ECOLOGICAL IMBALANCE IN THE GREAT LAKES

HEARINGS

BEFORE THE

SUBCOMMITTEE ON
MERCHANT MARINE AND FISHERIES

OF THE

COMMITTEE ON COMMERCE
UNITED STATES SENATE

NINETIETH CONGRESS

FIRST SESSION

ON

S. 2123

TO PROVIDE FOR THE CONTROL OF THE ALEWIFE AND OTHER FISH AND AQUATIC ANIMALS IN THE WATERS OF THE GREAT LAKES WHICH AFFECT ADVERSELY THE ECOLOGICAL BALANCE OF THE GREAT LAKES

AUGUST 6 AND 7, 1967

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CONTENTS

STATEMENTS

AUGUST 5, 1967

	Page
Text of bill, S. 2123	1
Agency comments:	
Department of the Interior	2
Griffin, Hon. Robert P., U.S. Senator from the State of Michigan, Senate Office Building, Washington, D.C.	3
Hutchinson, Hon. Edward, U.S. Representative from the Fourth District of the State of Michigan, Washington, D.C.	5
Vander Jagt, Hon. Guy, U.S. Representative from the Ninth District of the State of Michigan, Washington, D.C.	6
Baldwin, Dr. Norman S., executive secretary, Great Lakes Fishery Commission, Box 640, Ann Arbor, Mich.	43
Beedon, Hon. Francis W., State representative, 96th district, Lansing, Mich.	33
Bouwsma, Hon. Oscar, vice chairman, State senate committee on conservation and tourist industry, Lansing, Mich.	21
Cain, Hon. Stanley A., Assistant Secretary for Fish and Wildlife and Parks, Department of Interior, Washington, D.C.	12
Chambers, Keith, Southern Lake Michigan Fishermen's Co-op, Saugatuck, Mich.	65
Clevenger, Raymond F., chairman, Great Lakes Basin Commission, 1025 Vermont Avenue NW., Washington, D.C.	50
Engeman, Joseph, assistant professor of biology, Western Michigan University, Kalamazoo, Mich.	68
Goodsell, Col. Leonard, executive director, Great Lakes Commission, 2200 North Campus Boulevard, Ann Arbor, Mich.	34
Gregg, Glenn, deputy director, Michigan Department of Conservation, Stevens T. Mason Building, Lansing, Mich.	63
Hammond, Chase, director, Parks and Recreation, City of Michigan, Lansing, Mich.	60
Johnson, Hon. Donald, mayor of Muskegon, Muskegon, Mich.	69
Kitchel, Dr. John H., president, Michigan United Conservation Clubs, Box 2235, Lansing, Mich.	55
MacMullan, Dr. Ralph A., director, Michigan Department of Conservation, Stevens T. Mason Building, Lansing, Mich.	25
McGraw, William T., director, Tourism Division, Michigan Department of Conservation, Stevens T. Mason Building, Lansing, Mich.	46
Strohpaul, Aurey, executive director, Western Michigan Tourist Association, 107 Pearl Street, NW., Grand Rapids, Mich.	48
Tebeau, Wesley, Michigan Tourist Council, Stevens T. Mason Building, Lansing, Mich.	50
Tody, Dr. Wayne, chief, Fish Division, Michigan Department of Conservation, Stevens T. Mason Building, Lansing, Mich.	25
Wesley, Robert, White Lake Improvement Association, 6834 Old Channel Trail, Montague, Mich.	70

AUGUST 7, 1967

Percy, Hon. Charles H., U.S. Senator from the State of Illinois	107
Kluczynski, Hon. John C., U.S. Representative from the Fifth District of the State of Illinois, Washington, D.C.	88
Madden, Hon. Ray J., U.S. Representative from the First District of the State of Indiana, Washington, D.C.	76
McClory, Hon. Robert, U.S. Representative from the 12th District of the State of Illinois, Washington, D.C.	83

Page

Babinsack, William E., 1856 South River Drive, Munster, Ind---- 135
Barry, Jim, fishery biologist, Division of Fish and Game, Department of Natural Resources, Indianapolis, Ind---- 125
Bederman, Nathan B., president, Riparian Landowners Association, Highland Park, Mich---- 85
Broman, Carl, assistant superintendent of utilities, Youngstown Sheet & Tube Co., East Chicago, Ind---- 141
Carbine, Fenton, director, Region No. 4, Bureau of Commercial Fisheries, Ann Arbor, Mich---- 94
Cargile, Robert, general manager, Washington Park Amusement Corp., Michigan City, Ind---- 123
Chandler, Prof. Leland, Department of Entomology, Purdue University, West Lafayette, Ind---- 139
Colby, Averill C., superintendent, Power & Fuel Division, Gary Steel Works, Gary, Ind---- 136
Cook, Grover, Great Lakes Regional Office, Federal Water Pollution Control Administration, 33 East Congress Parkway, Chicago, Ill---- 129
Deuster, Donald, office of Congressman Robert McClory, House Office Building, Washington, D.C---- 85
Fleming, Woodrow, director, Division of Fish and Game, Indiana State Department of Natural Resources, State House, Indianapolis, Ind---- 125
Ginthner, Jerry, executive vice president, Michigan City Chamber of Commerce, Michigan City, Ind---- 122
Goodsell, Col. Leonard, executive director, Great Lakes Commission, 2200 North Campus Boulevard, Ann Arbor, Mich---- 110
Jardine, James W., Commissioner of Water and Sewers, City Building, Chicago, Ill---- 90
Katz, Hon. A. Martin, mayor of city of Gary, Gary, Ind---- 80
Miller, James R., president, Lake Industries, Inc., Milwaukee, Wis---- 142
Miller, Perry, Indiana Stream Pollution Control Board, Department of Health, Indianapolis, Ind---- 125
Mitchell, John, director, Indiana Department of Natural Resources, 605 State Office Building, Indianapolis, Ind---- 125
Moore, Jack, Air and Water Pollution Department, City Hall, Gary, Ind---- 82
Murray, Mrs. Florence, Chamber of Commerce, Michigan City, Ind---- 119
Nabhan, Ted, Council of First District, 7121 Forrest Street, Gary, Ind---- 83
Pastrick, Hon. Robert, acting mayor of East Chicago, East Chicago, Ind---- 79
Pautzke, Hon. Clarence F., Commissioner of Fish and Wildlife Service, Department of Interior, Washington, D.C---- 94
Pilon, Eugene A., Lake Excursions, Inc., 8022 West Harwood, Wauwatosa, Wis---- 144
Pinkerton, Cordell, office of Mayor Edward C. Dowling, Hammond, Ind---- 93
Read, Mrs. Charlotte, Box 438, Chesterton, Ind---- 138
Rock, Hon. Robert, Lieutenant Governor of Indiana, Indianapolis, Ind---- 86
Rosenbloom, Dr. Philip, Health Commissioner, 571 Lincoln Street, Gary, Ind---- 81
Smith, Ara K., superintendent of schools, Michigan City Area Schools, 609 Lafayette Street, Michigan City, Ind---- 120
Smith, Dr. Stanford, Bureau of Commercial Fisheries, Ann Arbor, Mich---- 94
Squarcy, Charles M., assistant to vice president, Inland Steel Co., 30 West Monroe Street, Chicago, Ill---- 119

STATEMENTS AND COMMUNICATIONS

Dirksen, Hon. Everett McKinley, U.S. Senator from the State of Illinois, Senate Office Building, Washington, D.C---- 148
Nelson, Hon. Gaylord, U.S. Senator from the State of Wisconsin, Senate Office Building, Washington, D.C---- 149
Dulski, Hon. T. J., U.S. Representative from the 41st District of the State of New York, Washington, D.C---- 149
Horton, Hon. Frank J., U.S. Representative from the 36th District of the State of New York, Washington, D.C---- 150
Zablocki, Hon. Clement J., U.S. Representative from the Fourth District of the State of Wisconsin, Washington, D.C---- 151

Page
Daley, Hon. Richard J., mayor of the city of Chicago, letter dated Aug. 4, 1967 89
Ackermann, John R., president, Door County Chamber of Commerce, Sturgeon Bay, Wis 163
Beeton, A. M., assistant director, Center for Great Lakes Studies, University of Wisconsin, Madison, Wis 163
Berg, Ronald D., president, Sturgeon Bay Board of Parks and Recreation, Sturgeon Bay, Wis 164
Bertschinger, W. D., manager, The Alpine, Egg Harbor, Wis 165
Bolda, Gerald I., president, Midwest Federated Fisheries Council, 2310 North Richards Street, Milwaukee, Wis 165
Darnell, Dr. Rezneat, professor of zoology, Marquette University, Milwaukee, Wis 167
Extrom, Ace, executive secretary, Illinois Federation of Sportsmen's Clubs, 13118 South Western Avenue, Blue Island, Ill 168
Fredrickson, Don, owner, Leathem Smith Lodge, Memorial Drive, Sturgeon Bay, Wis 169
Ginthner, Jerry D., to Senator Vance Hartke, letter dated Aug. 7, 1967 123
Gregg, Howard, general manager of parks, Milwaukee County Park Commission, Court House, Milwaukee, Wis 170
Hagedorn, Bernard, chairman, Door County Water Resources Advisory Committee, Sturgeon Bay, Wis 170
Harman, Harry D., Gary-Hobart Water Corp., 650 Madison Street, Gary, Ind 171
Hart, Hon. Philip A., to Secretary of Interior Stewart Udall, letter dated July 19, 1967 15
Hart, Hon. Philip A., to Senator John L. McClellan, letter dated June 19, 1967 42
Irwin, Barney, Manager, Door County Chamber of Commerce, Sturgeon Bay, Wis 171
Jensen, Roy A., secretary, Michigan Fish Producers Association, Escanaba, Mich 171
Lake Industries, Inc., joint statement by Dominic H. Frinci, Nicholas C. Catania, and James R. Miller, 161 West Wisconsin Avenue, Milwaukee, Wis 172
LeVan, Mrs. Rose G., East Chicago, Ind 173
Lotz, W. Robert, president, American Protein Co., Inc., 8828 North Port Washington Road, Milwaukee, Wis 173
Miller, Frank, Jr., Miller Fisheries, Inc., 2420 South Meadowners Parkway, New Berlin, Wis 174
Miller, Hon. Randall, mayor of Michigan City, Michigan City, Ind 174
Richardson, Thomas, department of food science and industries, University of Wisconsin, Madison, Wis 175
Schachtner, Norbert D., agricultural agent, Door County Office, Courthouse, Sturgeon Bay, Wis 176
Smith, Dan, Smith Bros., Port Washington, Wis 176
Smith, Stanford H., fishery research biologist, Biological Laboratory, Box 640, Ann Arbor, Mich 178
Stern, Howard W., president, Aquatic Controls Corp., 1203 East Main Street, Waukesha, Wis 182
Swaer, Art, Schilling Fish Co., Inc., 230 North Broadway, Green Bay, Wis 183
Udall, Hon. Stewart, Secretary of Interior, to Senator Philip A. Hart, dated July 27, 1967 15
Voigt, L. P., conservation administrator, Department of Natural Resources, Box 450, Madison, Wis 184
Wenniger, F. L., proprietor, Wenniger "Toot's" fish market, Algoma, Wis 185
Wheeler, C. W., president, Town Board, Beverly Shores, Inc., Beverly Shores, Ind 186

ECOLOGICAL IMBALANCE IN THE GREAT LAKES

SATURDAY, AUGUST 5, 1967

U.S. SENATE,
COMMITTEE ON COMMERCE,
SUBCOMMITTEE ON MERCHANT MARINE AND FISHERIES,
Washington, D.C.

The subcommittee met at 9 a.m. in the Walker Arena, Fourth and Washington Avenue, Muskegon, Mich., Hon. Philip A. Hart presiding.

Senator HART. The committee will be in order.[1]

This is a meeting of the Subcommittee on Merchant Marine and Fisheries of the Senate Committee on Commerce. Its chairman, Senator Bartlett, of Alaska, has expressed his hope that at the meeting here today we will be able to contribute something to the record which will permit us to respond effectively to a situation which became dramatically acute in the last several weeks.

I have a brief statement that I will make.

The hearings, of which this is a part, were requested by the Great Lakes Basin Senators, and are on S. 2123. This bill was introduced by Senator Nelson, of Wisconsin, and cosponsored by Senator Griffin and me, along with the other Senators from the Basin States; it is designed to conserve and protect the fish resources, to combat water pollution, and to promote and safeguard water-based recreation in the waters of the Great Lakes.

In addition to reaction and comment on this bill, the committee would be interested in any suggestions that may be offered as to the Federal role in helping cope with the alewife next year.

We recognize that this is a problem which will require effort at all levels of government, including regional.

The committee is acutely aware of the devastating effect the alewives had along the shores of Lake Michigan, and, to some extent, Lake Huron. We hope these hearings will contribute to a solution.

If there is no objection, the bill, S. 2123, will be printed in its entirety at this point in the record along with the comments of the Department of Interior.

(The material referred to follows:)

[S. 2123, 90th Cong., first sess.]

A BILL To provide for the control of the alewife and other fish and aquatic animals in the waters of the Great Lakes which affect adversely the ecological balance of the Great Lakes

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That, because of the fact that the ecological balance of the Great Lakes has been disrupted, the Secretary of the Interior

[1] The professional staff member in charge of these proceedings was John H. Wedin.

is authorized, for purposes of conserving and protecting the fish resources, combating water pollution, and promoting and safeguarding water-based recreation for present and future generations, in the waters of the Great Lakes, to cooperate with, and provide assistance to, the States in controlling the alewife (known biologically as "Alosa pseudoharengus") and other fish or aquatic animals which affect adversely the ecological balance of the Great Lakes.

SEC. 2. In carrying out the purposes of this Act, the Secretary of the Interior, in cooperation with the States, is authorized (1) to conduct, directly or by contract, such studies, research, and investigations, as he deems desirable, to determine the abundance and distribution of the alewife and other fish or aquatic animals which affect adversely the ecological balance of the Great Lakes and their effects on other fish or aquatic animals, pollution, and water-based recreation within the Great Lakes; (2) to conduct, directly or by contract, studies of control measures of the alewife and other such fish and animals; (3) to establish and carry out, based on studies made pursuant to this Act, programs relating to controlling the alewife and other such fish and animals, stocking, and the development of industrial or other commercial uses of the alewife and other such fish and animals; and (4) to take such other actions as he deems desirable in carrying out the purposes of this Act. The costs of any study, research, investigation, program, or other action conducted or carried out in accordance with the provisions of this Act shall be borne equally by the Federal Government and by the States, acting jointly or severally.

SEC. 3. The Congress hereby consents to any compact or agreement between any two or more States entered into for the purpose of carrying out a program of research, study, investigation, or other action relating to the control of the alewife and other fish and aquatic animals which affect adversely the ecological balance of the Great Lakes. The right to alter, amend, or repeal this section or the consent granted herein is expressly reserved.

SEC. 4. Nothing in this Act shall be construed to alter, amend, repeal, modify, or diminish the present general authority of the Secretary of the Interior to conduct studies, research, and investigations related to the mission of the Department of the Interior.

SEC. 5. There is authorized to be appropriated not to exceed $5,000,000 for the Federal share of the costs involved in connection with any study, research, investigation, program, or action conducted or carried out in accordance with this Act.

U.S. DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D.C., August 18, 1967.

Mr. HOWARD W. STERN,
President, Aquatic Controls Corporation,
Waukesha, Wis.

DEAR MR. STERN: This is in reply to your letter of August 8 concerning your proposed method of dealing with the alewife problem that has developed in Lake Michigan during recent years.

You may have heard that Secretary of the Interior, Stewart L. Udall, is very concerned about the seriousness of the problems caused by the alewife in the Great Lakes and has named a Federal task force to consider corrective measures. The task force with Dr. Stanley A. Cain, Assistant Secretary for Fish and Wildlife and Parks as chairman, is carefully evaluating all suggestions to solve the alewife problem. We are sure that your comments and observations of various methods of solving the alewife problem will be useful to them and that they will be interested in learning about your proposal of a modified marine scavenger developed by Aquatic Controls Corporation.

The extreme die-off that occurred in Lake Michigan this year coincided with the peak of the population explosion of alewives in the Lake. We know from experience in other lakes that after the peak population level has passed, windrows of floating dead alewives are rare in the open lake and that problems are most acute when alewives are concentrated in their spawning activity close to shore.

A method and equipment suitable to deal with the problem likely to occur in future years would have to be capable of operating effectively in very shallow and usually rough inshore waters. The shoreline of Lake Michigan is approximately 1,400 miles and the period of alewife die-off is about 30 days during which

alewives continually move from deepwater to shore. From this you can see that the removal of floating dead alewives might be a very substantial undertaking.

We appreciate your interest in this problem with which we are gravely concerned, and we are most happy to have your suggestions for consideration by the task force.

Sincerely yours,

CLARENCE F. PAUTZKE,
Deputy Assistant Secretary for Fish and Wildlife and Parks.

Senator HART. I have indicated that both Michigan Senators are members of the Committee on Commerce—I don't know whether this is good or bad. Anyway, this is a fact of life, and I am delighted that in this setting, part of his old district, we can hear, and have sitting on the committee, Senator Robert Griffin.

Senator GRIFFIN. Thank you, Mr. Chairman. I have a statement of approximately three pages. I would ask that it be included in the record in full, as I will only summarize that statement today.

STATEMENT OF HON. ROBERT P. GRIFFIN, SENATE COMMERCE COMMITTEE, SUBCOMMITTEE FOR MERCHANT MARINE AND FISHERIES

Senator GRIFFIN. Mr. Chairman, at one time Benjamin Franklin wryly observed that "Fish and visitors smell in 3 days."

When visitors smell we are likely to grin and bear it; after all, tourism is the second most important industry in our State. But the smell of decaying fish we cannot stand.

Mr. Chairman, I doubt that very many people other than marine biologists were ever aware of the existence of alewives until a few years ago. Now, I doubt that there is a single summer visitor or year-round resident in the Great Lakes region who is not familiar with the sight—and the smell—of this tiny fish which has thrown nature's scales so far out of balance.

This summer the alewife problem really came to a head. Southern Lake Michigan was hit by the worst alewife die-off in history. Millions upon millions of dead fish were washed ashore to decompose and rot on the beaches.

In Chicago, residents watched while more than 500 truckloads of dead alewives were hauled from the city's beaches since April.

In Michigan, the impact on the tourist and resort industry has been very serious; we hear predictions that the coming years could be even worse.

Mr. Chairman, I wish to take this opportunity to commend the subcommittee's chairman, Senator Bartlett of Alaska, for the concern he has indicated about this problem, and for his prompt scheduling of hearings. Although Chairman Bartlett is unable to be with us, I know that my distinguished senior colleague, Senator Hart, will conduct the hearings with characteristic thoroughness and objectivity.

S. 2123 was introduced on July 17 by Senator Nelson of Wisconsin; it was cosponsored by 10 other Great Lakes Senators, including Senator Hart and myself.

The bill seeks a long-range solution to the alewife menace in the Great Lakes. It would authorize the Secretary of the Interior to assist States in the effort to control the alewife.

Significantly, the legislation would give recognition to existing State programs aimed at control of the alewife.

Some of these programs seek to turn the alewife into a commercial resource.

Others, such as the Michigan program, aim at effective control by stocking the lakes with predatory game fish, such as salmon and trout. Such a program would not only control the alewife but it would provide a significant boost to sport and commercial fishing in the Great Lakes. It could add millions of dollars to the economy of the Great Lakes region.

