may, in some cases, also use universities. We can work with them on that. Most of the money is used, I understand, by the States themselves to carry out research.

Senator CHAFEE. Marine biologists within the State fish and wildlife services?

Mr. LEITZELL. Yes. For a number of reasons, one of the things I would stress that Lynn mentioned is a lot of the research does go toward States doing research on specific areas to determine either to impose fisheries management regulations of their own in State waters, or also possibly to impose pollution regulations so that although we are not funding specific pollution abatement construction, for example, some of the research may be directed in that area so that the States could then use their own regulatory authority for habitat protection.

Senator CHAFEE. Let's say you came up with a 50-percent funding project for a Northeastern State for some research. What are the parameters for your O. & M. to a State? Is it just for running a hatchery, is it just for maintenance of a fish ladder, could it extend to policing, marine policing of a certain area so there could be no pollution, or there could be no filling of a marshland, whatever it might be?

Mr. LEITZELL. Under this specific program, we can fund what we call enhancement activities. We can fund the construction of fish ladders and we can fund putting gravel into a stream to improve a spawning area. We could not fund under this particular program actual enforcement. The State could use its own regulatory authority to help to protect habitat in a particular area, but we could not fund its specific regulation or any of the work that it would do to enforce it.

Senator CHAFEE. Yes, that's under the construction part. Let's go into the O. & M. part.

Mr. LEITZELL. That is under the act entirely, I didn't mean the limited construction part.

Senator CHAFEE. Under the act, clearly, you can use your O. & M. funds for the operation of a hatchery; right?

Mr. LEITZELL. Yes.

Senator CHAFEE. How far can you stretch that? One of the points you made here, let's not get tangled up into believing the solution to these problems is all through hatcheries, it is through ladders, it is through protection of natural resources, it is through seeing to the protection of the environment, the marshlands, the wetlands. We agree on that. The question is, how far can a State who doesn't choose to have a hatchery but does want to protect these very environmental areas you believe is important, how far can they stretch you on getting some of that O. & M. money for those activities?

Mr. GREENWALT. They could not, for example, use this grant money to fund a part of a marine patrol program. On the other



hand, research that is conducted both by the Federal and State Governments could and has, in the past, determined certain water quality standards imposed by the State, which has been useful for fish, obviously, but also is part of the State's overall program of protecting its own waters for the benefit of its people. The point here is that research done under this program has yielded results that condition the level of water quality in many States to a point where the water quality is sufficient to maintain the fishery. So while we could not permit them to buy a boat for the Maryland Marine Patrol, for example, the protection is afforded in a less direct way, oftentimes by using information derived from this program to reinforce, to even develop the basic regulations that in the long run have the greatest impact on the resource—things like water quality.

Senator CHAFEE. Let me pursue this a little bit further, if I might. Do you have views on our expanding your authority and to using your funds for broader purposes other than the pretty narrow confines with which you now can use the O. & M. money?

Mr. GREENWALT. I have reservations based on some considerable experience in this area, Mr. Chairman, about, for example, specifically authorizing the use of this kind of money to conduct law enforcement in the literal sense. First of all, it can very quickly dilute the fund because there is perceived by many States a strong need for some assistance in their law enforcement effort.

Again, one must recognize that enforcement in the physical sense, the officer in a boat, monitoring the take of shad from a river, for example is less likely to be beneficial to the fish in the long term than some of these other things. The funding of law enforcement by these grant programs is, in my considered judgment, less effective in the long run for the kinds of resources we are dealing with than to do some of the more fundamental things which can be far more powerful in the final analysis.

Senator CHAFEE. I can see your thoughts on this. What bothers me here, as I look at the picture, it is clear that five Northwestern States have taken advantage of this program far more than the rest of the States of the Nation. I can see why Iowa isn't involved, but when you have 50 percent of the funds going to the States of Washington, Oregon, California, Alaska, what is the matter? Certainly the Northwest salmon, the Pacific salmon is an incredibly important anadromous fish to that area.

But now when we have on the east coast in the Northeast the striped bass, and I suppose you have got to stretch it further than the Northeast if you consider where they go to spawn; namely, the Chesapeake, the tidal areas and streams there, why haven't these other States taken advantage? Have they just come to realize lately the importance for salmon, for example, or the striper? Has the striper survived so well that everything is going on so nicely, or is it they are not willing to put up the money for the matching funds or their projects aren't high enough priority, or you gentlemen tilted in one direction? Edify me, if you would.

Mr. GREENWALT. I will attempt to from a Fish and Wildlife Service point of view. I think the fundamental problem with the Northeast has not been an unwillingness to participate so much as it has been a functional inability. In addition, the Northwestern



States have long recognized the tremendous value of their resource and have, for whatever reason, internally been able to make the adjustments necessary to match the grants.

It has been politically important obviously in the Northwest to deal with the anadromous fish program, and apparently the program has been raised to a level of priority in those States that has eclipsed the kind of compounded action one would expect from the Northeast. I am unaware that, at least in the recent past, we have ever rejected a project in the Northeast on the basis of anything other than substance. I think the basic fact is that the States find it difficult within themselves to match the Federal grants, which is, of course, necessary under the law.

Senator CHAFEE. If they go into joint multistate activities, the Federal Government puts up, what, two-thirds?

Mr. GREENWALT. That is correct.

Senator CHAFEE. So all you have to come up with, if several States get together, all they have to come up with is 33 percent?

Mr. GREENWALT. That is correct, sir.

Senator CHAFEE. But under your proposal for the O. & M. part, that would be 50-50, if we went to the multistate?

Mr. GREENWALT. That is correct, sir.

The amendment, Mr. Chairman, that we recommend, corrects a defect in the Act.

Senator CHAFEE. Nothing, no Federal contribution for multistate projects?

Mr. GREENWALT. There are no Federal funds for operation and maintenance of multistate projects.

Senator CHAFEE. I understand that. But now, drawing on your expertise and getting to the striped bass problem, which, in my own mind, based mostly on this book, which may be an alarmist book, I don't know. You know much more about these things than I do, it would seem to me there is cause for deep concern with the striped bass. You say you are not sure whether there is a problem or whether it is a cyclical matter.

Mr. GREENWALT. I think it is likely to be some of each, but we don't know how much it is cyclical as opposed to some kind of an environmental difficulty. I am disposed to be fairly optimistic about these kinds of things on the basis of evidence I have cited.

One of the fundamental questions that has to be raised is how willing is anybody to make a commitment to the resolution of these problems because that resolution requires money, a commitment that it will be used, that there will be, for example, an effort made to take dams out of rivers when that dam is an impediment to the fish or no longer necessary. As you know, in the Northeast, there is a host of old dams that belong to anybody anymore but still impose an impediment to fish migrating upstream.

Senator CHAFEE. Let me ask a quick question in that connection. Are ladders a rational way around dams, or do they present problems themselves?

Mr. GREENWALT. Fish ladders and elevators works pretty well but they are not a solution in every instance. In some of the cases that I speak of, the dam is a very low one, it may have been put in 100 years ago for a purpose that is no longer valid or it really doesn't hold significant amounts of water back, but it keeps the



fish from migrating upstream. A ladder around that dam is probably an improvident use of money. It would be better to take the dam out. The difficulty can be that nobody knows to whom the dam belongs and, therefore, who is responsible for it. Removal in such cases may not be possible. This is the kind of problems that crop up. I don't mean to get off on that tangent, Mr. Chairman, but the commitment to carrying out these programs is a thing that simply has to be arrived at by everybody involved and it has to be a commitment of relatively long term because these things are not corrected overnight.

Those 90 fish that came back to the Holyoke Dam has been away for 2, 3, or 4 years and one, therefore, cannot expect results a week from Wednesday upon the application of funds and effort to this kind of a program. It is a slow process and there must be a long term commitment.

Senator CHAFEE. I think you are right, but also I think that the rewards are so startling.

Mr. GREENWALT. Extraordinary.

Senator CHAFEE. That they are enough to give people very firm grounds for encouragement. Just think of what the Clean Water Act has done over the past 10 years to provide a Connecticut River in which salmon can survive.

Mr. GREENWALT. Absolutely. You are familiar with the fact that the Thames River in the vicinity of London was recently host to anadromous fish that returned after how many decades of total absence—

Senator CHAFEE. Centuries, not decades.

Mr. GREENWALT. The Thames was terrible.

Senator CHAFEE. I believe in the 16th century, it was as foul as it was 40 years ago.

Mr. GREENWALT. It can be changed.

Senator CHAFEE. What kind of habitat development or protection activities can be funded that don't involve construction? You mentioned some of the things that don't involve construction, such as dumping gravel into a stream bed to encourage spawning areas. That is something that can be done. Can you name some of the things that don't involve construction of ladders or hatcheries?

Mr. GREENWALT. Such things as removal of a logjam and the removal of dams, impediments in the stream.

Senator CHAFEE. This program could be used to remove a dam.

Mr. GREENWALT. Yes, and has been used for that purpose.

Senator CHAFEE. If you ever find out who owns the dam.

Mr. GREENWALT. Yes. In any event, there are some other kinds of things that can be done. I have already mentioned research activities. In addition, we have aided in construction of fish screens, streamside rearing and imprinting ponds, spawn taking facilities, purchase of fish for stocking, and projects for planning and coordination.

Senator CHAFEE. Let's go on to Mr. Leitzell now. I think we probably covered a lot of your points. I read your statement last night. I was interested to where you refer to non-Federal entities.

You say, "The act authorizes the Secretaries of Commerce and the Interior to enter into cost-sharing agreements with the States and other non-Federal entities \* \* \*."



Later on you talk about with universities. Aren't you doing something with the University of Washington?

Mr. LEITZELL. We have had a grant with the University of Washington, also with the Pacific Marine Fisheries Commission, and with an Indian tribe. Institutions such as these we can work with under this program.

Senator CHAFEE. Are there any particular points you want to stress in your statement?

Mr. LEITZELL. I think, Mr. Chairman, in the questions and answers, we have covered most of the points in the statement. I would like to add one other thing that I think is of importance in considering the actual impact and use of this program and other programs that both we and the Fish and Wildlife Service administer.

In the area of habitat protection, for example, both of us have responsibility under the Fish and Wildlife Coordination Act for commenting on Federal projects and Federal permits granted for any kind of development, whether it be in rivers or along coastal areas. In that sense, we do have an impact in terms of pollution, of both coastal waters and the rivers and can help through a completely different kind of mechanism.

Senator CHAFEE. Let me see if I understand this, because you have input on various permits, marine fisheries has an input on protection of the habitat.

Mr. LEITZELL. Both of us. While we don't have the authority under that legislation to fund changes, in many cases, the outcome of our recommendations will be various kinds of mitigation or changes in the project which will involve either the expenditure of private funds, State funds, or Federal funds. I just mention that because there are other mechanisms. The coastal zone management program is another mechanism whereby there is funding available for at least certain kinds of activities that could impact on anadromous fish. I think it is important to realize and understand that both of us carry on a number of programs that get to some of the problems you were raising.

Senator CHAFEE. That is good. I guess one of the things that has fascinated me is the numbers you talk about when you talk about these fish that are involved in these hatcheries. In your statement, you say, "The Alabama hatchery, a joint undertaking with the Fish and Wildlife Service," that means joint between National Maritime Fisheries and Fish and Wildlife, "will annually rear about 1 million striped bass for stocking."

How is that going down there? Is the striped bass going to take to the Gulf of Mexico?

Mr. LEITZELL. We hope so. This is a major undertaking. We also have another project with the Mississippi. This one is too new to know the results yet. We don't have returns, as I understand, from this particular hatchery, to know what the actual impact is.

Senator CHAFEE. I read in this book that the striped bass got to the west coast because somebody, I believe, Fish and Wildlife, transplanted them in about 1870. I am giving you gentlemen some credit that perhaps you are not aware of.

Mr. GREENWALT. They are extremely well established in the Sacramento and San Marcino River systems. I am not sure any of



us present should take any credit for that. That was a very long time ago. Nonetheless, it worked well at that time.

Senator CHAFEE. There is a fascinating story in here of how this man transplanted, I think, 27 of them and somehow got them alive to the west coast. He only had to get them to St. Louis and with a deep sigh of relief, turned them over to his relief there and he carried them through.

So admired was the creature from the very earliest days that in 1879, a bright Henry W. Mason spent 10 days in June on the Navesink River in New Jersey in 1879 trying to collect a significant number of striped bass to fry for his boss Livingston Stone, the United States Commissioner of Fish and Fisheries.

It was Commissioner Stone's purpose to respond to a plea from his State counterpart in California, S. R. Throckmorton, Chairman of that State's Fish Commission. Throckmorton discovered the striper on a trip east. He urged Stone to try to transplant some to the west coast. Stone dispatched Mason to the Navesink.

One hundred seven stripers survived the transcontinental rail journey, were released in the Cockrinay Straits in San Francisco. Twenty years later the west coast fisheries topped 1 million pounds of striped bass a year.

So maybe you are doing the same thing in the Gulf of Mexico. We hope so.

What would be the administration's reaction to a 75-percent Federal share? I think Mr. Gottschalk suggested that.

Mr. GREENWALT. This would make it equivalent to the other fishery grant program administered by the Fish and Wildlife Service.

Senator CHAFEE. Isn't one of the problems that the States have the option of putting their money in your program or into the Dingell-Johnson program from which they get more back?

Mr. GREENWALT. I think that is a fair assessment, Mr. Chairman, because the State administrators have limited funds and will make the most of them. They also are pretty well propelled into the Dingell-Johnson program because it represents an immediate return to the license buyer who provides most of the funding for this program. The return for a fishery program, for example, of raising and stocking bass is much greater and more obvious to the constituent than the somewhat mystical business of producing fish in a hatchery which 3 or 4 years later return. Obviously, the tendency is toward the Dingell-Johnson funding.

Senator CHAFEE. Dingell-Johnson would go primarily for nonanadromous fish.

Mr. GREENWALT. Sport fish.

Senator CHAFEE. So what is your answer?

Mr. GREENWALT. I think, Mr. Chairman, in all candor, given the general position of the administration, particularly with respect—

Senator CHAFEE. They wouldn't be enthusiastic.

Mr. GREENWALT. They would not be overly enthusiastic. This has been advanced before on several occasions largely at my good friend, Mr. Gottschalk's insistence and has not been met with what one would call great fervor by the administration.

Senator CHAFEE. Why don't we have Mr. Alperin and Mr. Gottschalk come up together. Thank you very much, gentlemen.



Mr. Alperin, tell me a little bit about how these fisheries commissions work briefly. You are speaking on behalf of all these people.

**STATEMENT OF IRWIN M. ALPERIN, EXECUTIVE DIRECTOR,  
ATLANTIC STATES MARINE FISHERIES COMMISSION**

Mr. ALPERIN. Yes.

Senator CHAFEE. The Pacific and Gulf States.

Mr. ALPERIN. They are all in interstate fisheries compacts very similar to the Atlantic States Marine Fisheries Commission. When you were Governor in Rhode Island, your State was a member of the commission. I know your appointed representative to the commission, Mr. Jacob Dykstra, the Governor's appointee, who still represents Rhode Island.

Senator CHAFEE. Yes.

Mr. ALPERIN. The commissions operate as nonregulatory compacts for marine fin-fisheries, anadromous fish, and shellfish. Incidentally, there is a misconception that the interstate compact commissions are concerned only with commercial fisheries. This is not so. They are concerned with all the fisheries along their respective coasts.

The State directors who represent the State fisheries agencies in the commission are responsible both for recreational and commercial fisheries.

Senator CHAFEE. You are the executive director of it?

Mr. ALPERIN. For the Atlantic States. I wish to represent here today also the executive director from the Gulf States Marine Fisheries Commission and the Pacific Marine Fisheries Commission who can't be here. We jointly prepared the statement before you.

Senator CHAFEE. How many States are in your compact?

Mr. ALPERIN. Fifteen.

Senator CHAFEE. Starting from Maine going how far down?

Mr. ALPERIN. Maine to Florida on the east coast and including Pennsylvania, because of their anadromous fish interest.

Senator CHAFEE. Your salary is paid by a fund which all the States contribute to?

Mr. ALPERIN. Yes; the operation of the commission is from State contributions.

Senator CHAFEE. Where do you hang your hat?

Mr. ALPERIN. Right here in Washington, Massachusetts Avenue.

Senator CHAFEE. Why don't you summarize your statement here.

Mr. ALPERIN. Mr. Chairman, incidentally, I have some knowledge that may interest you. I would like to contribute to some of the questions that you asked of the gentleman from the Federal administration.

Senator CHAFEE. I want you to.

Mr. ALPERIN. I worked in New York State on striped bass for 8 years.

Senator CHAFEE. We will get to those soon. Why don't we look over your statement. Why don't you stress any points you think we haven't covered today in these remarks.

Mr. ALPERIN. One of the things I would like to stress, from the point of view of the States, is that all the coastal States, except Texas, have participated in this anadromous fish conservation pro-



gram. Texas, to the best of my knowledge, has no anadromous fish populations except possibly if striped bass have been introduced into some of their freshwaters. But all the other coastal States have participated, as you mentioned, preponderantly in the Northeast and Mid-Atlantic and on the west coast from California to Alaska. I think the reasons are obvious because that is where the need was, basically those are the regions frequented by anadromous species.

Regarding your question about participation in the Atlantic coast striped bass studies, all States on the Atlantic coast, that have striped bass populations, have had striped bass programs at one time or another, mostly with State funds or other types of grant programs.

I worked in New York State under the Dingell-Johnson fish Restoration Act programs where some of the State's D-J money was put into a saltwater program including striped bass.

Senator CHAFEE. Do all the east coast States forbid netting?

Mr. ALPERIN. No, sir. The New England States have only hook and line fisheries, although one can sell striped bass in Maine, New Hampshire, Rhode Island and in Massachusetts. New York State has a commercial fishery for striped bass. There are striped bass commercial fisheries in Delaware Bay, Chesapeake Bay, and North Carolina.

Senator CHAFEE. I am talking about netting, though.

Mr. ALPERIN. Nets are permitted in States that have commercial fisheries.

Senator CHAFEE. They permit the nets right along the shore.

Mr. ALPERIN. There are different methods and variety of nets. In some cases trap nets, trawl nets, gill nets, et cetera, are the commercial gear; in other cases, as you say, haul seines are employed along the shore. The most extensive commercial fisheries for striped bass are in Chesapeake Bay. They are taken in a variety of nets as well as by hook and line.

Senator CHAFEE. The west coast, what happens there?

Mr. ALPERIN. On the west coast, the striped bass is solely a recreational species. That introduction that you talked about took almost 20 years to really grow to a population size where there was a fishery established and it was combined commercial and recreational fishery.

After awhile, California Fish and Game recognized that they didn't have enough estuarine areas to support large populations of striped bass, so they restricted striped bass fishing to hook and line fishing, recreational fishing under management with a prescribed number of fish per day per fishermen.

Some of those fish became migratory and moved up along the west coast and got into Coos Bay in Oregon. The striped bass population on the west coast compares not at all to the east coast. It is much smaller, the fisheries are very restricted and is under a very tight management regime.

Incidentally, Mr. Chairman, another species from the Atlantic coast was also introduced to the west coast successfully but doesn't seem to be quite as an important fishery as the striped bass or salmon. The American shad was introduced to the west coast through the predecessors of the Fish and Wildlife Service.



As I said, the States have all participated in the Anadromous Fish Conservation Act and find this one of the most attractive grant programs that they can participate in. They feel that there have been very substantial successes in the anadromous fish program. Anadromous fish are very special. There is a need for the fish to migrate from salt water to spawn in fresh water habitats and for the young to drop downstream into the bays and oceans to live for a number of years and then to return again to spawn. In the case of the Pacific salmon, the adults die after they have been at sea for 4 years or so, sometimes 5 years. On the Atlantic Coast, fishes, like striped bass, shad, Atlantic salmon, return year after year. If these fish can't get to their spawning ground, then you don't have a fishery.

If you have had an opportunity to read my formal testimony, I have described that situation. There are many adverse activities of man that hinder the success of the anadromous fish life cycle even if we didn't have the fisheries to take off the surplus because the fish have to pass through waters that are grossly polluted, that are toxic and inhospitable. They have to struggle against man's blockage of their heritage spawning ground by the damming of rivers and other obstructions. We can assist them through this program to get there and protect their return to the sea.

In addition, anadromous fish are among the most sought after species and, incidentally, among the most expensive if you have tried recently to buy salmon steaks or a filet of striped bass. There seems to be a never-ending need of supplies of these species to meet the fisheries demands.

The point also was made, I believe, by Mr. Leitzell, and as I stressed in my testimony, there are new demands on the States because of the extended jurisdiction legislation. Some of the regional councils cannot write adequate management plans unless the States can supply biological information, habitat protection or do stock assessments and things of this sort with anadromous species. Though the regional councils have the responsibility for management plans and the Secretary of Commerce writes the regulations, the States have to make an input. Funds from the Anadromous Fish Conservation Act could assist, I think, particularly, as I mentioned in my testimony, with the northwest salmon fisheries and Atlantic coast striped bass fisheries.

Senator CHAFEE. Let's just take a look at your statement here. I am interested in this.

In a cooperative endeavor to turn the tide and rebuild the population of striped bass, under the State/Federal fisheries management program, sponsored by the National Marine Fisheries Service, 12 Atlantic coast States \* \* \*

Which are those?

Mr. ALPERIN. All the States from North Carolina to Maine.

Senator CHAFEE [continuing].

And the National Marine Fisheries Service is wrestling with the development of a regional management plan to restore this most valuable anadromous fishery,

That is the striped bass—

To earlier heights. Because the striped bass spawns, lives and migrates predominantly within the internal waters and territorial seas of the several States, it is not a major concern of the Atlantic Coast Regional Fishery Management Councils—the striped bass is of insignificant harvest in the Fishery conservation zone. Meanwhile,



ASMFC's member States are attempting to accomplish this Herculean task with about \$30,000 a year. The Anadromous Fish Conservation Act could supply a major portion of the wherewithal to accomplish our goals.

What are you doing?

Mr. ALPERIN. What we are doing is trying to write a regional management plan for the protection, conservation, utilization of this species based on the best scientific and technical information because the fish is highly migratory across State boundaries. You won't have any striped bass in New England if they don't spawn successfully in Maryland.

Senator CHAFEE. We appreciate that, but how many of the States seem to care. If 12 States put up a total of \$30,000, that is less than \$3,000 apiece; they don't seem to care very much.

Mr. ALPERIN. As a matter of fact, Mr. Chairman, they didn't put up a cent for this program; they do supply expertise and manpower. That \$30,000 pays for a striped bass coordinator. It is 100 percent money from the National Marine Fisheries Service under a program identified as the State/Federal fisheries management program which is a nonstatutory program. There are six important species on the Atlantic coast for which planning for regional management is being conducted under this State/Federal program.

Senator CHAFEE. What happens, what is going on in these States? You say you were from New York State and New York State can't seem to care very much about this.

Mr. ALPERIN. New York State has cared about it and has even enacted legislation to protect the striped bass. It has size limits, but it is inadequate for New York State, or any other single State, to protect its striped bass population in a particular management scheme when the fish are migrating through the waters of New Jersey, Rhode Island, Connecticut, Maryland and Virginia—Maine to North Carolina, in fact. What we are trying to do is establish a mechanism and a plan that will manage the fish throughout its range. The scientists, biologists, and fish managers from these respective States are meeting on a regular basis to produce a management plan which will then be the responsibility of the State directors to have implemented in each of the member States.

Senator CHAFEE. They show very modest concern if they put no money into it.

Mr. ALPERIN. I agree with you.

Senator CHAFEE. They care a great deal except if it costs anything.

Mr. ALPERIN. I think, sir, you would have to address this to the State legislatures on their budgeting. Natural resource management is a very poorly funded business compared to other State needs.

Senator CHAFEE. The west coast States manage to do it.

Mr. ALPERIN. The west coast States seem to have a greater concern for their marine and anadromous fishes, I would agree to that. We have been struggling with this problem of striped bass—the Atlantic States Marine Fisheries Commission, Mr. Chairman, became a viable thing because of striped bass. This goes back to the 1930's. I was not a fishery biologist then, but I was soon aware of the problems in New York because of the argument about the allocation of striped bass between commercial and recreational



fisheries. Agents of the Council of State Governments, the legislatures, and the Fish and Wildlife Service, met together and decided there should be an interstate compact to address multistate problems in marine fisheries, particularly as they related in those days to striped bass. A number of States, as a result of the establishment of the Commission, did enact a uniform size for striped bass, which was in those days 16 inches fork length or 18 inches total length. A recommendation now is that the striped bass size limit to be 26 inches, to allow all females to spawn once before they are harvested. All females mature by the time they are 6 years old.

Senator CHAFEE. That is something specific for the striped bass industry. Let's look at your recommendations. Your recommendations are first that we give specific authorization for each of the 5 years at \$20 million a year. They have done that in the past. I think the appropriations committee then cuts it to \$5.

Mr. ALPERIN. Mr. Chairman, no, I have a summary table. The last table in my testimony, summarizes it. It is a review of the authorizations and appropriations. There have been, since 1967, \$172 million authorized for the anadromous fish program. That is including the 1980 proposal, presuming the administration gets the \$5.7 million, and there is a \$20 million authorization. You notice the appropriations are \$66 million over that period of time. Even though the administrators from the National Marine Fisheries Service and the Fish and Wildlife Service indicate perhaps some additional funds in the future, this program has been pretty level funded. The National Marine Fisheries Service budget has been level funded for \$2 million for 8 years. We don't think it is possible to conduct an adequate anadromous fish program on the east coast or anywhere else with this limit. Officials of the Fish and Wildlife Service did increase the amount of money into their program at small amounts at a time, to reach \$3.7 million. It is an improvement from the \$1.2 million that they were authorized in 1967.

Senator CHAFEE. The next point you make is you want to increase that amount to 20 percent in a single year that anyone can get; right?

Mr. ALPERIN. I would only do that if the appropriations were more extensive. I think that is for the future. A million dollars is probably adequate, but, Mr. Chairman, if you did have \$10 million or \$20 million appropriated, and if there were a reason for the Federal Government to help finance a State hatchery, it could be built more quickly and more adequately if there were a larger percentage of money put into the first years of construction; that is just an example of how a large grant could be efficient.

Senator CHAFEE. Then you go on to ask for two thirds Federal cost sharing of the operational expenses under multistate programs.

Mr. ALPERIN. Yes.

Senator CHAFEE. So you would have the operation following the cost sharing on construction.

Mr. ALPERIN. I notice the National Marine Fisheries Service talked about a 50-50 management there. The other elements of joint programs are 66-33. I think the higher cost-sharing is an encouragement to multistate projects. When I was an administrator in Massachusetts, I wouldn't use anadromous fish money at 50-



50 if I could use D-J money or Public Law 88-909 at 75-25, it is 50-50 in this program.

Senator CHAFEE. Is the Dingell-Johnson two thirds or 75?

Mr. ALPERIN. It is 75-25.

Senator CHAFEE. Suppose you were State administrator and this program was at 66-33, what would you do then, still go for the 75-25 money?

Mr. ALPERIN. It would depend on what is available. The other grant programs are formulized. The States are allocated so much money. It would depend on what State you are from. Some States get a minimum. Under Public Law 88-309, the Commercial Fisheries Research & Development Act for example, Rhode Island gets just about \$5,000 above minimum, which a year ago was \$19,000 because the formula is based on certain commercial landings of fish and the geographical size of the State. That makes it difficult for small States.

Massachusetts, on the other hand, is a maximum State. Under the formula it now receives \$300,000.

Senator CHAFEE. For what, Dingell-Johnson?

Mr. ALPERIN. No, Public Law 88-309. But the State have an option to use these funds for various species of fish. There is no distinction on the Atlantic coast between most commercial and recreational species. They are the same fish. You fish for them either commercially or recreationally. There is an opportunity to choose whatever you are able to manage.

Mr. Chairman, if I might, you touched on this question of the backlog of programs that both agencies have. I have appended to my testimony a list of projects, and you can see they are very considerable. It seems to me that if the States can, say, match an additional \$2 million of Fish and Wildlife Service projects, I don't see why they don't have the opportunity. I think this program is held back by these minimum appropriations.

Senator CHAFEE. Let me ask you specifically about an area you know, Mr. Alperin—New England. We have seen success up there in New England with the shad and the river herring.

Mr. ALPERIN. There have been some successes.

Senator CHAFEE. A hatchery has been produced in Atlanta—

Mr. ALPERIN. Yes.

Senator CHAFEE. Anadromous fish have been increased in the Penobscot and also the Connecticut River?

Mr. ALPERIN. Yes, Atlantic salmon in both cases, and shad in the Connecticut.

Senator CHAFEE. I want to know if there are ways to make our track record even better. Do you think we could see a greater return of Atlantic salmon? Where in New England would you spend the money if you had more?

Mr. ALPERIN. It is a multiple program. It is not only hatcheries. There has to be access to the spawning grounds to get up a river. I think the Fish and Wildlife Service supported 11 fish ladders on the Penobscot, for example. They have built their own hatchery in Maine at Green Lake, which will produce smolts downstream through the Penobscot. They have constructed a hatchery in Vermont to produce downstream smolts to the Connecticut. There is a multistate/Federal cooperative effort here. The Federal Govern-



ment is building some salmon hatcheries. The States also have contributed. For example, New Hampshire is building a hatchery with Federal cost-sharing money in cooperation with Massachusetts and both Federal services——

Senator CHAFEE. They are cooperating.

Mr. ALPERIN. Yes, on the Merrimac River between New Hampshire and Massachusetts.

Senator CHAFEE. New Hampshire and Massachusetts are doing it jointly.

Mr. ALPERIN. Yes. I don't know the extent of the cooperation, but Massachusetts is a partner in this thing. They either committed manpower, money, or whatever it takes. There is four-State input plus the Federal Government input in the Connecticut River program for anadromous fish. I was in Massachusetts when that river basin program started. Essentially, it was for shad originally, with the recognition that if the water pollution was abated and the dams bypassed there was an opportunity to return Atlantic salmon to Connecticut River. Historically, that is a magnificent feat, since this river originally supported Atlantic salmon. There are difficulties with this restoration because the salmon does go out to sea, where it is fished by commercial fisheries off Greenland and Iceland.

Mr. GOTTSCHALK. Mr. Chairman, may I intercede?

Senator CHAFEE. Yes.

#### STATEMENT OF JOHN S. GOTTSCHALK, LEGISLATIVE COUNSEL, INTERNATIONAL ASSOCIATION OF FISH AND WILDLIFE AGENCIES

Mr. GOTTSCHALK. In relation to the question of what the States might do with their funds in relation to the fish in the Northeast, a lot of these things were gone over in the earlier testimony from the administration witnesses. The construction of fishways and elimination of pollution were the two major problems that had to be addressed first. Work has gone along pretty well. It turns out both of those can be extremely expensive, as I am sure you are aware.

We are talking about the large amount of moneys in some cases, like bypassing the Bellows Falls on the Connecticut. It is going to be a very expensive operation. Until that is done, we have to rely on hatcheries, and they are very expensive.

There are other things that can be involved, too. For example, construction of low water augmentation reservoirs to put more water in the stream during critical low flows in the summertime, and stream bank stabilization. Both are extremely important, from the standpoint of making sure there are adequate spawning grounds and resting areas. Watershed protection in general to stabilize the hydrological cycle and make sure there is steady inflow into the stream. Access channels and removal of obstructions, all these things are the sorts of things that can be done to improve the habitat. We can't do anything out in the ocean, except to restrict excessive catching.

Senator CHAFEE. What has the 200-mile limit done to all of us?

Mr. GOTTSCHALK. The 200-mile limit has had very little effect on the Atlantic salmon. There is no fishing for Atlantic salmon by U.S. fishermen at sea. The problem with Atlantic salmon is they



are fished extensively by residents of Greenland in the Davis Strait where they mature and live during the time they are not in the spawning streams.

We have had a bilateral agreement with Denmark in effect now for, I think, about 8 or 9 years that has restricted the catch of the Danes and the Greenlanders and has been responsible, we think, for the increase in the returns of spawning fish to their native streams. It is more important, perhaps, in Canada than down here. That is an essential part of Atlantic salmon restoration, to reduce the level of exploitation so we get a greater return of spawning fish.

Senator CHAFEE. Do you have anything else, Mr. Alperin?

Mr. ALPERIN. I would, with your permission, like to talk a little bit about this problem of the striped bass.

Senator CHAFEE. Go ahead.

Mr. ALPERIN. The striped bass population on the Atlantic coast in any abundance are dependent on extraordinary year classes, that is very successful spawning and survival of young of the year from the Chesapeake Bay system. The fish become migratory when they are 2 years old. It is from those successful bursting year classes that we get the migrants that move along the coast. It also includes fish that have spawned in the Roanoke River from North Carolina. That is not as important. There also is a contribution from the Hudson River. Those fish are not as highly migratory as the ones from the Chesapeake Bay. The striped bass have been identified to have genetically different characteristics, depending on where they originated.

The question of why there hasn't been a successful super year class since 1970 has not been resolved. Some scientists and others are claiming that it is a result of, you might call it, the poisoning of the ovaries of the female fish through chemical contamination. We used to refer to DDT. Now the concerns are about Kepone, PCB's heavy metals, and other contaminants.

I just read an interesting article about the Consolidated Edison Co. approach to this problem. Consolidated Edison is very involved in licensing and construction problems at their atomic-powered generating plants on the Hudson River and other of their programs. The survival of striped bass is one of the considerations. They seem to have been able to raise striped bass successfully from fish taken from the Hudson River, spawned them artificially in Hudson River water, put them back to the Hudson River and recapture them within Hudson River system.

I am not yet convinced that this matter of contaminants is the major reason for the failure of the spawning success of striped bass.

Someone here mentioned the cyclical behavior of striped bass. I am well aware that there were long periods of time on the northeast coast without striped bass. When I say no fish, I mean small numbers of striped bass along the entire Atlantic coast, north of Delaware Bay, for almost 30 years when there were no chlorinated hydrocarbons and there was no contamination as we know it today.

Senator CHAFEE. What 30 years were those?

Mr. ALPERIN. That's the period around the turn of the century to when the 1934 and 1936 year classes burst out of Chesapeake Bay and reestablished themselves along the coast. Commercial fisher-



men who fished along the Atlantic coast couldn't catch anything but few and very large, very mature, very old striped bass, ranging up to 125 pounds. There were no juveniles to the north because there was lack of spawning success to the south. In the spawning area if there is some survival and recruitment there are some numbers of fish. The size limits are such and the nature of the fishery is such in the Chesapeake Bay, that striped bass are caught commercially and recreationally at 11, 12, 13, 14 inches in size in large numbers as 1- and 2-year-olds, from the fish that are spawned there and never get a chance to migrate.

Along the coast to the north, the fisheries are dependent upon the fish that reach and survive those 2 first years, and in the third year become migratory. The States and others have done extensive tagging. I personally tagged 5,000 striped bass on the south shore of Long Island in a 3-year period, and the returns came from fish going north in the spring or going south in the fall, even as far south as the Carolinas. This pattern of striped bass behavior is well known. The population dynamics of striped bass are not so well known. We don't know what makes for a very generous spawning success, a good year class, as we call it. It is just not known yet. That is one of the investigations that the State biologists, in connection with the National Marine Fishery Service, would like to undertake. They would like to look into this question of contamination.

Senator CHAFEE. When you say they would like to undertake, and from the testimony of Mr. Leitzell and Mr. Greenwalt, it seems very clear that the money is available for the northeastern States individually or conjunctively for research, but the problem is they are not willing to put up the matching funds that are required.

Mr. ALPERIN. That may very well be. I am just not that familiar with whether or not States have requested money or have not requested it because they couldn't come up with the matching funds.

Senator CHAFEE. They said, if I recall their testimony, they cannot recall turning down a northeast project for salmon or striped bass.

Mr. ALPERIN. I can. They cut off a program that was being conducted in Chesapeake Bay by the Virginia Institute of Marine Science, which is the research agency for the State of Virginia's marine fisheries. It is not the regulatory agency. They had a striped bass program going. When higher priority salmon and other programs came about, the Fish and Wildlife Service cut them off right in the middle of some work. That was a number of years ago. That is not too serious. It happens all the time in fisheries work.

What I am saying is, I don't know why and don't know if the States wouldn't, once they get a feel of what they are reaching for in this joint management planning, they may very well ask for money, multiple State program for the reestablishment or reintroduction of striped bass to areas where they disappeared or even for the construction of striped bass hatcheries. I don't know. I can't predict that, but I know they are looking for money.

Senator CHAFEE. They being who?

Mr. ALPERIN. They being the marine fisheries agencies.



Senator CHAFEE. I am sure they all are looking for money.

Mr. ALPERIN. As I said, it is hard to come up with a 50-50 matching. I will give you another example.

Senator CHAFEE. Wait a minute, if they get together, they only have to come up with one-third.

Mr. ALPERIN. That gives them a better opportunity. For example, I know of another grant program in fisheries that is 90-10. The coastal fisheries assistance program runs through the Office of Coastal Zone Management and offers States a 90-10.

Senator CHAFEE. Don't make this too difficult for us.

Mr. ALPERIN. I am using that as an example. It does leave a choice when you have different levels of matching and grant programs.

Senator CHAFEE. That is one of the problems. Do you know of any northeastern rivers or streams which are clean enough to support a possible Atlantic salmon population and thus would perhaps be susceptible to ladders or to hatcheries?

Mr. ALPERIN. I understand from Mr. John Cronan, who is chief of fish and game in Rhode Island that Rhode Island would like to introduce an Atlantic salmon program on the Pawtucket. Mr. Cronan told me on Friday that he had received their first shipment of 20,000 salmon eggs. Rhode Island had planned, I think still does have a plan, that I believe the Federal agencies will support for the introduction of the salmon and the building of a new fish hatchery. I believe Rhode Island is going to hatch these eggs in their present hatchery facilities which may not be adequate for Atlantic salmon.

Senator CHAFEE. You have to have the hatcheries for the anadromous fish right there on the stream where they are going to return?

Mr. ALPERIN. At least you have to have a streamside raising pool where you raise them so they are imprinted with the water. It is obviously some kind of sensory adaptation, olfactory or otherwise.

Senator CHAFEE. I would like to see one of these things. Do they have to be incredibly complicated or expensive?

Mr. ALPERIN. Some are.

Mr. GOTTSCHALK. Hatcheries?

Senator CHAFEE. Yes. When they are talking about an \$8 million hatchery, I was stunned.

Mr. GOTTSCHALK. That kind of a price tag means a large production of fish. In order to guarantee satisfactory returns from the planting of the smolts it is essential to put fish in very large numbers. We are talking about fish stocked on the order of 1 million in one stocking. This would be fish that would be 5 to 7 inch fish, probably 2 years old, reared in a hatchery. That requires a tremendous amount of raceway space in the hatchery. It is a simple function of volume, I believe, that runs these costs up as much as they are. The Fish and Wildlife Service had a small hatchery in Maine, Craig Brook, one of the very early hatcheries. When that hatchery first started producing fairly small numbers of smolts, both the construction, the capital cost of construction and the operational costs were at a minimum, but we got no results. We simply were not doing the job of getting enough fish in the stream. So there the Fish and Wildlife Service went into a very extensive enlargement program and most recently brought the



fishery program at Green Lake. These hatcheries are up into the multimillions of dollars. I can't give you the specific figures. It is a large amount of concrete construction with all of the water control facilities and it is expensive.

Mr. ALPERIN. Mr. Chairman, if I may, Dr. Gottschalk knows this better than I, the return results of adults from smolts going downstream, is perhaps as low as ten adults to 100,000 smolts. You are talking about a large production of juveniles in salmon restoration. It may not be true in other species, but it is in salmon.

Mr. GOTTSCHALK. Mortality is so high.

Senator CHAFEE. Is that why they are so thrilled to get 90 salmon back?

Mr. ALPERIN. Yes. I would judge they will have 200 fish back on the Connecticut this year. And if they continue to put migrant salmon downstream, they build this population up and it begins to become self-sustaining. It is not inexpensive. It is time consuming. It takes numbers of years to do this. It is not a simple operation.

Senator CHAFEE. Mr. Gottschalk, I have read your statement. Are there any points you particularly want to stress.

Mr. GOTTSCHALK. I think we have practically covered everything. I would like to stress this is a small Federal program in the context of what the Federal Government is doing. It has been a program of great value because it is targeted on a specific kind of a problem in specific areas. The small amounts of money have produced tremendous dividends, as you have already heard testimony on. We think the reason is because it is so tied to these special kinds of problems that the States have not been able to cope with adequately in the past. To a large degree, this is related to the kinds of pressures that you are well acquainted with, and that is competing uses for the available funds. There was a long time when there were so few Atlantic fishermen on the Atlantic coast that you could hardly get a dozen people to talk about Atlantic salmon because nobody had hardly heard about them. If it hadn't been for a small cadre of Atlantic salmon aficionados in New England, I am sure—

Senator CHAFEE. What was that?

Mr. GOTTSCHALK. Aficionados, no pun intended. Those things somehow do creep in. The other thing that I think is worth putting on the record, and that is the reason the individual States have not gotten into this program on their own more actively, I will say the State of Maine has never given up on Atlantic salmon. They have had a Sea Run Salmon Commission going for many, many years there. When everybody else had given up hope, Horace Bond, who ran that program for many years, he was devoted to the preservation of Atlantic salmon, helped us to get where we are. The benefits are spread widely over lots of people. They are not confined to a single State. Many, many people benefit. It is not fair in the sense of trying to divide up the responsibility for the cost to load the cost just on a single State. That is why it is a Federal program. I think considering the expenses, it has been extremely important. We think it would be more important if more money is put in. Of course, as you know, I am beating the drums for the 25-75 apportionment ratio rather than the present 50-50.

Senator CHAFEE. On what, on construction and operation or maintenance or both?



Mr. GOTTSCHALK. The whole thing. On joint projects, I would go one step further and suggest the ratio, in order to make it that much more attractive, be increased to 10-90; 10 percent State and 90 percent Federal on cooperative or joint programs involving several States to try to promote this cooperation that has been talked about earlier in the hearing.

Senator CHAFEE. Don't you have a similar problem with the Dingell-Johnson program, wouldn't you have that askew?

Mr. GOTTSCHALK. The Dingell-Johnson program does not have that kind of built-in capability but the simple facts are the D-J program is looked upon primarily as a vehicle for instate projects. We did a few years ago must have been in 1953, organize a cooperative striped bass program under the D-J program. The Federal Government hired a coordinator, Dr. Ed Raney of Cornell. Each of the Atlantic States had a D-J striped bass project. It was carried on successfully for 5 years with the States using Dingell-Johnson money. It was a result of one of these periodic depressions of striped bass numbers. All the States were willing to contribute the money to do it. Today, increased human population has brought about an increase in anglers. We have the Fisheries Conservation Management Act which has put a tremendous burden on the States. We have got the 309 programs, the commercial fisheries programs and frankly the States are just hard put for money. I think they are looking much harder for options today than they were 10, 15 years ago.

Senator CHAFEE. Gentlemen, is there anything further you would like to say?

Mr. GOTTSCHALK. May I have one short last comment?

Senator CHAFEE. Right.

Mr. GOTTSCHALK. You have heard testimony from both Fish and Wildlife Service and National Marine Fishery Service. It has been a source of great frustration to some of us who have been concerned about recreational fisheries that particularly the National Marine Fishery Service has been extremely reluctant to do anything much about some of the broad questions of striped bass conservation. At the present time, they have no program of any kind that relates to striped bass. This big question about whether the eggs are affected by chemical substances is one that really must be attacked by an organization that has the scientific sophistication to get into a lot of very difficult sorts of analyses and also an organization that looks at the problem over the whole range of the species. I really feel the National Marine Fishery Service has been derelict in not carrying on a monitoring program, at least, to tell what is going on with the striped bass. The problems that your fishermen in Rhode Island have are being ignored by the Federal agency that ought to be working on them. Some of us are going to try to encourage the Congress to give them a little money to look into this problem. It is not in the budget. They haven't asked for any money. They have been totally undisposed to accept any responsibility for finding out what is going on with the striped bass. I feel it is almost a calamity that the Federal Government has turned its back on this extremely important sport and commercial species.



Mr. ALPERIN. As a matter of fact, Mr. Chairman, if I may interject here, at one time, I guess it is the Beaufort Laboratory was devoted almost entirely to anadromous fish studies on the Atlantic coast, and was funded only for that purpose.

Senator CHAFEE. Beaufort?

Mr. ALPERIN. Beaufort.

Senator CHAFEE. South Carolina?

Mr. ALPERIN. North Carolina.

Senator CHAFEE. I think those are good points you have. I will ask them what their plans are or what is going on.

Thank you very much, gentlemen, for coming here. We appreciate your testimony.

We will conclude.

[Whereupon, at 11:45 a.m., the subcommittee was recessed, to reconvene subject to the call of the Chair.]

[The bill, S. 838, and statements submitted for the record by today's witnesses follow:]



96TH CONGRESS  
1ST SESSION

# S. 838

To amend the Anadromous Fish Conservation Act in order to extend the authorization for appropriations to carry out the purposes of the Act, and to initiate an emergency investigation on the striped bass in Atlantic coastal waters.

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## IN THE SENATE OF THE UNITED STATES

MARCH 29 (legislative day, FEBRUARY 22), 1979

Mr. CHAFEE introduced the following bill; which was read twice and referred to the Committee on Environment and Public Works

APRIL 2 (legislative day, FEBRUARY 22), 1979

Referred jointly, by unanimous consent, to the Committees on Environment and Public Works and Commerce, Science, and Transportation

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## A BILL

To amend the Anadromous Fish Conservation Act in order to extend the authorization for appropriations to carry out the purposes of the Act, and to initiate an emergency investigation on the striped bass in Atlantic coastal waters.

- 1 *Be it enacted by the Senate and House of Representa-*
- 2 *tives of the United States of America in Congress assembled,*
- 3 That section 1(c) of the Act of October 30, 1965 (79 Stat.
- 4 1125), as amended (16 U.S.C. 757 et seq.), is further amend-
- 5 ed by striking in its entirety the sentence, "Structures, de-



1 vices, or other facilities, including fish hatcheries, constructed  
2 by such States under a cooperative agreement described in  
3 this subsection, shall be operated and maintained without  
4 cost to the Federal Government.”.

5 SEC. 2. Section 2(a) of the aforementioned Act, as  
6 amended (16 U.S.C. 757(b)), is amended by striking out  
7 “United States” in the last sentence and inserting in lieu  
8 thereof “cooperating States or other non-Federal interests”.

9 SEC. 3. Section 4(a) of the aforementioned Act, as  
10 amended (16 U.S.C. 757(b)), is amended to read as follows:  
11 “There is authorized to be appropriated for the purposes of  
12 carrying out this Act, not to exceed \$10,000,000 for the  
13 fiscal year ending October 1, 1980, not to exceed  
14 \$11,000,000 for the fiscal year ending October 1, 1981, not  
15 to exceed \$12,000,000 in the fiscal year ending October 1,  
16 1982, and not to exceed \$13,000,000 in the fiscal year  
17 ending October 1, 1983.”.

18 SEC. 4. Section 4(b) of the aforementioned Act, as  
19 amended (16 U.S.C. 757d(b)), is amended to read “Not more  
20 than \$1,000,000 or 20 per centum, whichever is greater, of  
21 the funds appropriated under this section in any one fiscal  
22 year shall be obligated in any one State.”.

23 SEC. 5. At the end of the aforementioned Act as amend-  
24 ed (16 U.S.C. 757 et seq.) add a new section 7 to read as  
25 follows:



1       “SEC. 7. (a) The Secretary of Commerce acting through  
2 the Director of the National Marine Fisheries Service and the  
3 Secretary of Interior acting through the Director of the Fish  
4 and Wildlife Service in accordance with the authorities in the  
5 Act, are directed to cooperate with States and other non-  
6 Federal interests in conducting studies of—

7       “(1) the status of the striped bass (*Saxatilis Morone*)  
8 population in Atlantic coastal waters, and

9       “(2) the factors responsible for the decline in the num-  
10 bers of such fish which are available to the public for recrea-  
11 tion and commercial use including, but not limited to—

12       “(A) a determination of the extent and success of  
13 annual spawning,

14       “(B) an analysis of the extent and causes of mor-  
15 tality at successive stages in the life cycle of the  
16 striped bass,

17       “(C) a determination of the effects of pollutants on  
18 viability and condition of eggs and larval fish, and

19       “(D) a survey of economic significance of the  
20 striped bass to both recreational and commercial fish-  
21 ing.

22       “(b) The Secretary of Commerce acting through the Di-  
23 rector of the National Marine Fisheries Service and the Sec-  
24 retary of Interior acting through the Director of the Fish and  
25 Wildlife Service is directed to make reports to the Congress



1 concerning the progress of the studies conducted pursuant to  
2 subsection (a) of this section. Such reports shall be submitted  
3 annually and shall, where appropriate, contain recommenda-  
4 tions as to how the Congress could improve the status of the  
5 striped bass.

6 “(c) The Secretary of Commerce acting through the Di-  
7 rector of the National Marine Fisheries Service and the Sec-  
8 retary of Interior acting through the Director of the Fish and  
9 Wildlife Service are authorized to employ such personnel as  
10 may be necessary to carry out the purposes of this section,  
11 and to cooperate with State and other agencies and institu-  
12 tions upon such terms and conditions as they deem  
13 appropriate.

14 “(d)(1) There is authorized to be appropriated for the  
15 purposes of carrying out the study in subsection (a)(1) of this  
16 section not to exceed \$500,000 in the fiscal year ending Oc-  
17 tober 1, 1980; not to exceed \$750,000 in the fiscal year  
18 ending October 1, 1981; not to exceed \$1,000,000 in the  
19 fiscal year ending 1982; and not to exceed \$1,000,000 in the  
20 fiscal year ending October 1, 1983.

21 “(2) Any funds dispersed to the States and other non-  
22 Federal interests to this paragraph shall not exceed 66⅔ per  
23 centum of the cost of conducting the study. There is author-  
24 ized to be appropriated for the purposes of carrying out the  
25 study in subsection (a)(2) of this section; not to exceed



1 \$500,000 in the fiscal year ending October 1, 1980; not to  
2 exceed \$1,000,000 in the fiscal year ending October 1, 1981;  
3 not to exceed \$1,000,000 for the fiscal year ending October  
4 1, 1982; and not to exceed \$1,000,000 in the fiscal year  
5 ending October 1, 1983.”.



STATEMENT OF LYNN A. GREENWALT, DIRECTOR, U.S. FISH AND WILDLIFE SERVICE, DEPARTMENT OF THE INTERIOR, BEFORE THE SENATE COMMITTEE ON PUBLIC WORKS AND THE ENVIRONMENT, SUBCOMMITTEE ON RESOURCE PROTECTION, MARCH 5, 1979.

Mr. Chairman and members of the Subcommittee, I appreciate this opportunity to comment on extending the authorization for appropriations for the Anadromous Fish Conservation Act of October 30, 1965.

The Anadromous Fish Conservation Act authorizes the Secretaries of the Interior and Commerce to enter into cost-sharing agreements with the States and other non-Federal interests for the conservation, development, and enhancement of the anadromous fish resources of the Nation.

The program is administered jointly by the Fish and Wildlife Service of the Department of the Interior and the National Marine Fisheries Service of the Department of Commerce. The authorization for appropriations expires at the end of the current fiscal year.

The Anadromous Fish Conservation Act was passed in 1965. At that time the National Marine Fisheries Service and the Fish and Wildlife Service were both bureaus in the Department of the Interior. In general, the Bureau of Commercial Fisheries, now the National Marine Fisheries Service, funded projects that benefited commercial species; the Bureau of Sport Fisheries and Wildlife, now the U.S. Fish and Wildlife Service, funded projects of benefit to anglers. After the reorganization in 1970 which sent the Bureau of Commercial Fisheries



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to the Department of Commerce, this division was continued. Since the Act was first passed there have been a number of projects where the benefits could not be separated and these projects have been jointly funded by the two agencies.

Mr. Chairman, let me state at the outset that we support continuing the authorization of appropriations for this program. As the Administration has requested \$5,712,000 in appropriations for fiscal year 1980, we recommend an authorization of that amount for that year. For subsequent years, we recommend the authorization language read "such sums as may be required".

In addition, Mr. Chairman, at this time we would like to recommend that the Committee consider two amendments to the Act that we believe would enhance its effectiveness. The first change we recommend would correct an anomaly in the cost-sharing provisions for operational expenses under section 1(e) of the Act. The Act presently allows Federal cost-sharing of the operational expenses for projects involving single States. However, when projects involve several States, cost-sharing for operational expenses is prohibited. Quite naturally, this restriction discourages States from becoming involved in multi-State projects on interstate waters, a result we feel is contrary to the intent of the Act. We would therefore recommend the Act be amended to permit Federal cost-sharing of up to 50 percent of operational costs at multi-State or cooperative projects.



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The second change we recommend in the Act would increase the amount that any State may receive in a given year from \$1 million to \$1 million or 20 percent of the appropriation for that year, whichever is greater. With the substantial capital investment involved in construction projects, we believe that it may be advantageous in the future to provide more than \$1 million to a State in a given year.

The Department report, which should be before you, contains language that would make these changes.

Mr. Chairman, the species of fish that benefit from the Anadromous Fish Conservation Act provide our Nation with a nutritional, recreational and aesthetic resource. Anadromous fish include the Atlantic salmon, five species of Pacific salmon, shad, striped bass, steelhead, sea-run cutthroat trout, Arctic char, sheefish, Dolly Varden trout, and others which ascend rivers and streams emptying into our oceans or the Great Lakes and Lake Champlain to spawn. These species of fish are influenced to a greater degree than other fish by changes in the environment. Anadromous fish thrive only when conditions in the headwaters, downstream areas, and the oceans are suitable for the stages of the life cycle using those areas. Deleterious conditions in any one area may have harmful effects on entire populations.

Unfortunately, through the impact of man and nature itself, our waters have been changed, making some habitat unsuitable for spawning and rearing of the young anadromous fish. The changes have sharply



reduced anadromous fish abundance and, in some cases, destroyed runs entirely.

The several States vested with management authority have made a sincere effort to discharge their obligation and, within their limited means, to conserve and enhance the anadromous fish resources within their respective boundaries. They need help. Not only do they need help on local problems, but there are many problems that reach beyond State boundaries.

The Anadromous Fish Conservation Act became law in 1965, but the first program funds were not appropriated until fiscal year 1967. During the thirteen years (1967-1979) of the Act, over \$34 million has been appropriated to the U.S. Fish and Wildlife Service.

Accomplishments under the Act show that the priority needs for anadromous fish resources are being fulfilled. To date over 150 projects have been completed. Of 31 eligible States a total of 29 have participated. Specific accomplishments include the following:

o Five new anadromous fish hatcheries have been constructed and one more is presently underway. Ten other fish hatcheries have been renovated. This construction will increase anadromous fish production in hatcheries by an estimated 39,000,000 fish annually.



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o Forty-one fish ladders have been constructed, one dam has been removed, and one additional fish ladder has been renovated to provide upstream passage for migrating anadromous fish. Over 850 miles of streams have thus been opened for spawning fish.

o Research under a four-State project to restore Atlantic salmon and American shad in the Connecticut River has resulted in a speeded-up construction schedule for new fishways, bringing about earlier restoration of anadromous fish in upriver sections, and improvements to an existing fish-lift at Holyoke, Massachusetts, that have more than doubled the number of shad lifted over the dam.

o The State of Washington and concerned Indian tribes have developed a computerized program for assessing the anadromous fish harvest in the Boldt decision area. The computerized system provides all parties with uniform information. Previously, this type of information from Indian and non-Indian sources was subject to dispute. The computerized system provides harvest data on a daily basis making possible the rapid changes necessary in regulation of fishing periods and quotas for Indians and non-Indians.

o Research under this program has produced a vaccine to immunize juvenile salmon and trout against a saltwater disease known as vibriosis. Also, a new method of inoculating large numbers of fish has been developed using high pressure spray guns.



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What are the benefits of the program? I am pleased to say that this has been a successful program in relation to its cost. Recreational fishing for anadromous fish has been increased by an estimated 8,000,000 angler-days annually. The economic value of this is conservatively estimated at \$72,000,000 per year. Commercial fish landings have been increased by an estimated \$5,000,000 annually.

Atlantic salmon restoration in New England has been extremely encouraging. On the Penobscot River in Maine, where 11 fish ladders have opened 275 miles of stream, runs have increased from near extinction to over 2000 in 1978. On the Connecticut River over 90 fish returned, the largest run of Atlantic salmon in over 100 years. These increased runs are not only important in their own right, they also serve as indicators of the improving condition of the rivers.

The program has stimulated cooperation between States in solving their anadromous fishery problems. Four interstate basin projects are presently underway. These are on the Connecticut River, involving Connecticut, Massachusetts, New Hampshire, and Vermont; the Merrimack River, involving New Hampshire and Massachusetts; the Brandywine River, involving Pennsylvania and Delaware; and the Delaware River, involving New York, New Jersey, Delaware, and Pennsylvania.

Examples of work being done and accomplishments under the anadromous fish program do not tell the complete story, but they do illustrate the broad areas being covered by the program, as well as the success



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of work underway. The program has demonstrated its effectiveness and is already providing substantial sport and commercial fishing benefits.

Mr. Chairman, we urge enactment of legislation to extend and otherwise amend the Anadromous Fish Conservation Act. It is a proven program that provides benefits that greatly exceed its costs and preserves a resource that bestows a multitude of benefits on our society.

Mr. Chairman, that concludes my prepared testimony, I will be happy to answer any questions you may have.



Statement by

Terry L. Leitzell, Assistant Administrator  
for Fisheries

National Marine Fisheries Service

National Oceanic and Atmospheric Administration

U.S. Department of Commerce

Before the

Committee on Environment and Public Works  
Subcommittee on Resource Protection

United States Senate

March 5, 1979

Mr. Chairman and Members of the Committee:

Thank you for the opportunity to appear before this Committee today to testify on the extension and amendment of the Anadromous Fish Conservation Act, in which the authorization for appropriations is scheduled to expire September 30, 1979. The Department of Commerce recommends enactment of legislation which would extend the authorization, with amendments, as a means of continuing this grant-in-aid program.

The Anadromous Fish Conservation Act of 1965 authorizes the Secretaries of Commerce and the Interior to enter into cost-sharing agreements with the states and other non-Federal entities for the conservation, development, and enhancement of the anadromous fishery resources of the Nation, and the fish in



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the Great Lakes and Lake Champlain that ascend streams to spawn, and for the control of sea lamprey.

Up to \$20 million per year in Federal funds have been authorized under the existing legislation to carry out the purposes of the Act. Appropriations totalling more than \$60 million have been shared by the two administering agencies and have ranged from \$2.2 million to \$5.6 million per year since the inception of the program. Since its first year of funding in 1967 the National Marine Fisheries Service's (NMFS) share has been about \$2,000K per year for a total of \$26 million through this fiscal year.

| <u>Fiscal<br/>Year</u> | <u>NMFS<br/>Appropriation<br/>(\$1,000)</u> | <u>Fiscal<br/>Year</u> | <u>NMFS<br/>Appropriation<br/>(\$1,000)</u> |
|------------------------|---------------------------------------------|------------------------|---------------------------------------------|
| 1967 <sup>1/</sup>     | 1,002                                       | 1975 <sup>2/</sup>     | 2,000                                       |
| 1968                   | 2,100                                       | 1976                   | 2,000                                       |
| 1969                   | 2,150                                       | 1976 Transition        | 500                                         |
| 1970                   | 2,150                                       | 1977                   | 2,000                                       |
| 1971                   | 2,000                                       | 1978                   | 2,000                                       |
| 1972                   | 2,000                                       | 1979                   | 2,000                                       |
| 1973                   | 2,000                                       |                        |                                             |
| 1974                   | 2,000                                       |                        |                                             |
|                        |                                             | <b>Total</b>           | <b>25,902</b>                               |

The National Marine Fisheries Service managed program has been in actual operation for about 13 years and significant positive results have been obtained. 244 projects approved by NMFS have been initiated since the start of the program at an estimated cost, including both state and Federal contributions, of nearly \$48 million. Of the 244 projects, 197 costing about

<sup>1/</sup> \$10 million authorization.

<sup>2/</sup> \$20 million authorization.



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\$30 million have been completed, and 47 are in various stages of activity. Of the 47 ongoing projects, 6 are jointly administered and jointly funded by the Departments of Commerce and the Interior. For example, both agencies are contributing equally to the Federal share for operation and maintenance of the California Mad River Hatchery which was constructed under the Act at a total cost of about \$2 million. This facility produces about 6 million yearling salmon annually to benefit both commercial and recreational fishermen.

Eighteen states and five other non-Federal interests such as the University of Washington, the Nisqually Indian, and Pacific Marine Fisheries Commissions are presently participating in the program with us. Project activities cover various fields, including planning, coordination, research, construction, statistics, and fisheries development.

Fifty percent of the total state-Federal program funds has been used for research in such projects as measurement of the timing and size of fish stock returns, aquaculture, detection and control of fish disease and parasites, biology and life history study, and monitoring of anadromous fish populations.

Thirty-five percent of the program funds has been made for the construction of fish hatcheries, protection screens, fishways, and other anadromous fish facilities.



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Eleven percent of the funds have been used for exploratory fishing, operation and maintenance of fish facilities constructed under the program, and the collection of statistics. The remaining four percent have been used for coordination and planning.

By supplementing natural reproduction with artificially-spawned and hatchery-reared fish, a substantial contribution to the total stocks of anadromous fish occurs. As an example, four salmon hatcheries, constructed in California, Oregon, and Washington at a total cost of more than \$7 million, are annually producing more than 12 million young salmon and steelhead for release in Pacific Coast streams. About 12 state-owned salmon hatcheries have been enlarged and improved. Two large spawning channels, constructed at State-owned hatcheries in Washington, are returning about 100,000 coho and chinook salmon to the commercial and recreational fisheries annually. Two hatcheries--one to produce coho and Atlantic salmon in New Hampshire, and one to produce striped bass in Alabama--were constructed at a total cost of more than \$1.2 million for both projects. The New Hampshire hatchery will produce about 400,000 young fish annually. The Alabama hatchery, a joint undertaking with the Fish and Wildlife Service, will annually rear about 1 million striped bass for stocking Gulf of Mexico coastal streams.



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Fish screens and bypasses at diversion canals to protect young downstream migrant salmon and steelhead trout have been installed in four California rivers. The fish saved as a result of these projects will add each year 120,000 salmon to the commercial catch, and provide 30,000 salmon and 3,500 steelhead for sportsmen. Barriers to the upstream movement of alewife and American shad have been removed in several New England streams. The States of Maine, Massachusetts, and Rhode Island have reported that removal of barriers and construction of fish passage facilities in reopening several streams has greatly increased the river herring catch.

Although hatcheries, fish screens, spawning channels, and stream improvement projects are contributing much to the anadromous fisheries resources, research is really the backbone of the program. Significant progress has been made in the development and improvement of aquaculture and hatchery techniques. Scientists in Oregon and California are investigating ocean mortality and searching for ways to increase the offshore troll catch of salmon. An understanding of the basic biology and assessment of the status of the river herring and American shad populations along the Atlantic coast are being obtained. Investigations have been conducted to identify habitat suitable for striped bass in the Gulf States. Also, new and useful information from habitat surveys and fish population inventories along the Atlantic coast and Great Lakes has been obtained.



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Finally, although most of the program funds are being used to address specific intra-state fishery problems, several coastal states are directing a portion of their allocation to research related to Fishery Conservation and Management Act (FCMA) projects and toward research in support of our State/Federal Fisheries Management Program for fishery resources in state territorial waters. In FY 1979, about 10 percent of the funds appropriated were obligated for FCMA related projects (offshore salmon troll fisheries) and more than 40 percent for state/Federal management related projects (inshore salmon and striped bass fisheries).

While much knowledge has been acquired on the anadromous fish stocks and their needs, more effort is necessary to understand and to cope with the changing increased pressure upon these resources. Therefore, we urge enactment of this legislation to extend the authorization. At this time we are not recommending any substantive changes to the Act. However, we do have a few technical amendments to suggest:

The first would amend section 1(c) of the Act to exclude wording which would prevent Federal cost-sharing of expenses for operation and maintenance of facilities constructed under multi-state projects. This would permit 50 percent Federal cost-sharing to be available for the routine operations and



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maintenance of multi-state projects thus putting such projects on the same footing as projects constructed by a single state.

The second would amend section 4(a) of the Act to extend the authorization for the Departments of the Interior and Commerce at the 1980 budget level of \$5.712 million and for such sums as may be necessary for succeeding fiscal years.

The third would amend section 4(b) of the Act to modify the \$1,000,000 limitation that a state may receive in any one year by inserting the words "or twenty percent, whichever is greater". The \$1,000,000 limitation was no problem when the program was initiated with an annual authorization of \$5,000,000 and about a \$4 million appropriation per year. However, now that the authorization and base funding have increased, we need more flexibility in the amount a state may receive in any fiscal year to provide funding for all participants within a State such as Washington where Commerce and the Interior have ongoing approved work with the Department of Fisheries, Department of Game, University of Washington, and Indian Tribal Communities.

With reauthorization and enactment of the proposed changes, we would not expect any immediate changes in program direction. However, we would like to explore with the states ways in which they can use 89-304 monies to more effectively support cooperative State-Federal management programs. In



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particular, we would like to consider greater orientation toward efforts to complement management and research of ocean fisheries for anadromous species managed under the Fishery Conservation and Management Act.

This concludes my statement, Mr. Chairman. I would be pleased to answer any questions you might have at this time.



Joint Statement Of

Irwin M. Alperin, Executive Director  
Atlantic States Marine Fisheries Commission;

John P. Harville, Executive Director  
Pacific Marine Fisheries Commission;

Charles H. Lyles, Executive Director  
Gulf States Marine Fisheries Commission

At hearings before the Subcommittee on Resource  
Protection, Senate Committee on the Environment  
and Public Works

March 5, 1979

RE: Reauthorization of the Anadromous Fish Conservation Act,  
Public Law 89-304, as amended.

Mr. Chairman and members of the Subcommittee, I am Irwin Alperin, Executive Director of the Atlantic States Marine Fisheries Commission. In my presentation here today, in addition to representing ASMFC, I am speaking for Mr. Charles Lyles, Director of the Gulf States Marine Fisheries Commission, and Dr. John Harville, Director of the Pacific Marine Fisheries Commission. Our Compacts comprise 25 of the coastal States that are eligible, along with the Great Lakes States and those bordering Lake Champlain, to receive grants under the Anadromous Fish Conservation Act. Since the Act's inception in 1965, all of our member States, excepting Texas which seems to have no anadromous species as herein defined, have



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participated to some degree in this cooperative program. At the present time, twenty-six states have projects funded by either the National Marine Fisheries Service of the Commerce Department or the Fish and Wildlife Service of the Department of Interior, agencies that jointly administer P.L. 89-304. Our coastal States generally participate under grants available through NMFS funding, but FWS appropriations also have and do contribute to the 50/50 matching-fund basis of coastal anadromous fisheries projects in the areas of our jurisdiction, and FWS sponsors a number of cooperative interstate projects in East Coast basins, including the Delaware, Connecticut, Merrimack and Brandywine Rivers.

On behalf of all member States in the several interstate compacts, we thank you, Mr. Chairman, for this opportunity to appear before you today to express our strong support for the continuation of this extremely valuable and well-accepted program, and to share with you our views on reauthorization of the Anadromous Fish Conservation Act of 1965.

To begin, we applaud the comments of the Chairman of the House Committee on Merchant Marine and Fisheries, Mr. Murphy of New York, upon introduction earlier this year of HR 2035 to authorize the extension of the Anadromous Fish Conservation Act. The



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Chairman pointed out that despite the \$20 million authorized for this program each year since 1974, insufficient funds have been appropriated to provide for a multitude of anadromous fish projects, worthy of support, which have been proposed by the eligible States. Our Commissions are aware, for example, that in the current Fiscal Year, the Fish and Wildlife Service has a backlog of more than \$2.36 million worth of projects which are funded for amounts less than requested or are unfunded. For Fiscal Year 1979, the National Marine Fisheries Service has unfunded project requests in the sum of \$2.287 million and for Fiscal Year 1980, unfundable requests for an additional \$2.023 million worth of projects. The applicant States have indicated that they can match these funds to carry out their anadromous fish conservation programs.

Eight States and an Indian Tribal Group have made these latter proposals to NMFS; they include Washington, Oregon, California and Alaska on the West Coast, Louisiana on the Gulf Coast, South Carolina on the South Atlantic Coast, and Massachusetts and Maine on the North Atlantic Coast. The principal fisheries of concern in these instances are West Coast salmon fisheries of the territorial sea and the offshore troll salmon fisheries, striped bass fisheries in Louisiana and South Carolina, and alewife (river herring) fisheries in Massachusetts and Maine.



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Although appropriations are not your direct concern, Mr Chairman, a bit later on, I should like to return to the subject of funding for this grant-in-aid program reflecting what we consider to be appropriate levels to meet the needs of participants for the 1980 Fiscal Year.

This cooperative program for the conservation of anadromous fishery resources of the United States, including the waters of all the continental Coastal States, the States adjoining the Great Lakes, and most recently as the Act was amended in the last session of Congress, Lake Champlain, has been most beneficial in the preservation, restoration and enhancement of some of our most important commercial and recreational species. In the coastal waters of the Gulf, Pacific and Atlantic, these have included five West Coast species of salmon, the Atlantic salmon, the striped bass which inhabits all three coasts, the American shad native to the Atlantic but successfully introduced to the West Coast, several species of related river herrings, and a number of sea-run trouts. Nevertheless, and in spite of our prior and current successes with these species and the great economic benefits from these anadromous fish programs which have accrued to the participating States and to the Nation as a whole, there continue to be substantial problems with the adequacies of these fisheries, which must be addressed.



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As you know, Mr. Chairman, anadromous fishes are so very vulnerable to the adverse activities of man because of the nature of their life cycles -- their need to ascend streams to spawn, their regular passage through waters so grossly polluted by every class of toxic contaminant, and their exhausting struggles to overcome the obstructions within our waterways which may deny them access to their heritage spawning grounds -- that civilization can ultimately destroy or decimate a stock of these fish even without the presence of substantial fishing pressure. Unless assisted, through construction of fish passageways such as fish ladders or lifts, stocking of hatchery-reared fish to supplement natural reproduction, preservation of critical environment, diminution of pollution, and other managerial techniques, these species experience early population collapse. But anadromous fish continue to be among our most prized (and expensive) finfish species for both food and recreation, and there is an almost never-ending problem among the States for adequate supplies of these species to support constantly expanding fisheries.

To meet requirements of new management plans developing under the Fishery Conservation and Management Act of 1976, and to more effectively conserve and manage all anadromous fisheries, it is imperative that we strengthen and expand our cooperative



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State/Federal programs. For example, West Coast Regional Council management plans for Pacific salmon depend on such programs for habitat protection and enhancement, for long-term stock assessments and other biological and socioeconomic studies. The salmon fisheries, so avidly pursued by multitudes of our domestic commercial and recreational fishermen, have suffered from abusive Japanese fisheries on the high seas, from loss of management control through judicial decree, and from recent drought conditions in some basins which have seriously impacted the production of downstream smolts (juvenile salmon). On the East Coast, the American shad, hickory shad, alewife and blueback herrings are in a seriously depleted state along the South Atlantic and Mid-Atlantic coasts at least as far north as Delaware Bay. There is strong evidence that this has probably resulted from a combination of factors, i.e., man's objectionable despoilation of the estuaries and their attendant river systems upon which these species depend for spawning and nursery areas, and prior to FCMA, the over-large pelagic fisheries of the foreign fishing fleets which decimated the ocean-schooling stocks of pre-spawning adults. Additionally, and very seriously, the populations of the coastal migratory stocks of striped bass (or rockfish, as they are known in the Chesapeake area), recently one of the most abundant and successful East Coast species contributing tens



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of millions of fish to the recreational fisheries from North Carolina to Maine, and millions of pounds to the commercial fisheries of Chesapeake Bay, Delaware Bay, New York and other areas, have drastically plummeted. The reasons are still obscure for this species' failure to spawn successfully and to provide the occasional extraordinary large year classes necessary to replenish the migrating hordes for these valuable fisheries.

In a cooperative endeavor to turn the tide and rebuild the population of striped bass, under the State/Federal Fisheries Management Program (sponsored by NMFS), twelve Atlantic Coast States and the NMFS are wrestling with the development of a regional management plan to restore this most valuable anadromous fishery to its earlier heights. Because the striped bass spawns, lives and migrates predominantly within the internal waters and territorial seas of the several States, it is not a major concern of the Atlantic Coast Regional Fishery Management Councils -- the striped bass is of insignificant harvest in the Fishery Conservation Zone. Meanwhile, ASMFC's member States are attempting to accomplish this Herculean task with about \$30,000 a year! The Anadromous Fish Conservation Act could supply a major portion of the wherewithal to accomplish our goals.