However, in order to step up planting rates in the lakes, there is a need for hatcheries capable of producing some 30 million yearling trout and salmon. A lack of funds is the major problem hindering full-scale implementation of this significant program.

I am sure that spokesmen for the Michigan Department of Conservation, along with Congressman Vander Jagt and others will have more to say on this important subject.

While these hearings may be aimed at finding long-term solutions for the alewife problem, we cannot overlook the immediate practical problem which confronted Michigan this summer: How to clean up and dispose of millions of dead alewives when they wash up on the beaches.

I have written to Mr. Sargent Shriver, Director of the Office of Economic Opportunity, thanking him and the many members of the Job Corps who responded so effectively to my request for assistance a few weeks ago. I am pleased to report that more than 250 young men from camps near Battle Creek and Cadillac worked on Lake Michigan beaches from Benton Harbor to Ludington. With borrowed tools and equipment, these young men provided real on-the-spot help when it was needed, significantly reducing the danger of disease and pollution.

Mr. Chairman, as a member of this Senate subcommittee on Merchant Marine and Fisheries—and as one who has good reason to feel particularly close to Muskegon and the people of this area, I am very glad to be here this morning. I know these hearings will be fruitful, and I am confident that those who testify will assist us in developing a sound solution for this serious problem.

Senator HART. Thank you very much. We are glad to be here.

One of the disagreeable chores of a chairman is to pretend he is tough about time for witnesses. We have 17 witnesses listed. I know that the Conservation Department has a presentation which may take 20 or 25 minutes, involving slides.

May I ask those who possibly can to summarize their testimony in oral statements. There is no objection to having testimony that is prepared printed in full in the record as though given in full, but with a 1 o'clock cutoff, we will be very grateful if you would see what you can do about summarizing it.

I should have made that announcement after inviting the first witness. I should never try to cut off a colleague in the Congress.

Scheduled first is the distinguished Member of the Congress from the Fourth District, a former State senator, with whom I spent time in Lansing, and now spend time in Washington, Ed Hutchinson.

STATEMENT OF HON. EDWARD HUTCHINSON, A U.S. REPRESENTATIVE, FOURTH DISTRICT, STATE OF MICHIGAN

Congressman HUTCHINSON. Thank you, Mr. Chairman.

Senator Griffin, Senator Hart, I have no prepared statement and I am not going to presume very long on your time.

The situation along the shores of Lake Michigan in the Fourth District was, to use a word truly descriptive, catastrophic.

During the Fourth of July recess I had occasion to travel between my home in Allegan County in the southern end of my district several times, and down around Benton Harbor, and I don't exaggerate at all. In driving along the freeway, I could smell those fish.

I am told that a good many people whose business is in the tourist industry have actually shut up shop because of the general situation, and something must be done.

I am very happy to say that I joined with many other Members of the House in introducing legislation similar to the legislation that has been introduced in the Senate.

I am also happy to hear that the Senate legislation, as the House legislation, seeks to emphasize State action.

I hope that the subcommittee will ascertain what the State of Michigan is doing and what it plans to do, and to also ascertain through the State government what local units of government are able to do, particularly in cleaning up the beaches.

It seems to me, Mr. Chairman, that the long-range solution to this problem is through the introduction of predators. I have been contacted by commercial fisherman, as well as people who live along the lakeshore, and I don't think that we have any idea that the alewife will ever be eliminated, but the aim is to control it, to bring back into balance the fishery sources of the lake, and if that can be done, it occurs to me that there will be a supply of trash fish for commercial use, as well as a control of the supply so that we won't have this scourge along the beaches every summer.

Thank you, Mr. Chairman.

Senator HART. Thank you, Congressman. Senator Griffin?

Senator GRIFFIN. No.

Senator HART. I should introduce the committee professional staff member for these hearings, John Wedin, who is on my right.

Congressman, for as long as you are able to stay with us, we would appreciate it if you would come up here, and if you have any questions that you would like to ask, we welcome that, too.

Congressman HUTCHINSON. Thank you. All right.

Senator HART. Next, let me ask Senator Griffin to do a chore here.

Senator GRIFFIN. Well, it's a real pleasure to introduce my successor as the Congressman in this Ninth District, a very able young man who has roots both in Ottawa County and in Wexford County and who knows the whole of the Ninth District very well, and who, I am sure, has been active in the concerns of Congress concerning this alewife problem. We will hear now from Congressman Vander Jagt.

STATEMENT OF HON. GUY VANDER JAGT, CONGRESSMAN OF THE NINTH DISTRICT, STATE OF MICHIGAN

Congressman VANDER JAGT. Good morning. Thank you very much, Senator Griffin, and Mr. Chairman.

I appreciate very much the opportunity to appear before this Senate committee, and it is appreciated so much that I would like to show my appreciation by trying to carry out the instruction that I heard from the chairman by just briefly summarizing the statement which I will submit for the record.

I would like to thank this Senate subcommittee for the interest and the concern which your presence indicates you have in the alewife problem.

I feel a little awkward in welcoming you in the Ninth Congressional District—especially Senator Griffin—because, as he indicated, he is my predecessor and Senator Griffin has left a tremendous legacy behind him in this district.

I would also like to express my appreciation to my colleague from the House, Congressman Hutchinson, and for the members of the Michigan Conservation Department, the Michigan Legislature, representatives from the tourist industry, and everyone who is concerned with this problem.

I think our presence here this morning indicates that we do have a problem, a problem that has been recognized by Time and Newsweek. Copies of their articles are attached to the statement that I want to submit for the record—and it's one that, if you could get into my mail bag, and I imagine your own reflects this too, there are letters from throughout the area—from as far away in my own case as St. Louis, Mo., of people saying that they will never again spend a Lake Michigan vacation until we do something about the alewife problem.

During the Fourth of July recess, I drove the 225 miles of Lake Michigan shoreline from Holland to Leelanau in the Ninth Congressional District, and as Congressman Hutchinson indicated, as far as the eye could see in some cases, and certainly as far as the nose could smell, we had thousands upon thousands of alewife, and in some cases the restaurants, where people could not stand the stench that came up from the beach, had been closed.

I think it was most graphically driven home to me in that quite by happenstance I ran into six of my colleagues from the House from all over the country who found the beauties of this congressional district so attractive that they chose to vacation here during the Fourth of July recess, and without exception, they said—I am sure somewhat pulling my leg, and somewhat with tongue in cheek—but somewhat reflecting their own displeasure and frustration with the situation, and would say, "Congressman, what in the world are you doing about this horrible problem?"

Certainly on the House side, we have six salesmen over there who will very effectively tell my colleagues in the House that something must be done about this problem.

Now, not only must something be done, but something can be done.

In my opinion there is a very simple solution to the problem; certainly we need additional research—and I am sure this committee will explore the many facets of the problem—but I think that, basically,

the solution is the one that was outlined by Congressman Hutchinson.

The basic problem is that we have no natural predator, no natural enemy of the alewife, and that has made possible this alewife explosion. The solution isn't one that we are reaching out for now on an emergency, crash basis, but under the really imaginative leadership of the Michigan Conservation Department, studies were begun years ago. It was when Mr. Cain—now Assistant Secretary of the Interior—was a member that the commission began experimenting in a very well documented way. They have shown that the alewife is the favorite food of the salmon and the trout that they have planted in this experimental program.

The salmon gobbles the alewife faster than a kid can pop jelly beans in his mouth. For every pound of alewife—for every pound of salmon, he consumes 5 pounds of alewife. The salmon is planted as a little fingerling in the spring; by the fall, he has grown to 5, 7—in some cases, 10—fighting pounds of sport fish.

The program that the Michigan Conservation Department envisions is one that eventually will plant 30 million salmon and trout per year; if you compute those figures out, you can see that the consumption, then, of alewives would be well over half a billion pounds of alewife a year, and we can then have an ecological balance back in our Lake Michigan waters.

Not only would this solve the alewife problem, but I would like to point out to this committee that this program has unlimited potential for western Michigan.

In a recent study by the U.S. Bureau of Fisheries and Wildlife, they, in examining the salmon program in the Pacific Far West, have demonstrated what the wives have known all along, and that is that salmon fishing is a very expensive sport.

They estimate that the fish that is returned to the creel costs the fishermen of salmon between $30 and $40 for each fish in terms of boating and the bait and all of this.

If you allow just a 7- or 8-percent return to the creel of the fish that are planted, which is very conservative, when you multiple those figures out, you can see why they arrive at their conclusion that this program can bring $1 billion in new recreational money to western Michigan over the next 10 years.

The U.S. Bureau of Fisheries and Wildlife has called this potentially the most explosive and exciting recreational development in the Midwest in our lifetime, and I think it is that. So, I think the alewife cloud has a silver lining around it.

I think it's possible to turn this stumbling block into a stepping stone of unlimited potential, and I would again like to thank Senator Hart and Senator Griffin for your interest and your concern that is indicated by your being here.

I would like to thank you for introducing this bill which is before us. I support it enthusiastically, and wholeheartedly. I would like to suggest one modification before the bill is passed, at least that our legislative history make absolutely clear—and perhaps the bill states it now—we do desparately need research and further research, but I would hope that the bill is absolutely clear that we also need funds now to launch this program and this solution which is based already on research and studies over the past years.

We need the money to do something now, and we need it really in this fiscal year.

I am sure the conservation department will go into detail, but what we need is a million and a half dollars this year, a million and a half in the next fiscal year, and then $4 million spread over the years after that, to be matched by State funds.

It's a very modest investment to solve a horrible problem and to bring a really exciting new recreation to our Lake Michigan waters.

(The prepared statement of Congressman Guy Vander Jagt follows:)

Mr. Chairman, I am pleased to have the opportunity to appear before this Committee to state the case as I see it for correction of the serious problems caused by the alewife.

I am most grateful to the Chairman for his interest in and support for a solution to these problems.

I want to make particular note of the presence here today on this subcommittee of U.S. Senator Robert P. Griffin, former Congressman representing the 9th District of Michigan of which this community of Muskegon is the largest city. It is my honor to have succeeded Bob Griffin in this Congresional seat and it is my hope to become as well through of and respected in this District as my predecessor.

I would also like to welcome all of the representatives of the Michigan Tourist Industry who are here today as well as Stanley Cain, one of Michigan's outstanding citizens and now Assistant Secretary of the Department of the Interior, Senators and Representatives from the Michigan Legislature, representatives of the Michigan Conservation Department, the press, and others who are offering testimony. Solutions to the problem we are discussing will not be possible without the imaginative and effective efforts of the Michigan Conservation Department and the Michigan Legislature for both of which I have the greatest respect.

The alewife problem in the Great Lakes is one which has caused violent economic tremors in the tourist business, particularly along the Lake Michigan shoreline. I have received letters which would cause resort operators to blanch and give serious consideration to throwing in the towel. Vistors from as far away as St. Louis, Misouri, have stated that they will not return to Lake Michigan resorts so long as the stink and mess and pollution and flies caused by the alewife continue. I have summer camp operators who are losing their campers because swimming had to be eliminated from their summer schedules.

I drove from the south end of my district to the north and over the 4th of July recess, some 225 miles of Lake Michigan shoreline, and the smell of rotting alewives would have driven me from any beach in that entire distance. I understand that the condition has now improved, but having struck at the heart of the tourist season, a great deal of damage has been done.

I think that this threat to the economy of Western Michigan, and to other areas of the Great Lakes, is horrifyingly serious. The problems of Wisconsin, Illinois, and Indiana, as illustrated by both Time, July 7, 1957, and Newsweek, July 31, 1967, only lend greater significance to my concern. Copies of the Time and Newsweek stories are attached.

And if we were faced with the prospect of a continued alewife armegeddon I would suggest that we immediately begin exploring ways to provide emergency loans to resort operators, that we make arrangements to bring deep sea trawlers into Lake Michigan, to seine out the alewives, or that we subsidize commercial alewife utilization, or that we launch into a research program to find an alewife-specific poison such as the one the Great Lakes Fisheries Commission discovered to use against the lamprey eel in that brilliant technological battle.

I am reminded by the Michigan United Conservation Clubs and the Michigan Chamber of Comerce that that battle is not complete by the way. Lake Huron streams have not been treated with lamprey eel larvicide and U.S. State Department appropriation hearings going on now (Canada is involved), before the U.S. Senate, hopefully, will result in a re-instatement of $100,000 needed to complete this phase of the battle. It was the sea lamprey, of course, which administered the knockout punch to the major predator species in the Great Lakes allowing the alewife explosion.

Fortunately, there is a solution to this alewife problem which offers not only a significant reduction in the numbers of these fish contaminating our beaches, but also offers an economic opportunity to the Great Lakes Region far overshadowing the present cost of alewife pollution. I am speaking of the predator fish program being developed by the Michigan Conservation Department with some fine assistance from the United States Department of the Interior.

I won't go into the Michigan program because the Conservation Department will provide that information in great detail. However, I do want to state that the Michigan Conservation Department cannot put its program into effect to solve the alewife problem in the next several years and bring about this tremendous economic benefit without considerable financial assistance from sources outside the State of Michigan. And there is substantial support from Congressional delegations in states bordering Lake Michigan for Federal assistance in solving this problem.

This on-going Michigan program, and I call it that at this point because the Michigan Conservation Department has been able to take the first steps in developing a predator fish program to utilize the alewife to great economic advantage, has been described as the greatest potential new outdoor recreation program in our lifetime. The Michigan Conservation Department deserves our great thanks for taking these first steps. Let me also mention the name of a man who was formerly with the Conservation Department and who played a major role in the early stages of this program, Dr. Howard Tanner, now head of the Department of Natural Resources at Michigan State University. It was also my good fortune to have had the opportunity to support these first steps while in the Michigan Senate.

What the Conservation Department visualizes is a total fisheries recreation program based on predator fish introduction including several species of salmon, and steelhead and lake trout. Fully developed, this program will provide an estimated 2,000,000 harvested fish with an average weight of 5 pounds. Now those fish will generate economic activity to the extent of $30–$40 per fish according to U.S. Fish and Wildlife Service figures. That includes boats, bait, tackle, licenses, motels, charters, etc. But when the figures are aded up and multiplied out, they come to $1 billion new dollars in economic activity in a ten to fifteen year period. And we may be on the conservative side with these figures.

The bill being considered today in this hearing is designed to provide funds for research for the control of the alewife. I congratulate the Senators for the concern which has brought about the introduction of this bill. There can be no doubt that the alewife must be brought under control. I would hope that every effort be made to encourage its passage, but that in so doing some modification be incorporated to allow funds authorized therein to be used for the development of predator fish programs for the "control" of the alewife.

At the same time there are several other ways in which predator fish programs might be encouraged. One way might be to provide Federal grants directly to the State of Michigan for that purpose and I have introduced a bill to that effect, H.R. 7947, which has been referred to the Committee on Merchant Marine and Fisheries. No action has been taken on the bill, but I am hopeful that hearings will be held shortly under the leadership of Congressman John Dingell, Chairman of the House Subcommittee on Fisheries and Wildlife Conservation.

Another possible answer is to provide additional funds for this purpose through the Anadromous Fish Act of 1965. Under this Act, the Department of the Interior is authorized to provide assistance for the purposes of conservation of the anadromous fishery in the United States. The Act authorizes $25,000,000 over a five year period, $5 million in any one year, no more than $1 million to any one state in any one year for such purposes. Internal administrative policy rules out the use of these funds for building fish hatcheries, the major need by Michigan at the present time. The Congress has seen fit to appropriate considerably less than the amounts authorized in the first two years since the Act's inception, with last year's figure being $2,675,000 and fiscal 1968 $2,425,000. It is my understanding that the Department of the Interior task force on the alewife problem established by Secretary Udall last week and chaired by Stanley Cain feels that this Act is an appropriate vehicle for assistance to the states for solution of the alewife problems.

It is my understanding that the Michigan Conservation Department could effectively make use of $1,500,000 in fiscal 1968, and an equal amount in fiscal 1969 to proceed at an optimum pace with its predator fish program. It is my

intention to take action in the Congress to encourage a supplemental appropriation for funs to be utilized under this Act for the purpose of assisting Michigan and other Great Lakes states involving this problem. It would also be desirable in this emergency situation to amend the Act to allow the full $1,500,000 which Michigan needs now, and also to alter the administrative decision preventing the use of Act money for the construction of hatcheries.

Mr. Chairman, let me again thank you and the members of your Committee for giving me the opportunity to testify on this problem which is of such great concern to the people of my district, and to the people of the State of Michigan and other states bordering the Great Lakes. These hearings will make a major contribution to the solution of this problem.

[From Newsweek—National Affairs, July 31, 1967]

NATIONAL AFFAIRS

LAKE MICHIGAN: SOMETHING FISHY

The alewife is an ordinary, blameless little fish which historically concentrated mostly in Lake Ontario and kept its breeding instincts in decent checks. Then, it seems, the St. Lawrence Seaway was opened and the silver-backed, herring-size little creature found its way into Lake Michigan—and proliferation paradise. Over the years the alewife bred and bred, then suddenly began to die in groves—and last week the malodorous multiplication was inundating lakefront beaches in four Great Lakes states.

No one knows for sure why so many alewives have succumbed this year and why their bodies have washed toward shore. Unseasonable temperatures and winds and insufficient food for their increasing numbers have been blamed; so has the dearth of salmon and lake trout, which prey on alewives. But more fish are washing ashore every day, and there is no end in sight. Chicago has already carted off 2,000 cubic yards of moldering fish this summer, and one TV weatherman now includes an alewife forecast in his daily report. For half of July, downtown Milwaukee reeked of the dead fish floating up the Milwaukee River. And the hard-hit lakefront tourist industry can only pray the beaches will clear by August.

Nothing else can be done about the whole smelly mess—at least not this year. Despite their fearful mortality rate, alewives amount to 95 per cent of the total fish tonnage in the lake, and restoring the balance of nature by reintroducing salmon and trout would be a work of many years. One long-term solution has been advanced to encourage large-scale commercial fishing: building up uses for alewives as fertilizer and animal food.

But Congress so far has done nothing about the problem. The House this year struck out alewife research funds from the Interior program, and a $10 million effort to develop a long-term solution was not expected to be acted upon until next session, if then. The only thing certain, Sen. Birch Bayh said last week after a quick survey of the fishy scene back home in Indiana, was that the alewives problem was no "old wives' tale."

[From Time, July 7, 1967]

ECOLOGY

ALEWIFE EXPLOSION

From the Chicago waterfront to the Mackinaw Bridge, the shores of Lake Michigan were taken over last month by dead alewives. The fish,[1] members of the herring family, washed ashore on every incoming wave, piling up on the beaches faster than bulldozers and tractors could clear them away. They filled the air with the odor of decay and drew swarms of mosquitoes and flies.

Chicago's municipal water-supply inlets and those of industries that draw water directly from the lake became clogged time and again with the little (two-to-seven-inch) alewives. Off Benton Harbor, Mich., an aerial photographer re-

[1] Origin of its name is uncertain, but it may come from *ale* and *wife* because of the fish's large belly.

ported a ribbon of dead fish 50 ft. wide and 40 miles long floating on the surface of the lake.

Scientists have investigated a number of less spectacular alewife "die-offs" in recent years, but they still have conflicting theories about the cause of the phenomenon. Some believe that alewives head for shallow coastal waters in such great numbers every spring that they exhaust the oxygen supply in their immediate vicinity and suffocate. Others suggest that plankton—tiny water plants and animals on which alewives feed—suddenly begin dying just as the fish are crowding into costal waters in the spring. U.S. Fish and Wildlife Biologist Melvin Greenwood theorizes that the alewives are killed by sudden temperature drops caused by violent spring storms that drive colder waters from the center of Lake Michigan into the shore areas.