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We believe that increased appropriations, above those required to merely compensate for inflation and to bring the ongoing programs back to efficient levels, should be applied specifically to development of new or expanded programs having direct relevance to comprehensive management planning and plan implementation for anadromous fisheries subject to multiple jurisdiction as in the examples of Pacific salmon and Atlantic Coast striped bass. Given the necessary funds to support action, the States will provide urgently needed facilitation to Council management plans, and will initiate parallel management planning activities for anadromous fisheries harvested principally within the territorial sea (and therefore not effectively addressed by Regional Council plans).

I am aware that the Anadromous Fish Coordinating Committee of the Federal agencies that administer these programs have drafted several amendments to the Anadromous Fish Conservation Act which we find to be in the best interests of the participating States and I urge your favorable consideration. These amendments would: 1) extend the current authorization, which is set at \$20.0 million per year, for an additional five years. Since the present authorization expires on September 30 of this year, the proposed amendment to Section 4(a) of the Act will provide an authorization level of \$20.0 million per year for Fiscal



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Years 1980, 1981, 1982, 1983, and 1984; 2) modify the maximum amount that an eligible State might receive in a single year. Section 4(b) of the Act places a maximum limitation of \$1.0 million on the amount a State may receive from a single year's appropriation. However, amendments to the Act in 1970 and 1974 increased the authorization level to \$10.0 million and \$20.0 million respectively but did not increase the \$1.0 million ceiling. The proposed amendment would revise the limitation to \$1.0 million or 20 per cent of the appropriation, whichever is greater, allowing States to expand programs in accord with increased appropriation levels; 3) effect a change in Section 1(c) of the Act to permit Federal cost-sharing up to 66-2/3 per cent of the operational expenses of facilities, including fish hatcheries, constructed under multi-state cooperative agreements. Currently, these operational costs are borne solely by the States, although such costs are shared by the Federal government under single-state projects. The restriction against Federal cost-sharing of operational costs, as the Act is presently written, discourages States from becoming involved in multi-state projects and is contrary to the intent of the Act.

Finally, Mr. Chairman, we would return to the serious question of fiscal enhancement. For Fiscal Year 1980, the Administration



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March 5, 1979

Budget would appropriate \$2.0 million to the Commerce Department for NMFS-administered projects under the Anadromous Fish Conservation Act and \$3.712 million to the Department of the Interior for Fish and Wildlife Service-administered projects. These amounts are entirely inadequate to meet the program needs. The NMFS program has suffered terrible attrition, the product of eight years of level funding. Over this period, inflation alone has reduced the dollar value by some 68 per cent; thus the \$2.0 million requested by NMFS for FY 1980 will provide only about 60 per cent of the goods and services that the same level of funding produced in 1971. We recommend that you support a \$2.0 million increase to a total of \$4.0 million in the FY 1980 NMFS/NOAA appropriation for the continuation of the Anadromous Fish Conservation Act. About a million dollars of this amount will compensate for the inflation of the past eight years. The second million dollars would provide a start for the programs suggested above and partially satisfy the backlog of unfunded project requests which I earlier pointed out, amounting to approximately \$2.3 million for FY 1979 and \$2.0+ million for FY 1980.

The Fish and Wildlife Service has fared a little better over the eight year period -- nearly doubling its funding under the Anadromous Fish Conservation Act from about \$2.3 million in the early 1970's to a \$3.712 million request for Fiscal Year 1980. However, this latter figure is an increase of only \$100,000 over the FY 1979 appropriation of \$3.611 million



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March 5, 1979

and would accomodate only three small new projects in Oregon, Indiana, and Ohio. But even these small annual increases can not begin to meet the multi-million dollar backlog of worthy projects that have accumulated in FWS files. For instance, projects funded for amounts less than requested for FY 1980 amounted to \$2.3 million while requests unfunded amount to another \$375,000. Similar unfunded needs prevailed in FY 1978 and FY 1979. Therefore, we recommend a start towards decreasing this backlog by suggesting a \$1.0 million increase to a total of \$4.712 million for the FY 1980 Interior/FWS Appropriation for the Anadromous Fish Conservation Act.

Besides these costs to the program, I must bring to your attention Dr. Rivlin's Congressional Budget Office cost analysis of the Lake Champlain amendment to the Act (P.L. 95-464) which would add a Federal share of \$4.15 million over the next five years. Should the grant to build a fish hatchery on Lake Champlain for the introduction of a salmonid fishery at a total cost of \$8.3 million be made, it would put a considerable dent in the sums available to other projects during this period if there was no compensating fiscal enhancement.

All in all, we want to recommend that your Committee, Mr. Chairman, support a total appropriation for projects under the Anadromous Fish Conservation Act for Fiscal Year 1980 of



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approximately \$8.7 million, which more closely reflects the programs' needs and worth, than does the Administration's 1980 Budget recommendation of \$5.7 million.

Thank you, Mr. Chairman and Committee members, for this opportunity to express our interests in behalf of our member States in the continuance of the Anadromous Fish Conservation Act. We do believe the Act has more than proven its worth. We are aware that anadromous fisheries are among the highest valued by both commercial and recreational users, providing multi-million dollar harvests off our coasts and are of ever-increasing importance to the Great Lakes fisheries. We know that benefit-cost ratios for anadromous fisheries under this program are excellent -- nearly 4 to 1 for Pacific Coast salmon conservation and management, and more than 3 to 1 for Atlantic striped bass projects. We recommend a five-year reauthorization. And we propose and vigorously support substantially increased appropriations commencing in Fiscal Year 1980 to meet the modern requirements of anadromous fish management

March 5, 1979  
Washington, DC



U.S. Fish and Wildlife Service  
 Anadromous Fish Conservation Act, PL 89-304  
 PROJECTS FUNDED FOR AMOUNTS LESS THAN REQUESTED  
 FY 1980

|                                                                       | <u>Amount Not Funded</u> |
|-----------------------------------------------------------------------|--------------------------|
| <u>Alaska</u>                                                         |                          |
| AFS-41 Southeast King Salmon Investigations                           | \$ 31,200                |
| <u>California</u>                                                     |                          |
| AFSC-15 Mad River Hatchery Operation & Maintenance                    | 22,000                   |
| <u>Illinois</u>                                                       |                          |
| AFS-3 Purchase of Chinook Salmon Smolts                               | 29,000                   |
| <u>Indiana</u>                                                        |                          |
| AFS-3 Lake Michigan Anadromous Fish Stocking                          | 45,377                   |
| NEW- St. Joseph River Salmon Enhancement<br>and Hatchery Construction | 905,900                  |
|                                                                       | <u>951,277</u>           |
| <u>Michigan</u>                                                       |                          |
| AFS-22 Grand River Fish Ladders                                       | 189,300                  |
| New St. Joseph River Salmon Enhancement                               | 302,600                  |
|                                                                       | <u>491,900</u>           |
| <u>Minnesota</u>                                                      |                          |
| AFS-5 Anadromous Fish Stocking                                        | 16,900                   |
| <u>New Jersey</u>                                                     |                          |
| AFS-2 Delaware River Basin Anadromous Fish Study                      | 10,000                   |
| AFS-6 Shad Study on Raritan River                                     | <u>10,000</u>            |
|                                                                       | 20,000                   |
| <u>New York</u>                                                       |                          |
| AFS-8 Anadromous Fish Hatchery Development                            | 310,000                  |
| <u>Ohio</u>                                                           |                          |
| NEW Put-in-Bay Hatchery Improvements, Phase II                        | 53,000                   |
| <u>Oregon</u>                                                         |                          |
| AFSC- Streamflow Requirements and Stock Assessment                    | 50,000                   |



Washington

|      |                                                |         |
|------|------------------------------------------------|---------|
| AFS- | Cedar River Sockeye Spawning & Rearing Clannel | 210,600 |
|------|------------------------------------------------|---------|

Wisconsin

|       |                                       |               |
|-------|---------------------------------------|---------------|
| AFS-9 | Anadromous Fish Stocking & Evaluation | <u>62,500</u> |
|-------|---------------------------------------|---------------|

TOTAL

\$ 2,248,377



U.S. Fish and Wildlife Service  
 Anadromous Fish Conservation Act, PL 89-304  
 STATE REQUESTS NOT FUNDED  
 FY 1980

|                                                | <u>STATE<br/>REQUEST</u> |
|------------------------------------------------|--------------------------|
| <br><u>Alaska</u>                              |                          |
| NEW - Upper Cook Inlet Coho Study              | \$ 52,000                |
| NEW - Upper Cook Inlet King Salmon Study       | 50,000                   |
|                                                | \$102,000                |
| <br><u>New York</u>                            |                          |
| FA-3-R - Lake Erie Investigations              | 20,000                   |
| NEW - Hudson River Fish Development            | 20,000                   |
|                                                | 40,000                   |
| <br><u>Oregon</u>                              |                          |
| NEW - Salmon Monitoring in Estuaries and Ocean | 75,000                   |
| NEW - Early Ocean Life History of Salmon       | 75,000                   |
| NEW Instantaneous Salmonid Growth Rate Methods | 15,000                   |
| NEW Striped Bass Investigations                | 50,000                   |
|                                                | 215,000                  |
| TOTAL                                          | \$357,000                |



U.S. FISH AND WILDLIFE SERVICE  
 Anadromous Fish Conservation Act, PL 89-304  
 Projects funded for Amounts Less Than Requested  
 FY 1979

|                                                        | <u>Amounts Not Funded</u> |
|--------------------------------------------------------|---------------------------|
| <u>Alaska</u>                                          |                           |
| AFS-42 Southeast Alaska Steelhead and Sea-Run          | 4,630                     |
| Cutthroat Trout Investigation                          | 7,150                     |
| AFS-43 Mendenhall Salmon Rearing Ponds                 | 2,038                     |
| AFS-44 Russian River Red Salmon Study                  | <u>13,818</u>             |
| <br><u>California</u>                                  |                           |
| AFSC-15 Mad River Hatchery Operation & Maintenance     | 56,200                    |
| <br><u>Illinois</u>                                    |                           |
| AFS-3 Purchase of Chinook Salmon Smolts                | 26,000                    |
| <br><u>Indiana</u>                                     |                           |
| AFS-3 Lake Michigan Anadromous Fish Stocking           | 19,750                    |
| <br><u>Massachusetts</u>                               |                           |
| AFS-4 Connecticut River Basin Anadromous Fishery Study | 24,500                    |
| AFS-10 Merrimack River River Basin Restoration         | 4,600                     |
|                                                        | <u>29,100</u>             |
| <br><u>Michigan</u>                                    |                           |
| AFS-22 Grand River Fish Ladders                        | 320,981                   |
| AFS- St. Joseph River, Buchanon Dam, Ladder            | 10,000                    |
|                                                        | <u>330,981</u>            |
| <br><u>Minnesota</u>                                   |                           |
| AFS-3 Improvement of Sportfishing for Anadromous Fish  | 16,000                    |
| AFS-5 Anadromous Fish Stocking                         | 34,375                    |
|                                                        | <u>50,375</u>             |
| <br><u>New Jersey</u>                                  |                           |
| AFS-6 Shad Study, Raritan River                        | 7,500                     |
| <br><u>New York</u>                                    |                           |
| AFS-8 Anadromous Trout and Salmon Hatchery Development | 588,900                   |
| AFS-9 Hudson River Sturgeon Study                      | 25,000                    |
|                                                        | <u>613,900</u>            |



|                     |                                                |                    |
|---------------------|------------------------------------------------|--------------------|
| <u>Ohio</u>         |                                                |                    |
| AFS-4               | Anadromous Fish Resource Enhancement           | 27,600             |
| <u>Oregon</u>       |                                                |                    |
| AFS-62              | Salmon Streamflow Requirements                 | 44,800             |
| AFS-72              | Rock Creek Fish Hatchery                       | 425,900            |
|                     |                                                | <u>470,700</u>     |
| <u>Pennsylvania</u> |                                                |                    |
| AFS-5               | Lake Erie Salmon Program                       | 55,400             |
| NEW                 | Girard Anadromous Fish Rearing Station         | 109,500            |
|                     |                                                | <u>164,900</u>     |
| <u>Washington</u>   |                                                |                    |
| AFCS-85             | Nisqually Fisheries Enhancement                | 7,500              |
| AFS-                | Fisheries Enhancement-Hoh Indian Tribe         | 4,600              |
| AFS-                | Cedar River Sockeye Spawning & Rearing Channel | 42,020             |
| NEW                 | Northwest Indian Catch Monitoring              | 58,000             |
| NEW                 | South Tacoma Hatchery Pump Intake              | 5,000              |
|                     |                                                | <u>117,120</u>     |
| <u>Wisconsin</u>    |                                                |                    |
| AFS-9               | Anadromous Fish Stocking & Evaluation          | 94,400             |
| TOTAL               |                                                | <u>\$2,022,344</u> |



U.S. FISH AND WILDLIFE SERVICE  
Anadromous Fish Conservation Act, PL 89-304  
STATE REQUESTS NOT FUNDED  
FY 1979

|                   |                                                   |               |
|-------------------|---------------------------------------------------|---------------|
| <u>Michigan</u>   |                                                   |               |
| AFS-              | Hog Island Creek Fish Ladder & Lamprey Barrier    | 800           |
| NEW               | Fish Production Facility, Preliminary Engineering | 176,000       |
| <u>Oregon</u>     |                                                   |               |
| NEW               | Salmon River Hatchery Additions                   | 75,000        |
| <u>Washington</u> |                                                   |               |
| NEW               | Bear Springs Rearing Pond No. 2                   | <u>84,000</u> |
|                   | TOTAL                                             | 335,800       |



## Anadromous Fish Conservation Act, PL 89-304

PROJECTS FUNDED FOR AMOUNTS LESS THAN REQUESTED

FY 1978

| <u>State</u>      |                                                | <u>Amount Not Funded</u> |
|-------------------|------------------------------------------------|--------------------------|
| <u>California</u> |                                                |                          |
| AFSC-15           | Mad River Hatchery O&M                         | \$ 46,000                |
| <u>Oregon</u>     |                                                |                          |
| NEW               | Hatchery Improvements                          | 45,500                   |
| <u>New York</u>   |                                                |                          |
| AFS-8             | Anadromous Trout & Salmon Hatchery             | 514,500                  |
| <u>Indiana</u>    |                                                |                          |
| NEW               | Lake Michigan Anadromous Fish Stocking         | 22,500                   |
| <u>Michigan</u>   |                                                |                          |
| AFS-12            | Anadromous Fish Production                     | 20,000                   |
| <u>Ohio</u>       |                                                |                          |
| NEW               | Anadromous Fish Resource Enhancement           | 7,500                    |
| <u>Wisconsin</u>  |                                                |                          |
| AFS-9             | Anadromous Fish Enhancement                    | 10,000                   |
| <u>Washington</u> |                                                |                          |
| NEW               | Cedar River Sockeye Spawning & Rearing Channel | 121,200                  |
|                   |                                                | <u>\$787,200</u>         |



## Anadromous Fish Conservation Act, PL 89-304

STATE REQUESTS NOT FUNDED

FY 1978

StateMaryland

|     |                    |           |
|-----|--------------------|-----------|
| New | Striped Bass Study | \$ 50,000 |
|-----|--------------------|-----------|

Rhode Island

|     |                                    |        |
|-----|------------------------------------|--------|
| New | Anadromous Fish Hatchery<br>Design | 25,000 |
|-----|------------------------------------|--------|

Illinois

|     |                       |                |
|-----|-----------------------|----------------|
| New | Hatchery Construction | <u>392,500</u> |
|-----|-----------------------|----------------|

|  |  |           |
|--|--|-----------|
|  |  | \$467,500 |
|--|--|-----------|



## NATIONAL MARINE FISHERIES SERVICE

## BACKLOG OF UNFUNDED PROJECTS

P.L. 89-304

We have a backlog of requests for FY79 & FY80, totaling more than \$2 million per year, in addition to the State's approved ongoing programs. The States have indicated that they have the matching capabilities and need the additional funding for:

| REGION | State &<br>Others | PROJECT EMPHASIS                                                                                          | Federal Cost      |                   |
|--------|-------------------|-----------------------------------------------------------------------------------------------------------|-------------------|-------------------|
|        |                   |                                                                                                           | FY79<br>(\$1,000) | FY80<br>(\$1,000) |
| FNW    | Washington        | Salmon Ocean Troll,<br>Puget Sound Net, and<br>Recreational Fisheries<br>Management                       | 598               | 632               |
|        | Oregon            | Evaluate Ocean Contri-<br>bution of Salmon Hatcheries                                                     | 82                | 86                |
|        | Indians           | Construction and Expansion<br>of Salmon Rearing Facili-<br>ties on Tribal Lands                           | 49                | 24                |
|        |                   | Sub-total                                                                                                 | 729               | 742               |
| FSE    | Louisiana         | Expand Striped Bass<br>Stocking Program                                                                   | 30                | 40                |
|        | S. Carolina       | Assessment of Anadromous<br>Fish Stocks                                                                   | 40                | 40                |
|        |                   | Sub-total                                                                                                 | 70                | 80                |
| FNE    | Maine &<br>Mass.  | Expand Stream Improvement<br>and Development Programs<br>for Alewife and others<br>Anadromous Fish Stocks | 116               | 73                |
|        |                   | Sub-total                                                                                                 | 116               | 73                |
| FSW    | Calif.            | Solve Water Diversion<br>Problems with Design<br>and Construction of<br>Fish Screens                      | 200               | 200               |
|        |                   | Sub-total                                                                                                 | 200               | 200               |



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| <u>REGION</u> | <u>State &amp;<br/>Others</u> | <u>PROJECT EMPHASIS</u>                                                                                                         | <u>Federal Cost</u> |                  |
|---------------|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------|---------------------|------------------|
|               |                               |                                                                                                                                 | <u>FY79</u>         | <u>FY80</u>      |
|               |                               |                                                                                                                                 | <u>(\$1,000)</u>    | <u>(\$1,000)</u> |
| FAK           | Alaska                        | Expand Salmon Date<br>Processing and Analysis,<br>Management of Mixed<br>Stocks, and Improve<br>Optimum Escapement<br>Estimates | 1,072               | 928              |
|               |                               | Sub-total                                                                                                                       | 1,072               | 928              |
|               |                               | Grand Total                                                                                                                     | 2,287               | 2,023            |

NOTE: All proposed programs would contribute to State/Federal  
Management of Anadromous Fish Stocks in Territorial waters.



## ANADROMOUS FISH CONSERVATION ACT

## Review of Authorizations and Appropriations

| <u>Authorizations (Millions)</u> |                             | <u>Appropriations (Millions)</u> |                 |                 |
|----------------------------------|-----------------------------|----------------------------------|-----------------|-----------------|
| <u>Fiscal Year</u>               | <u>Per Year</u>             | <u>TOTAL</u>                     | <u>BCF/NMFS</u> | <u>BSFW/FWS</u> |
| 1967                             | \$ 5.0                      | 2.177                            | 1.002           | 1.175           |
| 1968                             | 5.0                         | 4.535                            | 2.100           | 2.435           |
| 1969                             | 5.0                         | 4.444                            | 2.150           | 2.294           |
| 1970                             | 5.0                         | 4.461                            | 2.150           | 2.311           |
| 1971                             | 6.0                         | 4.321                            | 2.000           | 2.321           |
| 1972                             | 7.5                         | 4.333                            | 2.000           | 2.333           |
| 1973                             | 8.5                         | 4.333                            | 2.000           | 2.333           |
| 1974                             | 10.0                        | 3.833                            | 2.000           | 1.833           |
| 1975                             | 20.0                        | 4.633                            | 2.000           | 2.633           |
| 1976                             | 20.0                        | 5.513                            | 2.000           | 3.513           |
| 1976 (TQ)                        |                             | 1.375                            | 0.500           | 0.875           |
| 1977                             | 20.0                        | 5.513                            | 2.000           | 3.513           |
| 1978                             | 20.0                        | 5.513                            | 2.000           | 3.513           |
| 1979                             | 20.0                        | 5.611                            | 2.000           | 3.611           |
| 1980                             | (Proposed) 20.0 (Requested) | 5.712                            | 2.000           | 3.712           |
| TOTALS:                          | <u>\$ 172.0</u>             | <u>66.307</u>                    | <u>27.902</u>   | <u>38.405</u>   |



TESTIMONY OF INTERNATIONAL ASSOCIATION OF FISH AND WILDLIFE AGENCIES  
BEFORE THE SENATE SUBCOMMITTEE ON RESOURCE PROTECTION, COMMITTEE ON  
ENVIRONMENT AND PUBLIC WORKS, CONCERNING THE REAUTHORIZATION OF THE  
ANADROMOUS FISH CONSERVATION ACT, H.R. 2035, March 5, 1979

Mr. Chairman, I am John S. Gottschalk, Legislative Counsel for the International Association of Fish and Wildlife Agencies, and I appear today in support of the reauthorization of the Anadromous Fish Conservation Act. I represent a voluntary association of the fish and wildlife resource administering agencies of the states, provinces, and federal governments of the United States, Canada, and Mexico. Our objectives are to promote the wise use of the renewable resources of North and Central America.

I am pleased to tell you that the Association enthusiastically supports the reauthorization of the Anadromous Fish Conservation Act, although we urge amendments that will make the Act more effective. We propose that there be two important changes made in the ratio of matching funds. First, the present law establishes a 50 to 50 ratio between state and federal funds. This ratio should be changed to 25 to 75. At the same time the ratio for joint interstate projects now 33 1/3 to 66 2/3 should be changed to 10 to 90. Secondly, there should be explicit authority in the revised Act to permit the latter ratio to apply to the costs of operating completed joint projects. At present the more favorable ratio only applies to the development phases of a project and not to its operation and maintenance.

This program, small as it has been, has nevertheless been responsible for major breakthroughs in fishery conservation, as well as providing for the restoration of fisheries in a general but highly significant way. For example, the work carried out by the Great Lake states to acclimatize the coho and chinook salmon is well known as a positive accomplishment derived from a combination of scientific study and bold administration.

Another example is the work that has been done with the striped bass. Supported largely by anadromous fish funds, the propagation of striped bass in hatcheries has become an operational technique in roughly the last 15 years. It is now possible to produce stripers in hatcheries and stock them in suitable waters not only along the coasts where they were originally found but in many land-locked inland waters as well.

These are but two examples of the accomplishments made possible through this program. Many others will have been brought to the attention of the Committee within a few weeks.

Meanwhile on the question of the ratio of state and federal funds. As you are aware, the well established Fish Restoration Program, known widely as the Dingell-Johnson Program, operates on a 25 to 75 basis. As a result in determining the priorities for the use of its matching funds, a state must take into consideration how much federal money will be available from a given expenditure of state money. A dollar of state funds under the D-J program generates three dollars of federal funds;



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whereas a dollar of state funds under the Anadromous Fish Conservation Act brings in only an additional dollar.

The result of this relative inequity is that faced with tough decisions on financing the states tend to choose the more favorable D-J financing. Thus, some otherwise desirable anadromous fish projects are not selected, and important resources may be slighted. If the states had an unlimited supply of license derived money, the matching funds question would be of little consequence. That is not the case, however. In my experience, the only thing more difficult to obtain than a state fishing license increase is Office of Management and Budget approval of federal matching fund increases!

Many of the anadromous fish projects are such that to be successful over the years they must be operated on a continuing basis. They are not like stocking bluegills in a pond and having the population mature naturally. Eggs must be obtained, hatched, the young fish reared to proper release size, and then planted in such a way that the maximum returns can be realized. All this costs money; and since the more favorable ratio accorded cooperative development projects does not apply to maintenance, again the program is under a handicap.

There are several other thoughts that we would like to leave with you.

We think it would be an asset to this and similar programs if the authorization period were to be standardized at five years. If a program goes wrong, its shortcomings will normally be brought quickly to the Committee's attention. The Committee may call oversight hearings at any time a reasonable need exists. Meanwhile the five-year rule would relieve the workload of the Committee, and not entirely incidentally, that of the agencies and the conservation organizations who must participate with the Committee in the periodic review of these programs.

At present there is a limitation of \$1,000,000 as the maximum that can go to any one state. In the past this has been adequate; but at some point given the rapidly increasing cost of doing business, and the possibility of increased funding, this may not be adequate. We suggest that the language be changed to make the limitation \$1,000,000 or 20 percent of the available funds, whichever is the greater.

Finally, Mr. Chairman, while the question of appropriations is not in your immediate area of responsibility, I would like to suggest that the limited amounts appropriated for anadromous fisheries work over the years is entirely inadequate. The increases requested by the Fish and Wildlife Service have been very conservative while there have been only modest requested increases in the budget of the National Marine Fisheries Service since the program started! The reasons for this are probably several, and all may not be related to the intransigence of the Office of Management and Budget in approving grants to the states for fishery work. Nevertheless we plan to join others in seeking additional funding



this year. Our position is justified if only because of the shrunken purchasing power of the U.S. dollar. In terms of "real" dollars, the funds that are being made available today are but a fraction of what were available when this program first started. The need is there for additional financial support. Several states are prepared to expand their programs immediately; and if the limitations on the matching ratios were expanded as we have suggested, the existing appropriations would be totally inadequate.

Indeed, I am informed that the states have submitted unfunded proposals of more than \$2,500,000 to the U.S. Fish and Wildlife Service and more than \$2,000,000 to the National Marine Fisheries Service. These projects are in the files merely waiting for the appropriation of adequate funds to get them started.

I would like permission to supply additional testimony for the record subsequent to this hearing. Because of the limited time for preparation, we have had no opportunity to solicit responses from our state members. The record could be enlarged substantially if we could supply additional information for the benefit of the Committee.

Thank you for this opportunity to be heard.



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## REAUTHORIZATION OF THE ANADROMOUS FISH CONSERVATION ACT

MONDAY, APRIL 9, 1979

U.S. SENATE,  
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,  
SUBCOMMITTEE ON RESOURCE PROTECTION,  
*Warwick, R.I.*

The subcommittee met at 7:20 p.m., in the Rhode Island Junior College Theater, Hon. John H. Chafee, presiding.  
Present: Senator Chafee.

### OPENING STATEMENT OF HON. JOHN H. CHAFEE, U.S. SENATOR FROM THE STATE OF RHODE ISLAND

Senator CHAFEE. Ladies and gentlemen, we will get started now.

First of all, we would like to thank all of you for coming. We welcome you all here tonight. We give our thanks to the Rhode Island Junior College for letting us use these facilities, and to Bob Green and Will Babbior and others who have contacted many of the striper enthusiasts throughout the State and New England.

In the early days of this country, along the Atlantic shores, the striper was a most abundant fish. In the mid-1900's, and even a few years ago, those hardy individuals who went fishing all hours of the day or night usually had a pretty good chance of having some success.

But something has happened to our striped bass population. We don't know whether it is toxics; or whether it is man's destruction of the estuaries which are crucial to the striper's survival; or whether it is a cyclical change that is unaccountable. We just don't know. We know we should find out what the problem is.

In early March of this year, I chaired a hearing of the Senator Resource Protection Subcommittee on what is known as the Anadromous Fish Conservation Act. This law mandates that the Federal Fish and Wildlife Service and the National Marine Fisheries Service carry out, in cooperation with the States, programs for management and research on our anadromous fish resources. As you know, an anadromous fish is one that lives in the saltwater, but enters the freshwater in order to spawn.

The striped bass is anadromous and has a coastal migratory pattern, which many of you are familiar with. It primarily comes through the Chesapeake Bay and turns north along the coast in the spring and summer and south in the fall. Thus, a striper could be in Maryland today, in Delaware tomorrow, and finally work its way up to Rhode Island and even north and east of here. This pattern of migratory habits makes the protection a perplexing task.



Because of the testimony on the subcommittee, which I mentioned before, and other reading I have done—including John Cole's magnificent book, which I commend to those of you who haven't read it, called Striper—I became concerned about the plight of the striped bass, one of the finest and most sought-after fish along our coast. So that is why we are here tonight. You certainly share that concern.

I think it is time to concentrate additional efforts toward the striper. Many of you already have activities along this line, individually or through organizations you belong to, or through a regional organizational effort, both private and Government. I applaud what each of you have done, what your clubs have done, the fact you realized the striper was in trouble. Your dedication is certainly noteworthy.

What we need to do, it seems to me, is tie this together. We need to decide what further data we need and what further studies are necessary, and then conduct those studies, formulate a comprehensive striped bass management plan. I believe this management plan is essential to the proper stewardship of the striped bass. We can't have a plan until the necessary research is done. This legislation I have proposed hopefully will produce the basic information on which to formulate this plan.

I might add one thing. We can't expect either the States alone or the Federal Government alone to undertake this effort—either of these two groups—we have got to include the private people, such as yourselves, with this tremendous enthusiasm that you have. So it seems to me if we can work out a partnership between you and the States and the Federal Government, we can make some real steps forward.

There are already in existence several general programs for marine fishery resources. As I mentioned before, the anadromous fish conservation program is nothing new. That stems from an act that came in 1965, and more recently has been funded at a rate of \$6 million a year. The trouble is the bulk of that money has gone to salmon projects on the northwest coast—Oregon and Washington—where they have had tremendous success. Unfortunately, none of these funds have been dedicated to striped bass on either coast, but especially our coast. The small amounts that have come to the east coast have been fragmented. In addition, the fragmented expenditures have often been at the State level, for which the Federal Government pays only 50 percent. As you know, the Federal Government on many fisheries programs pays as high as 75 percent. So there is a natural reaction for the States to come forward with 25 percent in order to get 75 percent from the Federal Government, as opposed to putting in 50 cents to get another 50 cents on the striped bass program.

The legislation which I introduced 2 weeks ago urges a partnership in setting up a program that does two things: (1) It monitors, and (2) it has research on our striped bass population. My bill earmarks funds for stripers. This is some thing that hasn't been done before. In other words, we set specific sums aside and it is solely for the striper, instead of putting in in a general fund that would go to the anadromous fish population as a whole.



Currently, if the States cooperate, if you get a couple States, or several States, cooperating, then they only have to put up one-third and the Federal Government will come up with two-thirds. But again, that hasn't been restricted to the striped bass population; it has been used in too many different kinds of fish. If we are going to spend something on the striper with this earmarking of funds, we will make a lot of progress.

What we are saying is the Federal Government's two-thirds money, if we are successful with this bill, their 66⅔ will be there. And the next thing is for the States to come up with one-third. That is where you all can help. I am quite confident we can get the money out of the Federal Government. But where you can all help is make sure that each of the States affected—some 10 States along the coast—will come up with their share to make up the one-third so that a really good research effort can be conducted.

Specifically, my bill directs the two agencies, one dealing with saltwater, the National Marine Fisheries Service, and the Fish and Wildlife Service, which deals with freshwater, to cooperate with the States to do these two things: To monitor a program to follow the striped bass; and second, a research program to find out what has happened. Why have they declined so dramatically? They will look into such things as the extent of annual spawning; extent and causes of striper deaths; the effects of pollutants on the striper eggs and larval fish; the economic importance of the striper to both recreational and commercial fishing.

So my challenge to you tonight is, as we hear these witnesses and those of you who choose to come forward later—we will give others an opportunity who want to come forward—first, we want to find out what is your analysis of the problems facing the striper; and second, what approach should we take that is different from the one I have proposed, which is, namely, a monitoring which causes each of the States to do certain things; and second, a research program by the Federal Government.

We need your thoughts, we welcome them. We are delighted to have the various witnesses here tonight. I just see a distinguished, well-known TV personality and sportscaster, who I first knew from the Red Sox games—I knew him, he didn't know me—Curt Gowdy. We are delighted you are here, Curt, and John Cole, who is the author of this wonderful book.

We will let Curt catch his breath a little bit, and why don't we start with John, and then we will call on Curt.

I just want to say this. Both of these gentlemen came down here. They are not getting a nickel from the Federal Government, or me, or anybody else. They came down on their own. I called Curt up about 3 weeks ago and I said we are having these hearings, we want to get some enthusiasm stirred up. You have been as active as anybody in the sports fishing world, and would you come? He said, I will be there. So that is the kind of person he is.

John Cole I call up, too, and he reacted just the same way. He is just out of the hospital, to tell you the truth. It is his first public appearance. So we are very, very grateful, John and Curt, to both of you for coming.

John, why don't you go to it.



STATEMENT OF JOHN N. COLE, AUTHOR OF "STRIPER,"  
BRUNSWICK, MAINE

Mr. COLE. Senator Chafee, members and staff of the Resource Protection Subcommittee, in my years, probably about 25, as a journalist, I have attended a good many hearings like this. But I can say without any doubt, I have never been happier than I am right now to be spending my night in a hearing.

We write books for a lot of different reasons—and several of them have to do with money, and ego, and paying the bills, and a few other things. I am not going to pretend I wrote Striper solely on behalf of striped bass. But when I did write the book, and when I finished it and after its publication, I really began to hope that somehow that book might alert the public and some of its elected representatives to what is happening to what I consider to be a magnificent creature.

Senator Chafee, your interest in the striped bass, and your bill to investigate its situation and the causes of its decline, really made me feel some of my hopes have been realized. I hope tonight is the beginning of the retrieval of a species that is almost lost, in my opinion. I don't attribute your effort solely to "Striper". There are a lot of dedicated people along the Atlantic seaboard—many here tonight—who have made a good many contributions over the years. I count myself very fortunate to be in this good company.

I have read your striped bass amendments pretty carefully, and I am especially impressed with what you call its central themes, as I remember the italics passage: Coordinating the work of the National Marine Fisheries Service and Fish and Wildlife Service to:

First, monitor the striped bass population in the Atlantic coastal waters. That is something that has just got to be done. There is still a great deal of confusion about that.

Second, to find the factors responsible for the decline of the striper. That is a big order.

I favor the third, perhaps the most—to answer the questions about the effects pollutants have on striper eggs and larval fish—largely because I think you have a problems there, and it has solvable dimensions, or some solvable dimensions.

And fourth, survey the economic significance of the creature to both the recreational and the commercial fisheries.

I couldn't have stated those needs better myself. In my view—and I don't want to repeat what I have already written in the book—these are precisely the areas that need to be studied. I think some facts have to be established, and that job has to be done quickly, which brings me to my next point.

Because the migratory striped bass does cross the borders of so many Atlantic Coast States, the matter of its survival—and I think that is what we are talking about tonight—inevitably becomes a Federal concern. As I see it, with all due respect, this could prove to be a mixed blessing. Given the performance some Washington agencies have produced during recent years, there are times when I tremble for the striper's future.

But blunders, even at the Federal level, are not inevitable. I think your bill is a splendid beginning. I pray it just gets the necessary followup from your committee first and—by the way, my



Senator from Maine I notice is on that committee. I think I am going to write him a line.

Senator CHAFEE. I hope you will.

Mr. COLE. After it leaves your committee, and after it hopefully passes both houses, then it gets involved with the bureaucracies, and I think that all of us, you are going to have to keep a public eye on it.

I have got an example of one of the things that can happen with even an agency that I have as much respect for as the fish and wildlife agency, when I got a call from an officer of Fish and Wildlife Service in Michigan who wanted to know if I had a copy of a report I cited in my book. It was a report that documents the amounts of certain toxic chemicals in the organs of striped bass taken from certain Atlantic coast rivers. I said, "Why are you calling me? That report was put together by the Fish and Wildlife Service. It's your own agency."

We know that. We called Washington. We were told such a report never existed.

So with the help of my wife, Jean, who really kept that book going, we got a copy of the original report. So I had it copied and sent one copy to him. I have one copy for you, which I will leave for you along with a copy of this statement. It is difficult reading. There are a lot of numbers in residual toxic chemicals. But I think you will find it interesting and rather depressing.

According to this report, the striped bass is already carrying a punishing load of manmade poison in its system. In fact, one marine biologist, who asked not to be quoted in my book, told me if trout and salmon had the same amount of toxic chemicals that these bass are already carrying, both those species would be dead. I think it is a tribute to the striper's incredible life force that it has managed to survive this long.

This minor bureaucratic mixup is a signal to me that good intentions don't always materialize.

I haven't figured out a way to do it yet, but I have such high hope for this beginning that I hope the followthrough comes along. Your intentions and those of your committee are superb, and they are exactly what I have written about.

I just have one final note. I hope that any solution you and your committee arrive at on the striped bass crisis gives the commercial fisherman a fair shake. As one who shared their lives and work for a little bit more than 7 years, I can testify to their grit and integrity, and really their love of this country. Don't let them get lost in the shuffle. We will lose an element of the Atlantic coast as important as the striper itself.

I want to thank you for asking me to be here and in such good company. I have to apologize to all the good people who are here. I don't usually speak and run, but I am going to have to leave before this meeting is over. My doctor didn't want me to come at all. I told him I would get to bed early. We made that agreement. I would like to stay and hear everything you have to say, I really would. I have been concerned about the bass for almost 40 years now, and I am just going to hate to miss all the good things that are said here tonight. But I want you to know in advance why I am cutting out.



If you have got any questions, Senator, I would be pleased to answer them.

Senator CHAFEE. I was wondering, John, perhaps if you could stay until after Curt makes his remarks.

Mr. COLE. I notice his remarks are short, so I can say yes.

Senator CHAFEE. Then I might have a couple questions both of you could handle, if you could stay that long.

Mr. COLE. That is fine.

Senator CHAFEE. Thank you very much, John.

Curt, the floor is yours, and we thank you again for coming. You are very kind to come down and bring your wife I see.

#### STATEMENT OF CURT GOWDY, SPORTS COMMENTATOR

Mr. GOWDY. I came up to New England in 1951 to broadcast the Red Sox. I was reared in Wyoming and had always been a fresh water fisherman, and I fell in love with the striped bass. I learned fly fishing for the striped bass by one of the great men in the history of it, Harold Gibbs—and I think I fished right off Warwick. He was the originator of the Gibbs' fly, and he was probably the leading fly fisherman for stripers in the State of Rhode Island. He used to be on the Game and Fish Commission here, and was the most marvelous carver and painter of bird life in America. A most unusual man.

He used to talk about the striped bass. He is handsome and rugged and firm meated, and he is at ease in the the boiling surf, and he can knife through 10-foot breaking waves. He can take 80 yards of line off your reel with a strong drag on it. He is just a great fish. And he is in trouble here in New England.

I am a very lucky man. I have been a host of a program called the American Sportsman for 15 years. I have produced three shows in New England. Frank Woolner appeared on a couple of shows trying to show the beach life and beach buggies and surf casting.

I am also chairman of the American League of Anglers. The American League of Anglers is a lobby group in Washington, and it was really born about 5 years ago. Three of us went to see—and I won't give his name—a U.S. Senator in the Nation's Capital. He was a nice man. He was a lawyer. He really wasn't much for the outdoors, not through any fault of his own. He had just never been reared that way. He was a Western Senator. We went to see him about a dam being built on a blue ribbon trout stream in the West. He listened to us. And this I think is the most important thing in this room for you people. He made the statement "What the hell do, I care. Fish don't vote."

So we got together and we decided we needed organization to get down where the action is, where a man like Senator Chafee is, who is doing something. So the slogan of the American League of Anglers is "Fish Don't Vote, But Fishermen Do."

You are the people that can help the striped bass. We have already seen a lot of help coming from letters and phone calls, from pressures, from the squeaking wheel of the fishermen of America. There are 60 million people who fish in this country. Just think if all the 60 million got together what they could do to improve the waters and habitats and fish in this country.



The striped bass I think is an Atlantic coast fish originally. He is so great that he is now swimming as a sport fish as much as a landlocked fish in South Carolina, in Arizona. He was taken to the Pacific coast in 1879 and 1882, 435 of them, on a transcontinental train, introduced to the Pacific coast, where in 1915, 1,800,000 pounds of striped bass were caught by commercial fishermen. So he not only survived there, but has done very well on the Pacific coast.

So now we are faced with what is happening to the striper. Is Mr. Robert Boyle here tonight?

Senator CHAFEE. Yes.

Mr. GOWDY. You have a man here tonight who you are very, very fortunate to have, a man who lives for the striped bass. I read some of his articles. He has done a great study in the Hudson River area on the migratory habits and habitats of the striped bass, and I think he is going to lend a great authority to you here.

I am no biologist. I just love to fish, and I love the sportsmen that do it, and I love the fish themselves. But I want you to pay very close attention to Robert Boyle tonight, because he has put a lifetime in this. I am sure he will give insight into the habitat and spawning grounds of stripers, where a lot of the trouble lies.

I think here in New England you have a natural resource. We all know that. You have a great sport fish. Before I ever came to New England, I used to see a picture of a surf caster on a lonely beach with the pounding waves and twilight, and it always really struck me what a marvelous sport this must be. You have a great image builder for the State of Rhode Island and New England and the striped bass. Most of all, you have a real champion.

The thing I get the biggest kick out of is the fish. They don't care how rich you are, who you are. They can really humble you, and we all know that the striped bass is a really mysterious fish.

The American League of Anglers has discovered all right, by the fishermen and public writing letters to their Congressmen, to their Senators, to the local State legislators, by creating some action, by putting some pressure on these people—a lot of them are not informed—they mean well, but they have to have some aid; they have to have some input from you people. If you give them input—60 million of you in this country—if we squawk and squeek and whine and be intelligent about it, we can get a lot of things done. Fish don't vote, but fishermen do. And if you will always remember this, I can tell you a lot of things have already happened because of you, the fishing public, and you are the key people behind Senator Chafee's bill to help support it and see that it goes through. You need a bill. You need a study. You need some money to get a proper study done.

By a strange quirk of fate, I was called this morning. I am going to Washington, D.C., tomorrow to see Secretary of the Interior Andrus. I produced a show on the Klamath River in California. Bill Conrad and I did a steelhead fishing show. We not only didn't catch a steelhead, but across the mouth of the river were gill nets stretched right across the mouth of the river so the steelhead and Chinook salmon could not come up river and spawn. We all know what is going to happen to the steelhead in that river, or the



Chinook salmon. The State of California took it rather lightly at first.

I happened to be out there in August to survey the situation for the film. I went to the town of Klamath, and, boy, you should have heard some angry people. Sure they had concern of their motels, but a lot of them really cared about the steelhead and Chinook salmon. There were 141 there, and the head of resources for Governor Brown came up and a couple of biologists who said, "Hey, there are hundreds of thousands of steelhead going up this river."

These angry people said, "You are wrong. You hired a bunch of teenagers to count them. You are underrating the effects of netting on the river. We are selling our businesses. We are going to move. This will be a dead river in 5 years."

They put the pressure on. We went out and did the film that will be on in about 2 weeks. Secretary Andrus went over a week after I was there, met with the Indians, talked to the local people, and now I think there is going to be a moratorium put on the river, and I think they are going to protect and do some thing about it. Once that river is gone, it is probably going to be gone forever for fish, a river that has been so great for over 100 years in this country, and longer than that.

See what can be done. These local people got on their local legislators, and they really cared. They made a lot of effort. Tomorrow I am flying down at 4:15 to Washington. Secretary of the Interior Andrus has agreed for this show to give a closing statement on what can be done. You have a problem. The saddest part of it all is the alienation now between the Indians and Caucasians in that area of the Klamath River Valley.

So fish don't vote, but fishermen do. Let's all go to work and let's help this champion, the striper.

Thank you very much.

Senator CHAFEE. I just had a couple questions, if I could, to share with both of you.

John, in your book you indicated that you weren't sure about what is causing this, and you indicated some history of a cyclical effect, that up to I think 1900 there were lots of striped bass, and they disappeared until into the middle thirties. Is there any indication this is a cyclical thing? Do you have any views on that?

Mr. COLE. There has been a lot written about that, a lot by Frank Woolner, among other people, who has begun to change his opinion a little bit. There is roughly a cyclical pattern about the reproduction. The big year classes come along when the fish seem to have reached a low ebb. So it is paradoxically when there are less fish around, they seem to do better at bringing up babies. That pattern, however, has been broken for 3 years now. In other words, 1976, or somewhere in there, the graph was supposed to start up again, and it hasn't.

I didn't say this flat out in the book, because I am not a scientist. But having visited the Chesapeake—that is, to some of the people here tonight—seen the bass spawning and looked a bit at this report and others, personally, I am convinced that the reason for the striped bass decline is the number and amount of different toxic chemicals in the Hudson River and Chesapeake Bay, which are the two primary spawning grounds. That is not a scientific



statement. It is what journalists call an intuitive statement. I make it just based on a couple years of work on that book, and reading what other people have written, and talking to people who know more about it than I do—marine biologists and other observers—and a visit to the Chesapeake, which I must say was an eye opener. So for what it is worth, a journalist's opinion, if I were running the circus, as the phrase goes, I would put most of my money into trying to find out more about these chemicals.

I always give long answers to questions. You better ask Mr. Gowdy one.

Senator CHAFEE. I had another question for him. I would be interested in his thoughts on this, too.

The second question I would have for Curt is in the course of your travels and doing your show, you must have seen remarkable effort at bringing back a fish, say in the Great Lakes. Could you give us any examples you might have seen where that has occurred? In other words, give us a little bit of encouragement that the thing can be done.

Mr. GOWDY. Talk is cheap. Everybody talks about conservation. Everybody talks about ecology. Of course, one of the great resource stories in the history of his country is the introduction of the coho salmon from the Pacific Northwest to the Great Lakes. It was a magnificent story.

I have seen many trout streams in the West, one in particular, with trout unlimited, Hat Creek in California, where a stream was completely polluted, ruined, trash fish in the river. It was cleaned up, restored and now is a very fine fishing stream. It is controlled, though, with fly fishing only.

I think when you monitor, when you study—and I am sure Mr. Boyle has something to say about this—when you study this fish, how much pressure is he getting, should sportsman's laws be changed, should the commercial laws, there are many, many facets of how much pressure it is really getting.

There are tragedies I have seen where certain areas are wiped out to fishing for various reasons, a lot of it mankind. Man himself has been the biggest enemy.

Then I see some great stories, where a bunch of people in a room, like these people, get together and get something done. I was lucky to participate in one.

Three years ago I went out to Portland, Oreg., when Tom McCall was the Governor. The Bumblebee Tuna Co. spent \$285,000 in commercials against a bill. I think it was called bill No. 13, which was to be voted on that November in the Oregon election. This is an election where they were electing their Senator. Governor McCall had been quite a figure out there. He was a former newscaster, the one that originated the odd number, even number license plate number gas days in the gas crunch, the beer cans and bottle cleanup in the State. The best thing was he was a steelhead fisherman himself.

He called the American League of Anglers. I met with the group. They asked if my way had been paid, and I said no, I paid my own way. We talked about this bill, which was to stop the netting of steelhead in the Columbia River. That night I went to what I really called politics in America—4,200 people in a big gymnasium in the



city of Portland; they came from all over the State of Oregon. They had little fish that said "Save the Steelhead" on it. That was magnificent. Every candidate, Governor McCall was there. I spoke.

The greatest vote in the Oregon election in November of that year was for issue No. 13, and they voted to ban forever netting the steelhead for commercial fishing in the Columbia River. But 4,200 people, on a rainy night like tonight, drove into Portland from all over the State and cast their support, and wrote to newspapers, radio and TV, these people and Governor McCall did. You know what they spent on the commercials to save the steelhead? \$11,000 against \$285,000, and they beat them by smitheriens.

So those are some of the kinds of things I have seen when people get together, as spokesmen, and fight together.

Senator CHAFEE. Thank you very much for coming, both of you gentlemen.

The model they have been pointed at, which I think everybody has seen here, is just a modest-sized fish, a small fish that was caught. Actually, I have to confess this was caught in Massachusetts. But you can see it is 66½ pounds, Nausett Beach, Cape Cod. But the unfortunate thing it was way back in 1963, and I am afraid we haven't seen many like that in quite a while. I hope we will.

Thank you both very much.

Senator CHAFEE. Now we are going to have a panel made up of three gentlemen. Nelson Bryant isn't here yet, so maybe it will be two gentlemen.

Les Boyd, whom we call now, is the fishing oracle from the Providence Journal. Les, why don't you come on up.

Also, Robert Boyle from New York, who has previously been mentioned by Curt Gowdy, and he is senior editor for Sports Illustrated. He has covered environmental matters for 20 years, and he is the author of "The Hudson River, A Natural and Unnatural History." He is president of the Hudson River Fishermen's Association.

So there is Robert Boyle. Why don't you gentlemen start off—Boyd and Boyle, that is two B's—and with Nelson Bryant that makes three B's.

Les, why don't you start off with some comments. If you have a statement, go to it, then Mr. Boyle.

#### STATEMENT OF LESTER BOYD, OUTDOOR WRITER, THE PROVIDENCE JOURNAL-BULLETIN

Mr. BOYD. My name is Les Boyd. I am a recreational fisherman and an outdoor writer for the Providence Journal-Bulletin. My testimony tonight is going to be from the rather narrow perspective of the sport fisherman, and to make the distinction clear, I am talking about sport fishermen who fish purely for sport.

Because I fish purely for sport and pleasure, there is no way of placing a dollar value on my sport. I buy bait and lures, and a dollar value can be placed on what I spend, but there is no way of placing a dollar value on the value I receive from fishing. It is incalculable. There is just no way of measuring it.

Many of you here tonight who feel the same way I do, for people who catch fish and we don't sell them, I am thinking of the poet Omar Khayyam, who wrote, "I often wonder what the vintner buys



one-half so precious as the stuff he sells." And some of us who catch fish and we eat them or we let them go, and we see people selling these fish we say, "I wonder what they buy one-half so precious as the stuff they sell." We certainly recognize that the catching and selling of fish is a legitimate occupation, and we have no argument with those who do just as long as they leave a few fish for the rest of us to catch.

I have fished for striped bass from the Kenebec River in Maine to Assateague Island in Maryland, but most of my fishing has been done within an hour's drive of where we sit tonight—in Narragansett Bay and along the Rhode Island shoreline and Cape Cod. I caught my first fish and striped bass in 1946, in August of 1946, about 10 minutes after I first began fishing for striped bass. I know people who have fished for years before they catch one. I lucked into one 10 minutes after I started. My most recent one was last September from the rocks off the foot of Newton Avenue.

What happened then when I caught that fish perhaps is an illustration of the state of fishery right now. This was a small fish of 2 or 3 pounds. I caught it on a bucktail jig with a strip of porkrind. There were 8 or 10 other people on the rocks there hoping for some bluefish to come. When I brought the fish up on the rock, it drew a crowd. They were saying, "Hey, Joe, a striper, honest." It caused that kind of reaction. One guy wanted to pay me \$1 for a strip of porkrind. A few years ago a fish like that wouldn't have caused any comment at all.

As a fisherman, I have been a close observer of striped bass fishermen, and as an outdoor writer I have had the opportunity to travel the striper coast many times to talk to many thousands of striper fishermen. I have seen years of plenty, and I have seen years when striped bass were mighty hard to come by. The present situation seems to me to be the most serious. I am not going to try to document the decline with statistics; others are more competent to do that. But based on statistics I have seen, on my own experience and on the observations of others, it occurs to me that the striped bass stocks are perilously low. Even that doesn't disturb me as much as the age class distribution. Even during some of the lean years we have had over the past three decades, there was almost always a fair supply of schoolfish, smaller fish, those in the 16- to 23-inch range. Now we are not finding those small fish, and this is a little frightening.

Three years ago I went up and down the coast, all the way from Maine to Maryland. I was in the process of writing a book on surf fishing. John Cole isn't the only one to write a book. Mine doesn't match his, but it is on surf fishing, published by Stonewall Press for \$4.95. John Cole's book will set you back \$10.

Anyway, I had the opportunity to visit a good many places where I had fished over the years, and as I went back to them I heard the same comment—no more small fish; they are gone; we are not catching any. This was 3 years ago. The problem was developing then; it was developing at that time.

The question, of course, is why is it happening? We have got theories. The Senator mentioned some of them. Some say this is merely a natural cycle, and sooner or later nature will right this situation and we will get the fish back. There are others who feel



that the fish are still there, we still have fish, but now they have changed their habitats and they have gone offshore to feed on schools of sand eels. The fish are still there, we are just fishing in the wrong place. One guy says the bluefish are responsible. The Chesapeake Bay has a lot of bluefish, and bluefish are eating the baby bass. A more widely held theory is that pollution in the spawning rivers is inhibiting production. Some blame overfishing—the recreational fisherman pointing to the commercial fisherman and the commercial fisherman pointing back. A couple of otherwise rational experts suggested maybe sunspots are affecting the striped spawning.

So we do have theories. What we don't have is facts, and that is why we need the research.

I am going to quote from a paper entitled "The Status of Striped Bass," written by Joseph G. Boone and Benjamin M. Florence of the Maryland Fisheries Administration. The paper says, in part:

Analyses of striped bass flesh and eggs have verified that many foreign substances are present, including various heavy metals and a bewildering array of chlorinated hydrocarbons, such as pesticides and polychlorinated biphenyls.

Some refer to those as PCB's.

Whether or not these detectable concentrations of foreign substances are implicated in the recent striped decline is completely unknown. Certainly the possibility of some tie-ins exists, and research is urgently needed. However, no individual state should be expected to shoulder this burden. Such studies would be expensive and prolonged, requiring sophisticated culture and laboratory facilities staffed by teams of specialists in various scientific disciplines. Along with management, endeavors in this direction require interstate and Federal cooperation.

As this paper notes, research is expensive—it is very expensive. But I don't believe it is as expensive as losing the species, or even as expensive as having the species so depleted that it doesn't contribute to the economy and doesn't contribute to recreation.

That research should give us direction. At the moment we don't know where to go, and only research can tell us where to go. We don't know what they will find. It may be these researchers will find it is a natural cycle, and if that is the case, it is simply a matter of management controls that will smooth out the hills and valleys so we will have a more constant supply. Maybe it is overfishing, in which case it would be a matter of exercising some control on catch mortality. If it is pollution in the spawning rivers, we probably have a massive task ahead of us to clean up these rivers.

Whatever these researchers find it is going to give us direction—unless it turns out to be sunspots, and then I don't know what the hell we are going to do about that.

Even the U.S. Senate, I am afraid, doesn't have much control over sunspots.

This bill for emergency research on striped bass calls for funding of \$6.75 million. There was a letter in the Attleboro Sun the other day from someone who didn't know much about the situation, who was appalled at this time when everybody is trying to cut spending that \$6.75 million is being proposed for striped bass. Of course, it isn't spending; this is an investment. This thing should pass; it is an investment in the future of a very precious resource if it is used properly.



This brings me to my final point, and I am sure some sort of machinery will have to be set up to administer this program. I have been in the news business for a number of years, and I have observed bureaucrats at work. And, frankly, I am suspicious of them. John Cole mentioned the same thing. I am sure I would not want to see a great amount of this money spent on liaison men, planners, project managers, program evaluaters, and other staffers. I am not sure how it can be set up, how it can be administered. But there has to be some tight, lean way of doing this.

You know bureaucrats. They have a descending order or priorities, and the last priority is getting the job done, because the first one is self-preservation, or—and this isn't in my testimony—the more common term is "saving his ass."

That is the first thing. Second, he has got to enlarge his influence, and by doing that he has got to collect more people around him, more staffers, a larger office, and become a bigger person and more of an influence in this bureaucracy. Third, he has got to keep on the bureaucratic ladder he wants to climb. He has to keep one eye on the rung up ahead to watch when the next guy slips, and one eye down below if the the guy below should grab at a vulnerable spot. If you have been counting, that is two eyes, and it doesn't leave much vision for performing the task at hand.

This is probably an exaggeration. There are dedicated bureaucrats. I never met any.

I am not trying to punch out a group of people who are not here to defend themselves. My purpose in saying this is we in the sport fishing community want to see this bill passed and we want to see the research done. We don't want to see the money disappear into a bureaucratic sink hole.

Thank you.

Senator CHAFFEE. Thank you very much, Les. It can be truly said you didn't mince words.

Now we will hear from Mr. Robert Boyle, who has come from New York State. We want to express our appreciation. Again, none of these witnesses have been paid a dime. They all came voluntarily, paying their own way.

Mr. Boyle, we are delighted to have you here.

#### STATEMENT OF ROBERT BOYLE, SENIOR WRITER, SPORTS ILLUSTRATED

Mr. BOYLE. Thank you very much. I am very pleased to be here this evening to offer this statement on behalf of the Hudson River Fishermen's Association, which includes both sports and commercial fishermen. I am president of HRFA, which I helped found in 1966. By profession, I am a journalist, but I have long been interested in the Hudson River and life in it.

Along with the Chesapeake system, the Hudson is a major spawning and nursery ground for striped bass, but no one knows precisely what percentage of contribution the Hudson makes to the coastal run. Our estimate is that the Hudson supplies most of the bass found in western Long Island Sound, a substantial number of bass on the western shore of southern Long Island and the northern New Jersey coast, and an unknown number to the fisheries beyond these areas. Striped bass I helped tag for the Fish and



Wildlife Service were recovered in the Merrimack River north of Boston and south to central New Jersey.

From all reports, the striped bass population on the coast is in alarming decline. Allow me to focus on likely adverse impacts on the spawning and nursery grounds in the Hudson.

#### CONTAMINATION BY TOXIC SUBSTANCES

The Hudson is heavily polluted by polychlorinated biphenyls, PCB's, so much so it is safe to assume that any striped bass in the river contain at least five parts per million of PCB's, the Food and Drug Administration action level for fish destined for human consumption in interstate commerce. In New York State, commercial fishing for striped bass in the Hudson River has been outlawed, and the public has been advised not to eat striped bass, and numerous other species of fish, from the Hudson River because of the possible danger to human health.

PCB's are known carcinogens in laboratory rats and mice. They have toxic effects on species ranging from water fleas to man. Testing shows that in the parts per billion range—repeat per billion—PCB's are lethal to scuds, midges, shrimp, longnose killifish, pinfish, spot, and rainbow trout. These concentrations are much lower than those present in Hudson River fish—the load in striped bass has been known to reach almost 50 parts per million while that in an eel exceeded 500 parts per million—but I am unaware of any studies that show the effect of PCB's on striped bass, their eggs or their larvae. Such studies are imperative.

The Hudson River has the most severe PCB contamination problem in the world. There are 400,000 pounds of PCB's in the bottom sediments above the Troy Dam. New York State plans to remove 313,000 pounds by so-called hot spot dredging, but so far the State has been unable to obtain Federal assistance for this dredging, which would cost \$25 million. If those PCB's wash into the estuarine Hudson below, which striped bass, bluefish, sturgeons, shad, alewives, blueback herring, mehaden, and other fish frequent by the hundreds or millions, the PCB disaster may spread in devastating fashion up and down the Atlantic coast when these species migrate. Although this matter is not now before the subcommittee, I urge you, sir, that you request Federal authorities to act now.

For the record, I would like to submit a copy of the State publication titled "The Hudson River: A Reclamation Plan," which refers to the PCB contamination problem.

Senator CHAFEE. Fine. We will accept that. (See p. 152.)

Mr. BOYLE. PCB's are not the only contaminant. A study by the Environmental Defense Fund and the New York Public Interest Research Group entitled "Troubled Waters: Toxic Chemicals in the Hudson River," makes evident that the river is polluted by a host of other chemicals, such as benzene, carbon tetrachloride, chloroform and diethyl phthalate. No one knows what effect these chemicals, either individually or in combination, have had upon striped bass and other life in the river. Again, studies are imperative.



## WATER WITHDRAWALS

Power plants on the Hudson, built with arrogant disregard for the well-being of marine and aquatic life, have slaughtered millions of fish and other organisms by sucking them in with cooling water. Con Edison's original nuclear plant at Indian Point, which began lethal operation in the winter of 1963, slaughtered tons of striped bass and other fish. Instead of seeking to stop the slaughter, officials in the New York State Conservation Department suppressed photographs of the kills and lied to concerned fishermen who inquired.

Kills at powerplants have continued with undiminished rapacity. Con Edison admitted that during a 12-month period ending in August 1977, plants at Indian Point had killed 2,215,890 fish by impingement—that is, by sucking them against intake screens. Those are Con Ed's figures; no independent observer was present to verify the accuracy of the company's count. A young woman employed to count the fish burst into tears when she told me about the carnage. Besides impingement kills, there are undoubtedly greater, but uncounted, kills of fish eggs, larvae and fingerlings that are entrained—that is, sucked through the screens and inside the bowels of the plant—and spewed back into the river. Represented by the Natural Resources Defense Council, the HRFA has fought for the installation of cooling towers at Indian Point to abate the needless slaughter, but after years of arguing, those towers have yet to be built.

## OIL POLLUTION

No studies have been done on the impact of oil spills on the Hudson. In the last several years alone, we have had appalling spills on the river in the heart of the striper spawning and nursery grounds. Frankly, I have lost count of how many gallons have gone into the river just between the Tappan Zee Bridge and West Point, but I would estimate that it is in the neighborhood of half a million gallons.

## SEWAGE SLUDGE

Sludge is dumped in the New York Bight off the Hudson mouth, an area where striped bass congregate in the spring. A Federal biologist once told me that the only things he collected with reliability with a tow net were sanitary napkins and cigarette filter tips. Sludge dumping has been blamed for pollution of south shore Long Island beaches and kills of marine life off New Jersey. In 1976, the summer of our Bicentennial, a fish kill nearly 50 miles long and 30 miles wide occurred off Jersey. Sludge dumping needs to be studied wherever it occurs on the coast.

## THE IMPACT BY FISHERMEN

No one knows, to my knowledge, what impact either sports or commercial fishermen have had on striped bass up and down the coast. Sports fishermen take a toll, and many of them sell their catch. Several years ago, commercial fishermen on the North Carolina coast took with the single set of a haul seine 100,000 pounds of



striped bass. I was told the fish could not be sold because they were sand burned. But the real question is, what was the home river, or rivers, of these fish? Was the spawning population in river X or river Y decimated as a result? No one knows the answers.

The Hudson River Fishermen's Association endorses the bill to amend the Anadromous Fish Conservation Act and its provision to initiate an emergency investigation of Atlantic Coast striped bass. It is time we made sense of this great resource and managed it as a whole. However, we have a few brief suggestions to offer besides those we have mentioned.

One, besides studying the effect of PCB's and other toxic chemicals on striped bass, their eggs and larvae, researchers should use these contaminants to identify the origin of the fish on the coast. By dumping PCB's into the Hudson, General Electric, in effect, tagged the fish in the river. Extensive sampling on a statistically valid basis should be conducted on the coast to determine the rivers of origin of the coastal migrants.

Two, we urge the creation of a citizens' advisory board to oversee any investigation of striped bass carried out in New York. We lack faith in the New York State Department of Environmental Conservation. Indeed, I suspect that we may be gathered here tonight as a result, in part, of the department's failure to do justice by the Hudson River and its fisheries. In the past, the department groveled before the power companies time and time again.

Several years ago, when the department was supporting Con Ed's proposed Storm King plant, I was dismissed from the witness stand at a State hearing when I testified that the lower Hudson River was tidal. This statement, absolutely factual, was thrown out as hearsay. The department gave GE a water quality certification to dump PCB's into the Hudson, and until August of 1975 when Ogden Reid, then the new Commissioner, made public the news about PCB contamination in the Hudson and elsewhere, the department covered up the problem of PCB contamination throughout the entire State. Indeed, in 1971, when I informed the department that PCB's had been detected in Hudson striped bass by the Wisconsin Alumni Research Foundation in Madison, I received a derisive reply from Albany.

I could continue at length to list the sins of this department over the years. But the point I want to stress on behalf of HRFA is this: It would be a serious mistake for the Federal Government to fund striped bass research in New York without a citizens' advisory board to oversee the investigation.

Thank you very much.

Senator CHAFEE. We have heard from two gentlemen who have had some experience with the bureaucracy all right. And now from New York State, we will have the last of the gentlemen whose names begin with B—we had Mr. Boyd and Mr. Boyle—Nelson Bryant from the New York Times, again, who has come up here on his own from New York City, where he is a fishing editor for the New York Times. We are delighted you are here, Mr. Bryant. We welcome you.

#### STATEMENT OF NELSON BRYANT, NEW YORK TIMES

Mr. BRYANT. First of all, I apologize to all of you for being late.



I would like to discuss the concept of making the striper a sport fish only.

On the east coast, the only State that does not allow commercial sale of the fish, the netting per se—that is, you cannot go out and get a striper with a net on purpose—you can do it in every State except Connecticut. In Connecticut, this is not permitted. You are permitted incidental sale in other States.

The striper was outlawed as a commercial fish in California in 1935. By the way, the stripers of California, about the turn of the century, came from one and two New Jersey rivers, were transplanted out there in the San Francisco Bay and have done very well. In 1935, California decided this should be a sport fish, and that is the way it has been ever since. The bag limit in California right now is three fish, 16 inches or longer.

They also have a salt water license in California. I tried to check up on this today. I understand it is somewhere around \$5. There is some bootlegging of the fish from Oregon, bordering California. Some people do bring them into California and sell them. But essentially, in that State the fish you catch are sport fish and are not sold on the market.

The interesting thing about all this is in California, where the fish is thoroughly protected, the striper population has dropped in the last 15 years. I had a discussion on the telephone today with the California Fish Commissioner, Peter Chadwick, and I said, "Well, what is the reason for striper decline?" I had an idea I knew the answer already, and he said it was the degradation of the habitat. And that is essentially what Bob is talking about.

The striper is an anadromous fish. He spawns in fresh water and goes to sea.

I have had a feeling for a long time—although the Senator said I was from New York, actually, I live on Martha's Vineyard Island, and I caught my first striper almost 45 years ago, and I love them and I have a great feeling for them. And I somehow know that it isn't really what the commercial fishermen are taking on the east coast that is hurting the striper; it is the degradation of his habitat. This is my personal opinion. But I think it would be substantiated if one cared to talk to various biologists up and down the coast.

One of the problems we have often talked about is establishing certain regulations for striped bass up and down the coast. It is one thing in one State and one in another—length limit, pound limit, bag limit. One of the real problems we must face is, for example, in Maryland, where commercial fishermen are banned from taking any fish over 32 inches long. In Maryland, the commercial fishermen can take fish from 12 inches up; but when he gets over 32 inches, he can't. The way the Maryland fishermen feel, they are in the Chesapeake Bay, yet they can't touch the big bass we get up here. If there is any sort of Federal law applying to this, clearly, we have got to take this into consideration.

Another problem—and the Senator has carefully pointed out that his bill does not include a salt water license. I happen to be in favor of a salt water fishing license, which probably makes me a pariah, but the way I see about this—and I spent almost all my childhood on the sea—is when I grew up, the ocean was unlimited.



Everything was there. You could take what you wanted and it would always give you back more. But the point is the ocean can be finished just like a lake or pond.

Recently, I read a biologist who came up with an estimate we are harvesting 80 percent of the renewable resources of the oceans of the world. I don't know whether or not that is valid, but I rather imagine it is close. What I am driving at is sooner or later we have got to realize you can empty an ocean just as rapidly as you can a lake or pond.

If we do have a salt water license—and there is a hell of a lot of resistance to that. For instance, I received in the mail at the Times the other day a bumper sticker “No Salt Water Fishing License.” The source of it was the United Boatmen of New Jersey. They say, “Thank you for helping our cause, imposition of a salt water fishing license. We are pleased to enclose a complimentary bumper sticker.” I didn't stick it on, because I am not quite sure. One thing I do know, because I was a mate on a charter boat, is we have to be very careful with the salt water license because we will literally kill a charter boat captain if we impose one without thinking about it carefully. The difficulty is that perhaps 50 to 60 percent of the clients of a charter and party boat captain are people who might fish once every 10 years, and you simply can't expect tomorrow to walk down to a dock and pay \$5 for a license and get on board. One suggestion is to have the skipper himself pay an overall fee of perhaps \$100 which would take care of his clients. I don't know. But the point is salt water licenses simply can't be thrown in per se any more than a length limit or any limit on striped bass up and down the entire coast.

There is—and I am going to wind this up right now—there is one thing for those of us who have been raised on the ocean. It is hard for us to think of buying a license or paying a fee for fishing in salt water. It has been there in front of us all our lives, and we went and used it, and the concept of an unlimited resource is very real. It is real with me anyway. But somehow or other I really feel that we must overcome this. We must realize that the oceans are as limited as lakes and ponds, and we must attempt to contribute to the rehabilitation or to research on fish.

With the case of the striper, I would like to issue one warning. Bob mentioned there are certain things that should be done. I have a feeling—and I may be entirely incorrect in this—but I have a feeling that most of the necessary basic research on the striped bass has already been accomplished. I don't think we need millions of dollars to research his plight anymore. I think what we need is to put money where the harm is coming from, and the harm is coming from environmental degradation.

There is one weak area. We don't know where all the fish come from yet. We know the Chesapeake is most important. We know the Hudson is terribly important. We know rivers up in Massachusetts, Connecticut, and Rhode Island are important. But basically, we know what the fish do. We know what his requirements are, and really where the effort ought to go is in preserving his habitat.

Thank you.

[An article by Mr. Bryant from the New York Times follows:]



[From the New York Times, Apr. 15, 1979]

## PROPOSAL ADVANCED TO AID STRIPED BASS

(By Nelson Bryant)

A laudable effort to replenish rapidly dwindling stocks of striped bass along the east coast of the United States has been launched by Rhode Island's Senator John H. Chafee.

Chafee's proposal involves re-authorizing the Anadromous Fish Conservation Act of 1965 with certain amendments, among them one that calls for studies of environmental factors contributing to the decline of the striper. Spending under the original act—which was set up to enhance the anadromous fishery resources of this nation, including those in the Great Lakes and Lake Champlain—ends this June.

An anadromous fish is one that ascends rivers or streams to spawn, dropping back to the ocean to attain growth and maturity before repeating the cycle. In some instances, as in the Great Lakes where certain Pacific salmon have been introduced, a fish can carry out this life cycle in fresh water, substituting the lake for the ocean. The striper is an anadromous fish and its semi-buoyant eggs drift downstream, or downstream and upstream with the tides, until they are hatched in from two to three days depending upon the temperature.

Striped bass spawn all along the east coast from Maine to Florida, with most significant breeding area probably being the Chesapeake. The Roanoke River in North Carolina and the Hudson River are well-known spawning regions.

## LANDLOCKED STRIPER EXIST

Populations of landlocked stripers also exist, the most famous probably being those of South Carolina Santee-Cooper reservoir. The Santee-Cooper fish were trapped in the reservoir by a hydroelectric project that was finished in 1941, and since that time various states have had considerable success planting the species in fresh water lakes. In most such instances, there is little or no natural spawning, because the streams flowing into the lakes either have improper flow or inadequate length.

Because the striper must use fresh or brackish waters for spawning and nursery areas, it is vulnerable to degradation of that habitat by man.

Both the Chesapeake and Hudson Rivers contain toxic chemicals, and there is evidence suggesting that they inhibit striped bass reproduction.

A great deal of research on striped bass already had been completed, but more is needed to determine the precise effects of various chemical wastes on egg viability. Senator Chafee's proposal would, among other things, provide the funds for such investigations.

## MONITORING AND RESEARCH

For fiscal year 1980, Senator Chafee's bill would set aside \$500,000 to participating states for monitoring striped bass populations, plus \$500,000 for research. For fiscal year 1981, the figures would be, in the same order, \$750,000 and \$1 million. As presently envisioned, the monitoring efforts would be financed by two-thirds Federal and one-third State funds. The research could be paid for completely by the Federal Government.

Research, however, will not solve the immediate problem of declining striper populations, for even after it is completed several more years may be needed to correct the various habitat-corrupting influences.

Meanwhile the striped bass, perhaps the most highly-regarded light tackle game fish from Virginia to Cape Cod, will continue to be caught by both commercial and sport fisherman; the pressure on the fish will continue to mount at a time when it should be diminishing.

Only one east coast state, Connecticut bans the sale of striped bass caught in its waters. In recent years when the fish have brought as much as \$2.50 in the round (that is, intact and ungutted) at the dock, more and more rod and reel fishermen have turned to selling their catch to help defray the cost of running their boats.

It is this writer's belief that restrictive bag limits, say two or three fish a day, should be in effect up and down the coast.

## PROVISION FOR QUOTA

Where a long-standing net fishery exists, some provision could be made for a quota. This is not as contradictory as it sounds, for netters take only a small percentage of East Coast striped bass. If bag limits were imposed all along the coast, some variations among the states would be needed.



In Maryland, for example, where most northeast stripers are born, state law now prohibits commercial fishermen from keeping any fish more than 32 inches long (approximately eight years old and from 13 to 18 pounds). Sport fishermen are allowed to keep only one fish of this size, except during the spawning season when they may keep none. Maryland anglers note with some asperity that their counterparts in the northern states, where, with the exception of the Hudson there are no significant spawning areas, are catching nearly all of the big fish.