Steelhead hopes

Originally an ocean fish, the alewife could not penetrate very far into the Great Lakes until the 1930's, when rebuilding of the Welland Canal provided it with a convenient bypass around Nigara Falls. Even so, their numbers remainded relatively small until the 1950's, when the sea lamprey—also an oceanic interloper—wiped the Great Lakes clean of the trout and burbot that were feeding on alewives. Too small a target for the lamprey (which is now being eliminated by chemical controls), and left with no natural enemies, the alewives promptly began a population explosion.

Commercial fishermen now take about 50 million lbs. of the plentiful alewives from Lake Michigan each year, for processing into fish meal, fish oil, and cat and chicken food. Worried federal and state agents have stocked the lake with 2,000,000 steelhead trout and 300,000 coho salmon, hoping that they will take to an alewife diet and proliferate, thus bringing the ecology of the lake back into balance.

The trout, salmon and fishermen have their jobs cut out for them. Despite the deaths of hundreds of millions of alewives in the current die-off, there are still an estimated 175 billion in Lake Michigan alone.

Congressman VANDER JAGT. Again, I thank the committee.

Senator HART. Thank you.

Senator Griffin?

Senator GRIFFIN. No.

Senator HART. Congressman Hutchinson?

Congressman HUTCHINSON. No.

Senator HART. Thanks very much, Guy. Would you join us up here for as long as you are here?

Congressman VANDER JAGT. Thank you very much.

Senator HART. May I, for those not familiar with it, indicate the other members of this Merchant Marine and Fisheries Subcommittee.

As I said, the chairman is the Senator from Alaska, Mr. Bartlett.

And the chairman of the full Committee on Commerce, Warren Magnuson, of Washington, is a member also of this subcommittee, along with Senator Pastore, of Rhode Island, and Senator Brewster, of Maryland, Senator Russell Long, of Louisiana, and Senator Hollings, of South Carolina.

Senator Griffin is the ranking member on the minority side, and he is joined there by Senator Prouty, of Vermont, and Senator Cotton, of New Hampshire.

If anybody recognizes a relative in that batting order, get in touch with him.

Congressman Vander Jagt actually introduced the next scheduled witness, who is now the Assistant Secretary of the Interior.

We knew him in Michigan as the former professor and then chairman of the department of conservation at the University of Michigan and all of us in this room knew him as well as a former chairman of the Michigan Conservation Commission. Dr. Stanley A. Cain is a

distinguished academician and practitioner and we are lucky in this country to have in the Interior Department a man who is so qualified.

Dr. CAIN. Senator Hart, Senator Griffin, gentlemen. I am very pleased to be able to come here today to make some comments. I have a short statement, Mr. Senator, about four and a half pages, and because of the relationship between the two Federal Bureaus of the Fish and Wildlife Service, the Bureau of Commercial Fisheries, and the Bureau of Sport Fisheries and Wildlife, I would like to read this brief statement and then answer questions, if you wish.

STATEMENT OF DR. STANLEY A. CAIN, ASSISTANT SECRETARY FOR FISH AND WILDLIFE AND PARKS, U.S. DEPARTMENT OF THE INTERIOR

Dr. CAIN. The recent massive mortality of alewives in Lake Michigan has focused attention on the problems generated by the recent population explosion of the alewife in the Upper Great Lakes. The alewife is showing promise of outdoing the notorious sea lamprey in upsetting the ecological balance of the Great Lakes and is, in addition, creating extremely serious and costly nuisance problems—the littering of beaches and harbors, and the clogging of water intakes.

This year's alewife die-off—estimated at several hundred millions of pounds—followed an explosive increase in the population during the past decade. Scientists of the Department's Bureau of Commercial Fisheries feel that the die-off is due primarily to the alewife's difficulty in adjusting to temperature changes, as they move shoreward in the late winter and spring. The alewife is a marine fish and it not perfectly adapted to fresh water where it suffers from a physiological defect called thyroid exhaustion which reduces its ability to adjust to temperature change and other environmental factors.

The alewife is not new to the Great Lakes. It was first noted in Lake Ontario in 1873 and has been very abundant there since 1890. Niagara Falls would have blocked movement of the alewife from Lake Ontario into the Upper Great Lakes but locks of the Welland Canal, which connect Lake Erie and Lake Ontario, were only partial barriers to upstream migration. It was 50 years after the alewives became abundant in Lake Ontario before they were first recorded in Lake Erie in 1931 where they became abundant by 1942. They were first seen in Lake Huron in 1933 where they reached maximum abundance about 1961, and were first noted in Lake Michigan in 1949 and reached maximum abundance there during 1966–67. Let's hope that statement is true, that that is the maximum abundance for all history, at least on the beaches. The alewife was found in Lake Superior in 1954 and has spread throughout the lake where it has not yet reached great abundance.

The extreme abundance of alewives in lakes where they have become the dominant species has been associated with the near disappearance or sharp decline of all of the species that were previously very abundant. The chuba which occupied the vast deeper waters of the lakes and the smelt that lived in the intermediate and shallow waters are declining sharply. In the shallower areas the lake herring and emerald shiner that were extremely abundant have all but disappeared, and the yellow

perch which lives near shore has declined during periods of peak alewife abundance.

The only lasting solution to the alewife problem can be obtained by understanding the ecological characteristics of the previous multiple-species complex and learning how the alewife was able to dominate the lake by eliminating other abundant native species. With such knowledge, it should be possible to manage the fisheries, to introduce predators, and to establish previous or new prey species in quantities that will restore the ecological balance and full fishery productivity of the lakes.

The first steps have already been taken here in Michigan where the Bureau of Sport Fisheries and Wildlife and the State department of conservation are cooperating in the introduction of predators that will feed on young alewives. About 3 million Coho and Chinook salmon were planted in Lake Michigan during 1966 and 1967, and nearly 5 million lake trout have been planted since 1965. Also a fleet of three trawlers operating from Saugatuck are harvesting alewives for processing into fish meal for use in animal foods.

Recognizing the seriousness of the many problems caused by the alewife in the Great Lakes, Secretary of the Interior Stewart L. Udall recently named a Federal task force to consider corrective measures. I serve as Chairman and the other members are: Frank C. Di Luzio, Assistant Secretary for Water Pollution Control; Commission James M. Quigley, Water Pollution Control Administration; Director H. E. Crowther, Bureau of Commercial Fisheries; Director John S. Gottschalk, Bureau of Sport Fisheries and Wildlife; and Dr. Milner B. Schaefer, Science Advisor to Secretary Udall. May I add to this that Dr. Schaefer has only very recently become science adviser and that he comes from the State of California, where he is one of their outstanding fishery specialists, so the Department of the Interior is getting more "fishy" all the time in terms of some of its technical people.

The task force will evaluate carefully all suggestions to alleviate the alewife problem, including Federal-State cooperation in cleanup campaigns, harvesting of alewives for manufacture of fish meal, pet food, and perhaps human food products, stocking of Lake Michigan with predators such as lake trout and coho salmon that will eat alewives, and improved methods of collecting dead alewives before they reach the beaches.

Although the Department of the Interior feels that the lasting solution to the alewife problem will be the restoration and maintenance of ecological balance in the Great Lakes, it recognizes that long-term research effort to accomplish this must be complemented with interim control measures to alleviate problems of large annual die offs. It also recognizes that the problem is broader than that of any one State and that a high degree of coordination and cooperation will be required for full and continuing success. The Department's alewife task force will shortly propose measures on what the Federal Government can do to help solve problems caused by the alewife.

Mr. Chairman, if there is time for just 2 or 3 more minutes——

Senator HART. Certainly.

Dr. CAIN (continuing). Since the task force has been mentioned Secretary Udall announced at a press conference about 2 weeks ago this coming Monday that there would be such a task force. These

gentlemen have met and they have consulted their technical people, and they are at the point of having made a summary of what could be done if facilities existed, and if the financing existed, and the personnel existed in the States that are involved, and the Federal Government. This outline of survey of the breadth of the problem, and the possibilities for seeking solution to aspects of it, is going out to the region and to the States for comments in an attempt to cost out any program that would involve these details.

I wish only to give you the idea of the breadth of the approach. There are three parts to it. The first would be action to monitor and control living alewives in an attempt to predict and to reduce die off. This has several aspects to it that could be developed. With information from the monitoring, it would be possible to concentrate commercial fishing efforts on the alewives because the problem arises at different times in the year, sometimes in late winter, sometimes not until the spring, and in different parts of the lake. It has been a very variable phenomena from year to year.

The second part of the study which would be started concurrently would be that of handling alewife die off, and here let me mention some of the details.

There would be investigations of measures to prevent dying and dead alewives from reaching inshore areas. Possibilities are subsidized commercial fishing opeartions, using present or modified gear; Federal contract with private concerns to develop equipment, and have available on a standby basis boats and barges to handle alewife disposal; providing funds directly to the States to handle operations of these sorts; investigating measures for harvesting alewives in in-shore areas too shallow for vessels with heavy gear, and so on.

Then, evaluating existing methods and equipment for beach cleaning, development of special equipment for cleaning beaches, and disposal of fish; methods of financing for areas that have severe die off; development of techniques to accurately measure the quantity of fish involved. We don't really know how many we have got. We have got some very big figures that have been estimated.

Then part 3 is a longer phase program directed to the restoration of the ecological balance of the lakes, and there are perfectly good scientists in the State who are familiar with the kind of research that is needed, as there are in the Federal Government, so I don't want to develop these points at this time, but I did wish the gentlemen here from both the Federal Government and the State to have some idea of the work of the task force which has just begun, and which will eventuate in a possible program for action by Government.

Just one more point for clarification. We have already as a Department sent in reports upon request of the Bureau of the Budget on ceratin bills that were earlier introduced. One report went in in late May and one in early June. We have asked the Bureau of the Budget to hold these reports so that we can make supplementary reports based on a better appreciation and an analysis of the situation, and we will, of course, comment on these bills which have been introduced when we are requested by Budget, and when we have a firmer Department position.

We have before us also at the present time requests for drafting service with respect to bills which have not yet been introduced, so that to summarize all this, let me say that I personally feel that the

Federal Government earlier missed the opportunity. We all knew that there would be another die off this year, and this task force should have been in operation a long time ago, but we are on it now, and we are going to do the best we can, and thank you very much for your attention.

Senator HART. Thank you, Mr. Secretary. I would offer for the record a letter of July 19, 1967, that I addressed to the Secretary, urging the creation of such a task force; Secretary Udall's reply to me, dated July 27, 1967; and the July 29 press release from the Department of the Interior announcing the creation of the task force.

JULY 19, 1967.

Hon. STEWART L. UDALL,
Secretary, Department of the Interior,
Washington, D.C.

DEAR MR. SECRETARY: You are fully aware, I know, of the alewife catastrophe that struck the shores of Michigan this year.

Arrangements have been made for Job Corps men to clear up the public beaches. However, there has been great loss to private industry which relies on tourism—Michigan's No. 2 industry—and to individuals. Cottage renting along the shore, for example, has been dealt a devastating blow. Home and cottage owners and vacationers have all been afflicted.

Although the peak of the crisis has now passed, it is imperative that plans be laid immediately to meet the problem next year. I realize there are no quick and easy answers, but we are dealing with an intolerable situation and drastic measures are called for.

Feeling this sense of urgency, I ask that you call together the federal, state and regional authorities involved to develop an across-the-board attack. As I understand it, this would involve among other things: 1) exploration of ideas to keep alewives off the beaches; 2) maximum utilization of all available resources for quick clean-up; 3) a greatly stepped up introduction of predator game fish into the Great Lakes, to feed on alewives; and 4) an intensified research effort to seek solutions to control these trash fish.

Will you please let me know what, if any, authorization and funding would be necessary to get underway this approach which seems to me to combine practical steps as well as research.

Thank you very much.

Sincerely,

PHILIP A. HART,
U.S. Senator.

U.S. DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D.C., July 27, 1967.

DEAR SENATOR HART: I am in receipt of your letter of July 19 in reference to the alewife problem in the Great Lakes.

I have appointed a special task force under the leadership of Assistant Secretary Cain to work on a program which we hope will effectively reduce the die off next year and provide for a systematic efficient cleanup operation when it becomes necessary in 1968.

I said at my press conference last week that it is a "tough, miserable problem" and that while we think it has peaked and will decline hereafter, in the interim, we have to solve it as best we can.

We will have the task force apprised of your letter and such additional information sent to you as we may have at this time on your inquiry.

Sincerely yours,

STEWART UDALL,
Secretary of the Interior.

[News release from the United States Department of the Interior, Fish and Wildlife Service, Bureau of Commercial Fisheries, July 29, 1967]

UDALL NAMES INTERIOR DEPARTMENT TASK FORCE TO STUDY ALEWIFE PROBLEM

Secretary of the Interior Stewart L. Udall today named a Federal task force to study problems created by alewives in the Great Lakes.

The chairman is Dr. Stanley A. Cain, Assistant Secretary of the Interior for Fish and Wildlife and Parks. Other members are: Frank C. DiLuzio, Assistant Secretary for Water Pollution Control; Commissioner James M. Quigley, Water Pollution Control Administration; Director H. E. Crowther, Bureau of Commercial Fisheries; Director John S. Gottschalk, Bureau of Sport Fisheries and Wildlife; and Dr. Milner B. Schaefer, Science Advisor to Secretary Udall.

The annual die-off of alewives, a non-food fish of the herring family, has in recent years clogged water intake systems and littered beaches. Exceptionally large mortalities have occurred this summer in Lake Michigan, where the alewife population has become abundant.

Scientists in Interior's Bureau of Commercial Fisheries believe that a reduction in the number of alewives is probable, but that substantial die-offs will continue in coming years.

The task force will evaluate suggestions for alleviating the problem. These include Federal-State cooperation in cleanup campaigns, harvesting of alewives for manufacturing fish meal, stocking of Lake Michigan with alewife predators such as lake trout and coho salmon, and improved methods of collecting dead alewives before they reach the shores.

Several explanations have been suggested for the large die-offs, including disease, starvation, temperature change, and lack of oxygen.

Alewives travel in dense schools and migrate from deep waters to coastal areas and streams in spring and summer to spawn. After spawning, they appear more susceptible to the causes of mortality. Bureau biologists believe that the sharp temperature changes, as the alewives migrate from the cold deep water to the warm surface layers near shore, are primarily responsible for the deaths.

Alewives have been in Lake Ontario since the late 1800's. They may have entered Lake Ontario via the St. Lawrence River and canals from their native habitat along the Atlantic coast or could have been introduced accidentally when shipments of shad were released in the lake in the 1870's.

The species was abundant in Lake Ontario by 1890 and continues to be the most abundant fish in that lake, as it has become in Lakes Huron and Michigan.

From Lake Ontario, alewives used the Welland Canal around Niagara Falls to reach Lake Erie, where they were first recorded in 1931. They were discovered in Lake Huron in 1933, in Lake Michigan in 1949, and in Lake Superior in 1954.

It is encouraging to hear that you have asked the Bureau of the Budget to hold, in order that you can evaluate in the light of more recent events, the proposed Department position on several of these bills. That is all to the good.

Dr. CAIN. I requested this about 3 days ago.

Senator HART. That is creditable. We won't ask you how adverse the recommendations were to the bill before. We will just let that die, I suppose. Hopefully, the report is now favorable.

Is there in addition to the bill that we are here considering, this S. 2123, any authorizing legislation additionally that would be needed, or are you yet in a position to advise us?

Dr. CAIN. I can't give you a very good answer to that, Senator. I think that the general reply is that we have got much more authorization than we have got money, and I believe that we could operate under a series of present authorizations effectively if there were a means of financing them.

Now, one of the real needs that we have is the kind of authorization and funding which enables us to combine both the efforts with respect to immediacy, such as alleviating and preventing the social problems of the contaminated, polluted beaches, and so on, and a longer range problem of restoring the ecological balance to the lake.

These are not by any means unrelated. We want those held together. We would like, I think, to have our ability to work simultaneously on the two different kinds of problems that exist.

Senator HART. Well, for the record, I think we should attempt to get clear whether S. 2123 does or doesn't get to the public nuisance, the disaster aspect of the problem. Do we need additional legislation in order to do that, remembering that this bill would authorize the Department to make the determination about the abundance of the alewives, and their effect on other fish, on pollution, and on water-based recreation?

These are the three aspects and relationships that are outlined in the bill, and it authorizes finally programs relating to the controlling of the fish, stocking and developing industrial or other uses, and takes such other action as is necessary, but there are really three things that the bill seeks to open up.

One is the distribution in the nature of the fish itself, and the second is the fish effect on pollution, and the third on water-based recreation.

I guess the question is, do you think the expression, "water-based recreation," would enable you to move on the public nuisance?

Dr. CAIN. I would prefer not to give—attempt to give any authoritative answer for the simple reason that the kinds of action that may be determined to be wise and hopefully efficient and effective have not yet been sorted out and compared one with another; and again, it would be more judicious to ask our legislative people to examine the specific language with respect to specific kinds of operations.

For example, this may result in Federal aid to State actions, kinds of moneys which are not covered by existing Federal-State programs. There are many things which might show up in which the bill—this is a broad bill, and I think a very good bill, but in which it might need amendments. I am not prepared to say what those amendments would be because we haven't got an analysis of the problem yet that is sufficiently broad to permit that kind of a statement.

Senator HART. Then the record will be open for the receipt, from the Department, of the legislative language changes, if any, that this study might suggest to you desirable?

Dr. CAIN. We would be very pleased to do that in due course.

Senator HART. You did mention the matter of appropriations; authorization is easy, and appropriating—getting the money is tougher.

The Anadromous Fish Act of several years ago provided for this matching with the States to introduce coho salmon.

This was up in the Senate last year and this year we managed to get them an addition, I think, of a million and a half.

Is this fund available for you in connection with any direct attack on the alewife?

Dr. CAIN. Senator Hart, the Congress sometimes does interesting things, because they define words to suit their purposes, and sometimes scientists are a little uneasy. Now, the alewife is an anadromous fish when it lives in the sea and goes up fresh water streams to spawn. It is an anadromous fish by courtesy when adapted to the Great Lakes. For example, it may not migrate from Lake Michigan up streams to spawn but may merely spawn in shallow water in the lake. All right, this is a little professorial quibble.

The point, I think, is that the Anadromous Fish Act was never designed to do anything like cleaning up dead alewives off the beaches, nor cooperating with trawler owners to in some way or other gather

and dispose of these things, whether commercially or under contract, before they hit the beaches and become a nuisance.

My personal opinion then is that this would be a diversion of money from an act, which was really for a different purpose.

I would like to leave the Anadromous Fish Act alone, so that these funds would be used in the way I think they were intended that they be used. I would like to see a new source of money for the cleanup problem.

Senator HART. Well, while we might not have understood the definition, I was a cosponsor of the Anadromous Fish Act about 4 years ago. I know we really didn't anticipate it being used to clean up beaches.

Dr. CAIN. I don't want to be misunderstood. I am not questioning the intent.

There is another interesting comment. By virtue of congressional definition, the shallow waters of Lake Michigan have become estuaries without any particular salt in them, unless it gets there by pollution, but the objective is the important thing, and I have no point about that, my friend.

Senator HART. Senator Griffin?

Senator GRIFFIN. Dr. Cain, looking at the bill, which I joined in introducing, there is one amendment that we might want to consider.

On page 2 it speaks in terms of the Secretary of the Interior being authorized, and then skipping down to line 12, "to conduct, directly or by contract, studies of control measures of the alewife and other such fish and animals;" and then "(3) to establish and carry out, based on studies made pursuant to this Act, programs relating to controlling the alewife."