This is not to imply that bag limits and quotas would solve the stripers problems, but they would go a considerable distance toward insuring that reasonable numbers of fish are around when the habitat difficulties have been identified and solved.

The strict bag and length limitations alone will not do the job is clearly evidenced by California's experience.

East Coast striped bass were introduced into California waters near the turn of the century. From 1935 to now, the fish have been protected against commercial exploitation and the daily limit is three fish 16 inches or more in length.

Despite this, striped experts in that state acknowledge that the populations of the fish have been falling off during the last 15 years, not as drastically as on the East Coast, but enough to cause concern. Environmental degradation is believed to be the source of this problem.

Senator CHAFEE. We thank you very much, Mr. Bryant.

I just would like to make one point. I wouldn't want any of this to get into a commercial versus sports approach, because what I am interested in in this bill is to find out as much as we can of the problems of the fish, and then the solution to those problems, and as to whether the sports fishermen or commercial fishermen catch them, that is something that will come later on. As John Cole pointed out, the commercial fishermen have played a wonderful part in the history of the east coast. And certainly nothing I am doing is directed one way or the other. I am just trying to get to the root of the problem.

It may well turn out that is entirely an environmental problem, as Curt Gowdy espoused in his remarks and as certainly Mr. Boyle and Les have suggested, too. A lot is being done in the area. You know we are cleaning up our rivers; we are spending billions of dollars attempting to clean them. Then I heard Mr. Boyle mention sewage sludge, and here right in our own bay the city of Providence's sewer plant isn't working and it is all being dumped in the river due to a temporary down in the facility.

Let me ask you this, Mr. Boyle: I know your feeling with the New York Conservation Commission or Wildlife Commission, do you think if we had this on a Federal level, as I have suggested, that again we should have the advisory commission you have talked about?

Mr. BOYLE. Senator, you alluded to that in your opening remarks, talking about capturing the sense of citizen enthusiasm. I think it is a great engine that drives this country—the citizen enthusiasm. I think you should move to capture it. You have some wild ones among us, I will grant you that. I know some pretty crazy people. But I think it is the engine, the enthusiasm. The reason we are here tonight is because of—not to start throwing lilies—but seeing Les and Nelson and Drew Freeman, it was like coming home to the legion tonight. But it is the people, people who are really concerned about the bureaucracy.

I am not here to use New York as a punching bag, although I would gladly kick them any time I can, even when they are down on the ground. Les put the finisher on it. We have seen these people waste money and waste money.



I have here a hearing that was to be the be all and end all. In 1964, in a hearing before the House Subcommittee on Fisheries and Wildlife Conservation, we thought we had Con Ed and the State of New York by the throat.

Senator CHAFEE. I got a little nervous there about what you were talking about.

Mr. BOYLE. The same people who were finagling with us then are going to be the same people as you are standing at the cash register counting. It would be a waste of our time and be the death of a resource. Have it on the Federal level, with coordination between the States, but have citizens' advisory boards. That has, in essence, already started, the meeting a year and a half ago of people in Baltimore when people concerned about the striped bass got together.

Senator CHAFEE. I think that is a good suggestion, because, as you pointed out, somehow we want to involve the people who are so tremendously interested in this. I mentioned that in my opening remarks. But in the specific legislation, we don't provide for that, and that is a darn good point, and we certainly will look at that.

Gentlemen, we thank you very much for your comments—Nelson Bryant from the New York Times; Les Boyd from our own Providence Journal; and Robert Boyle from Sports Illustrated. I don't know what we can do to reward you. We will buy Les's book and we will read the New York Times and we will read Sports Illustrated, rush down and watch Curt Gowdy. He is changing from NBC to CBS.

You have switched affiliates, haven't you?

Mr. GOWDY. Yes.

Senator CHAFEE. We will announce that here tonight.

Mr. GOWDY. Got to keep moving.

Senator CHAFEE. And we will buy John Cole's book.

Thank you all very much.

Our next witness is Mr. William Mackintosh, a commercial fisherman. We are glad to have you with us here tonight, Mr. Mackintosh, to tell us a little bit about the commercial side of things.

#### STATEMENT OF WILLIAM MACKINTOSH III, LITTLE COMPTON, R.I.

Mr. MACKINTOSH. Thank you, Senator Chafee.

I find myself in a position like a Posly going to Albany, for those of you who have read John Cole's book. I feel a little uncomfortable up here. I am more at home on the water. But I am glad I came to testify.

I find myself in a unique position on this panel in that I am the only member here who makes his living directly by fishing. I am a gillnetter. There have been some derogatory remarks made about that method of catching fish. But I would like to finish what I have to say, and maybe we can address that later if it is necessary.

My partner and I fish out of Sakonnet Point in a 30-foot boat. We catch fish for a fish market we jointly own in Little Compton, R.I., and we are both interested in the economic, recreational, and biological aspects of striped bass. I am here because I feel the striped bass are in trouble.



When we speak of striped bass, we are talking about an important natural resource, a resource that is in such demand that this demand exceeds the currently available supply. This alone does not mean bass are in trouble. I know that I am catching fewer stripers than in past years. I remember well when bluefish and weakfish all but disappeared from Rhode Island waters; they eventually came back in large numbers.

Is this what is happening to the stripers? Are we witnessing a decline now, only to see an abundance later on? No one has been able to answer these questions. We could be looking at the demise of the species. We can no longer predict its survival.

As a commercial fisherman, my nets catch a true representation of the species. In the past 4 years, I have witnessed an alarming increase in the numbers of blind and deformed bass in my nets. I have yet to catch a bass on a hook that is not a healthy looking fish. My nets tell me the true story. The percentage of healthy fish in a school is a good indication of the health of the species. When this percentage decreases and the number of fish with physical defects increases, it is a sure bet that bass are in trouble.

Another concern of mine is that the current price of bass will eventually lead to overkill. The pressure, if intensified rapidly, will only reduce the population of bass to an even lower level. At present, the numbers of recreational fishermen who are becoming commercial is fantastic. The inadequate supply of stripers is more pronounced because of this pressure, and the price is only driving it higher, never mind the tempers of those who feel others are catching more than their share. Striped bass, historically, have been under greater pressure than even this inflated price has produced, yet they have always survived. I feel this increase in pressure on the bass, while an important issue, is not as great a factor as the numbers of deformed bass showing up in my nets. These fish can only increase my belief that chemical contamination in the natural habitat of the bass is the major reason for its decline.

The high price bass are bringing on the wholesale and retail markets in no way helps the commercial fisherman. It only helps those who are looking for a fast buck. High prices and fewer fish, in the long run, will only make the consumer shop else where for his dinner. If conservation is needed to insure an adequate supply of bass at a reasonable price, then the commercial fisherman will cooperate. A continuous source of fish will insure our livelihood.

My major concern when one speaks of conservation is that the easy way out is regulating the commercial fisherman. This concerns us all, because it alone does not insure the survival of the bass. We as citizens of this country have every right to demand a share of its natural resources. This right requires involvement in the management and the conservation of these resources. The commercial fishing industry fought for years to get the 200-mile fishing limit passed by Congress. The result was the establishment of regulations which limit the historical freedom we once had. The reason for this is that the Fisheries Conservation and Management Act that established the 200-mile limit also required the Commerce Department to insure the conservation of the fish stocks. The for-



oreign fleets were allowed to deplete certain species of fish, and the Government has imposed harsh regulations on the American fleet.

We as American fishermen cannot be blamed for the depletion of certain fish stocks, yet we are told we must accept the responsibility of insuring the survival of these fish. The striped bass inhabit coastal waters, and therefore were not affected by the foreign fishing fleets. They are, however, affected by external forces beyond the realm of the fisherman. Any comprehensive conservation act for the striper must include conservation by the various States involved and the industries within those States.

I realize that when industry is affected, the Government will drag its feet. Industry means jobs, and jobs are important to us all. But tonight we are making a statement. We are saying that the fishing industry, and the bass in particular, are worth millions of dollars annually. The dollars generated by the striped bass annually gives us as much clout as other industries along the east coast.

Economics aside, enough people are concerned about the striper to give us a vote. We are here tonight to give Senator Chafee a vote of confidence for his bill to amend the Anadromous Fish Conservation Act. The accident at Three Mile Island demonstrates again the vulnerability of the bass, the fishing industry, and the environment to industrial pollution. Fishermen are saying tonight we are willing to do our part to save what we feel is our right: to fish in a healthy environment and to catch healthy fish.

It is my hope that Senator Chafee's proposal will become law and insure that the bass will survive. Senator Chafee said that, "The striper fans have an amazing structure of organization, and the common bond is the love for one fish." The striped bass is not the snail darter, yet the issue is the same. It is our responsibility to convince the Government of our sincerity. It is the responsibility of Government to see that industry does its fair share to preserve our bays, rivers, and our bass.

Almost everybody up here has spoken about relatively the same thing—habitat pollution and deformed fish. I don't think we should be talking about the method of how we each go about catching those fish. We should talk about whether we are going to have any fish to catch in the future. As I said, the numbers of bass in the waters are decreasing at an alarming rate. I am glad Senator Chafee has offered us an alternative. We don't have to sit back and watch those fish disappear. I can catch my share. You can catch yours. But at least the fish will survive.

Thank you very much.

Senator CHAFEE. Mr. Mackintosh, that was a very eloquent statement you made, and I share those sentiments as just being from the heart. Those present also share your sentiments. It is not, as I see it, as I mentioned before, commercial versus sport. It is doing what we can to save the species.

I don't know where this is all going to lead us. It may, as you mentioned in connection with the 200-mile limit, there were restrictions placed on fishermen in order to preserve that resource. It well could be that in order to preserve this resource, that there could be some restrictions. I don't know. It may be that we have overfished the stocks. I, personally, share the view that has been voiced most here tonight, and the one you voiced, that it is due to



degradation of the habitat—in other words, environmental abuse. But hopefully we will find out.

The modest amount that we are putting into this bill will provide hopefully the research. But it won't necessarily provide the cure—in other words, trying to eliminate PCB's, or stop some plant from polluting. That is a far more expensive thing. But at least we think that is what has gone wrong.

Mr. MACKINTOSH. As I said, Senator, the fishermen are willing to do their part. We would like industry to do its part. The pollution deal we can't handle alone.

Senator CHAFEE. One thing I mentioned earlier in my opening remarks, and it is very important to bear this in mind, that the Federal Government never goes 100 percent on these programs. We are all familiar with the fresh water fish programs, which are 75 percent Federal usually and 25 percent State. But even on this cooperative program, which will require the States to come up with one-third, do you think the States can be convinced to come up with their third?

Mr. MACKINTOSH. Well, I also said, Senator, that we have a voice. We are here tonight making ourselves heard. I think that politicians have to pay attention to the voters.

Senator CHAFEE. I did notice one Rhode Island politician, Senator Bill O'Neill, so you can register with him. Thank you, Mr. Mackintosh.

Bill is a very skillful and veteran politician, but I did notice he sat in back of the witnesses so he could get on TV. I should have placed myself back there. If you have a statement, we would be glad to hear it.

#### STATEMENT OF WILLIAM O'NEILL, SENATOR, STATE OF RHODE ISLAND LEGISLATURE

Mr. O'NEILL. I don't have a prepared statement, except notes I have made in the past hour or so.

I am Senator William O'Neill. I was a charter member of STAF, which stands for Save the American Fisheries. We were instrumental in getting the 200-mile limit through Congress. We sailed a commercial fishing vessel into Washington. I am also legislative chairman of ASMF, Atlantic States Marine Fisheries, which is a compact that is composed of all the States on the Atlantic Ocean who are interested in promoting uniform laws affecting commercial and recreational fishing. We are an active organization. We have a Washington office. Mr. Irwin Allen, our executive director, contacted me and asked me to attend this hearing.

I am not really an avid fisherman. I like to go out and, with a lot of lead on the line, turn on the Red Sox game and hopefully not catch anything. And I have been very successful in the past.

Some of the experts earlier mentioned New England as having a problem. It is not unique to New England. The entire Atlantic coast is affected.

Senator Barry Parker from New Jersey is a good friend of mine and also on the Commission on Atlantic Marine Fish. He is an avid fisherman. He and I were discussing the problems that sports fishermen are facing along the eastern seaboard. He was telling me several years ago that he considered the New Jersey coastline



literally a dead sea, that there was a band of sewage sludge so that effectively nothing was living for several miles off the New Jersey coast. It was a frightening revelation, and he reminded me that, don't worry, you will be getting this in a few years. I hope this isn't the beginning of something like that.

The question we still have to resolve is what are we doing to the striped bass? Are we poisoning it through inadequate pollution control or starving it through ineffective fishery management? Maybe it is a cyclical thing. Maybe we are in a cycle.

But the question that comes to my mind is what type of environment will we have when the cycle is over? Will we be able to sustain a substantial bass population even if this is a cycle? At the rate I believe the pollution in our area is growing I am inclined to doubt that.

I think many of us were shocked just a few months ago when we found out metal waste was being dumped in the Smithfield, and how proud we were that we have stopped that, and perhaps going to clean it up. I wonder how many people have asked themselves where these wastes are going now. I am frightened to think where they are ending up, and I think you might be. They are ending up in Narragansett Bay, some of the metal wastes that are now there through the closed sewage system that are polluting the bay. Just tonight, it is clear to me you are going to see the bay closed for the next week or so as a result of rains that overburden the inoperable Providence sewage treatment plant, and we will be without commercial fishing for a week.

Not only do we have to think about the effect on the striped bass itself, but the effect on the economy of south Rhode Island. I know a lot of striper fishermen, one who was probably the dean of striped bass fishermen in south Rhode Island, and he held a number of records for years. I know on a good late September, October day you would go along the seawall and find more fishermen than there are people here. These are a hardy bunch of people, mostly just because they love fish. I knew a striper fisherman who fished all season but never caught a striper. But he would be out there year after year just because he was that type of person.

But I think the effect on the economy of South Rhode Island is one that has extended our season—our motels, sports fishing, commercial fishing. In recent years it has declined.

I am particularly happy that Senator Chafee organized this group meeting tonight. I hope it isn't the end of it. I hope we can get together in the future and come up with a plan, hopefully, as someone else mentioned, early so we can avoid a nightmare, but some way, even if it is saltwater licensing, or Dingle-Johnson funds. There are Dingle-Johnson funds that are available that many Western States and so-called freshwater States take advantage of because they have so many licensed fishermen. It is based upon the contribution by the licensed fishermen. I can't tell you exactly what the formula is.

Senator CHAFEE. That is 25/75.

Mr. O'NEILL. We can avail ourselves of a lot more funds for research into why we are losing striped bass and why certain fish run in cycles. I think it is important, whether we have to go to a



saltwater license or not—which I hope we don't. I would think that that act could be amended so we could receive those, too.

Senator CHAFEE. Thank you very much, Senator, and I know that any help you could give in encouraging the State, provided we get this Federal Act passed, to come up with its portion of the one-third will be appreciated.

Mr. O'NEILL. Thank you very much, Senator.

Senator CHAFEE. Next we have a panel of Allen Peterson, Director of Marine Fisheries from the State of Massachusetts, and John Stolgitus from the Division of Fish and Wildlife in the States of Rhode Island. Then following that we will have another panel and then if there are people in the audience who would like to make a brief statement, we will take them. We are shooting to be out of here a little before 10. So this is going to wind up very soon.

But right now we do want to hear from Allen Peterson and John Stolgitus.

#### STATEMENT OF ALLEN E. PETERSON, JR., DIRECTOR OF MARINE FISHERIES, STATE OF MASSACHUSETTS

Mr. PETERSON. Thank you very much, Senator.

At this point in the hearing, I can probably only paraphrase your comments and those of other experts. However, I did prepare a statement, and I would like to go through it. Possibly, I have a different perspective.

For the record, my name is Allen Peterson. I am Director of the Massachusetts Division of Marine Fisheries. I am one of those bureaucrats that Mr. Boyd affectionately referred to a little earlier. I can't say I totally agree with his positions, but I can appreciate them.

It is indeed a pleasure to testify before you this evening relative to the striped bass—a species in which I have a sincere and long-standing interest from both a professional and personal view. My personal appreciation of this fish dates back to the early 1950's, to a dark night on a surf-swept beach when at the age of 12 I joined the ranks of successful striped bass fishermen. Subsequently, I have spent hundreds of hours of my professional career working directly with striped bass fishermen and toward management of this important resource.

Like John Cole, I am impressed to see this concern expressed tonight on behalf of this wonderful fish. For several years, Bob Pond and I shared a road show, trying to get support for doing something about the striped bass. While we came from different directions, we were both predicting this day would happen. My sincere belief is I hope it is not too late.

The striped bass is of significant importance to our economy and provides a valuable source of protein for our citizens. In addition, the striper is a source of countless hours of quality recreation, as we have heard attested to tonight. For instance, it was reported in 1970 that an estimated 783,000 anglers in the Northeast and Mid-Atlantic States harvested 73 million pounds of striped bass, and spent \$100 million in the process. Another 10.1 million pounds worth \$2.5 million dockside were landed by commercial fishermen. Although precise estimates of this extensive and diverse fishery are difficult to obtain, the results of the 1970 survey clearly attest



to its magnitude and importance. Given that all of us here tonight agree on the striped bass's importance, I will direct the remainder of my testimony to comply with your specific request for information on status of the resource, reasons for its decline, and my professional advice for positive action.

Let me start by saying that although historical accounts of our east coast fisheries refer to seemingly endless schools of striped bass, it is also a matter of record that periods of great abundance were periodically interrupted by periods of extreme scarcity. In fact, it was a situation similar to, if not worse than, today's concern that prompted the intensive study of striped bass in the late 1930's by Dr. Daniel Merriman, much of whose work we are still being guided by today.

The very excellent fishing we enjoyed during the 15-year period from the early 1960's through the midseventies was directly attributable to the dominant and regularly occurring year-classes of 1958, 1964, 1966, and 1970. There have been no dominant year-classes since 1970, and once again the striped bass population and subsequently our catch is declining.

This most recent decline in abundance has been accelerated by an unprecedented level of fishing effort. Today's anglers by virtue of their sheer numbers, more leisure time, better tackle and boats, and more effective fishing methodology have aggravated what I have to call a feast or famine syndrome. As a case in point, the 1970 year-class, which was one of record proportion, was very heavily exploited as 2- to 7-pound, 3- to 5-year-old fish during the mid-1970's. Stock removals were so intense that very few of these fish have survived, and their importance to today's fishery is minimal. In addition, this once great spawning potential was reduced without regard for future needs. While this harvesting strategy may have maximized short-term yield from the striped bass resource, it has become costly as we encounter the present protracted period of low to average reproduction. As a result of our action—or as some would say lack of action—we now see a precipitous decline in landings, and by necessity must concern ourselves with the future.

I am not suggesting that fishermen alone are to be blamed for our present state of affairs, but I am convinced that our collective striped bass harvesting capability along the east coast, even with numerous gear and other harvesting constraints in place, is formidable enough to render as unacceptable the risks associated with a continued lack of regional management. Present management efforts take the form of State-by-State regulations that are inconsistent, often contradictory, and fail to consider their combined impact upon striped bass stocks.

Although the fallacy of trying to manage a migratory species like the striped bass on a State-by-State basis has been long recognized, there has been little incentive to mount a regional 60 management effort, particularly during the highly productive fisheries of the 1960's and early seventies. Concern over dwindling catches in recent years has finally prompted a coordinated management effort under auspices of the State/Federal fisheries management program, which Senator O'Neill referred to. Participating in this program are the coastal States from Maine through North Carolina and the National Marine Fisheries Service. In addition, the United



States Fish and Wildlife Service is also being asked to take an active role in the program. Funds are provided by the National Marine Fisheries Service and administered through the Atlantic States Marine Fisheries Commission.

Management plan preparation is the responsibility of the policy committee, representing officials of each of the States. A full-time project manager has been employed to draft the plan with guidance and input from a scientific and statistical committee and a citizens' advisory committee. Despite the disparaging remarks against bureaucrats, we specifically put aside funds and have directly involved the citizenry for their input. It is designed under the present Federal/State program to have the striped bass management plan be developed jointly by both the technocrats and general citizenry alike. It involves the affected people.

These committees and the project manager are currently preparing State-by-State compilations of all data pertinent to striped bass management. This information will ultimately be assimilated into a single document that will be the forerunner of a striped bass management plan.

Among other things, this first draft is expected to identify data gaps and research needs critical to the development of future management strategies. While the State/Federal striped bass management program represents a significant and positive step in the right direction, it is important to note that it does not provide funds for research. I believe that the timeliness and the degree of success we achieve under this program will ultimately hinge upon our ability to develop sound scientific information basic to management plan development.

The striped bass has been the subject of extensive research over the years, and although we have learned much about the species, many complex questions remain unanswered. These voids have persisted largely because research programs of the magnitude necessary to address the problems exceed the capabilities of individual States.

One question of paramount concern, for instance, relates to the host of variables that influence egg and larvae viability and ultimately determine year-class strength. It appears that meteorological conditions strongly influence spawning and hatching success, but certainly, without question, we must also investigate the possible impact of man's water use activities and changing water quality upon the entire reproductive process. The effects of contamination by PCB certainly must be examined and their role hopefully can be ascertained. A better understanding of parent stock requirements, stock identification and parent/progeny relationships are also essential to sound management.

We should be forewarned, however, that these are difficult questions, and results will not be forthcoming overnight. Even given the answers, solutions may prove even more difficult. Research is not the panacea to striped bass problems. It is only a necessary ingredient in the management process.

Before concluding, I would just like to make a couple of observations on the comments made earlier, if you would permit. One is there has been a reference to cyclical nature—and I have referred to periods of abundance and decline. Classically, a cyclical species



should have predictable amplitude and periodicity of strong year-classes. This is not the case with striped bass, although there are data—and you can look at it—that show a relative approximate periodicity to the appearance of year-classes. They are not finite as may be demonstrated with other species. Without question, on the basis of the best information we have, the last good year-class was in 1970. But the data would indicate that all the classes since that time have not been poor, and many have been close to average, and this close to 10-year span would certainly not be out of keeping with past performance, as we understand fluctuations in the bass population.

You have asked for questions on causes of decline. I would be the first to grant we have to look at the environmental concerns, even if there is a natural cycle that is going on. The ability for our man-made activities to affect those cycles or those natural processes is immense, and we must understand those before we make any prediction on the natural process.

You raised a question earlier on the restoration abilities we may have. While some people have indicated that they have seen nothing good come from the bureaucrats and programs, I would say to you the Anadromous Fish Conservation Act has been highly successful in terms of expenditure of government funds. It has not made a lot of bureaucrats, but has made a significant step to restore Atlantic salmon here in the Northeast, a program now getting much acclaim. The Pacific salmon on the west coast have been brought back to a level far exceeding their natural level in some river systems. The work being done on shad and other species certainly attest to the fact the money can be put to good effort, and we can, given the tools, restore species back to previous levels.

I think this is particularly true with anadromous fish, where we do have a greater control over their environmental conditions, particularly for spawning.

One final comment. I noted that Mr. Bryant pointed out that netting is prohibited in only one State. In my own State of Massachusetts we have banned all forms of netting for striped bass, and you can't even keep one incidentally taken in a net. It is interesting to note that commercial harvest and sale of bass in Massachusetts has exceeded over 1 million pounds annually. In fact, when we look at the commercial landings, if you looked at that alone, you would not be able to ascertain there was a problem with the striped bass! It is a very complex issue to understand and appreciate. The point I am making with regard to landings, is that the data alone is not that meaningful, and hopefully funding that comes forth as a result of your bill will help us clear up some of the confusion and provide a better understanding of what, in fact, is really happening to the fish.

In conclusion, let me reiterate that I believe we have taken a very important first step toward responsible management of our striped bass resource. We have formalized a regional management program and are committed to development of a responsible management plan. The missing ingredient to expedite this process is an adequate funding base. I believe Senate bill 838, submitted by you, Senator Chafee, is a very timely and appropriate attempt to provide the funds for much needed research—research that will pro-



vide the technical base for a coordinated State/Federal approach to striped bass management.

Senator, I thank you for the opportunity to present my views on this most complex problem. I trust that through your initiatives and the cooperative effort of individuals such as those here tonight, we will foster the wise use and perpetuation of a resource so dear to all of us.

Thank you.

Senator CHAFEE. Thank you, Mr. Peterson, for a very fine statement. I think we all learned a lot. I would like to ask a couple questions. You see a pretty good chance that Massachusetts would come up with its share?

Mr. PETERSON. Senator, as far as I am concerned, I might add in the brief time I will continue in my capacity—but certainly I believe for the State as a whole the striped bass is a high priority species, and we will make the shifts in programs to see we take advantage of any funds made available to us. We are committed to the program.

Senator CHAFEE. Have you had striped bass hatcheries up there?

Mr. PETERSON. No, we have not. We are contemplating doing some research work involving maritime populations of striped bass. I would add, very candidly, I think there are some values to work with the striped bass. But I don't think we should have delusions of grandeur that we can replace what mother nature does. We can only supplement stocks.

Senator CHAFEE. You mean with hatcheries.

Mr. PETERSON. Yes, we can develop local stocks. But we are going to have to deal with mother nature to support fisheries as we know it.

Senator CHAFEE. By the way, bureaucrats may be kicked around here tonight, but don't take it too seriously. We are very grateful for what the Fish and Wildlife Service and Department of Natural Resources in Rhode Island have done. I am a little bit of a bureaucrat, so I am sensitive on the subject.

Now we will hear from John Stolgitus, acting chief of the Division of Fish and Wildlife for the State of Rhode Island.

#### STATEMENT OF JOHN STOLGITUS, ACTING CHIEF, DIVISION OF FISH AND WILDLIFE, STATE OF RHODE ISLAND

Mr. STOLGITUS. Thank you, Senator Chafee.

By and large, Allen Peterson just about summed up the great bulk of my statement. Basically, I was asked to come here this evening to place our support in the Department of Environmental Management and Division of Fish and Wildlife behind Senator Chafee's bill. We have questions regarding the bill, which I will get to in a minute.

Basically, just the initial publicity your bill has received, in essence has, stimulated what is the management arm of striped bass activity on the coast. The sub-board recently delegated two specific objectives, one to the S&S Committee, which was that they should immediately produce a status report on the striped bass, which, of course, will then lead to their input and asking the questions what needs to be done and what type of management do



we want to proceed with, and what are the objectives and the best way to approach these?

We have also asked the project leader to put together figures denoting the comparative abundance over the years as far back as we have recorded history on the striped bass to investigate the cyclical nature of the animal. If it is cyclical, we need to know what would be an average population of striped bass? Are we putting too much emphasis on these years of peak abundance?

Obviously degradation to the stream systems up and down the coast are not only detrimental to striped bass, I know they are extremely important. I am not trying to water them down. But one thing that sits in the back of my mind is after the war, after we discovered DDT, we sprayed up and down the coast. It really didn't seem to affect these years of peak abundance, when it was cast about on our environment. Obviously, there are many things coming into the environment now. I am sure they are important. DDT was important. I don't think the records up and down the coast can place the blame on one situation.

One of the S&S members, Randy Fairbanks, pointed out if we were in a position in the early seventies to manage the stocks of striped bass, the most abundant year-class that was ever produced in the Chesapeake Bay, would be producing fishing until the eighties.

We want to take a rational approach and get things done quickly and identify what needs to be done. Senator Chafee's bill is coming into the anadromous fish program. As Allen pointed out, this is an extremely effective program. I, personally, have been working in the program for 11 years, and have great faith in the Fish and Wildlife Service and the Department of Commerce Federal Aid offices. I dare say I have not seen any abuses in this program. The anadromous fish program has probably produced the most significant fishery management activities, certainly in Rhode Island and up and down the coast.

I do have one suggestion, Senator. The Feds have recommended at the last sub-board meeting and other sub-board meetings that the State/Federal program is at the whim of the people that are distributing money after the mandated programs have been funded. Whatever the director asks for and what he gets are two different things. Should we run into trouble with the bill, or should you in your wisdom and the committee in its wisdom feel some of the older State/Federal programs are taking priority, you should look into mandating the State/Federal program as a vehicle to provide research funding. It is established, but it is not mandated.

I do have one question in regards to your bill, and this came up at the directors' meeting last week, and that is in the final paragraph of the bill, you identify the 66 $\frac{2}{3}$  and one-third State funding ratio for the first year of the program, and no other statement for the additional years.

Senator CHAFEE. That is a good point. It was meant to be continuous.

Mr. STOLGITUS. OK.

Senator CHAFEE. Fine. Thank you very much. I just want to say in behalf of all of us we are proud of both you gentlemen and what you have done in your work for your respective States.



In the final panel we will have Mr. Robert Pond, who is head of Strippers Unlimited, which represents many of the people here tonight, and Dr. Phillip Goodyear, who is with the U.S. Fish and Wildlife Service. Dr. Goodyear operates out of Ann Arbor, Mich. He is a long distance commuter, so he deserves an extra warm welcome.

Mr. Goodyear, why don't you proceed.

**STATEMENT OF DR. C. PHILLIP GOODYEAR, AQUATIC BIOLOGIST, NATIONAL POWERPLANT TEAM, U.S. FISH AND WILDLIFE SERVICE, DEPARTMENT OF THE INTERIOR**

Dr. GOODYEAR. Thank you, Senator Chafee.

My name is Phil Goodyear, and I reside in Ann Arbor, Mich. I am a member of the National Powerplant Team which is a part of the biological services program of the U.S. Fish and Wildlife Service of the Department of the Interior. In this capacity I have the responsibility for estuarine problems, biological models, computer simulations, thermal effects, chemical effects and intake effects as these topics relate to powerplants.

My interest in the population dynamics of striped bass dates back to 1972 when, as an employee of the Environmental Sciences Division of Oak Ridge National Laboratory, I was responsible for the evaluation of the potential environmental impact of the Indian Point unit 2 nuclear steam electric generating plant on the Hudson River. This plant and others along the Hudson River withdraw large numbers of the early life stages of striped bass with the water required to cool the plant's condensers. Many of these bass are killed before the cooling water is returned to the river. In addition, hundreds of thousands of older young of the year bass are killed when they become impinged on the intake screens of these plants.

The need to assess the significance of these losses of young bass caused me to begin what has been a continuing assessment of the state of knowledge concerning the life history and population dynamics of the Atlantic coastal stocks of striped bass. What I have found is that, although there is considerable volume of scientific literature on the species, there are major gaps in our knowledge. These gaps are such that it is not presently possible to develop a comprehensive, scientifically based management plan for the coastal migratory stock of bass.

I presented my thought on the problem and what kind of research is needed at the Third Annual Marine Recreational Fisheries Symposium last spring. A copy of the paper I presented at the symposium is attached to my statement, so I won't go into much detail here. The thrust of my thoughts at that time were that additional research on the bass is particularly required to quantify the migratory behavior, the fishing and natural mortality, and the factors which control the number of young fish which survive each year to renew the stock.

In the past several months, I have become aware of the growing concern for the future status of the striped bass stocks along the Atlantic coast. I cannot say whether, at present, the stock is truly in a depleted state, but I have no reason to believe otherwise. The influence of fishing, power plant-related mortality and contaminants all affect the process by which the bass population renews



itself. By catching fish, fishermen reduce the number of bass that survive to spawn each year.

Environmental contaminants such as polychlorinated biphenyls may reduce the survival rates of eggs that are spawned. In some of the spawning grounds, power plants reduce the survival potential of those eggs that do hatch. Fortunately for the bass, and the fishermen who fish for them, natural processes come into play which, within limits, can offset or compensate for the reduction in the reproductive potential caused by man's activities. Unfortunately, there is a limit to how much stress the population can take. Beyond that limit the population can no longer maintain itself and will ultimately dwindle to extinction if nothing is done to relieve the stresses brought about by man's activities.

I developed these thoughts in a more formal way in a paper I presented at a symposium on the effects of power plant induced mortality on fish populations which was held in May 1977 in Gatlinburg, Tenn. I have also attached a copy of that paper to this statement. Very simply, what it says is that a fish population which is already in an exploited state before some other source of mortality is added is much more vulnerable to destruction by the additional sources of mortality than if the population is in a virgin, or unexploited, state. The striped bass, of course, has been intensively exploited for many years.

I cannot say what the future of the stocks might be. The information is not available for making such a judgment, and in any case the future state of the stock will depend in part on future events. Whether the course of future events is affected by scientifically based management decisions will depend on the availability of research findings from studies which have yet to be designed.

Thank you.

Senator CHAFEE. Dr. Goodyear, we appreciate your statement.

For the benefit of those here, attached with the statement is a very learned paper which deals with marine recreational fisheries, and then your paper that you delivered in Tennessee in May 1977 assessing the effects of power plant induced mortality on fish populations. I think all of this will be very, very helpful to us, and we will make them a part of the record.

[The statements referred to follow:]



*Marine*  
*Recreational Fisheries*  
  
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## Management Problems of Migratory Stocks of Striped Bass

C. Phillip Goodyear

The striped bass (*Morone saxatilis*) is perhaps the most sought after and most studied sport fish taken by the small boat livery and trailer fisheries on the Atlantic Coast. As a consequence, one would expect that the wealth of available information would enable fisheries managers to develop specific and reliable management plans to ensure that maximum benefit might be derived from this resource. Unfortunately, such is not the case. Several major problems need to be resolved before we can scientifically manage the coastal stocks of striped bass. This chapter addresses several of the more important considerations that will require additional research for the resolution of these problems.

### Life History Influences Management

The striped bass which inhabits the coastal waters from North Carolina to Maine is anadromous. Many adults spend a good part of the year in inshore waters of the Atlantic Ocean (Raney 1952). They migrate northward along the coast in the spring and summer and southward during the fall. Some enter estuarine waters during the fall migration period to overwinter. Many overwinter in the ocean, however, particularly along the North Carolina Coast (Smith and Wells 1977).

Each spring the adults enter the freshwater reaches above estuaries to spawn (Talbot 1966). The eggs and early larvae drift with the current as they develop. Older larvae tend to concentrate in the low salinity waters near the saltwater-freshwater interface. The young fish generally spend their first year in low salinity portions of estuaries below the spawning grounds, although some may remain upstream in freshwater. Year class strength is established during the first year and there is some evidence

that it may be established by the time the young fish have grown to a length of 25-30mm (Chadwick 1964).

After spawning, the adults migrate to their summer feeding grounds. Many of the larger, older bass join the coastal migratory stock although some remain in the estuarine waters near their spawning grounds. Younger smaller bass in Chesapeake Bay tend to remain near their spawning grounds and do not begin to join the coastal migratory stock until their fourth or fifth year of life (Mansueti 1961). Tagging studies indicate that many of the larger adults that spawn in the Hudson River and tributaries of Chesapeake Bay join the coastal migratory stock and are exploited from New Jersey northward during the summer and fall (Chapoton and Sykes 1961, Texas Instruments 1976). Thus, the striped bass which inhabit these northern coastal waters are a mixed stock with individuals originating from a number of different spawning grounds.

This characteristic is important for several reasons. First, it means that exploitation of the coastal migratory stock affects the numbers of adults which survive to spawn in all of the various spawning grounds which contribute to the stock. This observation is particularly relevant to the female portion of the stock because of the high fecundity of older females (Jackson and Tiller 1952) and the relatively high proportion of females in the coastal migratory stock (Schaefer 1968). Thus, the number of eggs spawned annually in each contributing spawning ground is determined in part by the impact of the sport and commercial striped bass fisheries in the coastal waters. The degree to which these fisheries affect egg deposition in each of the spawning grounds is directly related to the proportion of the adult females of each spawning stock that participate in the



coastal migration and to the survival of those that do not.

The mixed nature of the coastal migratory stock is also an important factor in the development of a management plan for the coastal striped bass fisheries, since no single stock-recruitment relationship is applicable. Similarly, because some individuals from the migratory stock will contribute to spawning in each of the spawning grounds, management plans for any of the separate spawning stocks must involve some consideration of the exploitation of coastal migrants.

It is likely that the relationship between the number of spawners and the average number of recruits that they produce is different for each spawning ground. If this is true, any comprehensive management plan for the striped bass stocks from North Carolina to Maine, which would provide for optimum yields would be extremely complex. The basic approach to such a management plan would be to regulate fishing so that some optimum number of spawners would be present in each spawning ground each year. The achievement of the goal would not, of course, eliminate year class fluctuations caused by environmental variations. It would serve, however, to protect the stocks from overfishing as well as to optimize the annual production available to fishermen.