What strikes me is that, even though the Michigan Department of Conservation has made extensive studies, this language seems to box us in by saying that the Secretary can't establish and carry out programs relating to control until there have first been studies made pursuant to this act.

I wonder if we can't make that broader so that, if there are already studies that are adequate or that have promise, we could move directly to the control phase. Does that make any sense?

Dr. CAIN. If there is a language difficulty, I think the intention, as I read this, was to permit programs of action that would not be exclusively based on studies yet to be done.

I would admit immediately that there is enough known by the State biologists and by the Federal fisheries biologists that a great deal could be done.

Now, there is more that needs to be known, even with respect to crash control programs; but I certainly wouldn't recommend waiting for more information. I would recommend starting immediately in anticipation of 1968 with various kinds of monitoring programs, and also concurrently research programs to increase our data. I don't want to wait for more knowledge; I want to start doing something about it.

Senator GRIFFIN. Thank you, Dr. Cain.

Senator HART. Congressman?

I think Senator Griffin does raise a good point in the draftsmanship. I agree with you that the intention was to move now on whatever solid basis we have.

I think Senator Griffin is right; the language may very well bounce

in, and it happens to be a clause that can be easily corrected to do this.

Dr. CAIN. Yes.

Congressman VANDER JAGT. Thank you, Mr. Chairman.

For whatever it's worth, the House agrees with the Senate. I think the phrase, "based on studies under this act," would rule out taking advantage now, as studies have already been done.

Dr. Cain, you have mentioned the Anadromous Fish Act that was cosponsored by Senator Hart, and I know, as a member of the conservation department here in Michigan, that the whole Commission and you exercise, I think, real imagination and leadership in utilizing that act, so that we do have some knowledge now.

Is my understanding correct that while this act is designed for the purpose of helping the State go into a coho salmon planting program, or Chinook salmon, trout salmon, that in terms of any massive planting, that what we really need along the Great Lakes are the fish hatcheries, and is my understanding correct that it is the policy of the Interior Department not to permit funds under this act to be used for the building of hatcheries which would be used for the planting of salmon?

Do I make that question clear?

Dr. CAIN. Yes, you do. I should say that the Anadromous Fish Act works with respect to proposals that come from the States; and different States want to do different things to enhance anadromous fisheries, and in some cases there have been funds expended for hatcheries. Your question was, though, is there a departmental policy with regard to this that would apply in the Great Lakes; I don't know that there is.

There may be a good deal of feeling that the limited amount of money that is available for anadromous fish in Michigan, Wisconsin, and so on in the national program, which isn't fully funded according to its authorization, that other sources of money should be sought for hatcheries rather than to use up all the anadromous fish money for them.

Congressman VANDER JAGT. I think the bill, doesn't it, Dr. Cain, limit the amount that can be given to any one State to $1 million?

Dr. CAIN. I believe that is right, yes. That is based on full funding, which would be $5 million.

I believe I remember that this year Michigan got more than its allotment under the formula for the reason that they were able to match; some States were not, and the States that could not were, I presume, happy to let Michigan use their money.

Congressman VANDER JAGT. The Department was very generous. Thank you.

Senator HART. Congressman Hutchinson?

Congressman HUTCHINSON. Dr. Cain, can you, without going into it at all, just tell us whether other States than Michigan are addressing themselves at all to the alewife situation? Is Wisconsin, is Illinois, is Indiana concerned, or doing anything at all?

Dr. CAIN. Oh, yes. They are concerned, and there is a good deal of interest.

There is a hearing on Monday in Indiana very similar to this: there was one scheduled for yesterday in Wisconsin, but it was called off. The interest is there.

There was one point in my remarks that I am sure you noticed, and that is that this is a several States problem.

Supposing that a new effort, a strong one is mounted on Lake Michigan, because this is where it has been most critical. The problem exists in other lakes; it's coming up in Superior. It has some past history in lakes lower down the chain, but the problems are still there and still potential, and in some cases the need to reestablish equilibrium of many species, complexes that are viable and sustainable and will prevent these kinds of explosions, hopefully, is Great Lakes wide.

Therefore, I suggest in this testimony that this is a several State problem and it should be a coordinated State problem. It isn't a question at the moment in attacking the problem, as I see it, whether the different States may have different degrees of interest, or even indifferent attitudes.

I think these need to be resolved because the fish are no respecters of the State boundaries in the Great Lakes waters, and they do migrate, these alewives particularly, and the predator fish migrate along with the forage fish, so I would like to see, as this develops in an effective attack, it done on a coordinated interstate basis.

This is pertinent to your question?

Congressman HUTCHINSON. Yes, that response. Thank you, sir.

Dr. CAIN. I kind of dodged part of the answer because the details of other State programs I don't happen to be as familiar with as I am with Michigan's.

Senator HART. Mr. Wedin?

Mr. WEDIN. No.

Senator HART. Thank you very much, Dr. Cain.

I take it that there was mail here for Senator Griffin and me, and I don't know what Bob got, but one to me concerned a person who said that lots of the things that she had read we were doing in responding to the alewife problem were good, but the alewives are the result of the Seaway, and that just as when you are bleeding you put a tourniquet on, the only sensible thing to do is to close the Seaway.

I take it from your testimony that these things got into the Great Lakes Basin before the seaway?

Dr. CAIN. That is correct.

Senator HART. Well, I will write her and tell her all is well.

Thank you, very much.

Dr. CAIN. Thank you, gentlemen.

Senator HART. Next, and we are delighted and grateful that he would come, is the vice chairman of the State of Michigan Senate Committee on Conservation and Tourism, State Senator Oscar Bouwsma.

Senator GRIFFIN. Mr. Chairman, I think we might want to recognize—I wasn't aware, and I doubt that Senator Hart was aware—that a State senate committee has hearings scheduled Tuesday in Muskegon on the same subject. Muskegon is really looking into this problem in a big way, and I think that, I am sure that these hearings will complement each other.

Senator BOUWSMA. Thank you, Mr. Chairman, and Senator Griffin, and members of the committee.

We, too, felt this way: that we needed the help of Washington. We needed the help of the State of Michigan. We need the help of

every individual, and certainly we do have a problem that exists. We do have to take care of it.

I thought I would come up here just to make a prepared statement and give you the conservation report from the State of Michigan, but at the same time ask anyone that could be here next Tuesday, we certainly would appreciate them coming and giving any added information to our committee, because we do want to have a crash program to start things going.

We need a hatchery program right now which the State does not have, and get things moving, because alewives are here. We have to take care of them, and we are certainly going to have the problem again next year, and the next year and the next year, so we are happy to have you here in town, and certainly appreciate your coming to our area, and we know you will do a real good job, so I would just like to give a prepared statement.

STATEMENT OF HON. OSCAR BOUWSMA, SENATE COMMITTEE ON CONSERVATION AND TOURISM OF THE STATE OF MICHIGAN

HOW TO SOLVE THE ALEWIFE PROBLEM

The unusually large accumulation of dead and decaying alewives along our beaches through early summer has created problems that seem insurmountable. The stench that prevails along lake shores is overpowering and has severely cut down on tourist income up to this point.

The natural tendency is to take quick and drastic steps to completely eradicate this trash fish, which now makes upward of 90 percent of the total fish weight of all fish in Lake Michigan.

There are some alternatives that would effectively reduce this problem in the next few years without completely eradicating the fish which should be discussed rationally. The Michigan State Chamber of Commerce, in the interest of the total and ultimate economy of Michigan, offers the following information for consideration.

THE PROBLEM EXISTS

The first temptation for everyone in the control of the alewife is to encourage an all-out effort to reduce the fish to a usable product through the establishment of industrial fisheries. These industrial fisheries can convert the alewife into a protein meal, or as is going on right now, dog and cat food. The alewife is not fit for human consumption because of its bony construction.

If the alewife is controlled in this manner we can expect an economic gain to the commercial fishery, and at the same time an increase in the recovery of chubs, herring, smallmouth bass, yellow perch, northern pike, and other valuable native fishes.

This would be an immediate benefit to the commercial fishing industry, but it might not be lasting. Fisheries experts can see the possibility of an ever-increasing fishing program, with more efficient fishing methods being developed that would tend to overharvest the alewives to the detriment of the sports fishing program. This conflict of interest, because of long-term investments in equipment could be years in being resolved.

FISHERIES DOLLARS AND CENTS

Let us look at the economics of, for example, the Lake Michigan fishery. Using a unit of 100 million pounds of alewives that could be harvested annually, and assuming that they continue to be valued at 1 or 2 cents a pound, 100 million fish would be worth between $1 and $2 million gross to the commercial fishermen. These same fish, in the form of meal, would be worth between $3 and $4 million at the consumer level, offering employment to about 100 fisherman and shore workers in the meal plants.

Or figure it this way: Conservatively, 10 pounds of alewives can be expected to produce about 1 pound of sports fish. On this basis 100 million pounds of alewives would produce 10 million pounds of salmonids, with a value placed conservatively at 60 cents a pound on the market. Coho salmon recently sold easily at 75 cents a pound in the Chicago markets.

The value of the salmonids, then, if caught by the commercial fisherman, would be valued at around $6 million. Add to this the processing and the marketing and this would be doubled, giving employment to perhaps 100 to 200 commercial fisherman and shore workers.

HIGHLY DEVELOPED SPORTS FISHERIES IS BEST ANSWER

Now let's look at these same alewives in terms of dollars and cents value as strictly a sports fishery. Ten million pounds of salmonids can be considered as 2 million game fish, at an average size of 5 pounds.

To the sports fisheries, each of these fish is considered to have a value of $30 to $40, representing the expenditure that a fisherman puts out in travel, lodging, bait, tackle, charter boat fees, licenses, and other incidentals in the tourist or recreational industry. So, instead of the $6 million or the $12 million for commercial enterprises, we are talking about $60 to $80 million to the tourist and recreational industries. Employment would be available for several hundred or thousands of people in the charter boat business, the motel business, the sporting goods business, and the other related functions of a healthy tourist industry.

It would appear from the great differences of economic benefit between the alternatives, that these figures would be subject to some question. These figures on the value of the sports fishery were derived from a report of the U.S. Fish and Wildlife Service to the U.S. Senate in 1965, in testimony on the national wild rivers bill. Similar economic reports on the value of the sports fishery are available from California and other areas of the west coast.

It is hard to estimate the total possible income from a sports fishery that has not yet begun breathing evenly, after a dramatic birth and a touch-and-go existence in infancy. In spite of some dramatic and exciting things that have happened in the past year, it still appears that our infant experiment might starve before it has a chance to prove itself.

NO STATE LIKE MICHIGAN

There is no State in the United States that is more suitable for a giant sports fishery. We are in the middle of the largest collection of fresh-water lakes in the world and touch four Great Lakes with our

shores. Some 50 million people live within a day's drive of the Great Lakes Basin and are looking to Michigan for recreation, fishing, and hunting activities. While the inland fisheries have slumped somewhat in recent years, there is no indication that such a slump would continue in the Great Lakes.

A good example of this is Lake St. Clair, where the sports fisheries have expanded 10 times over during the past 10 years. At the present time some 50,000 boats are registered on the American side, representing many millions of dollars in capital investment.

Sportsmen there have indicated that they would move from this heavily fished lake to other reaches of the Great Lakes, if there were fish there in ample numbers. This has already been demonstrated with the limited planting of the coho salmon in three areas of the State.

The demand for sports fishing is here now, and will grow into a gigantic magnet for trout fishermen all across the Nation, providing the fish are here. It should be pointed out that in addition to the coho program, lake trout, steelhead trout, chinook and brook trout are being planted to enhance the total fishery in the Great Lakes. Standing in the wings are the striped bass and the summer steelhead.

SPAWNING AREAS ARE SCARCE IN MICHIGAN

Michigan has a great variety of streams that are ideally suited to the production of salmon and trout. Unfortunately, down through the years manmade obstructions would today effectively block the full development of most of our streams as effective spawning streams. It will be necessary to take the eggs from spawning fish and hatch them artifically in hatcheries.

The goal of the fish division of the Michigan Department of Conservation is to artifically rear 30 million salmonids for release each year. It is anticipated that this will provide the necessary check on alewives, and at the same time produce sufficient fish for the sports fishery, and all the fish necessary for the commercial fisheries, utilizing the surplus fish not caught by sports fishermen.

This will require the building of five major hatcheries in strategic locations. In addition, fish passage facilities around dams will have to be constructed and egg-taking stations will have to be built to assist in natural spawning runs, access to fishing areas, and new facilities.

This building program will require close to $30 million over the next few years. Only one hatchery is now under construction, and it appears that this one hatchery on the Little Manistee will be shortchanged before the year is out.

MAKE HASTE SLOWLY

The urgency of the situation with regard to control of the alewife problem may lead to some unwise and damaging control measures that would be penny wise and pound foolish. The State chamber is joined by many in adovocating a make-haste-slowly program toward the control of alewives by the enhancement of a sports fisheries program that would make Michigan the sports fishing capital of the Midwest.

There are several steps necessary to insure the success of such a program:

(1) A continuation of the long battle to contain and control the sea lamprey. This program has already proven itself, but is a vital necessity for Lake Superior, Lake Michigan, and Lake Huron.

(2) A tight regulation of commercial fishing, so as to prevent overharvesting of sports fish and the killing of sports fish in gill nets. Once the sports fisheries are established, then commercial fishing should be controlled on an area and quota basis only.

(3) Find ways of funding the five major hatcheries necessary to produce some 30 million yearling trout and salmon to step up the planting rates in the Great Lakes.

(4) Make long-range plans to surmount power dams in many of Michigan's streams, so as to further enhance the spawning runs of native trout and salmon. In the case of dams not now being used, to either remove, or build fish ladders, when community development is established on backwaters.

(5) Secure the cooperation of all Great Lakes States in establishment of coordinated fishing regulations, and encourage these States to establish hatchery programs of their own.

(6) Give the Fish Division of the Michigan Department of Conservation emergency authority to change regulations or to modify regulations when it appears that a species may be endangered by over fishing or overnetting.

Even with all the funding necessary, it is anticipated that it will take up to 10 years to complete all of the hatcheries necessary to bring production up to the minimum of 30 million trout and salmon yearly. In the meantime, and before the full impact of the program can effectively reduce the alewife populations to a point that they are tolerable, there is a danger that an unwise program of eradication and utilization of these fish will develop.

The Michigan State Chamber of Commerce recognizes the rights and privileges of free competition in industry and would encourage this activity, within the limits of a program established primarily for sports fishing.

Senator HART. We welcome receiving it. Thanks very much, Senator.

If there is no objection, I will put into the record at this point the press release that your committee issued some days ago. It comments on the meeting coming up on Tuesday.

Senator BOUWSMA. Yes, sir.

Senator HART. And expresses the desire of the Senate committee to work cooperatively with Federal authorities. Certainly we hope we will demonstrate we want to respond in kind.

LANSING.—A Senate Interim Committee on Great Lakes Fishing launched its study of the alewife problem at a meeting in Lansing Thursday afternoon.

The five-man committee, chaired by Senator John F. Toepp of Cadillac, includes Senator Harold Volkema—Republican of Holland, Senator Oscar Bouwsma—Republican of Muskegon, and Senators Basil Brown and Stanley Novak—Detroit Democrats.

Senator Toepp stated that, following his initial survey of the alewife problem in the Grand Haven, Holland and South Haven areas, he is convinced the problem is critical.

"This is seriously damaging our tourist industry," he warned, "in that these hills of dead alewives on Michigan shorelines are ruining the swimming and fishing, and creating a serious health hazard.

"Our committee will work closely with Senators Robert Griffin and Philip Hart and Congressman Guy Vander Jagt, since this is a joint state-federal problem," Toepp explained.

"After the committee's initial meeting with the Conservation Department, we feel it is imperative to move ahead quickly with our trout and salmon program, and with the hatchery construction, in order to achieve control over these hordes of alewives," the Senator added.

"In order to achieve an ecological balance in the Great Lakes," he said, "sufficient numbers of predators—such as salmon and trout—must be introduced to cut back the overwhelming population of alewives, which now dominate the Great Lakes."

The committee met in Lansing Thursday afternoon with Dr. Wayne Tody—Chief of the Fish Division, T. B. Durling—Chief of the Hatchery Section, Myrl Keller—Great Lakes Survey Specialist and Jim Gibson—Michigan representative for Congressman Vander Jagt.

Conservation and legislative representatives from Wisconsin, Illinois and Indiana have been invited to an August 8th meeting in Muskegon to discuss the problem with committee members and Michigan conservation officials. Senators Bouwsma and Volkema, co-vice chairmen of the committee will make the necessary arrangements for this meeting. Hopefully, the four states can join forces to solve the alewife problem which plagues them all.

Senators Griffin and Hart, Congressman Vander Jagt and the other 18 Congressmen have also been invited to the Muskegon meeting.

Several of the Interim Committee members plan to go to Washington, D.C. next month to meet with Stuart Udall, Secretary of the Interior and the Michigan Congressional delegation to seek federal assistance in the fight against the alewife, Toepp said.

Senator BOUWSMA. Fine.

Senator HART. Before I, in a sense, left Michigan for certain months of each year, I thought the Department of Conservation of Michigan was excellent. After having been exposed now for a few years to other State departments of conservation I welcome an opportunity to put on the record today my feeling that the good things we say about the Michigan department are literally true, and that there is no conservation commission in this country that is in a class with it.

And having said that, we would welcome the director of the Michigan Department of Conservation, Dr. Ralph MacMullan, and I think Dr. Wayne Tody is with him.

STATEMENT OF DR. RALPH MacMULLAN, DIRECTOR OF THE MICHIGAN DEPARTMENT OF CONSERVATION; ACCOMPANIED BY DR. WAYNE TODY, CHIEF, FISH DIVISION, MICHIGAN DEPARTMENT OF CONSERVATION

Dr. MACMULLAN. Thank you, Senator Hart, Senator Griffin, Congressman Vander Jagt, and Congressman Hutchinson. We are very grateful—I speak for the people of Michigan—that you would take the time to come and talk about this problem.

I would like to say I am also representing Gov. George Romney, in addition to the Michigan Conservation Commission.

We, in State government, are greatly concerned over the alewife dieoff which occurred in Lake Michigan this summer. The tremendous accumulations of dead alewives along our beaches resulted in a substantial loss in the summer tourist trade and created a variety of other problems for west Michigan residents. Fortunately, the major portion of the alewife dieoff is over for this year, and the dead fish still littering our beaches can be expected to rapidly decompose. But we are pain-

fully aware that the problem has not been solved, and that the threat of a recurrence of this visitation next year is very real.

It is our firm conviction that the ultimate, long-term solution to the alewife problem lies in restoring the biological balance in Lake Michigan. The introduction of large numbers of lake trout, steelhead, coho and chinook salmon is, in our judgment, the first and most logical step toward the solution to the alewife problem. If successful, it will also provide a flourishing sports fishery for the 50 million people who live within a day's drive of the Great Lakes—a side benefit that will vastly overshadow the problem it solved.

Unfortunately, our best efforts will hardly restore a semblance of biological balance in Lake Michigan in the next year or two. It will take time and a considerable expenditure of money to produce the fish required to do the job. We would, therefore, enthusiastically endorse any alternative, short-term solution which would not be a deterrent to or otherwise conflict with our goal of achieving a biologically balanced fish population in Lake Michigan.

Restoring the ecological balance of mighty Lake Michigan is a tremendous undertaking. Yet, already, the job has been well started. Control of the sea lamprey has set the stage; the difficult part has been done. We are completely optimistic. Already our salmon introductions have taken hold, and our lake trout rehabilitations and steelhead introductions have proven out; we really have gone past the trial and error stage to the point where we can take credit, as a civilization and as a culture, as having done a very tremendous job in a tremendous body of water, so that a lot of the guesswork has gone out.

Mr. Chairman, with your permission I would like to have Dr. Wayne Tody, who is chief of our fish division, and who is the current mastermind of this program, show you graphically, and I think quite precisely, what our plans are for doing this job.

Senator HART. We would like to have the slides.

Dr. TODY. Thank you, Director, Senator Hart, and Senator Griffin.

(Showing of slides entitled, "Sport Fishing for the Great Lakes, an Action Program.")

Dr. TODY. The purpose in showing these slides is to tell the Great Lakes fishery story and to give the committee a visual reference on many of the things that will be said here today. [Showing of first slide.]

Here we have a global reference to the Great Lakes showing the landmark that they constitute in North America relative to Hudson Bay, and the Rockies. They are a tremendously valuable resource, large in scope, and worthy of our best attention. [Next slide.]

And also, as has been mentioned, they are the seat of a large mass of our Nation's population. It's literally true that 50 million people live within a day's drive of these lakes. [Next slide.]

Actually the Great Lakes form a resource base for an extremely valuable recreation and residential area. [Next slide.]

The northern areas are truly beautiful and scenic. [Next slide.]

In the south, in the Detroit and Chicago areas, are the sites of large cities. [Next slide.]

Some of the waters, like Lake St. Clair, have been developed for very valuable recreational fisheries.

Our data indicates that Lake St. Clair, where a good warm-water fishery is present, is utilized by 50, 000 boats, and we have observed a tenfold increase in the use of it in the last decade. [Next slide.]

We now have a problem in biological or ecological balance in the lakes, as is evident, if we believe in the food chain demonstrated here. You can realize we have to restore large predators in order to regain a biological balance.

Large predators dominated by a prime species feed progressively on smaller size fish. This is what we are talking about in this term, "biological balance."

Now, using that as a reference, let's look at a little bit of the broad history of the Great Lakes. [Next slide.]

Up until the 1940's we had essentially what constituted a biological balance. The chubs, or whitefish, formed the base of this pyramid and it was topped off with a lake trout as the chief predator in the open waters. [Next slide.]

This fishery was utilized primarily by commercial fishermen. They were able to harvest the lakes very adequately.

I must say that it was never an exceedingly valuable industry, but it was the primary use of the Great Lakes fisheries populations. [Next slide.]

In about 1950 we got in trouble with the biological balance in the Great Lakes. The primary offender in upsetting the balance was the sea lamprey, an invader from the ocean which came in and literally annihilated the top predators—but also an uncontrolled commercial fishery played a role. [Next slide.]

Now, quickly, let's review the success story on sea lampreys—the animal, and the damage that they have caused.

A successful control program has been worked out under the auspices of the Great Lakes Fisheries Commission, and the leadership has been largely provided by Canada, and by our Bureau of Commerical Fisheries in the United States. [Next slide.]

The ammocetes are destroyed on a rotational poisoning program every 4 years. In other words, these larva lampreys are wiped out at a weak spot in their life cycle. [Next slide.]

Here quickly we can summarize the result of this program. In one life cycle of the lamprey after chemical control was started on Lake Superior, we had a very high level of control. Coupled with that, lake trout were restocked, again under the auspices of the Great Lakes Fisheries Commission, and we have observed a very good comeback of the species. [Next slide.]

This is evident by the sport fishery out of Black River Harbor up on our northwestern shore. We not only have lake trout in the catch but a considerable number of brown trout, steelhead, and in the last year, coho salmon. [Next slide.]

The fishery is good enough so it is attracting this sort of adventuresome fishermen out. We don't have facilities that are safe to accommodate the demand. It is another pleasant area of development that faces us. [Next slide.]

In Lake Superior, then, we are at some sort of a point in restoring biological balance. The sea lamprey control program on Lake Michigan is well underway, and equally successful. It is not yet started on

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Lake Huron, but in both of these lakes we have the now notorious problem of the alewife explosion. [Next slide.]

Here is our culprit. [Next slide.]

And the problem that has been discussed this morning. How would you like to swim in that? [Next slide.]

I think basically this is the reason we are here today. It is a pretty rotten smelly mess. [Next slide.]

The thing got ahead of all of us, I am sure, and we can see why right here. In just 2 years, from 1962 to 1964, the whole fish population in Lake Michigan flip-flopped in favor of the alewives. Since 1964, of course, the specie has continued to increase until it makes up most of all the fish now in the lake. [Next slide.]

All right. How to arrive at a control through restoring the biological balance? Here we have the present population in the lake in step 1. We need to reduce this dominant population of alewives by predation. [Next slide.]

Step 2 is already well underway. This consisted of introducing the lake trout as a deep-water predator in the lake. Several million have been stocked. [Next slide.]

But early in the game we recognized that the lake trout was not really adequate to control or restore a complete biological balance. It left much of the upper water uninhabitated. The problem was to search worldwide to find predators and valuable game fishes that could live in this area. [Next slide.]

And this is where the salmon, the coho and Chinook and the steelhead fit. These fish are all good predators, very valuable and capable of living in the entire upper layer of the Great Lakes. [Next slide.]

Once this combination of predators is established in the outer waters, I think it is very reasonable to expect that we can see a comeback of yellow perch, smallmouth bass, walleyes, northern pike, and the other in-shore species. These fish, these native species are also predators, and will contribute to the final population balance. [Next slide.]

So by some period in the early 1970's we can hopefully expect to restore the population balance. The alewife will always be there, but they should be relegated down to their proper role as one of the forage species, headed by the various top predators. [Next slide.]

As I mentioned, the Great Lakes is the scene of a lot of sport fishing interest. [Next slide.]

Early in the game, frankly, we were pleasantly amazed at what happened, with the results of the first coho plants, which were made just a year ago. The cohos came in all over. We had our run of jacks, as we expected, and this year they started out and entered the sport fishing catch, especially in Lake Superior, in a big way. [Next slide.]

But hardly before we got into the program we began to hit some problems; one of the famous foremost, was the high incidence of coho taken in commercial gill nets in Indiana waters. The fishermen there took about 21,000, which exceeded our jack run last fall by about threefold. This is not really surprising because, as I mentioned, the Great Lakes have been dominated for many, many years by a very intensive commercial fishery. [Next slide.]

If we look at gill nets lifted in the Great Lakes, it is quite surprising to see how intensive this effort really is. Our monitoring of commercial fishing incidental catches seems to indicate about 27 percent

of the first lake trout plant may have been removed in this current year alone. This is a problem that we are going to have to face up to. Necessary regulations and controls must be installed if these predators that are being stocked are to received adequate protection. [Next slide.]

And although we are here today to discuss alewife control, as a means of getting at this solution to a nuisance we can predict that if we get carried away with all the quick approaches we may very well have this sort of a conflict not too very far off. [Next slide.]

So let's look just a little bit at the economics of these things as we will see them 5 or 10 years from now. To the commercial fishermen, 50 pounds of alewives have a gross value of about $1. These fish could convert into one 5-pound coho, which it has been mentioned is worth about $32 to our economy in a sport fishery. [Next slide.]

So trawls should be looked at as a means of taking surplus. The industrial fishery is well placed and needed to remove the surplus. It should not be looked at as the primary utilization of these fish. [Next slide.]

So then let's just briefly compare some economics of the sport fishery. We haven't tried to be exact here. We are just showing the trend that we expect to follow a realistic planting rate. [Next slide.]

On the other hand, the Great Lakes commercial fish production makes up about 1 percent of the total take in our Nation. [Next slide.]

This is a valuable product. It is probably the most valuable use that alewives can be put to. [Next slide.]

But if it ever becomes a matter of choice, we in the department think it should be made in terms of the recreational fisheries. This, by the way, is a steelhead that was caught on the Manistee River last fall. I can guarantee this fish grew that size in a couple of years, feeding primarily on alewives. [Next slide.]

So what is needed to bring all of this about? Well, there are four things: Hatcheries, land and fishing facilities, fish passage facilities and, finally, research and management evaluation. [Next slide.]

Let's look at each of these items. First of all, in Michigan we have five State hatcheries. These hatcheries can produce 250,000 pounds of trout and salmon for planting purposes. This is one of our hatcheries. [Next slide.]

It is an attractive place. It is pretty. I have to say this. It was designed in the 19th century to raise brook trout. It is not designed for high production or efficiency as is needed today to meet the type of problem we have on the Great Lakes. [Next slide.]

To demonstrate this very graphically here, you see a man out feeding fish in the pond in the wintertime, slinging in the feed with a bucket. In a moment I will contrast that with some modern fishery developments around the United States. [Next slide.]

So here is what we feel is needed at this time, and now, five new hatcheries that will produce just under 2 million pounds of planting stock. [Next slide.]

This looks like a lot of money but in terms of the resources and the job that can be done, it is dirt cheap. [Next slide.]

Actually, we already have, thanks to the Anadromous Fish Act and some funds from our State legislature, this program going along. Here is actual construction on a new hatchery up on the Little Manistee River. [Next slide.]

It will involve materials and methods and design that are completely unfamiliar in the Great Lakes area. [Next slide.]

We got the idea of high production from Dr. Tanner, when he was chief of our division in visits to private trout hatcheries such as this in Idaho and new hatcheries such as this. [Next slide.]

This compact little hatchery unit can raise literally more fish with three men than our entire present hatchery system in this State.

I will show you how they do it. [Next slide.]

First of all, it is all automated. The fish are fed and handled essentially electronically. [Next slide.]

Here is how they feed them. Just as an example, there is a traveling gantry that traverses the entire system of a pond. You see the feed coming automatically out of the hoppers. [Next slide.]

And this entire gantry then goes down the raceway, and feeds the fish in one simple mechanical operation. [Next slide.]

Even larger hatcheries are being built. This is a new steelhead hatchery in the State of Washington. The ponds are over a quarter of a mile long. [Next slide.]

And here is one that I hope will impress you. This single hatchery in the State of Washington on the Cowlitz River is programed to produce 28 million salmon, Coho and Chinook, for migration down to the Pacific Ocean in one single unit. I think this would do a pretty good job of meeting our entire need. [Next slide.]

Well, here is our expectation of normal State and Federal Government cooperation development of this program. I could point out the planting rate could be moved ahead a year or two at least by rapid action and understanding of the problem. If the funds could be made available now we could have the design, and have this thing going and have a degree of alewife control within not more than 5 years. [Next slide.]

This is how large we have to raise our salmon. This fish is a Coho that weighs 1 ounce. It costs a few pennies at most to produce, and I think when I get through these slides we are going to show what one of the fish of this size looks like after a year. [Next slide.]

To round out this program, in the long run there are many things needed than just hatcheries. One of them is a fish passage facility. [Next slide.]

Many of our streams are blocked by natural barriers, such as Manibesno Falls. [Next slide.]

And especially by manmade barriers, such as Tippy Dam. [Next slide.]

We need fish passageways over these barriers, such as this one. [Next slide.]

And this one. By the way, this fishway is on the Alaskan Peninsula, 400 miles from civilization. I say that just to indicate the degree of interest people with valuable anadromous species place on the resources. We sure are behind the times in this Great Lakes area. [Next slide.]

Our surveys indicate that these streams are now available to migrating steelhead and salmon. [Next slide.]

Here is what should be made available, and what can be accomplished by surmounting dams and natural barriers. [Next slide.]

We need land acquisition to provide public fishing facilities in the long run. [Next slide.]

There are many streams that are not yet developed, but they are being developed for residential and recreational sites, and very rapidly. [Next slide.]

We don't want this sort of thing to become too widespread, to become the rule, where it is nice to look at, but, "please don't touch." [Next slide.]

This is really what we want to see. It is a shot on the Big Huron River, early this spring—a fisherman taking steelheads and anadromous fish from the Great Lakes. [Next slide.]

Finally, we need research in management evaluation. [Next slide.]

Here is a converted patrol boat out trawling, taking samples in Lake Michigan. [Next slide.]

And a crew stocking fish on the salmon runs last fall. [Next slide.]

One early result of this evaluation program is indicated here. The new distribution of Coho salmon catchers within 12 months of release in the Great Lakes. They can travel around and it is extremely interesting where they go, how they survive, and how—and all that necessary sort of information. [Next slide.]

In Michigan we feel it is our obligation to display a certain amount of leadership because of our large stake in these waters.

Taking the three upper lakes—Lake Huron, Lake Michigan, and Lake Superior—Michigan has a jurisdictional responsibility for some 74 percent of the water, and the program that I have discussed has been programed and planned on waters under Michigan's jurisdiction. It does not include any needs or plans for Minnesota or Wisconsin waters on Lake Superior, or Wisconsin, Illinois, and Indiana waters on Lake Michigan.

I agree that there is an obligation on the part of these other States. They should be coordinated, and certainly the Federal Government or the national interest should come in to a large part. These waters are not strictly local in nature. They will be regionally important in uses by a good many people in our Nation. [Next slide.]

Here then is a summary as we see it, of the needs for development in the next 5 to 10 years to get this program off the ground. The first item there of fish hatcheries, I have to say, should receive the first and absolute priorities. Some $14 million will be required to build these five hatcheries to produce 30 million young salmon. They could be programed and contracted within 3 years if the money could be made available now. It won't be long before we need to consider land. We certainly can supplement fish production by fish passage and increased natural reproduction. Certainly we need the additional streams to get a harvest of the fish and, finally, research and survey activities are essential. [Next slide.]

So there is the problem we are discussing now. [Next slide.]

There is the solution that we offer to it.

Thank you.

Senator HART. Doctor, thank you very much.

Dr. MACMULLAN. Thank you, Senator Hart.

I have, as an anticlimax, a bird in the flesh here.

Dave Weaver, our district fisheries biologist—Dave how long did it take that to grow, and what does it weigh?

Mr. WEAVER. It weighs 7½ pounds, 26 inches long. It was put in at about 7 inches a year ago, this past spring, so it's a little over a year old, as having been in Lake Michigan.

Dr. MACMULLAN. One of our local newspapermen, Senator, said that he thought that this Coho program was just a fabulous mess, because he had never caught a Coho fish in the time he had been fishing all along, Jim Crowe, from the Detroit News.

Senator HART. We will raffle it off at the end of the hearing.

Mr. MACMULLAN. Senator, I have some others on my staff here, so if you have any questions at all, we would be glad to try to field them for you.

Senator HART. Let's see if we can spare you some time.

How long will it take to do the job?

Dr. MACMULLAN. Wayne?

Dr. TODY. Well, to do the job of balancing the population, looking at the hatchery program, which I am sure you need, Senator——

Senator HART. Yes.

Dr. TODY (continuing). There is a period of funding, which we are in now; then a period of design. Contracts must be let, and then fish have to be reared.

So any hatchery that we would start right now could be physically installed in the field within less than 3 years, and the fish could be out in the lake contributing to this balance in 4 to 5 years.

Senator HART. And that for $29½ million?

Dr. MACMULLAN. Yes.

Dr. TODY. Just the hatcheries part we estimate will cost $14 million, about half of it.

Dr. MACMULLAN. The $30 million is to provide the system for this program for producing approximately 30 million fish a year.

Senator HART. Well, we will see if we can convince all and sundry that that is an approved investment.

Senator Griffin?

Senator GRIFFIN. Dr. MacMullan, Dr. Cain stressed the importance of cooperating and working with the other States in any approach that is taken.

I sort of got the impression from your emphasis on what Michigan's jurisdiction was, and what Michigan wanted to do, that you weren't quite stressing that joint approach, so I guess my question really is to what extent is the Michigan Department of Conservation aware of the activities of other States, and cooperating with them in some joint effort? Because, obviously, whatever any one State does is going to affect the other States in this situation.

Dr. MACMULLAN. Senator, this, of course, has to be completely a cooperative program. Not only between the States but between the States and the Federal Government.

By a fortunate geographic accident Michigan has the larger area of jurisdiction, but at the same time we also were fortunate in being best with even larger majorities of the feedable streams for the anadromous fish around, for example, the west coast of Lake Michigan, up and down the coast here, has many more times as many suitable waters as the opposite coast in Wisconsin.

We felt the responsibility, as Dr. Tody said, to take the leadership in this, and because we really had the biggest stake—but by all means, this is a total effort, because in the rehabilitation of Lake Michigan, Wisconsin, Illinois, and Indiana have as much or more interest collectively than we.

I think that I am extremely pleased to see the task force that the Secretary of Interior has produced, because I think this is really the ultimate answer.

We have cooperated very well with Wisconsin and Minnesota and the other States and we have cooperated with the Bureau of Commercial Fisheries, and, of course, depend on them for much of the information and the research and so on that has been done and will be done.

But I think this task force should be able, then, to bring together a reasonable set of cost figures, such as we have presented here, only for the entire proposition and we, of course, can't speak now—at least we can't speak for Wisconsin and the other States, and each of us might have a different idea and I think this is a quite proper function of this task force.

I am very optimistic they can come up with similar figures to ours, and come up with an overall figure, and also perhaps some ideas about how this should be handled jurisdictionally.

Senator GRIFFIN. Thank you.

Senator HART. John?

Mr. WEDIN. No.

Senator HART. Gentlemen, thank you very much. I would hope that any of the slides we saw, and for which you have the graphic reproduction on paper, will be made available. To the extent that they are, we will make them part of the record. We all wish we could have that last exhibit made a part of the record.

To make this completely official, I would like to introduce the representative in Lansing of this district, the 96th District of Michigan, State Representative Francis W. Beedon.

Francis, would you give your blessing?

STATEMENT OF HON. FRANCIS W. BEEDON, STATE REPRESENTATIVE, 96TH DISTRICT, LANSING, MICH.

Representative BEEDON. Thank you, Senator Hart and Senator Griffin. I apologize for coming in about 1 minute late, because you gentlemen started things right on time today. I was hoping to greet you beforehand.

You are in my district, the 96th District, which is the cities of Muskegon and Muskegon Heights; that is about 71,000 people and 4 or 5 million dead alewives.

I do want to welcome the committee to Muskegon, and I think you are right in the center of the problem. At the present time, of course, it has been alleviated considerably by the natural desiccation of the alewives, but it has been, as has been pointed out already, an extremely important problem.

The question just asked of Dr. MacMullan and Dr. Tody to the effect of the cooperative application among the various States, I was remarking to one of the gentlemen from the Federal Fisheries Agency that our concern has been especially a localized problem of removing the dead alewives, and also, I was thinking that we have had the problem of the removal of salmon by our neighboring States to the south.

I think that hasn't been mentioned yet, but I believe it is a part of the problem.

We released the coho, and they are being taken, I understand, in rather large quantities in the southern part of Lake Michigan.

I assume there is much more to be presented here, and I especially appreciate the opportunity of welcoming you here, and I am especially pleased that you are making this study.

Senator HART. Thank you very much; thank you.

Representative BEEDON. Thank you.

Senator HART. I think that Dr. MacMullan or Dr. Tody at one point did make a comment about the extent of the fishing to the south of us on the coho.

Representing the next agency which has a very significant role in the relationship between the States in this Great Lakes basin is the executive director of the Great Lakes Commission, Col. Leonard J. Goodsell.

Colonel GOODSELL. Mr. Chairman, Senator Griffin, ladies and gentlemen: This is a very refreshing hearing this morning, if I may say so, because we are all agreed that we have a major problem here, and we have no dispute that we have to do something relative to this problem.

Our big problem from here on in would be how do we go about meeting the problem and come up with something worthwhile that will not only take care of the problem, but maybe convert what is now a problem into an asset or resource, as Dr. Tody and other speakers have already mentioned.