Although simple in concept, the development of such a management plan would require a substantial amount of information which is not presently available. For instance, knowledge of the functional relationship between parental stock and resulting recruitment is needed for each of the contributing spawning stocks. In addition, age and sex specific migratory behavior for each spawning stock must be determined. This information would have to be integrated with size and area-specific fishing and natural mortality rates to optimize the annual number of spawners returning to each spawning ground.

#### A Conceptual Model

Any discussion of research needs related to management must have as its conceptual basis some framework for synthesizing the needed information in such a manner that it will be useful for management decisions. The approach

taken here is to present a conceptual model which includes the geographical, seasonal, and biological elements that would describe the behavior of the striped bass populations which inhabit the coastal waters from North Carolina to Maine.

It would be a relatively simple task to translate the conceptual model into a series of equations that would describe the behavior of the stocks if sufficient information were available to quantify the various relationships. Taken together these equations would constitute a mathematical model of the striped bass fishery along the Northeast Atlantic Coast. Such a model could be used to study the implications of various management alternatives and to develop management plans.

#### *Distributions of Spawning Stocks*

The development of the mathematical model will require an adequate quantitative description of the spatial and temporal distributions of all of the contributing stocks that constitute the fishery. A schematic representation of the spatial elements of such a model is presented in Figure 1.

The major spawning rivers that are included consist of the Roanoke and Tar in North Carolina (Hassler and Hogarth 1970); the James, York, and Rappahannock in Virginia; the Wicomico, Nanticoke, Choptank, Patuxent, and Potomac in Maryland (Mansueti and Hollis 1963); the Delaware in Delaware (Murawski 1969, Chittenden 1971); the Maurice in New Jersey (Hamer 1971); and the Hudson in New York (Rathjen and Miller 1957, McFadden 1977). In addition to these rivers, striped bass are known to spawn in the C & D Canal and the upper part of Chesapeake Bay (Dovel and Edmunds 1971).

Other spawning grounds could be added to complete the description of spawning and nursery areas as they become known; similarly some of those that are included might be eliminated if they are shown to be marginal habitats. For the present, however, it is sufficient to note that many different spawning grounds exist.

Each of these spawning areas represents a separate stock of bass that potentially can contribute not only to a local fishery, but may migrate to other areas before being captured.



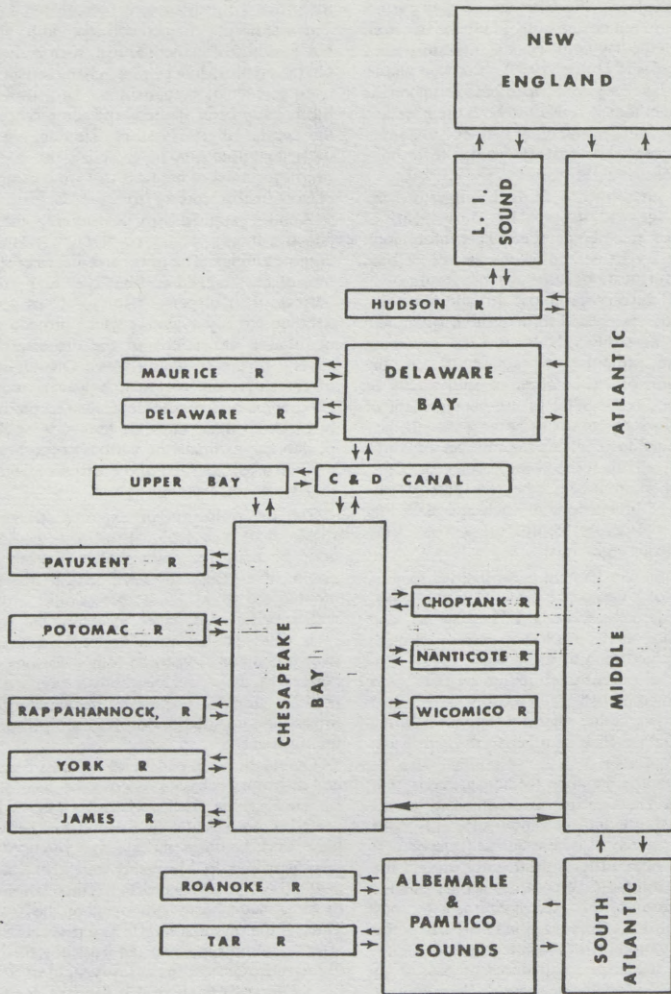


Figure 1. Schematic diagram of the spawning grounds, migratory pathways, and feeding grounds for the Northeast Atlantic Coastal stocks of striped bass.



For example, in the Chesapeake Bay system such migration occurs both within the bay itself and from the bay to the coastal migratory stock (Mansueti and Hollis, 1963). It is also known that the tendency for striped bass to undertake such migrations is related to both their sex and their age; females and older fish tend to dominate the coastal migratory stocks (Merriman 1941, Mansueti 1961).

As a consequence of their migratory behavior, age and sex specific movements of each stock must be detailed. This information is necessary to determine the source of bass captured at locations some distance from spawning and nursery grounds. In addition, this information is needed to determine where and at what ages individuals of each spawning stock are exploited. As already stated, the description of exploitation of individuals of each stock is essential to the management of each of the separate stocks because the intensity of exploitation regulates the number of adults that are available for spawning each year. Thus, it is important to describe, for each of the stocks, the proportions of each age class that migrate to summer feeding areas away from their spawning grounds.

Such summer feeding areas include various portions of Chesapeake Bay, Delaware Bay, Albermarle Sound, Long Island Sound, and the inshore waters from New Jersey through New England (Smith and Wells 1977). Obviously, the rate of exploitation by both sport and commercial fishermen must be determined for each geographic region through which the bass migrate to their summer feeding grounds. Such information would, of course, also be needed for the summer feeding grounds, fall migration routes, and overwintering areas. Similar information on natural mortality rates in each area may also be required if the natural mortality rates differ significantly among the various geographical areas that the bass inhabit.

Acquisition of this information is a formidable task that involves essentially two categories of investigation. The first category is quantification of the dispersal patterns of bass from their spawning and nursery areas. Discriminant analysis is one approach that may help to elucidate this information. This technique is based on identifying characteristics of each stock that will allow individuals from that stock to be

identified from a sample of a mixed origin. The identifying characteristics could be almost any attribute of individual fish, such as meristic characteristics, biochemical characteristics, or even elemental composition. This technique has already been applied with some success to the coastal migratory stock, although without sufficient precision to establish the river of origin for most of the bass that were examined (Texas Instruments 1976).

Another approach to determining the dispersal patterns would be through additional tagging studies. The times and places of recapture of bass tagged on their spawning ground indicate their dispersal patterns. Considerable data are already available which provide some qualitative indications of the dispersal from several of the spawning areas. Quantification of the migratory patterns, however, requires geographic and season-dependent exploitation rates. After these rates are known it would be possible to estimate the various proportions of a given stock, in each of the various geographical elements, from tag returns.

The determination of exploitation rate by season and geographical element could be done by mark-recapture studies in each geographical element for each season that bass inhabit the area. Such data would provide area specific exploitation rates and migration rates. These studies would have to be conducted over a number of years to follow various year classes as they develop, and to examine the possible stock and age specific variability in migration and exploitation for each geographical element.

The relationship between year class density, and migratory behavior, needs to be determined for each of the stocks. Schaefer (1972) presented a positive linear relationship between New York landings and average young-of-the-year densities in Maryland waters of Chesapeake Bay 3 to 6 years earlier. The relationship he found had a positive intercept on the X-axis. Thus, if the regression reflects a true cause and effect relationship, then the tendency for bass to migrate must decline at low year class densities. The regression of Chesapeake landings on the mid-Atlantic landings lagged by 2 years (data from Koo (1970) also supports this hypothesis ( $Y = -152.2 + 0.245X$ ;  $R\text{-Square} = 0.81$ , 29df).



It is possible, however, that these regressions are confounded by synchronous year class strengths in all of the spawning grounds that support the coastal migratory stock. Whatever the case, the precise relationship between year class density and migration needs to be quantified so that the movements of each of the spawning stocks can be adequately predicted.

#### *Life History*

In addition to factors related to the geographical distributions of the various spawning stocks, the development of a management model must consider the biological aspects of the life history of the species. Specifically, the annual gains and losses to the population both in biomass and numbers must be predicted.

A schematic representation of the female portion of a single spawning stock is presented in Figure 2. The population is viewed as a

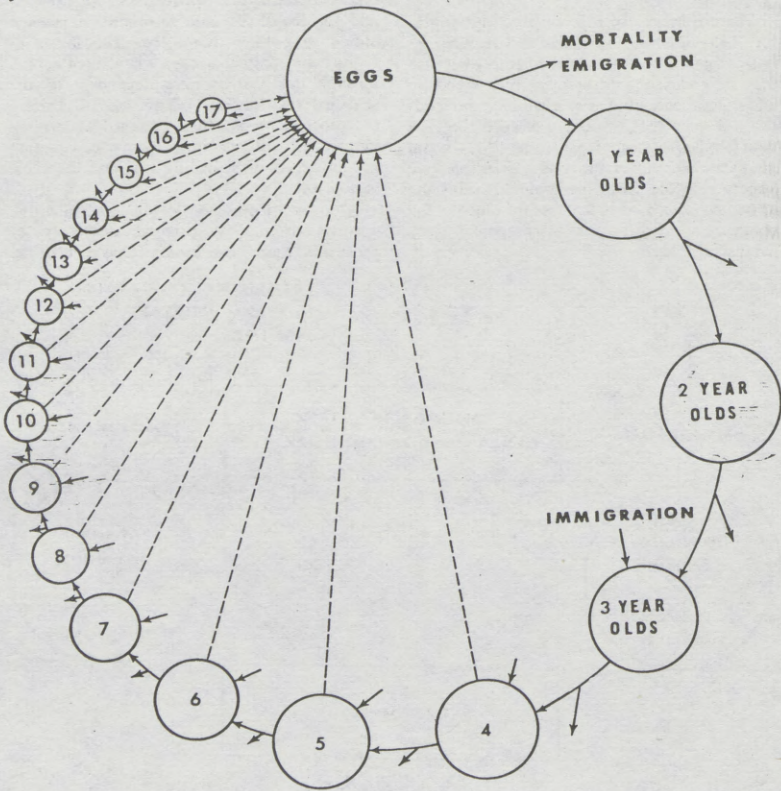


Figure 2. Schematic of the life history of females of a single striped bass spawning stock. The circles represent the standing crop of females at the time of spawning each year. The solid arrows refer to the processes of aging, mortality, emigration, and immigration. The dashed arrows indicate the contribution of reproductive material to the annual spawn.



closed system in which females are considered to begin their contribution to spawning as they become 4 years of age and continue throughout the remainder of their life. There are gains and losses to the various age classes through the processes of natural and fishing mortality, growth, emigration and immigration.

A graphic representation of the male portion of the population would be similar except that their annual contribution of reproductive material consists of milt.

The differences in reproductive and migratory behavior between males and females requires that they be modeled separately because they are exposed to different sources of fishing and natural mortality. For example, the tendency of male bass to mature at an earlier age than females (Mansueti and Hollis 1963) would increase their vulnerability to a size selective fishery near the spawning ground, during the spawning season, as is the case for much of the commercial fishery in Chesapeake Bay (Mansueti 1961).

The processes which occur between one spawning season and the next are illustrated in Figure 3. After spawning, the migratory elements leave the spawning ground and begin their migration through other geographic regions to their summer feeding areas and subsequently to their overwintering grounds. As they pass through the various regions they are exposed to different levels of natural and fishing mortality. The actual losses will depend on the mortality rate to which they are exposed and the length of time they remain in each area during their migrations. The losses to fishing and natural causes would then accrue through the year at rates dependent on the seasonal distributions of the stocks. During the subsequent spawning season the surviving mature fish migrate from their overwintering grounds to their spawning area and the cycle begins again.

Along with the need to obtain quantitative descriptions of these migration and mortality processes, three other biological aspects of the

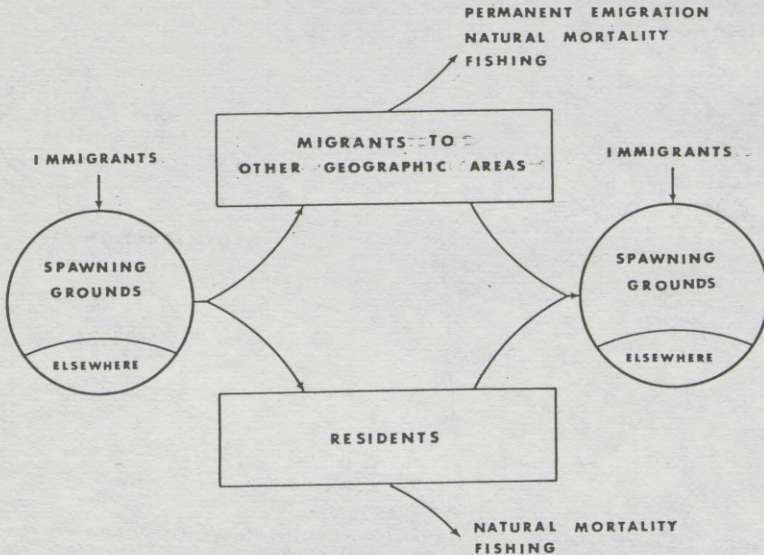


Figure 3. Schematic of the processes which occur between one spawning season and the next. See text for explanation.



population need to be investigated. The first of these involves the immigration of individuals that originated from other spawning areas into each spawning population. The colonization of striped bass in Coos Bay, Oregon, by emigrants from the San Francisco Bay population (Morgan and Gerlach 1950) is evidence that the bass do not always return to their place of origin to spawn. There is, in fact, little direct evidence for 100 percent homing in the striped bass stocks along the Atlantic Coast. Mansueti and Hollis (1963) summarized the findings of several studies in which bass tagged on spawning grounds were found to return in following years to spawn on the same grounds. The authors went on to state, however, that there was no evidence which suggested where these spawning fish were actually born.

In addition to the mark-recapture studies cited by Mansueti and Hollis (1963), the concept that most bass return to their river of origin for spawning is supported by other information. For example, many of the various stocks have been separated based on meristic characteristics (Raney and de Sylvia 1953) and serum proteins (Morgan et al. 1973). If these variations between stocks are the result of genetic factors then some degree of homing is likely.

In contrast to these observations, Raney et al. (1954) concluded that in some years part of the Hudson River population of young are derived from Chesapeake Bay stock or bass with similar characteristics. It is clear that the degree of homing cannot yet be quantitatively described. Thus, the rates of emigration from, and immigration into discrete spawning stocks cannot be predicted. This topic is important because it also has important management implications.

An additional aspect of the life history which needs to be examined is the spawning frequency of mature females. It is generally assumed that after the adults reach maturity they will spawn every year (Lawler 1972, Van Winkle et al. 1974, Saita and Lorda 1977; Goodyear 1977). This assumption, however, has not been rigorously examined. Mansueti and Hollis (1963) concluded there was some evidence that spawning was curtailed or intermittent for some of the specimens older than 7 to 10 years, but confirming and quantitative data are lacking. Similarly, the relative viability of eggs spawned

by females of each age class needs to be determined, as well as the proportion of ovarian eggs that are actually spawned. These data are required to calculate the number of viable eggs that would be deposited each spawning season.

The third aspect of the life history relates to the behavior of the subadult females that are part of the migratory stock. These immature individuals that do not participate in the spawning run with the mature individuals are likely to suffer different levels of mortality depending on their geographic distributions. These differences may or may not be important for each of the various populations, but some assessment of their significance should be made.

#### *Stock and Recruitment*

The schematic illustration of the life history presented in Figure 2 is a closed system where gains to the population from reproduction and immigration are offset by losses from mortality and emigration. If the gains and losses exactly offset each other then the population would neither increase or decrease. If, however, management decisions were made which affected fishing, and hence mortality, the model population would begin to grow if fishing were reduced or decline if fishing were increased.

In the real world, the tendency for the population to grow when fishing is reduced would eventually be offset by density dependent processes that would increase natural mortality or decrease reproduction. A population declining in response to added fishing may or may not reach a new equilibrium, however, depending on the amount of compensatory reserve that is left in the population (Goodyear 1977). The actual change that will occur in the population in response to such a management decision is directly related to the factors which regulate the population.

This observation points out the need for a precise quantitative description of the relationship between spawners and the recruits that they produce. Knowledge of the stock-recruitment relationships is essential for the prediction of the long term impact of management decisions. This relationship is not known for any of the striped bass stocks that contribute to the fishery along the Atlantic Coast, although



several possible models have been proposed (Lawler 1972, Van Winkle et al. 1974, McFadden 1977, Christensen et al. 1977).

Research directed at discovering these relationships should fall into three basic categories: systematic collection of time series data, study of density-dependent mechanisms, and the study of density-independent mechanisms. Density-independent factors, such as environmental fluctuations, are likely to be primarily responsible for the year-to-year fluctuations in year-class strength. The fluctuations caused by density-independent factors confound the relationship between the spawning stock and the recruits that they produce. As a consequence, it is important to determine the environmental variables that are affecting recruitment and to quantify their influence.

The study of possible density-dependent mechanisms that operate in the population is required to determine those factors in the population which are controlling the population size. A quantitative description of these mechanisms would allow researchers to establish the mathematical form of the relationship between stock and recruitment. For instance, if the number of 1-year old recruits is determined by competition among developing larvae for food, the form of the stock recruitment equation would relate only to the density of eggs. If, however, the young of the year are preyed upon by, say, 2, 3 and 4-year-old bass, then the stock-recruit equation would have to include terms for the abundance of these age classes.

The development of a time series of data is required both to discover the density-independent factors that influence recruitment and to set parameters on the relationship between stock and recruitment. The data base should include estimates of egg deposition, indices of the number of young-of-the-year produced, the abundance of potential predators in the nursery areas, and relevant environmental factors. A thorough, detailed analysis of available historical records help to establish the important parameters which may need to be measured.

The studies mentioned need to be performed for each of the major spawning stocks that contribute to the fishery. As a consequence, there is an obvious need for developing simple, adequate, and reliable research plans and methods. These methods might best be de-

veloped from analysis of available information and then tried on one or more of the major spawning grounds. After the methodologies are proven adequate the research could be expanded to other spawning grounds.

#### *Other Factors*

The development of a model to be used in management decisions will also require quantification of the importance of factors related to man's activities other than fishing. Further research should be devoted to identify the true causes of population collapses, such as those in the James and Delaware Rivers (Grant and Joseph 1968, Chittenden 1971), and the factors preventing their recovery. This information may prove to be a valuable tool in the future protection of other important spawning grounds. Additional research into the feasibility of methods such as stocking, to aid the recovery of reduced stocks, is also needed.

#### *Information Synthesis*

The technology to assimilate the information outlined above into a mathematical form for computer simulation is already available. The development of such a simulation model would enable resource managers to forecast the effect of changing the size limit on bass or eliminating the restrictions on the taking of large fish, not only on the Maryland fishery, but throughout the area from North Carolina to Maine. Similarly, managers could study the implications of imposing landing quotas for the commercial fishery or creel limits for sport anglers anywhere along the coast. This capability would allow resource agencies to study the various management alternatives and arrive at some optimum decision.

Such a model would likely be quite imprecise at first. It would, however, serve as a hypothesis around which additional studies could be performed. Through time it would evolve into a truly predictive tool.

When the simulation model has achieved a sufficient level of accuracy it may be possible to couple it with linear programming techniques to develop optimum management strategies for the utilization of the resource. These techniques are widely used to solve problems



when large numbers of interacting variables must be considered simultaneously. In using these techniques, the resource manager would specify the objective (e.g., maximum economic yield or maximum yield) and a series of constraints (e.g., minimum number of spawners for each spawning stock, minimum allocation of landings to either sport or commercial fishermen, minimum allocations of landings by geographic region, or size limits). The linear programming solution would then guide the managers in allocating the resource to fishermen.

The successful completion of the research outlined would go a long way toward the development of a scientifically based management scheme for striped bass along the Northeast Atlantic Coast of the United States. Completion, however, would be a monumental task that would require many years of intensive coordinated research.

### Summary

The striped bass is perhaps the most sought after and most studied sport fish taken by the small boat livery and trailer fisheries on the Northeast Atlantic Coast. There are several major problems, however, that must be resolved before scientifically based management plans can be developed.

The migratory behavior of each spawning stock along the coast must be determined. These data should include a quantitative description of the geographic distribution of each age class for each sex throughout the year. Similarly, quantitative descriptions of natural and fishing mortality are needed for each age class and sex throughout the year for each geographic location that the bass inhabit.

In addition, the factors which control the size of year classes for each spawning stock must be determined. The needed information includes quantitative descriptions of the environmentally caused fluctuations in year classes as well as those that are related to parental stock size. The factors that control the relationship between parental stock size and subsequent recruitment need to be determined and quantified so that an accurate spawner-recruit model can be developed.

The information on migrations, exploitation, and the stock-recruitment relationship can be

integrated into a simulation model which can be used to examine various alternative management schemes. This capability will allow resource managers to examine the implications of various management options and thereby act as a guide to establishing regulations which will ensure that optimum benefit will be derived from the exploitation of this resource.

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## Assessing the Impact of Power Plant Mortality on the Compensatory Reserve of Fish Populations

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### ABSTRACT

A technique is presented to quantify the concepts of compensation and compensatory reserve in exploited fish populations. The technique was used to examine the impact of power plant mortality on a hypothetical striped bass population. Power plant mortality had a more severe impact on the compensation ratio and compensatory reserve for an exploited stock than for an unexploited stock. The technique can be applied to determine a critical compensation ratio which could serve as a standard against which additional sources of mortality, such as those caused by power plants, could be measured.

*Key words:* compensation, compensatory reserve, critical compensation ratio, density-dependent factors, exploitation, fish population analysis, fish population dynamics, modeling, potential fecundity per recruit, power plant impact, reproduction curve, striped bass, viability index

### INTRODUCTION

One of the critical problems in the assessment of the impact of power plants on populations of commercially or recreationally important fishes is our limited understanding of the mechanisms that control population change. It is comparatively easy to estimate the proportion of eggs, larvae, or juveniles which may be killed by power plant operation. Unfortunately, this information is not always sufficient to make sound management decisions related to siting or continued operation of individual power plants. Such decisions also require knowledge of the impact of the identified losses on the long-term health of the population and on the associated yield to fishermen.

The problem of predicting population responses to changes in mortality is not restricted to analysis of the impact of power plants but rather is a key



problem in fishery research in general (Cushing 1968, Hunter 1976). The same mechanisms that will dictate the long-term consequences of power plant mortality are responsible for the relationship between spawning stock and recruitment. These mechanisms can be broadly categorized as compensatory and include such phenomena as cannibalism and density-dependent starvation, growth, predation, fecundity, etc. The operation of these types of mechanisms enables a population to be exploited by man without its dwindling to extinction.

The continued existence of fish populations undergoing exploitation is ample evidence for the operation of compensatory mechanisms within the life cycles of those populations. However, there is a limit to the degree that these mechanisms can offset the additional mortality caused by increasing exploitation, as evidenced by the catastrophic failure of some fisheries (e.g., Burd 1974).

The purpose of this paper is to present a technique for quantifying the degree to which compensatory phenomena are exerted in exploited populations and to examine the impact of power-plant-induced mortality on this measurement of compensation.

## COMPENSATION

Compensation, as used in this paper, is the sum of all density-dependent phenomena that act to stabilize the population. Consider, for example, a hypothetical Ricker-type stock recruitment relationship with recruits measured in terms of sexually mature progeny of the form in Fig. 1. Curve I is the reproduction curve for an unexploited population where the maximum sustainable yield can be achieved by exploiting the population such that the spawning stock is reduced by 73% of maximum surplus production (the distance AB/AC). If the stock is continuously exploited by this amount, then the reproduction curve for the exploited stock will correspond to Curve II. In each case the spawning stock will replace itself at a density corresponding to the point where the curve crosses the 45° axis. The difference between the two curves results from the fact that fishermen are removing the excess production, represented by the distance AB, so that the equilibrium spawning stock size is given by the distance BC (BC = OC) for Curve II.

For both situations the combination of survival and fecundity parameters at equilibrium are such that, on the average, each egg spawned by the adult population will produce one egg in the recruit population. As a population is exploited the probability that one egg will survive and produce one egg must increase in order to maintain population stability. This increase in probability of survival is required because the average total number of eggs produced by each recruit over its lifetime is lessened due to fishing mortality.

The relative impact of exploitation on the egg production potential per recruit is illustrated in Fig. 2 for a hypothetical striped bass population. The



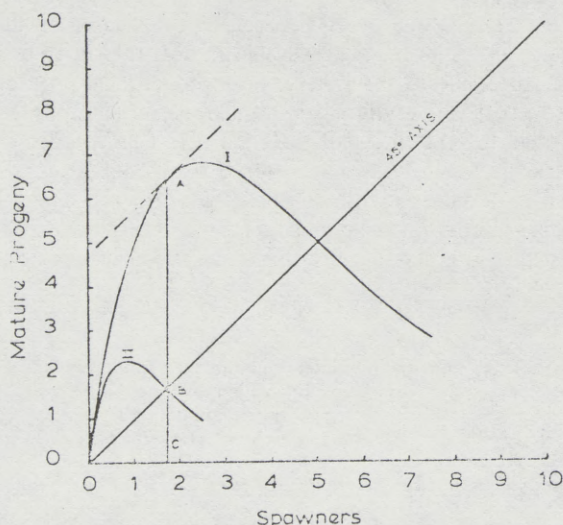


Fig. 1. Hypothetical stock recruitment curves for an unexploited and exploited fish population with recruits measured in terms of sexually mature progeny. Curve I represents the relationship between the abundance of spawners and mature progeny for the unexploited condition. Curve II represents the relationship between the abundance of spawners and mature progeny when the population of mature progeny is reduced by AB/AC. In both cases the population is in equilibrium where the curves cross the 45° axis.

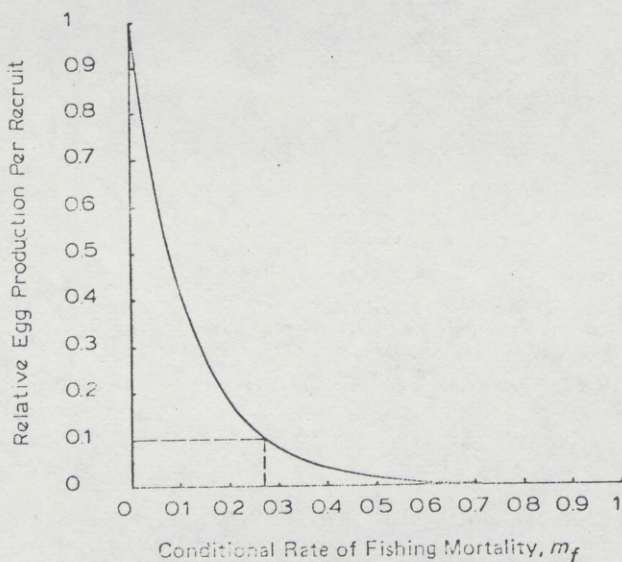


Fig. 2. Relationship between egg production per recruit and conditional rate of fishing mortality for a hypothetical striped bass population.



life history parameters (Table 1) used to generate this curve are those of a population in which 20% of the two-year-old fish and 100% of all subsequent age classes are vulnerable to the fishery. For a conditional rate\* of fishing mortality,  $m_f$ , of 0.28, the egg production potential per recruit is reduced to only 10% of that for the unexploited population (Fig. 2). Thus, for the population to stabilize, the probability for a spawned egg to survive and reproduce itself must increase tenfold. This increase is a measure of the level of compensation required for the population to persist at that level of fishing mortality. This concept is developed further in the following discussion.

Table 1. Life history parameter values for the hypothetical striped bass population

| Age class <sup>a</sup> | (F) <sup>b</sup> | (M) <sup>c</sup> | Survival rate <sup>d</sup> | (E) <sup>e</sup> |
|------------------------|------------------|------------------|----------------------------|------------------|
| 1                      | 0.50             | 0.00             | 0.4                        | 0                |
| 2                      | 0.50             | 0.00             | 0.60                       | 0                |
| 3                      | 0.50             | 0.00             | 0.80                       | 0                |
| 4                      | 0.50             | 0.00             | 0.80                       | 0                |
| 5                      | 0.50             | 0.00             | 0.80                       | 0                |
| 6                      | 0.50             | 0.67             | 0.80                       | 430347           |
| 7                      | 0.50             | 1.00             | 0.80                       | 559864           |
| 8                      | 0.50             | 1.00             | 0.80                       | 771958           |
| 9                      | 0.50             | 1.00             | 0.80                       | 956812           |
| 10                     | 0.50             | 1.00             | 0.80                       | 1179234          |
| 11                     | 0.50             | 1.00             | 0.80                       | 1414750          |
| 12                     | 0.50             | 1.00             | 0.80                       | 1682813          |
| 13                     | 0.50             | 1.00             | 0.80                       | 1899491          |
| 14                     | 0.50             | 1.00             | 0.80                       | 2135438          |
| 15                     | 0.50             | 1.00             | 0.80                       | 2458802          |

<sup>a</sup>Parameter values for age classes 15–25 are assumed to equal the values for age class 15.

<sup>b</sup>Fraction of fish that are female.

<sup>c</sup>Fraction of females that are sexually mature.

<sup>d</sup>The survival rate is the probability that an individual entering a given age class will survive the influence of natural mortality to enter the next age class.

<sup>e</sup>Fecundity as the mean number of eggs per mature female.

\*A conditional mortality rate (Ricker 1975, p. 9) due to some single source of mortality (e.g., natural causes, entrainment, impingement, or fishing) is the probability of mortality due to that source in the absence of any other competing source of mortality.



## COMPENSATION RATIO

The compensation ratio (CR) is an index of the degree of compensation being utilized by an exploited population at equilibrium and is defined as

$$CR = \frac{\nu_e}{\nu_0}, \quad (1)$$

where  $\nu_e$  = viability index of the exploited stock and  $\nu_0$  = viability index of the virgin stock.

The viability index ( $\nu$ ) is a theoretical parameter which represents all of the density-dependent factors that operate throughout the life history of a population. It is defined as

$$\nu = \frac{1}{Ps_0}, \quad (2)$$

where  $P$  = potential fecundity per recruit and  $s_0$  = probability of survival from density-independent sources of mortality between the deposition of eggs and recruitment.

For purposes of this discussion we will now consider that an individual is recruited to the progeny population at the time it becomes one year of age. Thus, the power plant mortality resulting from entrainment and first-year impingement would be included in the parameter  $s_0$  such that

$$s_0 = s_n s_p, \quad (3)$$

where  $s_n$  = survival from natural causes of mortality for age class 0 and  $s_p$  = survival from power plant mortality for age class 0.

Potential fecundity per recruit ( $P$ ) is defined as the average lifetime production of eggs per recruit at equilibrium population densities, plus those eggs that would have been produced under conditions of optimum growth and natural mortality. Thus,  $P$  is the maximum average lifetime production of eggs per recruit under optimum conditions. This definition is selected to incorporate into the parameter  $\nu$  the effect of density-dependent fecundity and survival that might exist in the adult population. These density-dependent phenomena would tend to decrease the actual average egg production per recruit at equilibrium below the levels that would exist at low population densities.

The potential fecundity per recruit ( $P$ ) can be calculated from the following relationship:



$$P = \sum_{i=1}^n S_i E_i M_i F_i, \quad (4)$$

where

$S_i$  = maximum probability of survival from recruitment to age class  $i$ ,

$E_i$  = maximum mean fecundity per mature female in age class  $i$ ,

$M_i$  = maximum fraction of age class  $i$  females that are mature,

$F_i$  = fraction of age class  $i$  that is female,

$n$  = number of age classes in the population.

The parameter values needed to solve for  $P$  can generally be assumed equivalent to their values in a heavily exploited stock. This procedure assumes that the density-dependent growth and survival that might occur within the adults has been fully utilized. Specifically, no further reduction in abundance would cause the recruits to be subject to less natural mortality, to be more fecund upon maturity, or to mature earlier.

The probability for a recruit to survive to age class  $i$  ( $S_i$ ) is simply the product of the annual total survival probabilities to which the recruit is exposed prior to entering the  $i$ th age class. The total survival probabilities are higher in the case of an unexploited population than an exploited population. Thus, the value of  $P$  is higher for the unexploited population and the corresponding viability index,  $\nu$ , is lower for the unexploited population ( $\nu_0$ ) than for the exploited population ( $\nu_e$ ). The relationship simply reflects that the probability of an egg surviving to produce a recruit egg has to be higher in the exploited population.

Substitution of Eqs. (2) and (3) into Eq. (1) yields the following:

$$CR = \frac{\nu_e}{\nu_0} = \frac{1/(P_e s_0)}{1/(P_0 s_0)} = \frac{1/(P_e s_n s_p)}{1/(P_0 s_n s_p)} = \frac{P_0 s_n s_p}{P_e s_n s_p}. \quad (5)$$

Since the value of  $s_p$  for a virgin stock is unity and the density-independent natural survival rates for both the exploited and unexploited populations are equal, Eq. (5) further reduces to

$$CR = \frac{P_0}{P_e s_p}. \quad (6)$$

Computed in this manner the compensation ratio is a measure of the overall change in the survival and fecundity parameters that must have



occurred for a population undergoing exploitation to have stabilized at a new equilibrium. We can examine the impact of fishing mortality on the compensation ratio by plotting CR as a function of the conditional rate of fishing mortality,  $m_f$ , with no power plant mortality, that is,  $s_p = 1$ .

Results of the application of the technique to the striped bass population parameters previously used are presented in Fig. 3. For this set of population parameters the compensation ratio begins to increase sharply above a conditional rate of fishing mortality of about 0.35 (again, assuming that 20% of age class 2 and 100% of all older age classes are in the fishery). For example,  $m_f = 0.5$  requires an increase in CR of 64-fold above the conditions existing in the virgin stock just for the population to persist (Fig. 3). At  $m_f = 0.6$ , this value rises to 160-fold.

Obviously there must be a finite limit to the compensatory ratio above which the population cannot maintain itself. The critical limit is defined as  $CR_{crit}$ . Beyond this critical limit the population tends toward extinction unless and until the rate of exploitation is reduced. The difference between the existing compensation ratio of a stock and the critical limit is a measure of the compensatory reserve available to allow the stock to sustain additional stresses such that

$$\text{compensatory reserve} = CR_{crit} - CR. \quad (7)$$

The value of  $CR_{crit}$  may be impossible to ascertain accurately. However, it may be possible to employ estimates of the maximum sustainable rate of exploitation for a species. McFadden (1976) provided a summary of published exploitation rates\* for a variety of fish stocks which range from about 0.05 to 0.7. Of the values presented only about 7% were above a value of 0.5. Using equations in Ricker (1975), it can be shown that the combination of a conditional rate of mortality from fishing,  $m_f$ , of 0.55 and a conditional rate of natural mortality,  $n$ , of 0.2 (see Table 1) results in an exploitation rate of 0.50. If we assume that  $m_f = 0.55$  exceeds the compensatory capability of our hypothetical population, then we can compute a value for  $CR_{crit}$  that corresponds to that level of fishing. This calculation is done using Eq. (6) with  $s_p = 1.0$ . The variable  $P_e$  in the denominator of Eq. (6) is calculated using Eq. (4) with the  $S_i$  values reduced to reflect the additional mortality due to fishing. In our example this value would be about 100 (Fig. 3). In actual application the  $CR_{crit}$  value should be determined based on exploitation data specified for the species under investigation.

From a management standpoint it may not be necessary to estimate the  $CR_{crit}$  value above which the population can no longer maintain itself. Each CR value is associated with a specific equilibrium stock size. Thus, if we know

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\*Exploitation rate, denoted  $u$  by Ricker (1975, p. 5), is the fraction of the initial population killed by the fishery during a year.



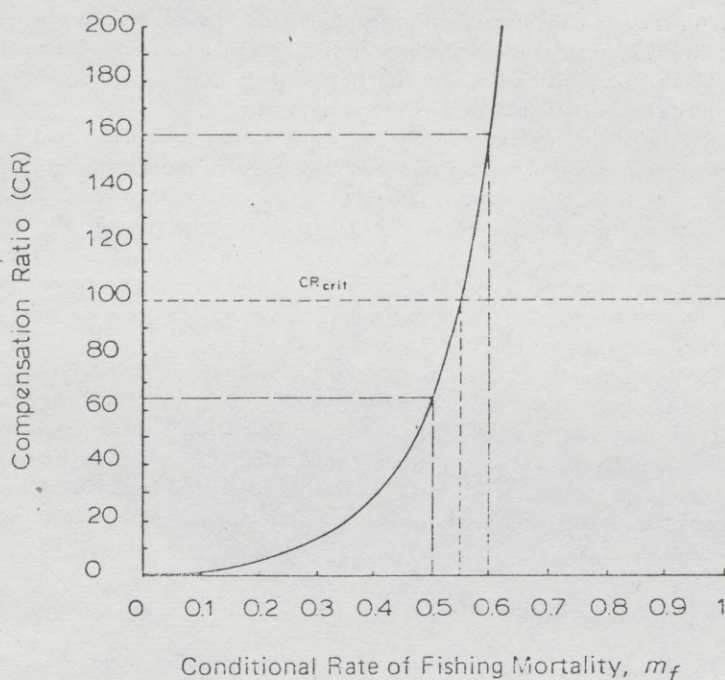


Fig. 3. Effect of fishing on the level of compensation that must occur to stabilize a striped bass population at the specified conditional rate of fishing mortality. A compensation ratio of 100 means that the combination of survival and fecundity parameters in the exploited population must be such that an egg is 100 times as likely to produce an egg in the succeeding generation as it would have been in the virgin population. The critical compensation ratio ( $CR_{crit}$ ) is the level above which the population can no longer sustain itself.

that serious stock depletion occurs with fishing mortality rates in excess of a given level, we can solve for a  $CR_{crit}$  value which corresponds to that rate of exploitation. This procedure would provide a standard against which the impact of additional sources of mortality, such as those imposed by power plants, could be compared.

#### COMPENSATION RATIO AND POWER PLANT MORTALITY

The impact of a power plant on the compensation ratio of a fish stock is determined by including the probability of surviving power-plant-induced



mortality ( $s_p$ ) into Eq. (6) and plotting CR as a function of  $1.0 - s_p^*$  for different levels of pre-existing fishing mortality. This procedure provides a technique for comparing the relative impact of the power plant both as a function of the level of mortality caused by the power plant and as a function of the pre-existing exploitation by fishermen.

This technique was applied with the striped bass population parameters previously used (Table 1) for various levels of fishing mortality (Fig. 4). The

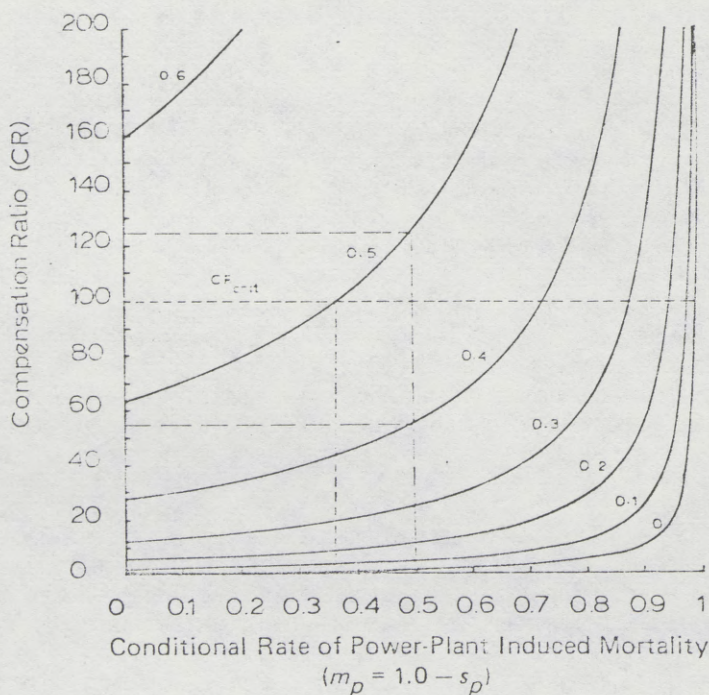


Fig. 4. Relationship between conditional rate of power-plant-induced mortality and the compensation ratio at various levels of the conditional rate of fishing mortality for a hypothetical striped bass population.

impact of power plant mortality on the compensation ratio increases as the fishing mortality rate increases. With no fishing mortality ( $m_f = 0.0$ ) the compensation ratio is about 2 for a conditional rate of power-plant-induced mortality,  $m_p$ , of 0.5. However, for  $m_f = 0.5$  the value of CR increases from

\*This is,  $(1.0 - s_p) = m_p$ , the conditional rate of power-plant-induced mortality.



62 at  $m_p = 0.0$  to 124 at  $m_p = 0.5$ . As a consequence of this observation, it is clear that the probability for power plants to induce sufficient mortality for  $CR_{crit}$  to be exceeded increases with increasing fishing mortality.

Assuming that we have determined a  $CR_{crit}$  value of 100, as developed in the preceding discussion, we can examine the impact of various levels of power plant mortality on the compensatory reserve of the stock. For example, with  $m_f = 0.4$  and no power plant mortality ( $m_p = 0.0$ ), the compensatory reserve in the population would be approximately 72 compensatory units (i.e.,  $100 - 28$ ; Fig. 4). The introduction of a power plant mortality of  $m_p = 0.5$  in the first year of life would decrease the reserve to about 45 units (i.e.,  $100 - 55$ ). However, if  $m_f = 0.5$ , the compensatory reserve of 37 units that exists with  $m_p = 0.0$  (i.e.,  $100 - 63$ ; Fig. 4) would be entirely consumed by a power plant mortality of  $m_p = 0.56$ .

Any analysis of the effects of power-plant-caused mortality on a fish population must consider all of the other sources of mortality that are being imposed by man's activities. Each additional source of mortality will remove some of the compensatory reserve of the stock until ultimately it can sustain no more. When this point is surpassed the stock will dramatically decline and may never be able to recover.

From the standpoint of managing our fish resources we should seek to maintain sufficient compensatory reserves to allow the populations to sustain additional unpredicted mortality. For exploited populations, the mortality caused by power plant operations will, at a minimum, reduce this margin of safety and make the affected resource more vulnerable to destruction.

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Senator CHAFEE. Bob, why don't you go ahead.

**STATEMENT OF ROBERT POND, EXECUTIVE DIRECTOR,  
STRIPERS UNLIMITED**

Mr. POND. Senator Chafee, my name is Robert Pond. I am the executive director of Stripers Unlimited, a nonprofit organization formed in 1965 to promote, conserve and protect the striped bass, and to protect and restore its environment.

We also promote and encourage research on striped bass in order to preserve it as a natural resource and seek to increase its areas of reproduction. We represent members from 21 States and two Canadian Provinces.

I am also president of Atom Manufacturing Co., manufacturers of the "Striper Swiper" fishing lures. Our company has contributed almost one-half million dollars in excise taxes to the Dingell-Johnson fund over the past 30 years.

Stripers Unlimited is particularly interested in the Maryland strain which is unique because of its bouyant egg. It would be extremely valuable for starting new populations in the dammed rivers of the Northeast.

As early as 1966, because of my conservation training in forestry college, I recognized the need for coastal management of stripers if we were to avoid the cycles of abundance and scarcity which are so devastating to a sport fishery. We publish an annual guidebook for our membership concerning conservation problems and solutions affecting striped bass.

Even as far back as the 1930's, Dr. Daniel Merriman, who published a most comprehensive study of striped bass, stated that the three major threats to the survival of the striper population were pollution, loss of habitat, and overfishing. These three problems have worsened drastically in the intervening years.

In 1967, Dr. Saul Salla of the School of Oceanography at the University of Rhode Island, suggested to us that, in order to improve the sport fishery for striped bass and to alleviate the fluctuations in the cycles of scarcity and abundance, we could attempt to set up new areas of reproduction in rivers of the Northeast, and he outlined such a program.

In 1969, Stripers Unlimited embarked on a transplant program, which over the last 10 years has cost some \$90,000, derived from membership dues and private donations. Through these years we have sought the advice and help of the scientific community.

In the spring of 1969, with the help of a graduate student from the University of Rhode Island and a tank truck from the university, ripe males and females from the Nanticoke River in Maryland were transported to the National Fish Hatchery in Edenton, N.C. Nathan Powell, superintendent of the hatchery, and his biologists, unfortunately, were unable to produce any swim-up fry due to the excessive die off of the Maryland eggs. Mr. Powell, a very knowledgeable fish culturist, had worked on Maryland striped bass eggs the previous year. He processed the eggs from the fish we brought him, but after 24 hours all the eggs died.

On our return trip, we obtained more eggs from the Nanticoke and took them to the University of Rhode Island, but again our efforts were unsuccessful.



In 1970, Stripers Unlimited observed and photographed hatchery operations at the National Fish Hatchery in Edenton, N.C., and also at the State Hatchery in Weldon, N.C. We were given our own hatchery equipment at Weldon and allowed to hatch out the roe of one female striper. We returned home with approximately 10,000 day-old fry. We raised these successfully, familiarizing ourselves with feeding techniques. We took these fingerlings to several sportsmen's shows, with no apparent ill effects.

In 1971, Stripers Unlimited set up a temporary hatchery on the Nanticoke River in Maryland in conjunction with State personnel from Louisiana, Florida and Alabama. We again observed an excessive die-off of the eggs. The eggs seemed weak; the cell walls ruptured easily; and the chorions, the outer protective membrane, disintegrated much too soon.

We shared the few viable eggs among the four groups and gave some to the National Fish Hatchery at Edenton.

Within 3 weeks, the few thousand fry we had managed to save had all died. We had observed several strange patterns of behavior in the larval fish. They all gathered on the surface, behaved in a disoriented manner, finally became paralyzed and died.

Stripers Unlimited personnel returned to Maryland, to the Chesapeake-Delaware Canal, where spawning was still in progress. This time we worked with Ichthyological Associates and biologists from Mississippi. Again we observed the same abnormalities in the developing eggs and larvae, and again we lost them all within 3 weeks.

We then went to the Hudson River and obtained males and females, which were brought to the University of Rhode Island. The Hudson is where I first met Bob Boyle. We had no scientific permit to net fish in the Hudson, so we worked with Bob who possessed a permit. Working with members of the Hudson River Fishermen's Association, we were netting from property belonging to the Federal Government late at night. Suddenly lights began to flash and the police arrived. They began to question us about our activities. Bob Boyle had gone off somewhere, leaving us in a totally untenable and illegal position. Fortunately, he returned and explained the situation. We obtained males and females, which were brought to the University of Rhode Island. They were not ripe however. Because of the behavior patterns we had observed in the fry, it was suggested that we have the eggs analyzed for DDT. Our fry had exhibited signs similar to those of DDT poisoning.

Professor Charles Olney of the University of Rhode Island did the analysis and found 12 parts per million combined pesticides in the eggs, well above the 4.75 parts per million which had been fatal to lake trout fry at Lake George, N.Y.

In 1972, 1973 and 1974, conditions steadily worsened, with survival rates dropping. Other State agencies gave up on their efforts to hatch Maryland striped bass eggs. The University of Rhode Island collected eggs and larvae from the river in 1975 and 1976, and we observed the same abnormalities in these as in the hatchery operation.

In November 1975, because of the lack of reproductive success in Chesapeake Bay and because of the abnormalities we observed in the eggs and fry, we filed for a threatened species classification



under the Endangered Species Act. Our petition was rejected, with no mention being made to the points we had raised. The National Marine Fisheries Service concluded their letter of rejection by stating: "The striped bass populations of Chesapeake Bay and the Hudson River are not now threatened with extinction and are unlikely to become so in the foreseeable future."

Senator CHAFEE. What date was that?

Mr. POND. It was in November, 1975 that we received their letter of rejection. We went to see Rogers Morton, who was then Secretary of Commerce, and talked to his aide. He did not seem able to comprehend the problem. They were looking at catch records, we were looking at damaged eggs and larvae. We were seeing the bottom line and they couldn't or wouldn't believe that our observations were valid.

In the spring of 1976, less than 1 percent of the fish captured during the spring harvest of striped bass in Maryland were new fish entering the fishery. Historically, these 3-year-olds made up 50 percent of the harvest.

These figures and accompanying charts foretell a poor future for the striper, if it indeed has a future at all.

Our observations included the following:

One, ripe eggs were highly contaminated with chlorinated hydrocarbons and other pollutants.

Two, eighty percent or more of the eggs were destroyed by the stretching and tearing of the egg membranes. We were photographing the eggs and larvae from the side and could see the eggs tearing apart. Most people were observing the eggs from the top and missed seeing the damage. We finally concluded the damage resembled what happens to osprey and eagle eggs when these same chemicals are present.

Three, the outer protective membranes broke up to 12 hours too early, leaving the inert larvae helpless.

Four, Surviving sac-fry became paralyzed and died before their jaws were developed.

Five, the oil in the oil globule, upon which the sac-fry live for their first few days, was highly contaminated by chlorinated hydrocarbons and other pollutants.

Six, ninety-nine out of 100 of those surviving fail to inflate their swim bladders.

Seven, surviving fingerlings were extremely nervous and hyper active and succumbed to the slightest shock. We requested Dr. Bob Stevens, developer of the hormone treatment of striped bass to ripen them in captivity, to send us stripers of the same year from Florida by air. These replacements lived through the show and suffered no ill effects.

We feel that future research should include the following:

One, scientific observations of the signs we listed above, plus electron-microscopic studies of the various life stages of the eggs and larvae.

Two, stress tests should be conducted on yearling striped bass from Maryland, North Carolina and South Carolina for comparative results of the different populations.

Three, biochemical research into how pollutants might inhibit enzyme reactions in the developing eggs and larvae.



Four, remove young brood stock to a clean environment and allow them to spawn there to see if their eggs are of a better quality than the contaminated stocks.

Five, study the feasibility of starting new populations in other coastal areas.

We strongly support this bill and see it as a culmination of our efforts to educate the public to the need of research on striped bass before it is too late. We are more than willing to help in any way we can. A member of our board of directors, who is a biochemist, formerly of Woods Hole, has offered his services as an advisor on research needs in the biochemical field—which we feel is so important.

Thank you.

Senator CHAFEE. Thank you. Bob, I can't help but be impressed at the tremendous amount of work Stripers Unlimited has done. What is your membership?

Mr. POND. We have about 750-1,000 members. It fluctuates annually. We have a core of about 20-30 really dedicated workers.

Senator CHAFEE. You have done an extraordinary job here, and I suspect you are one of the most dedicated members.

We have promised we would stop at 5 minutes of 10:00. Frank Whitamore of Save the Bay has asked to say a few words.

Gentlemen, I just want to say the suggestions you have made have been excellent. The paper you submitted and your proposals, Bob, I didn't know it was as bad as you outlined it.

Mr. POND. The problem is something you have to observe through a camera or microscope. We took hundreds of pictures in obtaining these examples of damage.

Senator CHAFEE. It is sort of like what has happened to bird eggs as a result of DDT, the shell is too thin.

Mr. POND. Our proposal is to have biochemists go to Maryland to observe the spawning runs and observe the problems.

Senator CHAFEE. Thank you very much.

Frank Whitamore, who is chairman of the board of Save the Bay, will be our next witness.

#### STATEMENT OF FRANK WHITAMORE, CHAIRMAN OF THE BOARD, SAVE THE BAY

Mr. WHITAMORE. My name is Frank Whitamore and I am chairman of the board of Save the Bay. I will read this so we won't take any more time.

I just want to assure this group that Save the Bay, with 20,000 members, is very interested in what has transpired here tonight. I would also like to assure that Save the Bay is doing all in its power to restore and improve the quality of the water of Narragansett Bay, and all the waters of Rhode Island and nearby Massachusetts.

We are deeply involved in attempting to reestablish pretreatment of all sewage entering these waters. We are working for implementation of pretreatment practices in the plating glass industry.

We are the watchdogs over possible marsh and wetland alteration. We are striving to achieve a physical environment that will complement legal and legislative efforts, which we are here this



evening to endorse. We stand ready—20,000 members—to aid in any way that we can.

Save the Bay is currently involved in its annual membership drive, and we sure would appreciate your help. It costs money to fight.

Thank you very much. Thank you, Senator.

Senator CHAFEE. Thank you.

Now Jim Pollack wanted to say something.

#### STATEMENT OF JIM POLLACK, DIRECTOR, STRIPERS UNLIMITED

Mr. POLLACK. Senator Chafee, I had some prepared comments, but I think most of them have been covered, and eloquently. I am a director of Strippers Unlimited and a member of the Massachusetts Coastal Resources Advisory Board.

I want to thank you for bringing all of us an opportunity to come here and talk with you. I can assure you we have a lot of fishermen who vote.

Senator CHAFEE. I hope they all don't live in Massachusetts.

Mr. POLLACK. I see people from New York are here, people from Massachusetts and Rhode Island, of course.

I want to get my name in the record so my wife will know I am here. I have been doing a lot of fishing, and over the years have been taking home fewer fish. When I come home Sunday night after striped bass fishing, I don't have any fish to show. It is going to get to be a problem. So I think on selfish reasons I am here trying to express our confidence in your bill and trying to get some more fish in the water.

I don't think there is a conflict between the commercial and sports fisherman. I think we are all interested in getting more fish in the water. I don't think the management program is enough. The management program just tells you how you are going to allocate among many with respect to the fish that exist. I think what you have to do is basic research if we are going to find out how the fish are declining and how to get the population restored.

I want to commend Allen Peterson in Massachusetts for the courage that he had in involving the citizens in Massachusetts' Subcommittee on Striped Bass in the Atlantic Marine Compact. I think it is working very well under that format, and I think there should be a striped bass citizens' advisory commission in your will. I recommend that strongly, as have others previously.

I think that is about the extent of my comments.

Thank you.

Senator CHAFEE. Thank you very much. I just want to conclude with a little quote from John Cole's book, and many of you have probably seen this quote. He is talking about what Captain John Smith wrote 350 years ago in 1614. He said this, which I think we will all subscribe to:

The bass is an excellent fish, both fresh and salted. One hundred, where after salted, at market have yielded five pounds sterling. They are so large the head of one will give a good eater a dinner, a daintiness of diet to exceed the marrow bones of beef. They are of such multitude that I have seen stopped in the river close adjoining to my house than with the sands one tide to much that load a ship of a hundred tons. I, myself, at the turning of the tide have seen such multitude pass out of a pond that it seems to me that one might go over their backs dry shod.



Now those days have gone for a while. I think if we all put your effort into this, we will do our vest best to see those days again.

We have letters for the record from the Massachusetts Wildlife Federation and from Deborah Westin of the University of Rhode Island.

[The letters referred to follow:]



*Massachusetts Wildlife Federation**The State Affiliate of*

NATIONAL WILDLIFE FEDERATION

P.O. Box Q, BURLINGTON, MA 01803

71 Cliff Road  
Wellesley Hills, MA 02181  
April 9, 1979The Honorable John H. Chafee  
United States Senate

Dear Senator Chafee:

Let the record show that the Massachusetts Wildlife Federation Inc., appeared at the April 9 hearing held by the Committee on Environment and Public Works to express favorable support for a bill for Emergency Research on the Striped Bass.

We in Massachusetts have witnessed the abrupt decline in recent hatches of striped bass. Whether the cause is pollution, overfishing, or some other factor, the data must be obtained and corrective action instituted. The striper plays an important role in the economic and aesthetic life of the Massachusetts fishermen. The breed must be saved.

All the state-affiliate members of the Massachusetts Wildlife Federation support this position. In particular one group, the Plum Island Surfcasters, asked to be specifically recorded in favor.

Your acknowledgement of this letter would be appreciated.

Sincerely,

MASSACHUSETTS WILDLIFE FEDERATION

*Kemp Maples*Kemp Maples for the  
Board of Directors

mtt





University of Rhode Island, Kingston, R.I. 02881  
Graduate School of Oceanography, Narragansett Bay Campus

4 May 1979

Hon. John H. Chafee  
United States Senate  
Committee on Environment and  
Public Works  
Washington, D.C. 20510

Dear Senator Chafee:

The enclosed synopsis of the data available on the striped bass may be of some assistance to you and the Committee in your efforts to understand the fish and its problems. This edition is out of print, but has been updated through March 1979 and is part 2 of our final report to the EPA. We have just completed a five year study aimed at developing culture techniques for the striped bass for this agency and the report will be out later this year in their Ecological Research Series. We have all of the studies cited in this report available at URI.

During the course of your recent hearing in Rhode Island, I made some notes on comments which I felt needed clarification which I will share with you. First, there are current research programs for striped bass throughout the country which have been doing studies for a number of years. The Bureau of Sport Fish and Wildlife supports continuous research on striped bass at its Marion Laboratory (Alabama) under direction of Dr. Blake Grant. Extensive research, in cooperation with the California Fish and Game Department, is being carried out at the NOAA Tiburon Laboratory under the direction of Dr. Jeannett Wipple. Both state and federal hatcheries (see section 7.1 of the Synopsis) receive funds for striped bass production and related studies. There are many other studies funded on individual spawning rivers, primarily as part of power plant site evaluations. Results of many of these were presented at the American Fisheries Society meeting last August. These are scheduled to be published later this year. Second, in reference to specific points made at the Rhode Island hearing, I have the following comments:

NOTE: The synopsis referred to in this letter has been retained in the committee files.



1) The manuscript submitted by Mr. Cole of work presently under review, or in press, by Mr. Glen McBay of the U.S. Fish and Wildlife Service should only be cited after contacting the author (Federal Building, Rm. 332, Brunswick, Ga. 31520).

2) Work we have completed, which will appear this year, indicates that the larger female bass produce heavier eggs. This increased egg weight seems to be in the yolk present and thus would be of direct benefit to the developing larvae, especially during the time it spends searching for its first food.

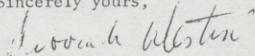
3) There is a 1979 paper out on the cycles in year class abundances by Webster van Winkle and others (Oak Ridge National Laboratory, Oak Ridge, Tennessee).

4) New studies on swim bladder inflation (Dr. S. I. Doroshev, Univ. of California, Davis) indicate that filling is a function of amount of dissolved gases, especially oxygen, in the rearing water. That is, insufficient gas appears to retard filling.

5) Finally, anyone who has worked with naturally spawned (river collected or tank spawned, preferably non-injected females) and artificially spawned (hormone injected and/or stripped) striped bass eggs agree there is a noticeable difference in the early mortality prior to hatching and often early larval mortality also. This was first documented by Shannon (1970), but has received no direct study since. It is a factor which should be kept in mind, especially when comparing laboratory studies to field situations.

I hope this information is helpful to you in your effort to do something for striped bass along our coasts. It is a wonderful fish to work with as well as see in our waters, both esthetically and biologically. If there is anything we can do, please do not hesitate to contact us. Best of luck.

Sincerely yours,



Deborah T. Westin  
Marine Biologist

Senator CHAFEE. Thank you all very much for coming.  
[Whereupon, at 9:50 p.m., the subcommittee recessed, to reconvene subject to call of the chair.]

[The publication submitted for the record by Mr. Boyle, and a statement from the Conservation Council of Virginia follow:]



S.838

Proposed Striped Bass Emergency Research  
Amendment to P.L.89-304  
The Anadromous Fish Act.

Senator John H. Chafee  
Rhode Island Junior College  
Warwick, Rhode Island

9 April, 1979

John Cole's eloquent lament for "...a creature whose poetry has nourished the souls of men..." might be the trigger that will explode an astonishing lethargy into a structured course of action. In the event of such a happening, his name should be inscribed in bronze alongside Isaac Walton. His difficulty in understanding the inertia surrounding the plight of the striped bass is quite understandable, since the condition seems to defy rational explanation. Root causes, however, become more discernable, as one involves himself with the problem.

The legal, the administrative, the economic and the scientific environment in which the "...natural preserve of a natural god..." swims its way to oblivion, are as much responsible as are the indeterminant factors influencing its chances for survival. Given an opportunity, the striper has an incredible capability to survive, and the apparent will to do so. There is no question that substantial sums of money will be required to assist this natural effort. But it must be recognized that money alone will guarantee nothing, and unless the total of the problem is addressed emphatically, and in all its specifics, there seems little future in appropriating funds.

By definition, an anadromous fish needs fresh water to spawn. This particular species, seasonally moving coastwise from the Virginia Capes to New England, and rarely beyond territorial waters, has been abused out of nursery after nursery, until, today, a minimal number of spawning sanctuaries are the last hope for the stabilization of mortality. This last hope is the one which must be realized as a precedent to any measurable improvements leading to enjoyment by future generations. In and of itself, this proposes no small problem. It seems fair to say that in the achievement of this first objective, one may reasonably foresee the format for the long range preservation of the striper.



While there are identifiable marine populations along sections of both coasts and parts of the Gulf, as well as hybrid and stocked populations in many fresh water impoundments, we will confine our remarks to the range of the species previously described. This encompasses eleven coastal states from North Carolina to Maine.

In this area there is a minimum of eleven different regulatory agencies, at least twice that many marine science activities funded by various Federal, state and private sector interests, and a wide variety of concerned users. In this last category we include recreational, charter boat, and commercial fishermen.

The economic impact of the striper has been measured in the value of the charter fleet at Montauk, Cuttyhunk, Sakonnet Point and the Atlantic Highlands; in the value of the haul seine harvest at East Hampton and/or on the Outer Banks, and by the gill netters take home pay on the Rappahannock. The fishery is populated by those who would have it declared an endangered species and summarily closed, and too, by those who would maintain a sustained fishing effort right down to the last fish. This polarized thinking reflects no real appreciation of the other fellow's problem, and gives little evidence of any interest in compromises which might produce some common good. New Englanders may legally possess all the 50 pound fish they can catch, while a Maryland fisherman is restricted to 15 pounds, and a Virginian to only two of roughly 40 pounds.

When the Hackensack, the Passaic, the Toms and the Forked Rivers in New Jersey, the Connecticut, Thames, Blackstone, the Merrimac and the Saco all provided viable spawning and secure nursery areas, local regulation and conflicting philosophies were understandable. Today, when one of the few areas of scientific agreement suggests that the Chesapeake, the Roanoke, and the Hudson are the only significant sources of resupply, failure to equalize these regulations, on an emergency basis, only seems to demonstrate the inertia and document the polarization.

In the early part of 1978 two committees, one comprised of citizen users, and one of marine biologists representing each of the Northeast Atlantic



States, were formed at the instigation of the Atlantic States Marine Fisheries Commission. Funding was to be provided by the State-Federal Office of the National Marine Fisheries Service in the Department of Commerce. The assignment was, ostensibly, for the citizens and the scientists, working together, to examine the problems and develop a fishery management plan for striped bass. More than a year later very little significance has been concluded, and nothing of significance has been done. This last observation should, in fairness, be modified to recognize the efforts of the Maryland Watermen's Association, which, with \$500.00 of their own money, reclaimed and operated an abandoned facility to hatch 125,000 experimental striped bass fingerlings.

The stated reason for this stagnated effort is that old sore, "lack of funds". Granted that, at the present time, the administrative agencies are victims of the Proposition 13 Syndrome, that they are under executive pressures to economize, but is it not fair and reasonable to ask where, within these structures, they place their priorities? To ask where, in the recent past, their attention has been directed? The plight of the striped bass didn't come to light with the establishment of the committees, nor with the publication of John Cole's book.

In October 1970, a striped bass sub-committee of ASMFC reported, "There is no question that the striped bass resource supports a major fishery"... that, "...the resource might be considered an almost classic example of a fishery which is both important and extremely diverse...", that, "...we wish to avoid (any) unfavorable inference that no attempt should be made to manage a stock until after it has suffered some serious degree of decimation.", and that, "...striped bass stocks are in relatively good condition and catches appear to be near all-time highs." This 1969-1970 committee concluded that it "...could not design a coastal management plan at this time..." citing the need for a "new body of fishery theory" as a vital prerequisite.

It is now ten years later. According to the best available figures, between 1967 and 1973 commercial fishermen average landings per year were on the order of 10 million pounds worth \$1.7 to \$3.7 million dollars. Recreational fishermen are charged with catching 73.2 million pounds in



1970 alone. Since that time the stocks have steadily declined, and the dockside price to commercial fishermen advanced from .37¢ to its present dollar plus, a pound. During this same ten years there has been "88-309" money, "89-304" money, Sea Grant funds, and no doubt, private capital, if it were solicited, all available for the development of the "new body of theory". Yet, today, we are told it will take another three to five years to accomplish all the research necessary to provide a management plan.

A recent indexed bibliography, compiled by a private enterprise, marine research corporation, lists one thousand five hundred and five papers devoted to the study of striped bass. It cites more than 400 studies dealing with populations and management, more than 850 on distribution of stocks, 150 on migration, another 175 on spawning and reproduction, and it lists 9 other bibliographies.\* Truly, the charge that the striped bass has been studied to death is a succinct analysis of where we are. The administrators choose to wait for scientific recommendations before regulating, and the scientists, apparently giving little credence to all the technical work that has been done, promise constructive reporting in three or four years, if funds are available. In the meantime, "...this creature whose poetry...", "...this natural preserve...", out of compulsion, is fending for itself, obviously without too much success.

The thrust of these comments is twofold: First, to strongly endorse the amendment which will provide funds earmarked exclusively for striped bass research, and to wholeheartedly subscribe to the use of the word "EMERGENCY" in moving the amendment, appropriating the money, and its ultimate allocation. Next, to place on the record some thoughts which should be considered if we are to realize measurable progress toward the purposes of the amendment.

As a preface to expressing these thoughts, proper respect must be paid to the wording and the philosophy of the Atlantic States Marine Fisheries Compact. If the implementation of its philosophy, in the instance of the striped bass, seems less than aggressive, the Compact and the Commission should still be considered the proper vehicle for carrying the responsi-

\* Some papers are indexed under several subject categories.  
Ichthyological Associates, Inc.  
Bulletin 13. April 1976.



bilities of the enabling legislation. The structure is existing, its members are known to one another; and, through its ultimate decisions, the highly desirable integrity of the individual states, and management of their unique local problems, is preserved.

Briefly then, these recommendations derive from an attempt to analyse the alleged inertia cited by John Cole. In such an effort one finds some of the contributing factors to be:

1. The socio-economic complications which proved to be the major stumbling block to the 1969-1970 committee still exists. In simplest terms they translate into an understandable reluctance among the various states to take any individual action which might place their resident users at an economic disadvantage. If this was considered lethal at a time when the dockside price was .37¢, what chance then for individual state action when the price is over one dollar?  
For this reason the concept of a subsidy for those who derive a significant portion of their livelihood from their catch of striped bass should be considered if seasons, closures, or quotas are judged necessary.
2. The tremendous increase in fishing effort, improvements in fishing equipment and methods, the increase in the dollar value have all brought a significant number of occasional sellers of fish into the market.  
For this reason, a permit to sell striped bass, with a substantial annual fee, administered on a Dingell-Johnson formula should be required. Its proceeds could provide some or all of the matching funds required under sections of this amendment.
3. There appears to be a significant lack of enthusiasm for applied research or for expenditures to implement research that has been accomplished. The definition, and, if necessary, the acquisition of spawning and nursery areas, experimental stocking and restocking, fish ladders, LANDSAT surveillance of migration, and recruitment of the fishery users to provide research assistance come quickly to mind.



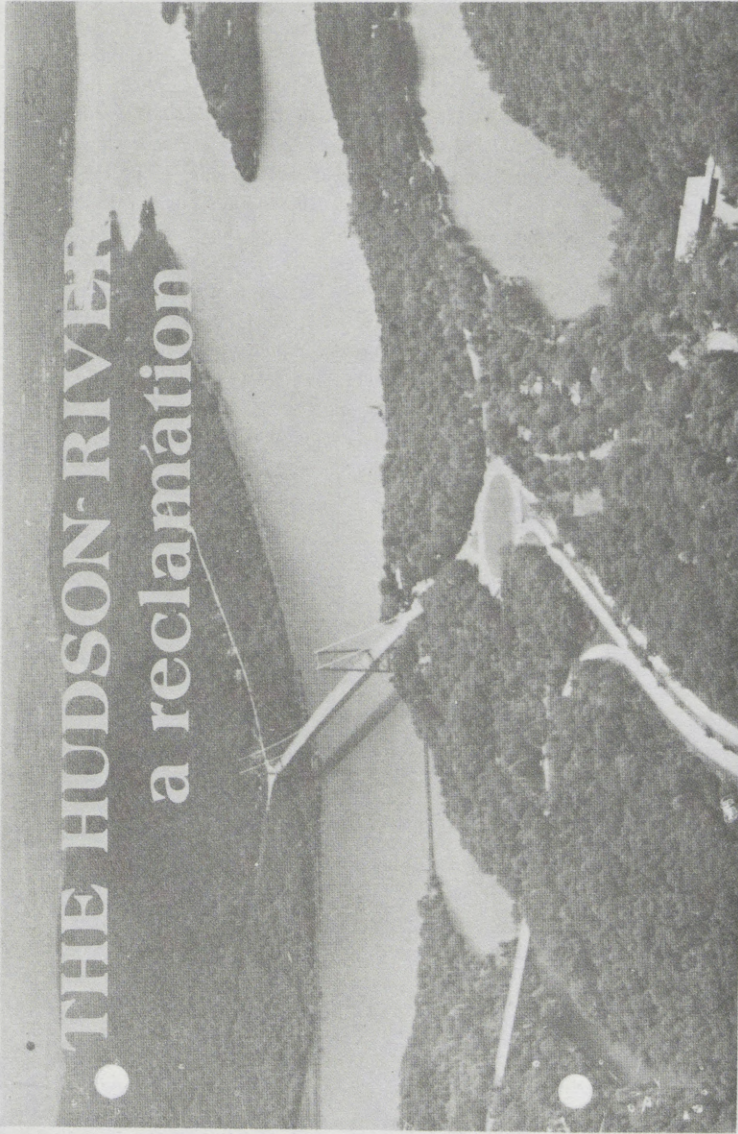
For this reason it would seem that the expenditure of the funds provided by this legislation might realize their most beneficial return if a committee of users, representing in equitable numbers all the categories, headed by an impartial task force leader, were given administrative oversight for the funds made available under this amendment. It could be hoped that the decisions of such a group would not only produce fresh concepts for approaching the problems but would also result in coordinated, efficient, and productive technical effort.

4. Finally, either by means of this legislation, or some other action of the Congress, steps should be taken to fund a necessary legal research effort to resolve the apparent constitutional roadblocks to effective and acceptable State-Federal cooperation in matters of the coastwise fishery, and to effective and acceptable methods of facilitating local, limited entry regulations.

James F. McHugh  
Conservation Council of Virginia  
Angling Clubs  
28 Research Drive  
Hampton, Virginia 23666  
Tel. (804) 838-6866



# THE HUDSON RIVER a reclamation





**To Federal Officials and Congressional Delegates:**

A serious toxic waste problem is plaguing the great and historic Hudson River. The bottom sediments of the river—from Ft. Edward to the Battery in New York City—are laden with PCBs, a group of toxic chemicals once discharged to the river by two upstate General Electric manufacturing plants.

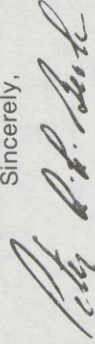
New York State has spent \$1.3 million on a series of comprehensive scientific studies and field investigations to measure the extent of the problem and explore the feasibility of removing the contaminated sediments.

The studies have been completed and we have developed a pilot removal program. But we are running out of money. We need \$25 million more to remove the most highly concentrated deposits which make up about three-quarters of the total PCB load in the upper riverbed.

We must act now. Fish and other organisms living in the river are already heavily contaminated and cannot be eaten. Riverside communities which obtain their drinking water from the river are worried about ingesting PCBs. And a potential multi-million dollar loss in the river's commercial and sport fisheries, both freshwater and marine, is feared.

The department has used up its resources and is now turning to Washington to help solve this significant national problem which, unfortunately, is plaguing virtually every American waterway.

Sincerely,



Peter A.A. Berle  
Commissioner



A toxic environmental contaminant continues to cripple a multi-million dollar segment of New York State's economy, endanger the drinking water supply for thousands of residents and seriously curtail recreation on one of the Northeast's greatest rivers.

The Hudson River, which springs to life in New York's Adirondack Mountains, is polluted with an elusive chemical called polychlorinated biphenyls (PCBs), once discharged to the stream as an unwelcome by-product of our industrial society.

While PCBs are present in virtually every river in the nation, studies show that the Hudson ranks first in the degree of contamination of its water, bottom sediments and aquatic life.