Senator HART. Maybe I should make a fuller, though still brief, introduction and explanation.

The Great Lakes Commission is made up of representatives of all the States bordering our Great Lakes. I have been trying to get a compact bill through Senate Judiciary Committee for several years, and haven't delivered it; but we are still at work.

Colonel GOODSELL. Actually, Senator, you succeeded. It's on the other side that we have the problem.

Senator HART. The other fellows are gone, so we can really put the finger on them.

Colonel GOODSELL. Shall I proceed?

Senator HART. Yes, sir.

STATEMENT OF COL. LEONARD J. GOODSELL, GREAT LAKES COMMISSION

Colonel GOODSELL. The Great Lakes Commission is the operating entity of the Great Lakes Basin compact, ratified and approved by the legislatures of and wholly supported by the States of Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin. The Commission has been operating as the advisory and recommendatory agency for the eight Great Lakes States on regional water resources matters for 11 years. Ours, we like to think, was and is a real pioneer effort in interstate cooperation and consideration on water resources matters. Indicative of the Commission's interests are the fields of activity of its five standing committees: (1) Pollution control, (2) water resources, (3) fisheries and wildlife, (4) shoreline use and recreation and (5) seaway, navigation, and commerce. We keep abreast of activities and developments which affect the Great

Lakes region, and initiate or respond to actions which occur or need to be undertaken.

Since the time of pioneer settlement, the Great Lakes—with about one-quarter of the world's fresh water—have been looked upon as huge reservoirs with an inexhaustible supply of unpollutable water abounding with delectable game and pan fish and providing an unexcelled traffic artery for huge lake carriers and ocean vessels as well as almost limitless area for pleasure craft to navigate.

More than a decade ago the States of this region saw that the old concept of the Great Lakes enduring forever in pristine purity was fallacious and began to move to meet the problems and effect solutions incidental to the wise use and conservation of the water of the Great Lakes. The States recognized the lake waters as a natural, usable, and reusable, resource and raw material and that man must make use of these waters and related land areas as a place to live, a place to play and a place to work.

Now, almost all citizens are becoming aware of the need to manage the waters of the Great Lakes and to keep these waters available and usable for the generations to come.

RELATED ACTIVITIES

In 1964, the Great Lakes Commission recommended to the Secretary of State that the International Joint Commission, established under the provisions of the treaty of 1909 with Canada, undertake studies on what can be done; (1) to reduce the range in the water level fluctuations in the Great Lakes (Lake Michigan-Huron levels vary from high to low about 6 feet), and (2) to investigate and recommend measures to alleviate the pollution problem in Lakes Erie and Ontario and the international section of the St. Lawrence River. These two items are of regional, national, and international concern and are being vigorously prosecuted by the International Joint Commission.

In 1965, a study was completed by the U.S. Public Health Service and State of Michigan relative to the contribution of the Metropolitan Detroit area to the pollution of the Detroit River and western Lake Erie. A similar study was undertaken for the Illinois River and tributaries and the southern portion of Lake Michigan. Both studies have resulted in corrective actions now underway to control and abate pollution.

Also in 1965, a Federal water pollution control conference was held for Lake Erie with hearings at Cleveland, Ohio and Buffalo, N.Y. The House Government Operations Committee has held hearings throughout the Great Lakes region to determine what can best be done to correct the pollution menace in the Great Lakes. Again, corrective actions are underway.

The Water Quality Act of 1965 requires States to establish water quality standards for interstate waters and to prepare and implement a plan to accomplish water quality objectives. All Great Lakes States have responded promptly, and have submitted water quality standards and their plans for meeting or achieving the standards.

I mention these selected examples to point out several actions now underway which stem from the realization that the Great Lakes waters are not as they were once thought to be—inexhaustible and unpol-

lutable. We must continue our efforts to enhance, improve and use wisely this most important water resource.

As a part of the overall problem of managing the waters of the Great Lakes, we have the matter of interest before the committee today—the overabundance of alewives which are giving us so much trouble in Lake Michigan.

ALEWIFE EXPLOSION

The alewife, a prolific little fish, a native of the Atlantic, was first reported upstream of Niagara Falls in Lake Erie in the early 1930's and appeared in Lake Michigan in the late 1940's. Since the mid-1950's the alewife has become increasingly abundant and has become a nuisance in Lake Michigan, fouling water intakes, adversely affecting the habitat and growth of high-value fish species, reducing the availability and size of high-quality species for sport and commercial fishing and becoming so abundant that, in die-off, they become a pollutant, littering beaches and making beaches and beach properties unusable because of the health hazard and the stench involved.

One indicator of the extent and growth of the alewife in Lake Michigan is its commercial production over the past decade which has gone from 220,000 pounds in 1957 to 29 million pounds in 1966. During just the past 5 years, alewife landings have risen more than sixfold, with the 4.7 million pounds taken in 1962 representing 20 percent of the total Lake Michigan catch and last year's 29 million pounds accounting for 68 percent of the total of the lake. In terms of dollar, during the last 5 years the alewife catch has risen from 3.5 percent of the total to about 16 percent of the total. (See details in appended table.)

The recent growth in alewife landings is primarily indicative of increased commercial interest in this species rather than serving as a prime indicator of the rate of increase in numbers, but this rapid gain does show that an expanding market is developing to utilize this resource to the extent that it becomes available. Presently, the Lake Michigan production is utilized by three processing plants which produce fish meal and oil and by cold storage plants which serve the pet food industry. It is estimated that these facilities could utilize a million pounds of alewife daily. Whether a market is now available to utilize a million pounds—or rather, to utilize perhaps two or three times the present output of alewife products is not known. Based on the recent rapid gains in commercial harvest, however, the prospects appear good. To meet such a production level, additional commercial equipment will be required to supplement the pound nets and some 19 available trawlers now being used.

The present vast number of alewife is related to the invasion of another ocean species, the sea lamprey, which was first noted in the western Great Lakes in the early 1920's. The lamprey pursued its parasitic way of life, attacking the lake trout and whitefish and, for all practical purposes, eliminated these species from Lakes Michigan, Huron and Superior with lake trout disappearing from Lake Michigan about 1950. Prior to this development, the lake trout and other predator species which feed on small fish served to limit the number of alewife. However, with the sea lamprey depredation, one of the bal-

ancing mechanisms was removed and in this very favorable environment the geometric progression of alewife population increase became in fact, an explosion. Presently, fishery experts look upon 1962 or 1963 as the years when the maximum number of alewife were hatched. With a 3- or 4-year life cycle to mature, spawn, and die, it appears that we are now witnessing the demise of the year class of 1963 or 1964 in the tremendous accumulation of alewives, which have fouled the beaches and offshore water of Lake Michigan.

The Great Lakes Commission has a very keen interest in the enhancement and improvement of the Great Lakes fishery. This is reflected in the many matters considered by the Commission's Fisheries and Wildlife Committee and the actions proposed by the members and advisers of this committee which subsequently have been supported by the Commission as a whole.

The Commission's early awareness and concern about the needs and developments of the Great Lakes fishery are suggested by some of the matters considered by its Fisheries and Wildlife Committee Chairman, Mr. Gerald Eddy, in 1963. At the meeting of the Commission he reported on the need for:

1. Further control of the sea lamprey and rehabilitation of the lake trout.
2. Technological and economic studies to further the utilization of underexploited species and to improve the quality of fishery products for the Great Lakes.
3. Development of improved understanding and relationships between commercial fishermen and sports fishermen. (This item concerns itself with species most adaptable for commercial harvest, species in demand for the angler or sports fisherman, areas adaptable for commercial fishing and sports fishing, need for balance in fish types or species and commercial and sports fishing exploitation to achieve an acceptable balance.)
4. Development and testing of procedures for estimating the catch made by sports fishermen.
5. Development of adequate sampling and analytical procedures of wide applicability to the fishing problems of all the Great Lakes.

The Great Lakes Fishery Commission was established in 1955 and has concentrated its efforts on an international program to control the sea lamprey. The Great Lakes Commission has continuously supported the work being done by the Great Lakes Fishery Commission in its efforts to control the sea lamprey, and continues to do so. The House Subcommittee on Appropriations, in reviewing the budget of the Department of State for fiscal year 1968 cut the U.S. contribution to the Great Lakes Fishery Commission by $100,000. We feel that this is a serious mistake and recommend full requested funding for the sea lamprey control program of $1,057,000 for fiscal year 1968. (This amount represents the U.S. portion of costs for support of the work of the Great Lakes Fishery Commission.) In 1965, the Great Lakes Commission recommended that the Great Lakes Fishery Commission undertake studies and programs for control of the alewife, much in the same fashion as that Commission functions with respect to control of the sea lamprey.

In November 1965 and again in June 1967, the Great Lakes Commission advocated and passed formal resolutions requesting that the

authorized anadromous fish program which includes the Great Lakes be adequately funded. Authorizing legislation—Public Law 89–304—provides $25 million for the program over a 5-year period. Several Great Lakes States—Michigan, Minnesota, New York, Pennsylvania, and Wisconsin—are eager to pursue this program and to provide required matching funds. This program will assist in further establishing the high-value species of fish in the Great Lakes; ready for the angler and, as a primary benefit, feeding on the small alewives, and limiting their numbers.

In May 1966, the Great Lakes Commission requested the Secretary of the Interior to conduct a survey-development-action program for the effective control of alewife in the Great Lakes.

In 1966 the Great Lakes Commission endorsed the fish concentrate bill, S. 2720, which would authorize the construction of five demonstration plants set up to reduce little-used or low-value fish into a fish protein concentrate, and urged that a demonstration plant be established in the Great Lakes area to process the alewives.

In June 1967 the Fisheries and Wildlife Committee of the Great Lakes Commission urged Congress to include $410,000 in the budget of the Department of Interior for basic biological research as a forerunner to subsequent programs designed to control the alewife in the Great Lakes and to correct imbalance. The money was not included.

In June 1967 the Great Lakes Commission, alarmed by the menace to health and sanitation posed by the alewife die-off and accompanying beach litter problem, requested the Secretary of the Interior, as head of the Federal executive department having jurisdiction over both fish and pollution control to take immediate action to determine measures that can be taken to alleviate the condition.

Taken together, these foregoing actions combine very nicely into an action program worthy of serious consideration. The anticipated problems are with us.

Our idea is a pragmatic approach designed to meet today's problem of the millions of alewives which annually plague the people of the Great Lakes States and it also provides for the near future and long-range requirements, and the same types of items have already been brought to the attention of the committee. I will add a little bit to them.

(1) Take maximum tonnages of alewives through commercial fishery operations, and process them for sale:

Now, the items that might go along to accompany this particular step would be to enact legislation to authorize and fund fish concentrate plants (similar to S. 2720 of the 89th Congress) and establish at least one such plant in the Great Lakes region to supplement and to extend the operation of those now in being.

Under this particular item, to promote the sale of the products from the processing plants, and also as an accompanying action, enact legislation which would permit on a temporary basis, the charter or or purchase of non-U.S.-built fishing boats which might readily adapted for use in commercial trawling for the alewives in Lake Michigan.

The second step, make use of the alewife as a food for predator fish (coho salmon, lake trout) as Dr. MacMullan and Dr. Tody have pointed out.

Here we would like to see a full funding under the anadromous fish program to the extent it supports the Great Lakes anadromous fish program, and the resulting benefits that we will get from that program in controlling the alewife.

Provide funding support for States to construct and operate hatcheries for high-value species for planting in the lakes. This would be a part of the $29 million outlined for the State of Michigan.

Item 3, institute a program aimed at controlling the alewives population beyond the needs of the commercial fishery and beyond the needs of the sport fishery.

In other words, if we have alewives that are still plaguing us after we have taken the commercial catch, and also used them for food for predator-type fish, then we need a control program, I think, which is envisioned as a long-range solution in your bill, S. 2123.

Along with this we need to appropriate funds for basic biological research on the Great Lakes fisheries to include fundamental data and intelligence on the alewife and the monitoring its major movements.

We need to support the Great Lakes Fishery Commission's work and encourage them to undertake an international alewife control program similar to that undertaken in connection with control of the sea lamprey.

In connection with the last item, there are certain bills now before Congress. There is H.R. 4793, whose object aimed for the elimination or eradication of alewives; 2123, which I believe is a broader approach, and others. These are all directed toward the control of the alewife.

Our States and private enterprise have begun to work on commercial utilization of processed alewives. We estimate that the take for 1967 will run between 50 to 70 million pounds, which would be for commercial utilization.

People in this work need further assistance and encouragement. Our States—and I think we all agree that Michigan is a leader and probably the leader—are doing an outstanding job in conjunction with Federal and other agencies in rehabilitating the high-value sport fishing species in the lakes.

These efforts must be reinforced and promoted. As a matter of fact, the high-value predator fish are showing excellent growth in numbers and size in Lake Michigan and their effects, hopefully, will soon become apparent, and that was most forcefully demonstrated, I think, by the size of the fish that was demonstrated.

It is recognized that action on the three fronts proposed above—maximum commercial utilization of the alewives, utilization as forage for highly prized predator game fish and curbing the present alewife population—will doubtlessly lead to changes in the present situation, but this is something that has to be monitored and kept under surveillance.

As Mr. Tody previously indicated, we might one day in the not too distant future have a conflict in what the alewives should be used for, whether forage for the high-value species, commercial take, or whatever, but this is something that will have to be developed as time goes on.

Dr. MacMullan, Dr. Tody and Congressman Vander Jagt have all indicated this would have to be a program that would have to be kept under surveillance so we can see what happens as we go along.

In conclusion, I think the nuisance effect and health menace resulting from the die-off of alewives has brought public attention to a very difficult problem. We can all see the dead fish, we can touch them, we can smell them, and I think mainly this might be the silver lining to the alewife problem. Soon we are going to have a program that will utilize and control the alewives in the Great Lakes.

ALEWIFE PRODUCTION IN THE LAKE MICHIGAN FISHERY 1962–66

[In pounds]

Species	Total	Michigan	Wisconsin	Illinois-Indiana
1962				
All	23,475,300	7,584,300	15,595,000	296,000
Alewife	4,742,300	1,394,800	3,346,400	1,100
Other	18,733,000	6,189,500	12,284,600	294,000
1963				
All	21,021,300	6,382,200	14,348,000	291,100
Alewife	5,396,400	1,578,100	3,818,300	----------
Other	15,624,900	4,804,100	10,529,700	291,100
1964				
All	26,201,100	8,562,700	16,982,500	655,900
Alewife	11,743,300	3,329,700	8,410,200	3,400
Other	14,457,800	5,233,000	8,572,300	652,500
1965				
All	26,994,100	8,336,600	18,470,000	187,500
Alewife	14,006,700	3,140,200	10,866,500	----------
Other	12,987,400	5,196,400	7,603,500	187,500
1966				
All	42,454,800	11,522,200	30,852,900	79,700
Alewife	29,001,800	6,438,200	22,563,600	----------
Other	13,453,000	5,084,000	8,289,300	79,700
DOLLAR VALUE				
1962				
All	1,899,448	819,711	1,041,314	38,423
Alewife	67,503	17,295	50,195	13
Other	1,831,945	802,416	991,119	38,410
1963				
All	1,870,833	730,544	1,107,474	32,815
Alewife	102,220	25,854	76,366	----------
Other	1,768,613	704,690	1,031,108	32,815
1964				
All	2,601,134	1,175,473	1,311,846	113,815
Alewife	218,865	50,611	168,202	52
Other	2,382,269	1,124,862	1,143,644	113,763
1965				
All	2,425,906	1,179,552	1,204,137	42,217
Alewife	252,121	56,524	195,597	----------
Other	2,173,785	1,123,028	1,008,540	42,217
1966				
All	2,762,316	1,239,560	1,508,731	14,025
Alewife	435,028	96,573	338,455	----------
Other	2,237,288	1,142,987	1,170,276	14,025

Source: U.S. Department of the Interior, Bureau of Commercial Fisheries, Great Lakes Fisheries (annual).

Senator HART. Colonel, thank you very much. Your statement, the full text of which we have leafed through here, is loaded with specifics, and we appreciate that kind of presentation.

Senator Griffin and I are aware of that House cut. It affects Dr. Baldwin's operation. We will attempt to do our best.

You comment, and we might just as well face it, there are competing interests in terms of the use of some of these fish and no one kids himself that the day will not come when someone's economic interest may be adversely affected by reversing the trend in the lake.

Senator Griffin?

Senator GRIFFIN. Is it colonel?

Colonel GOODSELL. Yes.

Senator GRIFFIN. Just for my information, I notice your offices are in Ann Arbor. How much of a staff do you have? How is the commission financed?

Colonel GOODSELL. We have a professional staff of two. I am one of them. We have a staff aide and two secretaries. We are funded and paid for wholly from States' funds. Each of the Great Lakes States contributes an equal share to the upkeep of the Great Lakes Commission each year.

Senator GRIFFIN. Have you had any difficulty getting your appropriation from the various States to keep in operation?

Colonel GOODSELL. To date, I think they are all in very good shape. We don't anticipate any problems in the future. We are a very low budget outfit.

Senator GRIFFIN. Thank you very much.

Senator HART. Thank you very much.

The committee is delighted that the chairman of the Conservation and Recreation Committee of the Michigan House of Representatives was kind enough to come across the State and join us this morning. I didn't realize he was here, State Representative Ray Baker from Farmington and, Representative, if you would like to add a word for this record, we would be glad to have it.

STATEMENTS OF STATE REPRESENTATIVES RAY BAKER AND DENNIS CAWTHORNE

Representative BAKER. Thank you, Senator. I am very happy to be here.

I am here to listen and enjoy the meeting this morning. I really think that if I were to have too much to say, it might be repetitious, so I would just prefer to sit here and listen.

Senator HART. The fact that you are here, I think, is pretty eloquent testimony of the concern of the State and the desire that the State and the Federal Government coordinate an effective attack. We do appreciate your coming.

Representative BEEDON. Mr. Chairman, Dennis Cawthorne, of the 98th District, is here also.

Representative CAWTHORNE. Good morning. I have no words to add except personal greetings to my former employer, Senator Griffin, and personal greetings to Senator Hart.

I am certain it is going to be a very productive hearing.

Senator HART. Thank you very much.

The presence of the members of the Michigan Legislature is helpful. We do appreciate it.

We didn't really think we were moving into enemy territory, but sometimes when we hear the speeches and examine our consensus, we get the feeling that everybody thinks the Federal Government is an enemy, alien power, and it is nice to see us at work.

We have heard mention several times now of the Great Lakes Fishery Commission and its role, and our next scheduled witness is its executive secretary, Norman S. Baldwin. Mr. Baldwin.

First, let me indicate from a staff memorandum the fact that the chairman of the Senate Committee on Commerce, Mr. Magnuson, has asked that at this hearing we get into the record a current status report on the lamprey eel program.

Now, this is the program which was referred to by other witnesses as having suffered a $100,000 cut in the House appropriation, and Senator Griffin and I are attempting to restore that cut.

I would ask that a copy of a letter I have written to Senator McClellan, chairman of the subcommittee that handles that appropriation, be made a part of the record, and to the extent that you don't respond to Senator Magnuson's concern about describing the sea lamprey program, we would ask some questions.

The shortsightedness of that $100,000 cut is, I think, as vividly demonstrated by the Canadian action as any other.

All of us recall that the first coordinated attack against the lamprey was in Lake Superior, and the successes it has had there. Then the focus of the fight moved to Lake Michigan. And here, while Michigan and Huron are one lake—according to the experts—Michigan is regarded as U.S. water. It does not abut Canada, but Canada continued jointly to participate and finance the lamprey effort, as it was in operation in Lake Michigan.