Besides posing a potential health problem for thousands of residents who obtain their drinking water directly from the Hudson River, PCB contamination has also had an adverse effect on the state's commercial fishing business.

Commercial fishing has already dropped off 60 percent since the state imposed its fishing restrictions, and the demise of what has been estimated as a multi-million dollar commercial and sport fishery, both freshwater and marine, is feared by some.

New York State's Department of Environmental Conservation in 1975 imposed a commercial fishing ban on the Hudson from Troy to New York City, and an overall fishing ban on the upper stretch from Troy to Ft. Edward. Commercial fishing for striped bass and eels has been banned.

The department, along with 13 independent scientists and environmentalists from around the nation, has explored ways to rid the stream of the toxic PCBs. Those 13 concerned citizens, who make up the PCB Settlement Advisory Committee\*, and department researchers have concluded that a massive, innovative clean-up program is needed to restore the Hudson.

That restoration can only be accomplished, it seems, when the state and federal governments become partners in this nationally significant effort.

### GE Discharges

PCBs were first developed by chemists in 1929 and used as electric insulators in capacitors and transformers. In 1975, state environmental officials took action against two General Electric manufacturing plants located along the upper Hudson. The factories were discharging thousands of pounds of waste chemicals into the river each year, in the effluent from their capacitor manufacturing operations. During administrative hearings in 1975 and 1976, the company was found guilty of violating water quality standards. The plants were ordered to reduce their PCB discharges to the Hudson and to begin work on a wastewater treatment facility.

The department set a national precedent when it successfully pursued GE for discharging a chemical contaminant for which no specific legal discharge limit had ever been established. The entire incident also focused

\*PCB Settlement Advisory Committee on page 16



nationwide attention on the use of toxic chemicals which, once released into the environment, are extremely difficult to control.

Despite the administrative solutions and complete elimination of discharges to the river, PCBs remain imbedded in the bottom sediments, adversely affecting the water quality. As a result of the hearings, a settlement between GE and the state was reached in which both parties — sharing the responsibility — agreed to fund research on ways to remove the chemicals from the river.

The case also established a precedent of "joint culpability" on the part of government and industry in dealing with this type of pollution case where the company was discharging PCBs in violation of water quality standards, but it had federal and state permits to do so. The hearing officer blamed the discharges on corporate abuse and regulatory failure by both federal and state agencies.

#### The Settlement

As a result, a \$7 million settlement was reached with the company paying the department \$3 million for research and agreeing to conduct \$1 million worth of additional in-house studies on PCBs and their substitutes. The department agreed to match the GE cash contribution with a comprehensive program of research and abatement work. The advisory committee was also created as part of the settlement, in which several environmental groups acted as intervenors.

GE was ordered to stop using PCB compounds in its New

York State plants, to immediately limit its monthly average discharge as it phased out PCB use and to begin work on a \$3.5 million treatment facility, which is now operating.

In addition to its own studies, the department, on the committee's recommendation, commissioned eight outside research firms to monitor the locations and levels of PCBs in the river and organisms living in the river, investigate the feasibility for remedial action, and explore a host of other scientific and engineering questions concerning PCB contamination in the Hudson. The United States Geological Survey also studied and monitored PCB sediment flow into the river's ecologically sensitive estuary, the feeding and breeding habitat for many fish species.

GE, in turn, began to investigate ways of removing or treating PCBs in liquid and sediments dredged from the river; suitable substitutes for PCBs in its capacitor-manufacturing operations; and the impact of various hazardous chemicals on the environment.

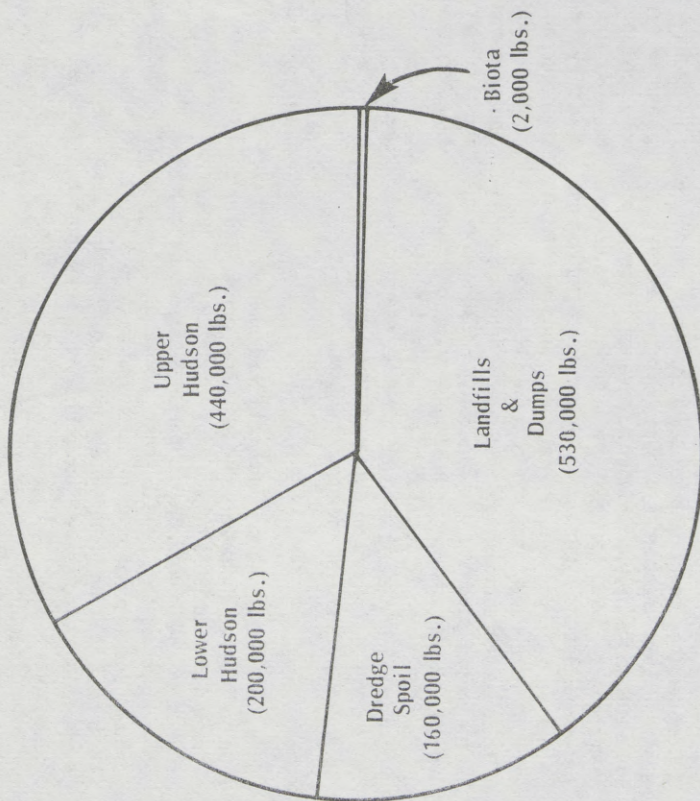
Most of these studies have been completed. While much remains to be studied, more is known today about the Hudson and its ecosystem as a result of these studies than ever before.

The next step is to resolve the problem. And that takes money.

#### Pilot Plan

For the state to continue its reclamation plan for the Hudson, additional money is needed to send in clean-up crews to remove the offending chemicals and monitor the effects of reducing PCB sediment flow.





POUNDS OF PCBs IN THE HUDSON RIVER BASIN

|                           |                          |
|---------------------------|--------------------------|
| Upper Hudson              | 5,700 lbs.<br>(per year) |
| Lower Hudson              | Unknown                  |
| Dredge Spoil              | 170 lbs.<br>(per year)   |
| Landfills<br>and<br>Dumps | 800 lbs.<br>(per year)   |
| Biota                     | Variable                 |

POUNDS OF PCBs RELEASED FROM THE HUDSON RIVER BASIN INTO THE ESTUARY



The department has developed a pilot program in which PCB-laden sediments in the river will be removed through dredging. The dredging operation is based on recommendations made in environmental and engineering studies commissioned last year.

Several alternatives to dredging were also studied by the researchers; however, all other options were found to be impractical and unworkable because of yet-untested methods, high costs, non-applicability to the Hudson, or tremendous ecological side effects.

Some of the alternatives included bio-harvesting of contaminated fish in an effort to remove PCBs; adsorption of PCBs by oil-soaked mats; adsorption of PCBs by activated carbon; destruction of PCBs by ultra-violet ozonation; destruction by chemical treatment or biodegradation.

Development of sufficient technology to evaluate some of these alternatives would take from 5 to 10 years and cost several million dollars.

Current plans call for the removal of about 75 percent of the total PCBs from several "hot spot" (highly concentrated) areas along the river's upper reaches. This will cost about \$25 million and will herald the beginning of the Hudson's restoration. The plan would involve three years of dredging and result in removal of about three-quarters of the total 440,000 pounds of PCBs from the river north of Troy.

A 40-mile segment of the upper river is included in the

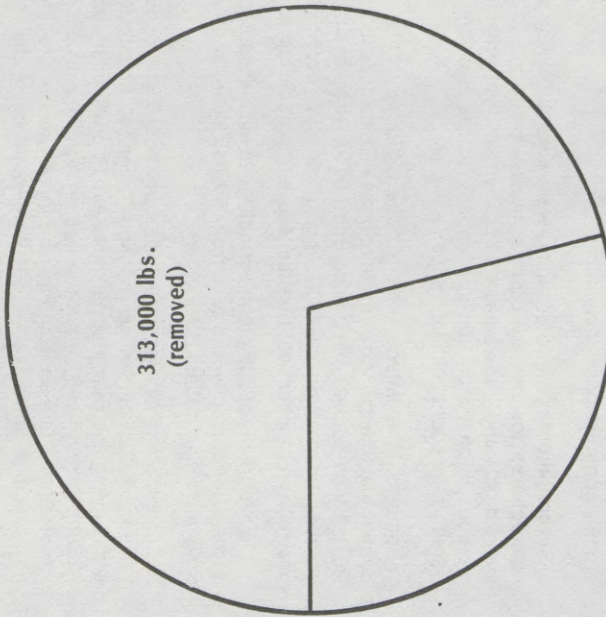
state's canal system. The estimated 340,000 pounds of PCBs that will be removed by "hot spot" dredging of the upper Hudson includes 50,800 pounds which would have been removed through normal maintenance dredging by the New York State Department of Transportation, under its responsibility of maintaining and improving the canal system.

Although the combination "hot spot" and maintenance dredging admittedly falls short of complete removal of all PCB deposits, it will serve as a trial program in which a sizable portion of the contaminants can be removed and the effectiveness of the project judged, and at a much smaller cost, both financially and environmentally. Estimates for dredging the entire contaminated section of the upper river range up to \$204 million. In addition, dredging this entire 40-mile segment from Ft. Edward to Troy would take about a decade and involve substantial environmental disruption, according to environmental and engineering studies.

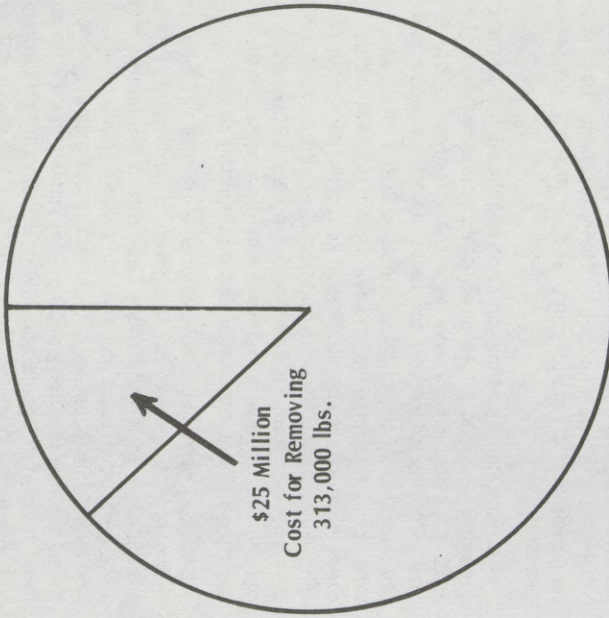
Besides removing three-quarters of the PCB-laden sediments, "hot spot" dredging would also have another beneficial effect on the river. The bottom sediments have also been shown to be contaminated with organic pollutants and other toxic materials, and partial dredging would remove these sediments. Dredging the "hot spots" will also keep these highly contaminated sediments from spreading to the fragile estuary downstream. And dredging can occur without any adverse effect on the water supply of communities which obtain drinking water from the river.



# "HOT SPOT" DREDGING PROPOSAL



TOTAL POUNDS OF PCBs  
in the  
UPPER HUDSON RIVER  
(440,000)



COST FOR TOTAL CLEAN-UP OF PCBs  
in the  
UPPER HUDSON RIVER  
\$204 MILLION



PCB-contaminated sediments will be dredged by either clamshell or hydraulic dredging and then transported to the disposal site. The individual characteristics of each "hot spot" will determine the type of equipment used.

Clamshell dredging involves the use of buckets or scoops to lift the material above the waterline and onto a barge or similar conveyance for transport to shore, where the material would then be trucked to the disposal site.

Hydraulic dredges move the material from the bottom of the river via a centrifugal pump and pipe it directly to the disposal site.

Either method can remove up to 94 percent of the PCB contaminants in the area dredged, according to the data collected from pilot studies already completed on the Hudson.

### Environmental Effects

The preferred option ("hot spot" dredging) is not without its environmental implications. Localized ecological disruption at the dredge sites will occur with temporary (1-2 years) loss of benthic or bottom-dwelling creatures and a local increase in turbidity (cloudiness) during the dredging operations. In addition, the disruption of 75 to 175 acres would occur at the inland disposal site.

### Disposal

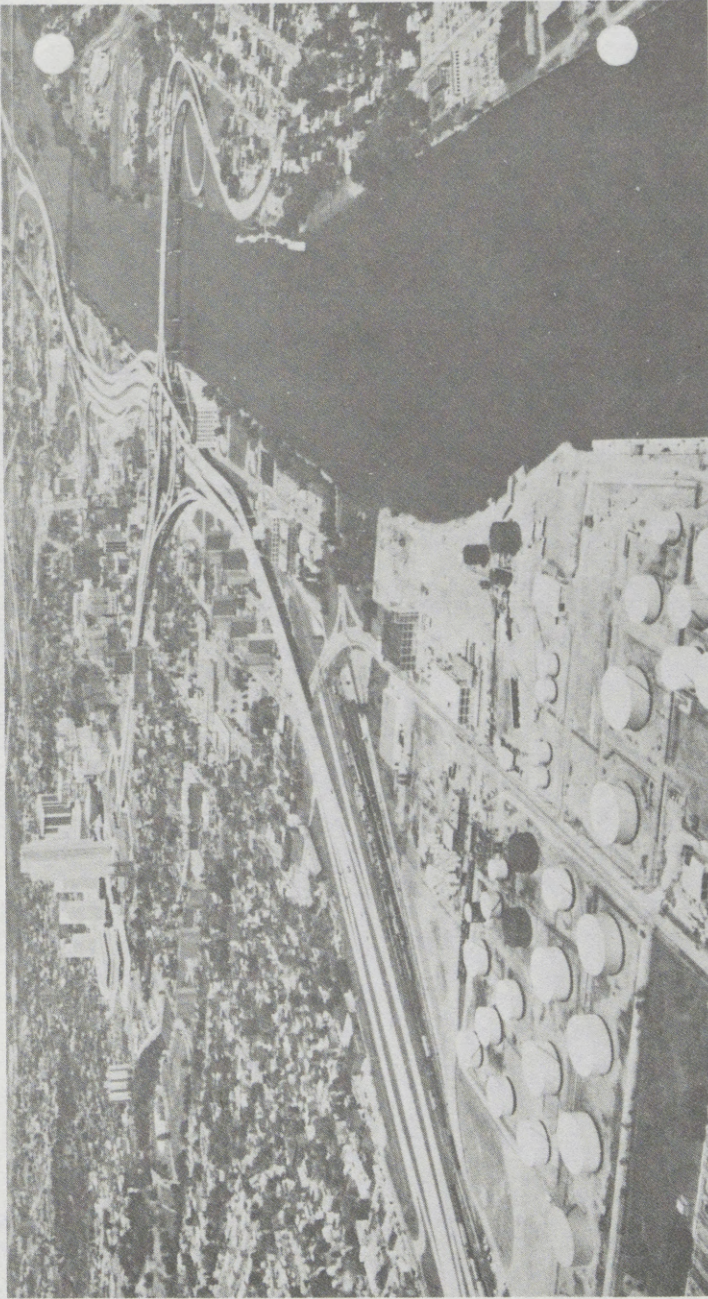
Besides disturbances at the dredging sites, there will be disruptions at the disposal sites along the river where the

contaminated materials will be buried at specially designed locations. However, this disruption, likewise, is expected to be temporary and minimal and the areas will later be used for a host of compatible uses.

Two other disposal methods were explored but rejected by the advisory committee and the department either because of high costs or insufficient technology. They included incineration and biodegradation of PCBs. Biodegradation holds promise for the future, however, as both a practical and economical means of naturally breaking down the contaminants. PCB-laden sediments would be exposed to naturally occurring bacteria which degrade the contaminants. While this technique is not yet fully developed, burial of the sediments now would not preclude using biodegradation at the disposal sites later. Incineration, on the other hand, is both technically and environmentally possible, but burning river sediments would be an expensive undertaking considering the price of fuel.

Forty potential burial sites have been pinpointed along the upper Hudson from which one or more will be selected following extensive scientific, field and soil investigations by the department. The facilities would be designed to meet governmental criteria for chemical landfills. They would be enclosed and leaching would be prevented by a virtually impermeable natural lining (clay) over the top and bottom of the site, creating a capsule-like effect. Unlike municipal landfills, this disposal site would primarily contain PCB contaminated sand and gravel and would be ready for compatible uses in a much shorter time.

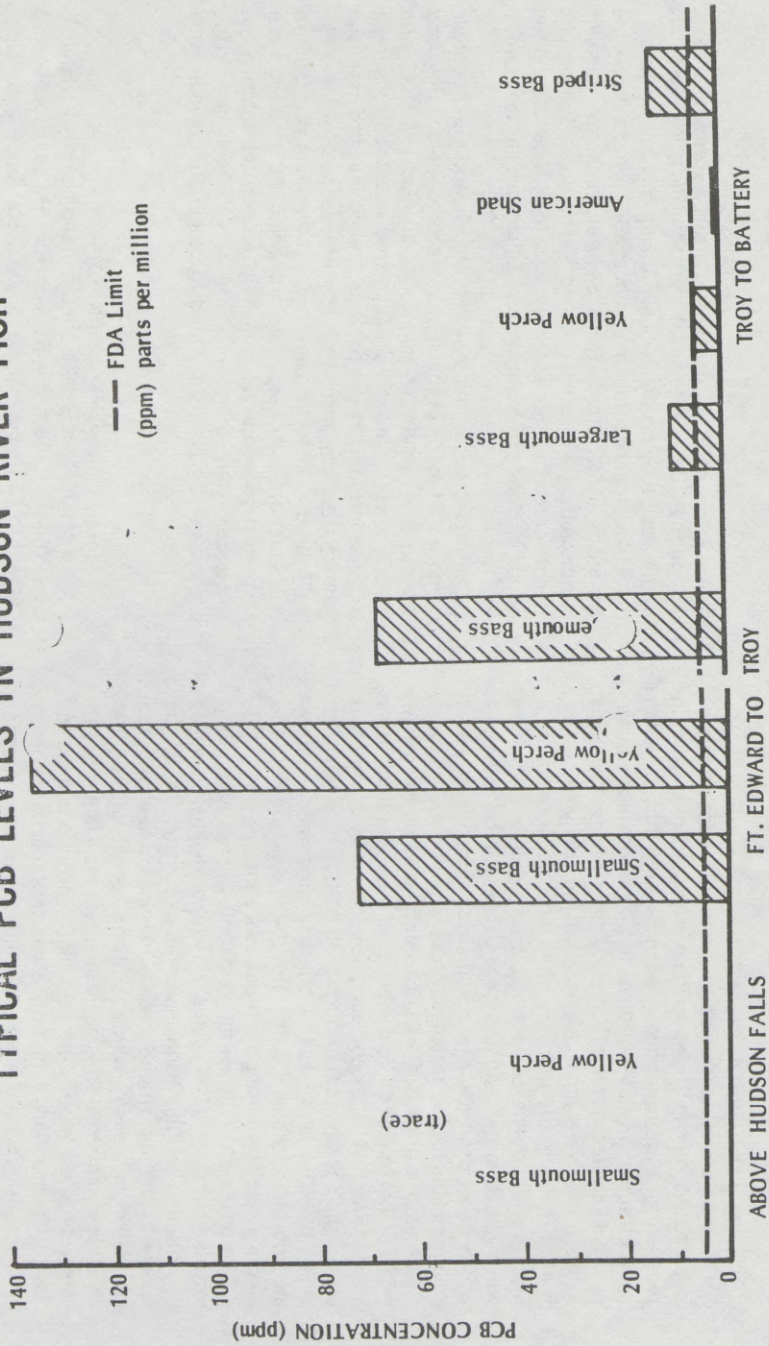




In sharp contrast to the Hudson's upper reaches, the lower section has a more urbanized look. Here, the river flows past Albany, seat of New York State government and a busy international seaport.



# TYPICAL PCB LEVELS IN HUDSON RIVER FISH





### Fish Populations

Once the dredging is completed and PCB concentrations decrease in the river, fish populations are expected to begin recovering. Migratory species such as striped bass, which spend the majority of their lives in cleaner coastal waters, would likely recover more rapidly than resident species living in the river's more heavily contaminated water.

As a result of the recovery, the Hudson's potential as a multi-million dollar commercial and recreational fishery would be brighter and the seven riverside communities which depend on the river for their drinking water would have one less toxic contaminant to worry about.

Although a great deal of uncertainty remains as to how PCBs fit into the food web dynamics of the ecosystem, it has been shown that fish flesh becomes contaminated when fish absorb the contaminant through their gills. Another way fish pick up PCBs is by eating contaminated food, thereby incorporating those PCBs into their own bodies and magnifying them through bio-accumulation.

The effect of PCBs on the Hudson estuary's ecosystem remains unclear. The estuary, which makes a major contribution to the Atlantic's commercial fishery, supports species such as striped bass, American shad and the menhaden or alewife, which is prized as one of the most valuable commercial species taken along the Atlantic coast. Menhaden are ground up as a highly nutritious meal for poultry. Destruction of this critical habitat could be the death knell for an important segment of the nation's commercial fishery.

### Effects on Man

The effect of PCBs on aquatic life is a warning to man. Although PCBs have served many useful industrial purposes in the past, they do create a significant biological hazard.

An industrial accident in Japan in 1968 brought home the seriousness of the hazard. Several Japanese families contracted what has been called Yusho disease, a serious skin disorder. The disease was traced to PCB contamination of rice oil during its manufacture. Since then, more research has turned up other frightening facts.

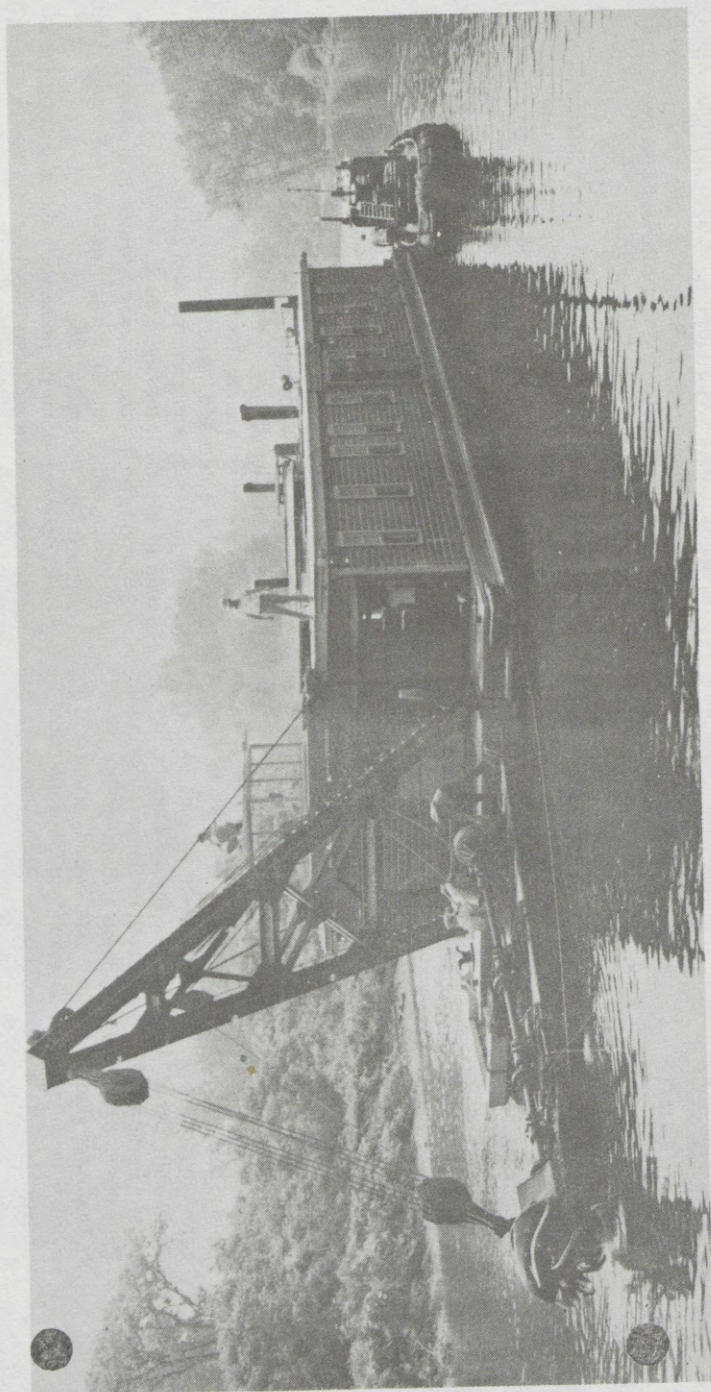
Controlled experiments with monkeys and other animals confirm that many of the symptoms associated with Yusho disease are directly related to PCBs. For example, skin lesions, severe acne and cheese-like eye discharges, similar to those found in Yusho patients, can be induced in rhesus monkeys fed low doses of PCBs in their food.

Of more concern, however, are the effects of PCBs on reproduction. Very low concentrations of PCBs in food can severely reduce reproduction in mink, chickens, rabbits and, to a lesser extent, monkeys. PCBs are also highly toxic to the embryos and have been found to be carcinogenic in mice and rats.

### A National Problem

On a national scale, PCB contamination is not restricted to New York, although the Hudson River is said to have 10 percent to 15 percent of the nation's total amount of PCBs. The contaminant has found its way into hundreds of lakes,





Dredges, like this one, would be used to remove PCB-laden bottom sediments along the upper Hudson.



ivers and brooks across the nation — although at lower concentrations than found in the Hudson.

PCBs have been reported in the Great Lakes; Escambia Bay, Florida; the Waukegan River in Illinois; the Ohio River; the Housatonic River in Connecticut; the Chesapeake Bay; the San Francisco Bay, and Puget Sound.

But because of the size of lakes, PCB concentrations in the fish generally remain below the federal limit, compared to some Hudson River fish which are 30 times higher in PCB levels than the current acceptable federal limit.

### The Next Step

New York State has launched a pioneering effort to eliminate PCBs from the Hudson River. We need \$25 million more to embark on the kind of clean-up project that will remove three-quarters of the upper river's PCB-laden sediments and supply a wealth of scientific information and practical know-how for other states to use in solving their own PCB problems.

This investment would represent still another sign to the people of this state and the nation that our natural resources can be preserved and restored and that governments are willing to spend the money to do it.

Embarking on this course also corresponds to our national policy of making all American waterways suitable for swimming and fishing by 1983.

New York has done its homework and is waiting for a federal commitment so it can take the next step.



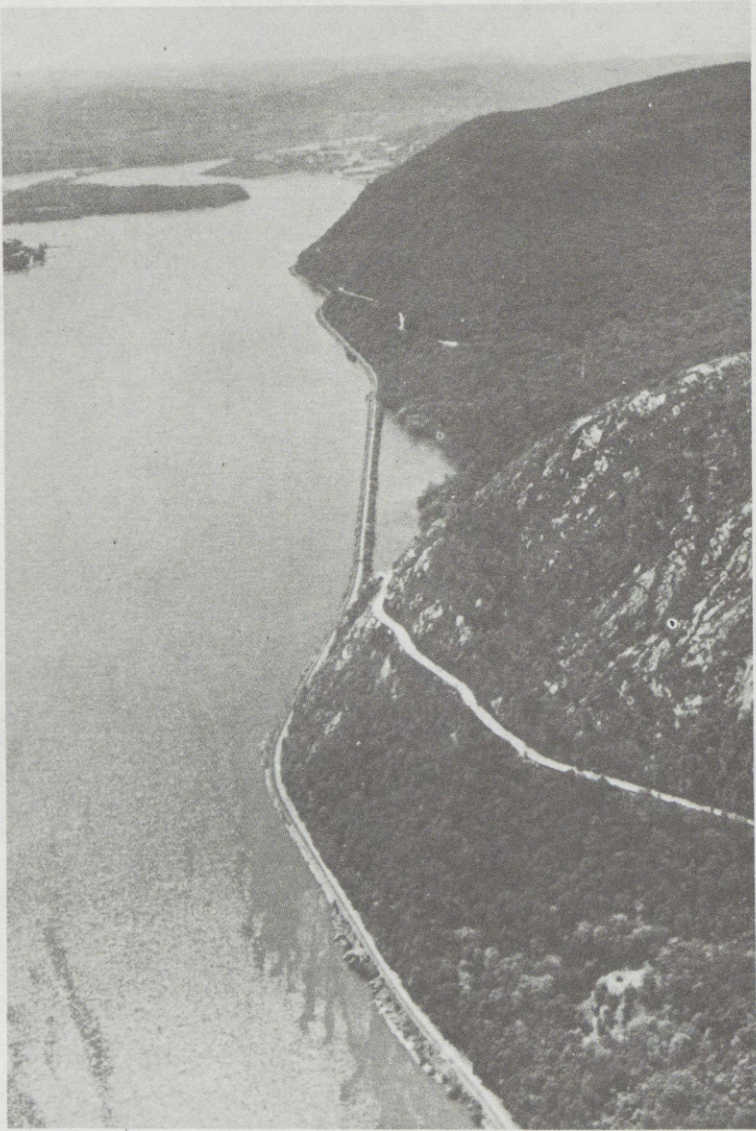
The Hudson River gorge at Blue Ledge

### The Basin

The Hudson River Basin can be divided into three sub-basins: the upper Hudson River, the Mohawk River and the lower Hudson River (see map). From Spier Falls to Troy, the river is actually a series of low level dams and below Ft. Edward serves as part of the Champlain Canal. The Mohawk River serves as the eastern portion of the New York State Barge Canal and joins the Hudson above the Federal Dam at Troy.

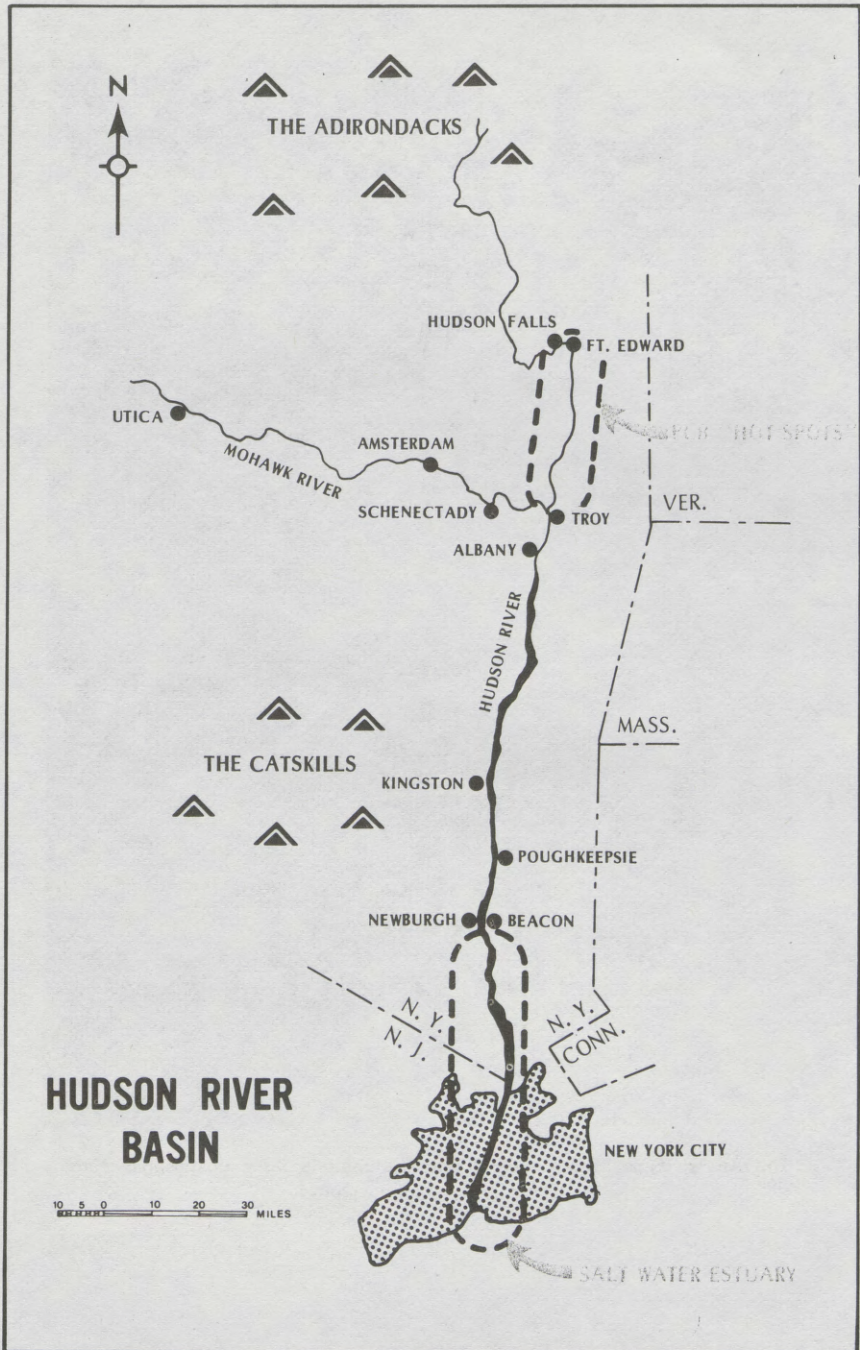
The lower Hudson Basin is tidal over its entire 150 miles. Salt water intrusion extends quite a distance upriver.





The river winds past Storm King Mountain, along one of the most scenic sections of the 200-mile long waterway.







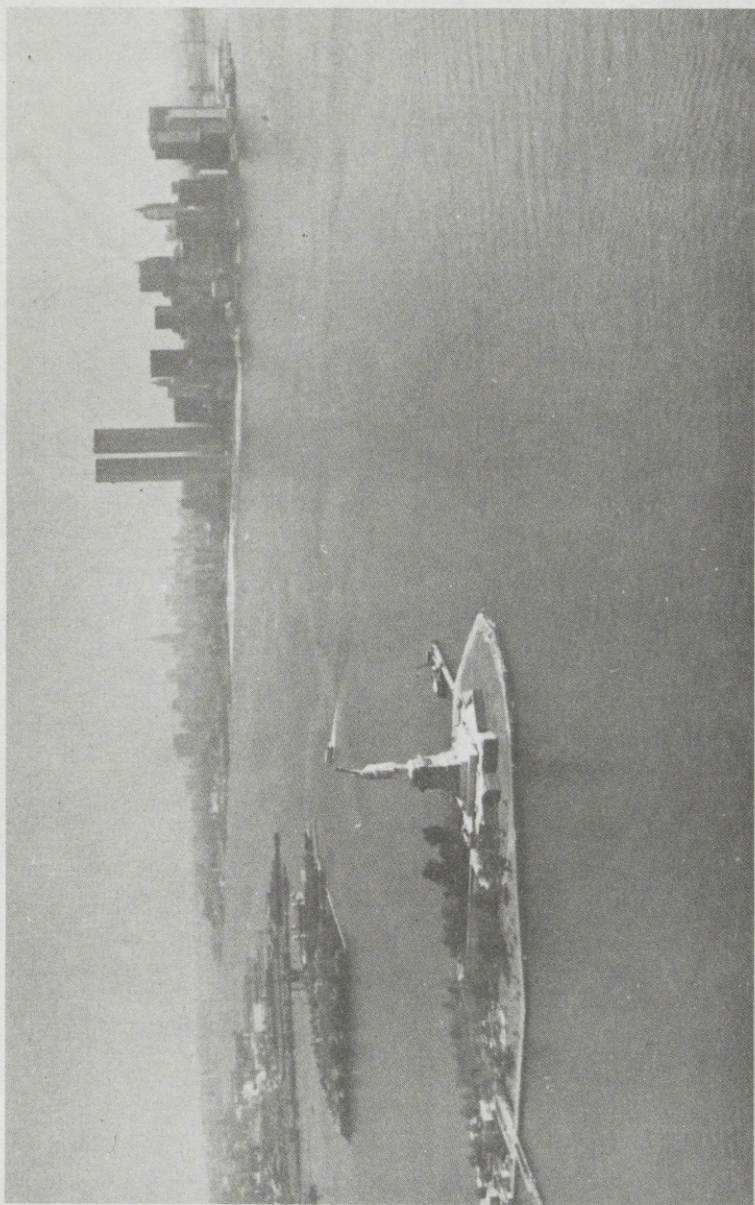
# \*PCB Settlement Advisory Committee

|                                                                                                                                            |                                                                                                              |
|--------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
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A detailed scientific report on PCBs in the Hudson River is available from the department. Send requests to:

N.Y.S. Dept. of Environmental Conservation ■ Room 519 ■ 50 Wolf Road ■ Albany, N.Y. 12233





The Hudson reaches its end in New York Bay where the Statue of Liberty, like a sentinel, stands watch over one of the world's busiest harbors.