Now, the efforts move to Lake Huron. Canada has again come up with its share of the annual funds, but the cut by the United States of $100,000 means that, while Canada is funding the continued fight in Lake Huron, the United States now proposes to back off and trim off, and in Senator Griffin's judgment and mine, it is very shortsighted.

JUNE 19, 1967.

Hon. JOHN L. MCCLELLAN,
Chairman, Subcommittee on State, Justice, and Commerce,
Senate Appropriations Committee,
Washington, D.C.

DEAR MR. CHAIRMAN: Permit me to call your attention to a cut, made by the House Appropriations Committee and approved by the House, in the funds for the Great Lakes Fishery Commission for Fiscal 1968. Without noting that a cut was being made and without explaining its effect, the House reduced the budget figure from $1,057,000 to $957,000.

The $100,000 which was cut was intended to extend the lamprey control program into Lake Huron.

As you may recall the lamprey control program is funded jointly by the United States and Canada. It was started in Lake Superior where control is now almost complete. The work was then extended to Lake Michigan where enormous progress has been made. Canada participation financially in the Lake Michigan work even though Lake Michigan is considered a U.S. body of water and Canada does not border on it.

Now the work was to have moved on to Lake Huron. Canada has already appropriated its share for this work namely $45,000.

Very substantial sums of money have been allocated to the lamprey control program and successfully so. It would seem tragic for us to call a halt to this program which is showing a fine benefit-cost ratio.

I strongly urge the Committee to restore this $100,000 which will result in $145,000 worth of actually needed work.

With kind regards.

Sincerely,

PHILIP A. HART, *U.S. Senator.*

Senator GRIFFIN. Mr. Baldwin, the country and the Congress has been hearing good reports about the success of the lamprey control program. However, the natural tendency of Congressmen and Senators from other States is to back off and say, "Now that we have done the job we ought to be able to cut down." Anything you can do to throw some light on the kinds of questions they ask—how long will we have to continue, at what level will we have to continue, when can we begin to taper off—in the funding of this kind of a program?

Those are the things we would like to have you comment on.

STATEMENT OF NORMAN S. BALDWIN, EXECUTIVE SECRETARY, GREAT LAKES FISHERY COMMISSION

Mr. BALDWIN. Mr. Chairman, Senator Griffin, I would like to leaf through this text of mine and point out first of all that control of the sea lamprey became a responsibility of the Great Lakes Fishery Commission in 1955, and also that the commission advises the two countries on research needed and measures required for maximum sustained production from fish stocks of common concern.

It is also involved in coordinating the research and management measures between the two countries.

The commission receives its funds for lamprey research and control from both Governments and the contracts then are made with the U.S. Bureau of Commercial Fisheries for the program in the United States, and with the Department of Fisheries of Canada for the program in Canada.

Investigations by the U.S. Bureau of Commercial Fisheries led to the development of a chemical treatment method which destroys young lamprey during their early nonparasitic life in streams.

Chemical operations began in Lake Superior in the spring of 1958, and by the end of 1960, most of the streams with large populations of young lamprey had been treated.

The first indication that stream treatments were reducing lamprey in Lake Superior came in the fall of 1961, when the incidence of lake trout with lamprey wounds dropped sharply.

Subsequently, in the spring of 1962, the catch of adult lamprey at specimen barriers fell to about 20 percent of the average catch for the preceding 5 years. The catch have since declined to less than 10 percent of this average catch.

Spawning lamprey, although reduced in number, continue to enter streams following treatment. These streams must, therefore, be re-treated before the first generation of young lamprey reestablished in them migrate to the lakes.

This migration generally occurs in 5 years and streams are, therefore, re-treated at about 4-year intervals. Re-treatment of streams is necessary to maintain control once it is established. Surveys indicate,

however, that the reduced lamprey population in Lake Superior and Lake Michigan are using fewer streams and the cost of maintaining control on these lakes will be less than the cost of establishing it.

Lake trout populations in Lake Superior, including both native and planted fish, responded promptly to the reduction in sea lamprey. Investigations in the United States and Canadian waters have shown a steady improvement in the survival of trout, and an increase in their size and availability since 1961.

The most striking improvement has occurred in Wisconsin waters, where legal-sized trout are as abundant now as in prelamprey days. The improvement is less pronounced in the Michigan and Ontario waters of Lake Superior where lake trout abundance is believed to have reached 50 percent of normal. Although the inshore trout populations consist largely of planted fish, naturally spawned trout are appearing in increasing numbers each year.

Treatment of lamprey streams was extended to Lake Huron and Lake Michigan in 1960, but subsequently discontinued on Lake Huron when it became evident that the commission could not maintain an effective program on the three upper Great Lakes at the same time with the funds appropriated.

On Lake Michigan, the initial round of treatments was completed in 1966, and there are indications of a substantial reduction in sea lamprey. The catches at barriers, operated until this year on Green Bay, have shown a steady decline with the catch in 1966 less than 15 percent of the average catch for the period 1958–62.

Although no comparable data are available on the main lake, the recovery of whitefish production, low incidence of lamprey wounds on whitefish, and much improved angling for steelhead, to which Michigan officials present will attest, all indicate a reduced lamprey population.

The control program was again extended to Lake Huron in 1966, and almost half of its lamprey-producing streams have now been treated. Those remaining include some large rivers and completion of the initial round of treatments is not anticipated before 1970.

It is essential for effective control on Lake Huron to complete the first round by 1970 and begin re-treatment of streams first treated in 1966. It is also essential to continue to re-treat certain streams on Lake Superior and Lake Michigan to destroy reestablished larvae and hold the adult lamprey population at a low level.

Despite the success of sea lamprey control and its basic role in any attempt to restore an ecological balance in the Great Lakes, the commission is experiencing difficulty obtaining funds to carry out an effective program as you have pointed out.

In order to maintain within the proposed budget with the cut mentioned, the commission has suspended stream treatments on the west shore of Lake Huron and discontinued several research studies aimed at improving control methods.

Lost ground can be regained if these funds are restored, but if greater support is not given the program in the years ahead it may fall short of establishing effective control in all three of the upper Great Lakes where it is so badly needed.

TABLE 1.—*Lamprey catches at assessment barriers on 24 Lake Superior streams*

1957	52,435
1958	58,477
1959	45,955
1960	40,303
1961	69,583
1962	9,614
1963	11,908
1964	12,580
1965	12,407
1966	5,142
1967	3,745

TABLE 2.—*Numbers of lake trout taken per 10,000 feet of gill net lifted in inshore waters of Lake Superior during the spring (unweighted average for Ontario, Michigan, Wisconsin, and Minnesota)*

1961	36
1962	48
1963	54
1964	70
1965	75
1966	87
1967	114

TABLE 3.—*Lamprey catches at assessment barriers on 3 tributaries of Green Bay, Lake Michigan*

1958	10,669
1959	8,636
1960	6,651
1961	12,886
1962	8,089
1963	7,461
1964	4,593
1965	3,277
1966	1,168

TABLE 4.—*Whitefish production in Lake Michigan*

[In thousands of pounds]

1950	2,361
1951	1,214
1952	1,770
1953	1,046
1954	789
1955	376
1956	57
1957	25
1958	49
1959	31
1960	124
1961	396
1962	266
1963	285
1964	777
1965	955
1966	1,422

Thank you, Mr. Chairman.

Senator HART. Thank you for a statement which, in its full text here, I think shows the dramatic progress that has been made in the fight against the lamprey, and which clearly underscores the lack of economy that would be represented by trimming back now.

This happened to us a couple of years ago, the same whack, as I recall occurred, and we were able to get it back; I hope we can do it again.

I think you have been responsive to the questions which Senator Magnuson was concerned about, the effectiveness of control in Superior, the effectiveness of control in Michigan, the amount of money to date, and your answer to the question, "How long will this go on?" is answered in part, at least. How much money are you going to need to do the job?

Mr. BALDWIN. Mr. Chairman, maintaining control will go on indefinitely unless some other method, perhaps biological control, can be introduced while this population is at a low level resulting in its complete elimination.

Biological control is very difficult to achieve, and while there are ideas, none of these have, as yet, shown any practicality.

Senator HART. Well, failing biological control, that will be required forever, how much dollar effort would be required once you get the stability that you developed in Superior, for example, through the basin?

Mr. BALDWIN. We have estimated that it will take about $400,000 to $450,000 for each of the three upper lakes to maintain control.

Senator HART. Senator Griffin?

Senator GRIFFIN. I think that answers my question. Thank you.

Senator HART. We turn now to the Michigan Department of Conservation, and director of the tourism division, William T. McGraw.

STATEMENT OF WILLIAM T. McGRAW, DIRECTOR OF THE TOURISM DIVISION, MICHIGAN DEPARTMENT OF CONSERVATION

Mr. McGRAW. Thank you, Senator Hart and Senator Griffin.

As our Senators in Washington, I needn't tell you how important tourism is to our State, and of the fact that our industry, the tourist industry, is vitally concerned and quite frankly disturbed about the alewife situation.

Mr. Strohpaul, the West Michigan Tourist Association, will give you a little detail later on just what economic impact this has had on his portion of the State.

But I can tell you as the director of promotion for the State that it has meant many millions of dollars to us this year and, of course, a great deal of adverse publicity which will affect our tourist income in the future.

In addition to the millions of dollars in lost tourist business to businessmen and communities, of course, there is the immeasurable effect of loss of recreational opportunity for both residents and visitors.

The Michigan Tourist Council has called for an all-out war on alewife fish populations to protect the State's recreational advantages and tourist appeal.

In a resolution released this week, the council urged full efforts by Federal, State, and local governments to combat the invasion of millions of the small fish which die and wash ashore on Great Lakes beaches.

Hundreds of miles of Great Lakes beaches have been covered by dead and decaying alewife this summer, despite cleanup efforts, and

the resulting loss to communities and businesses in vacation spending is expected to run into millions of dollars, according to council spokesmen.

The council said tourism represents a billion dollar industry in Michigan and depends "in large measure on the realization of the recreational potential of the Great Lakes."

"Undesirable fishlife, such as lamprey and alewife, damage recreational values and threaten present and future use and enjoyment of these unique bodies of fresh water," the council said.

The council stated it supports proposed plans at the Federal and State levels for research on the alewife problem, control of alewife and lamprey, and "rapid and massive expansion of the planting of anadromous fish (principally Coho salmon) in the Great Lakes as a control measure.

Planting of Coho salmon and other introduced species, as well as reestablishment of lake trout, also can develop sport fishing opportunities for residents and visitors and will attract millions of dollars in tourist spending, council spokesmen said.

In calling for prompt action, the council specifically urged passage of Federal legislation to allot funds for research and control of alewife; an increase in lamprey control programs in Lake Huron and other Great Lakes and connecting waters; and said top priority should be given under programs of the Upper Great Lakes Regional Development Commission to make funds available for rearing and planting Coho and Chinook salmon, lake trout, and other desirable sport fish.

The upper Great Lakes regional development program is a Federal-State effort to boost the economy of northern counties in Michigan, Wisconsin, and Minnesota.

"Tourism has the most promising potential for 'depressed,' northern counties in the tristate area," the council said, "and improvement of the Great Lakes, including suitable development of fishing, swimming, and boating opportunities, can make a major contribution to the economic well-being of the three States."

The council said it is calling on State legislators and officials, Congressmen, and private citizens throughout Michigan to generate support for quick and effective action on the problems.

As a result of the problem, I would like to read a resolution passed by the Michigan Tourist Council on July 17 of this year. It reads as follows:

Whereas, tourism represents a more than $1 billion annual industry in Michigan, essential to the economic well-being of the state and its citizens, and

Whereas, the fullest development of this important industry depends in large measure on realization of the recreational potential of the Great Lakes, and

Whereas, undesirable fishlife such as alewife and lamprey damage recreational values and threaten present and future use and enjoyment of these unique bodies of fresh water: Now, therefore be it

Resolved, That the Michigan Tourist Council urges the fullest efforts of local, state and federal agencies of government in programs to develop the recreational potential of the Great Lakes, and be it further

Resolved, That the Michigan Tourist Council supports plans at the state and federal levels for research on the alewife problem, for control of alewife and lamprey, and for rapid and massive expansion of the planting of anadromous fish in the Great Lakes as a control measure and to develop additional recreational opportunities.

Specifically, the council urges passage of legislation in the U.S. Congress to allot funds for research and control of alewife; urges increase in lamprey control programs in Lake Huron and other Great Lakes and connecting waters; and urges that top priority be given under the programs of the Upper Great Lakes Regional Development Commission to make funds available for the rearing and planting of Coho and Chinook salmon, lake trout and other sport fish as may be desirable to improve the ecological balance of the Great Lakes for the benefit of residents and vacationers in the Great Lakes region.

The tourist council and tourist industry certainly is pleased to see the prompt and immediate attention that has been given to this problem in Congress, and the council wholeheartedly supports the Senate bill 2123 as introduced.

Senator HART. With that solid endorsement I hope we will advance the cause in the progress of the bill.

Senator GRIFFIN. I appreciate having you here, Mr. McGraw. Your contribution is very helpful.

Mr. MCGRAW. Thank you.

Senator HART. Still in the area of the tourist business and the effect of the fish deposit on it is the executive director of the Western Michigan Tourist Bureau, long a strong voice in the promotion of this whole area, Aurey Strohpaul. He will be joined, I believe and hope, by Wes Tebeau, who is a member of the Michigan Tourist Council.

I know that Mr. Tebeau was here earlier.

Mr. STROHPAUL. Mr. Chairman, Senator Hart and Senator Griffin, I think that anything which Mr. Tebeau had to say would be kind of repetitious, and he asked me to state that to save a little time——

Mr. TEBEAU. I am here.

Senator HART. I dragged him up, and I wanted to make sure he was here.

Mr. STROHPAUL. I think, Mr. Senator, you might be interested to know that we have another State representative here, Mr. DeStigter, from Hudsonville, who is a member of the Conservation and Tourist Committee of the House of Representatives.

Senator HART. We are glad that he came, and that he is here, and let the record so show.

STATEMENT OF AUREY D. STROHPAUL, EXECUTIVE DIRECTOR OF THE WESTERN MICHIGAN TOURIST BUREAU

Mr. STROHPAUL. Well, Mr. Chairman, I come before this committee today with no proposals for control of the fish in the Great Lakes, preferring to leave this phase of your study to the fish biologists who are qualified to give the committee the assistance it needs in this field.

My statement will deal with the heavy die-off of the alewife and the adverse effect it has had on the economy of west Michigan through the loss of patronage in our communities by those who for generations have come from outside and from within our State to enjoy the vacation and recreational advantages of the beaches along Lake Michigan.

This can best be presented to you by acquainting you with the vacation industry that has been attained through a continuous pro-

gram of advertising and publicity for the last half century by the West Michigan Tourist Association and the numerous communities in the 31 counties we serve. Thirteen of these counties border on Lake Michigan and several of these are the most attractive to vacation visitors. As a result revenue derived from their visitors contribute the most to their economy.

Research has indicated that Michigan's vacation business in 1966 contributed more than a billion one hundred million dollars to the State's economy, approximately $555 million of it in west Michigan counties. The greatest share of the west Michigan business is derived in the period from June through September.

The West Michigan Tourist Association has been concerned with the great decrease in the number of vacation visitors in late June, throughout July and the prospect that the decline will continue through August.

It is our best conservative judgment, in considering the reports from all areas of west Michigan, that our region has lost from $50 to $55 million that would have poured into our area had not the unexpected and unprecedented die-off of alewife occurred.

These are losses that cannot be recovered even though we look forward to normal business in September. Certainly the cancellation of thousands of visitors that had planned to come into west Michigan this summer will make it extremely unlikely—even with a buildup of our advertising and publicity efforts—extremely unlikely that any of these visitors will return next year; that is the thing this disturbs us.

Some of our Lake Michigan shoreline communities have reported losses of patronage in excess of 20 percent, blamed entirely on the die-off. Petoskey, one of our oldest and finest vacation centers, reported within the last week that it had to close its municipal beach for the season and the city's chamber of commerce has reported to us that it estimates the loss in vacation and recreational patronage close to $2 million—and this city is on Little Traverse Bay away from the heaviest pileup of dead fish.

We point out to you also that all of our communities and scores of resorts have had to divert funds not budgeted to the cleanup of their beaches, not only so vacation visitors could bask or swim, but to alleviate the nauseous stench that was disturbing the residents of these places.

In the history of the vacation industry of our region, no other menace has so seriously affected the economy as has this situation this summer.

In closing we commend this committee and our own Senators Philip Hart and Robert Griffin for their promptness in this action to correct a situation that we feel will imperil the vacation and recreational use of the facilities in west Michigan as well as those in Indiana, Illinois, and Wisconsin, which also count touristry as important to the economy of their States.

We have confidence in this committee, in the part you anticipate the States will take in cooperating with the Federal Government, will bring a solution so our people will not again have to endure a plague of the proportions as the one that hit the Great Lakes region this summer.

Thank you, sir.

Senator HART. Thank you. Getting the economic hard facts into the record is very helpful.

Mr. Tebeau, do you have anything to say?

STATEMENT OF WESLEY TEBEAU, MICHIGAN TOURIST COUNCIL

I would like to add my welcome, of course, to both Senator Hart and Senator Griffin to Muskegon, and to congratulate you on using this city and this site as a kickoff to this fine conference in this attempt to find a solution to quite a devastating situation that has developed here in west Michigan.

We were stating that we have a big real estate involvement in the problem from the terms of just water acreage and shoreline affected by the alewife.

We also have a leadership position in mid-America from a tourist standpoint, being the No. 1 tourist destination State in mid-America, so I am glad that Michigan is taking a leading role in solving this problem.

I wish you continued success, and I hope that some kind of favorable publicity can result very quickly that will indicate that it will never be as serious a problem next year as it was this year, so that we can head off some of the real looked-for or unhoped-for problems that Mr. Strohpaul touched on; namely, the fact that a great many people may not come here next year, that just based on the experiences we have had so far in 1966 and 1967. Thank you.

Senate HART. Thank you.

Senator GRIFFIN. I would like to thank both of you.

Senator HART. One of the newest of the agencies important to the future of the Great Lakes Basin is the Great Lakes Basin Commission, and present this morning is one who was a colleague of Senator Griffin and mine in the 89th Congress.

He is now the chairman, in fact, of the Great Lakes Basin Commission, Raymond F. Clevenger.

STATEMENT OF RAYMOND F. CLEVENGER, CHAIRMAN OF THE GREAT LAKES BASIN COMMISSION

Mr. CLEVENGER. Senator, Mr. Chairman, Senator Griffin, my friend from part of the State that is just about as beautiful as that part to the north——

Senator HART. If anyone has forgotten, Mr. Clevenger comes from our Upper Peninsula, the only rival of Texas in its description of itself.

Mr. CLEVENGER. But without rival in its beauty and natural resources.

Well, I am delighted to be here; I am delighted and grateful that this committee is meeting in this great world port city.

I think the fact that these hearings are being held on a Saturday attests to the concern of all of us to find a way of avoiding repetition of the problem.

Under the Water Resources Planning Act (Public Law 89–80), it is the duty of the Great Lakes Basin Commission:

> (1) To engage in such activities and make such studies and investigations as are necessary and desirable to encourage the

conservation, development, and utilization of water and related land resources of the Great Lakes on a comprehensive and coordinated basis by the Federal Government, States, localities, and private enterprise with the cooperation of all affected Federal agencies, States, local governments, individuals, corporations, business enterprises, and others concerned;

(2) To serve as the principal agency for the coordination of Federal, State, interstate, local, and nongovernmental plans for the development of water resources;

(3) To prepare a comprehensive joint plan for Federal, State, interstate, local, and nongovernmental development of water and related land resources; and

(4) To undertake such studies of water resource problems as are necessary.

To discharge these duties, the Great Lakes Basin Commission may, among other things:

(1) Hold such hearings as are necessary;

(2) Employ personnel, including consultants as is advisable;

(3) Arrange for the services of personnel from any State or the United States, or any subdivision or agency thereof; and

(4) Request the head of any Federal departments to furnish such information as is necessary and to detail to temporary duty with the Great Lakes Basin Commission such personnel as the commission may need to carry out its duties.

The Great Lakes Basin Commission has been organized and is now beginning its work of focusing the resources available to the Great Lakes Basin upon the problems of the Great Lakes. The nine Federal departments having substantial activities connected with the water of the Great Lakes have representatives on the commission. The Governors of the eight Great Lakes States have appointed their representatives on the commission. Five of these are the heads of the departments of conservation or natural resources of the States.

Senator GRIFFIN. What about Michigan?

Mr. CLEVENGER. We are honored and privileged to have Dr. MacMullan as the representative of the State.

Senator GRIFFIN. Thank you.

Mr. CLEVENGER. The following resolution concerning the alewife problem was passed at the meeting of the Great Lakes Basin Commission held in Cleveland, Ohio, on July 19, 1967:

RESOLVED, That the problem of the alewife in the Great Lakes is of growing concern to the respective states of the Great Lakes Basin as it relates to the long-range management of the water resources and their contribution to the economic benefits afforded by these waters.

The Great Lakes Basin Commission was created to:

1. serve as the principal agency for the coordination of federal, state, interstate, local, and nongovernmental plans for the development of water resources;

2. prepare a comprehensive joint plan for federal, state, interstate, local, and nongovernmental development of water related land resources; and

3. undertake such studies of water resource problems as are necessary.

In fulfillment of these duties, the Great Lakes Basin Commission moves that the Chairman request the Secretary of the Interior and other appropriate Federal departments and the member states to provide the Chairman with a summary by September 1, 1967, of what is being done to control the alewife, and what is now being done in the research of this problem and what future programs are being planned to alleviate the alewife problem—thus to allow the Commission to determine the role of coordination that might be needed.

The Commission will give early attention to the alewife problem as the Commission undertakes to develop a water resource plan for the Great Lakes Basin. The Commission will also be willing to accept the responsibility for determining the necessity of further research effort and shaping the nature of these studies in regard to the alewife problem as is needed and not within the capability of already existing Federal and state agencies.

Gentlemen, in view of the above, you may want to consider amending the bill to provide for its implementation by the Great Lakes Basin Commission with the understanding that the full resources of the Secretary of the Interior would be utilized along with those of the other eight Federal departments, the States, and other resources to be available to the commission.

Because there is no agreement on a long-term answer to alewives, and while an agreeable answer is being sought, I believe we must act now to prevent another period next year like we had this year.

We should do the following—at least in my opinion:

(1) Call together a regionwide conference at which Federal, State, and local officials can coordinate efforts to combat the effects of the alewife dieoff.

And I might add parenthetically that we would expect that this would be a working conference with those people who are directly involved in the effects of the problem as well as others who are interested.

(2) Consider an intensive overfishing program during the next year to reduce the alewife population before the annual dieoff; and

(3) Prepare plans to use more effectively the Job Corps, Neighborhood Youth Corps, local sanitation resources, and the resources of all Federal departments that might be mobilized to remove the dead fish from our shores, and before they get to our shores.

In conclusion, may I reiterate that the Great Lakes Basin Commission is welling to help with this problem, but at the same time appreciates that many others have already done much and must continue to do more before the alewife problem will be solved.

Thank you for your efforts.

Senator HART. Thank you, Mr. Clevenger.

I see you have a suggestion here that we might consider amending the bill to designate the Great Lakes Basin Commission rather than the Secretary as the fulcrum or the moving power. While we don't anticipate any head-knocking that will have to be done, but doesn't the commission take its action only as a result of an agreement among the several State members? If there is a division in the commission as to a program or action to move after studies, we are liable to get deadlocks, whereas the Secretary could say, "Forward march," couldn't he?

Mr. CLEVENGER. This could happen. I would expect, however, that unless there is a consensus among the people who are affected by the problem, there is not going to be an answer. You can't have a part of an answer applied to the States of Illinois, Wisconsin, and Minnesota, and not have it affect what the States of Indiana, Michigan, and Ohio might want to do, so you have got to have a means of having agreement.

We have, I think, the capability and we certainly have the hope and support of many people, to have the operative, admininstrative respon-

sible officials meet together and determine what is a program that can be commonly supported, both Federal and State.

Senator HART. It is an interesting suggestion. Clearly, the exchange that your commission provides among the States and between the States and the Secretary would be of critical importance as to the role that would be played in either case.

Mr. CLEVENGER. Excuse me, Senator, and, of course, when the act provides, as it does in section 5, an authorization of $5 million for the Federal share of the cost involved, I believe this would suggest that this sum be matched by the States and I have an old belief that he who spends money ought to be able to say where that money is going.

Senator HART. Even if he spends a fifth of it?

Mr. CLEVENGER. I think he should have——

Senator HART. Some measure of it?

Mr. CLEVENGER. The views of a person ought to be represented in accordance with what he pays for. It is much easier to have views if you don't have to pay for it, or if you are spending someone else's money, but we can get into deeper water, I think, than we want to, Senator.

Senator HART. No. When I said it is an interesting suggestion, it is. Any of these devices to improve the effectiveness of the relationship between several levels of government, certainly any new concept or suggestion is very slow in selling, but the sooner it is suggested, if there is validity to it, the sooner it will be adopted.

Senator Griffin.

Senator GRIFFIN. I want to welcome my former colleague, I recall writing a letter attempting to insure that the headquarters of the Great Lakes Basin Commission was located in Michigan. I would like to ask where you are located?

Mr. CLEVENGER. Senator, almost precisely because of your letter we located in Ann Arbor.

Senator GRIFFIN. So actually the Great Lakes Commission, the Great Lakes Fishery Commission, and the Great Lakes Basin Commission are all headquartered in Ann Arbor; is that correct?

Mr. CLEVENGER. That is correct, sir.

Senator GRIFFIN. OK.

Senator HART. Thank you.

Dr. CAIN. Mr. Chairman.

Senator HART. Dr. Cain.

Dr. CAIN. May I respond to your question to Mr. Clevenger, as I see it? I know this is irregular.

Senator HART. No; it is useful. Proceed, please.

Dr. CAIN. Perhaps I can help him out of what seemed an uncomfortable position by putting myself in it.

There was earlier testimony about the task force which the Secretary of the Interior established, and I don't think I made clear the objectives that existed in assigning this task force. It is to examine the scope of the problem, to discover means of action to correct the problem, both in short-term and long-term reference, and to make a preliminary cost out of what this may mean to the States and the Federal Government, within the function of the task force. It is not conceived as a coordinating body for a Federal-State action. That is the first point.

The second point is that the responsibility of the Secretary will be those which Congress gives him, and I don't want to make any plea whatsoever for any extraordinary responsibility in regard to this kind of a problem, so I think what I am saying is that Mr. Clevenger's suggestion appears to me personally, without it having been discussed in the Department, as a thoughtful and very useful recommendation to the committee that is considering this problem.

Senator HART. That is a useful contribution in this record.

Mr. CLEVENGER. And I am sure so that there is no question that there is any competitiveness here, the committee may be interested in knowing that on, I believe, July 13 I discussed with Secretary Udall the alewife problem, and Assistant Secretary Cain, and on the morning of the 14th we had further discussion between Dr. Cain and myself only to do, as many, many others were doing, and trying to do many weeks, and so as this problem emerged, to get efforts coordinated and without any feeling that we were trying to ask for some additional responsibilities.

Dr. CAIN. That is, he is saying there is no collusion. I didn't see his testimony until just now. Thank you very much.

Senator HART. Thank you very much.

Mr. CLEVENGER. Thank you.

Senator HART. Oftentimes you wonder if hearings are helpful, but that last exchange clearly indicates some can be.

Senator GRIFFIN. Let me ask one question. Under the rules of the commission do you need a majority vote, or unanimous agreement, or something else?

Mr. CLEVENGER. In a most intriguing manner. Let me quote the words of the act, and then let me give our brief experience. I am quoting from section 202, subparagraph D:

> In the work of the Commission every reasonable endeavor shall be made to arrive at a consensus of all members on all issues, but failing this full opportunity shall be afforded each member for the presentation and report of individual views, provided that at any time the Commission fails to act by reason of absence of consensus the position of the Chairman, acting in behalf of the Federal members and the vice-chairman, acting upon instructions of the state members, shall be set forth in the record.

And it continues on.

In fact, what is happening is that we have operated by consensus, and where there have been any differences, the differences have not been along Federal representative lines and State representative lines.

The alewife resolution, for example, came from, I believe, the director of the Indiana Department of Natural Resources, John Mitchell. I would say that the decisions are going to be made in as much as possible on a consensus basis, and within that realm after conversation, which has to take place before any program can be launched that involves different sovereignties and different jurisdictions.

Senator GRIFFIN. I didn't know that word "consensus" was creeping into our legislation. I am not quite sure what it means.

Mr. CLEVENGER. Senator, I haven't had the courage to review the entire history of the Public Law 89-80, but I think I have learned more from some of the State members of the commission as to what it means than I might have thought possible.

What it is, really, is a desire by those who have responsibility for State actions to be able to sit down on an equal basis with people hav-

ing responsibilities for the Federal Government, and have their views expressed, and have their positions considered. It may be the areas that we can legitimately move in may call for subjective judgments. If it is a technical fact question on which there is a division, we ought to be able to resolve it, but not on the basis of, "I am a State representative," or "I am a Federal representative." When you come to the subjective judgmental factors, reasonable men want that opportunity to express their views and know that they are a part of the decisionmaking process, and I think this is what consensus in this statute meant.

It is an effort of a society to arrive at a way of applying resources, all other resources, to a problem, without the duplication of resources, but if you are going to commit the resources of a State, representatives of the executive authority of that State ought to be able to say what their views are.

Senator HART. Thank you very much.

The next witness speaks for the Michigan United Conservation Clubs. Dr. John Kitchel is the president of MUCC, and Senator Bartlett had a letter from Jim Roman suggesting that this morning you would speak for the organization.

STATEMENT OF DR. JOHN KITCHEL, PRESIDENT, MICHIGAN UNITED CONSERVATION CLUBS

Dr. KITCHEL. Thank you, Senator. I have one good copy for the committee, and a number of reproductions. Our office obtained a new machine last week, and one of the girls Thursday afternoon baked a cake. It turned out that the mix had been a bit long on the shelf somewhere, so the reproductions are a little bit difficult to read.

I have been active in Michigan United Conservation Clubs for over 20 years and have served on or chaired committees in a number of areas, the longest service, since 1954, is that of fish and fisheries, with most emphasis on the Great Lakes and connection waters.

I have also held office in Michigan United Conservation Clubs for many years and am currently serving as president. This statement is presented on behalf of Michigan United Conservation Clubs, one of the larger and more active State organizations in the Nation.

The alewife problem which has been so frequently referred to this year in the news is not really a problem in itself. It is a symptom of a problem or problems created by mankind as our society has, without adequate forethought, exploited the resources of the Great Lakes Basin. The beginning came in the latter part of the 19th century as the forests were cut, the slash burned, and agriculture introduced. Aging of the lakes was accelerated by the increase in the erosion and transfer of fertile topsoils to the riverbeds and the bottoms of the lakes. At the same time disposal of domestic and industrial wastes by the people congregating in the basin enriched the waters still more. We are all familiar with the problems that Chicago encountered in maintaining a good domestic water supply even before the turn of the century.

Other factors have further disturbed the ecology of the Great Lakes since the turn of the century.

Landlocked Atlantic salmon were brought into Michigan late in the 19th century. Smelt were brought along to insure a suitable forage.

The salmon did not survive. The smelt did. No one had successfully measured the impact of this introduction. At about the same time the carp and the rainbow trout were introduced into the Great Lakes Basin. Unfortunately the carp has not become the much sought after food fish that the introducers hoped. Almost everyone agrees that the impact has been undesirable. The rainbow trout had succeeded but not spectacularly enough to occupy a large niche in the Great Lakes although it has become an important sport species and has been exploited commercially to a limited extent.

In addition to these three deliberate and highly successful introductions, there have been others that were inadvertent. Three of these were resoundingly successful. Two, the marine lamprey and the alewife, came almost certainly from stocks long established in Lake Ontario and bypassed Niagara Falls via the Welland Canal. The third, the gizzard shad, appeared at about the same time but its effect has not been nearly so spectacular as that of the marine lamprey and the alewife.

In addition to enrichment of the waters and introduction of exotics, we have the effects of commercial exploitation on the fish stocks. This was not sufficient to produce dislocations until after the turn of the century but became ever more efficient and more intense until it began to produce dislocations soon after World War I.

Picture, if you will, fish stocks in the Great Lakes waters which had come into being after the last glaciation and had existed in a state of balance for hundreds of years. They consisted of a few large predator species and very few other species that reached large size. Although yellow perch, blue pike, whitefish, and some of the chubs and herring are piscivorous, the only predators capable of feeding on mature fish of the smaller species were the northern pike, muskellunge, Mackinaw trout, walleyed pike, lawyers, and sauger. Commercial exploitation is euphemistically referred to as production by commercial operators and biologists who monitor their activities and the fish stocks they utilize. These harvests or landings were for decades primarily made up of the larger fish. Mackinaw trout and whitefish were cropped intensively as markets expanded until the commercial harvest and actual biologic production of these species became equal about the time of World War I. Vastly more efficient gear and better markets in later decades did not increase the harvest. There weren't any more than that to catch. Fish stocks were deteriorating even before the lamprey and the alewife appeared on the scene.

When the lamprey administered the coup de grace to the Mackinaw trout in the upper lakes, the stage was set for an erruption of smaller fish. The smaller species of chubs, commonly called bloaters, led the way. The newly introduced alewives and gizzard shad followed rapidly. The public has not been aware of the increase in numbers of two of these species. The chubs are a deep-water fish and deaths from old age or epizootics do not produce windrows of dead fish on the beaches. Neither did the epizootic in smelt about 1943. The gizzard shad is a relatively long-lived fish and has different habits than the alewife. They are also less abundant. The problem about which our citizens who go down to the beaches are complaining is the nuisance of dead alewives on the shore. The fish is pelagic, prolific, and terrifically efficient as a forager. In the enriched waters of three of the Great Lakes

(Erie, Huron, and Michigan), it has become tremendously abundant. It is also a rather short-lived fish. Dieoffs have been occurring for some years accompanied by minor grumblings. The peak of the irruption appears to have been reached 1 or 2 years ago and the dieoffs have become proportionately more spectacular. The nuisance is also proportionately greater.

In 1956, an MUCC committee, of which I had the honor of being chairman, reported to the people of Michigan that we were in trouble, that worse trouble was brewing, and urged action at that time. Among our recommendations we urged that commercial harvest of the large predator species, particularly Mackinaw trout, be curtailed. Apparently the problem was not close enough to their noses and no action was taken. In the same year a compact with Canada was ratified and enabling legislation was approved by Congress. The international commission thus created—the Great Lakes Fisheries Commission—began work on developing solutions to the problem which would bring some order out of the chaos created by the terrific upheaval in the ecologic systems. At about the same time the States in the Great Lakes Basin entered into an agreement and established the Great Lakes Commission. I understand that the Congress is still considering consent to this compact. The Great Lakes Commission has not concerned itself directly with fisheries but has lent some assistance and encouragement to the Great Lakes Fisheries Commission.

I have been closely associated with the Great Lakes Fisheries Commission since its inception and have been highly gratified at the way they have gone about the job assigned. They have been bold in their approach and yet conservative, penurious I felt at times, in their budgeting. We are all aware of the success achieved in developing a method of controlling marine lampreys through use of highly selective poisons. I have been disappointed twice since 1960 when the appropriation to cover their bare-bones budget has been reduced by our Congress, because this slowed down the control program and deferred the solution of the problems in the Great Lakes. I hope the cut proposed by the House in this session of Congress will be restored and provisions made for modest increases in coming years so that lamprey control can be rapidly extended to cover all of the Great Lakes Basin. This will be a very necessary part of any solution.

I also envision a two-story operation in the upper lakes, especially Lakes Huron and Michigan. Deep water predators (lawyers, Mackinaw trout and ciscowet) will, when restored to sufficient abundance, control the population of the smaller deep-water fish; namely, bloaters, sculpins, and others. The lawyers were not wiped out by the lamprey and I understand are staging a comeback without assistance. Mackinaw trout are reaching good levels in Lake Superior and are currently being reintroduced in Lake Michigan at the rate of about 2 million fish a year. This rate will establish good populations in a reasonable time if too many are not removed by gill nets. The deep-water predator proposed for Lake Huron, a selected hybrid of Mackinaw trout and brook trout, will be introduced as soon as lamprey numbers are reduced to provide reasonable assurance of survival to maturity. I am optimistic about the success of this effort.

The top story of the lakes will need a variety of predators. We already have five adapted species. The northern pike and muskellunge

inhabit shallow waters close to shore. Numbers of northern pike can be enhanced by providing special managed breeding areas. Increasing the numbers of muskellunge will require a little more study. Rainbow trout are pelagic and will rove offshore waters not ordinarily used by the family Esox or the pike-perch. The recently introduced coho, a Pacific salmon, is also pelagic and will help do the job. They have demonstrated that they will survive and grow. Certain details of logistics such as source of the eggs to be used, natural and/or artificial reproduction, numbers required, et cetera, remain to be decided. The Chinook salmon, another Pacific, introduced this year, is still a big question mark. The answers will be some years in coming.

Commercial harvest by trawls and other gear to land alewives and other nonfood fish for animal food and industrial uses can be an aid in reducing the abundance of trash and the plants that process them could also be utilized to handle rough fish from the shallows and inland waters. We should, however, exercise some care in this area not to encourage overbuilding so that we tool up capacity that we will not be able to utilize when a reasonable balance of prey and predator species is established.

While all this is going on, it will be necessary to carefully limit commercial fishing harvest to insure that these operations do not kill the predators which we are trying to establish. When the abundance of predator species reaches a reasonable balance with prey species, we will, I anticipate, need some commercial harvest to supplement the tremendous sport fishery which will, in all probability, develop. Without it we might find our beaches littered with dead salmon which will die off about as spectacularly as the alewives.

To the best of my knowledge, none of the States involved has funds with which to pursue these objectives with all possible vigor. The provisions of matching funds of up to $5 million annually would accelerate the program appreciably. I believe this could be discontinued after 5 to 10 years and the States could then carry on the program from the revenues that should be derived from sport and commercial fisheries.

As a temporary measure to reduce the nuisance on the beaches, large, small-mesh haul seines or purse seines could be used to collect the dead alewives when they begin to drift inshore in rafts. They could then be pumped into barges and hauled to fertilizer plants. I have no idea what the cost of this operation would be.

I made a few notes after I got here which I would like to add.

Senator HART. Thank you.

Dr. KITCHEL. We currently have a number of proposals to fund and promote economic development in the Great Lakes Basin.

We have in existence many aid programs which occupy much of the time and energy of our chiefs, subchiefs and assistants in our State agencies just to do the paperwork for these programs.

Mr. Clevenger's suggestion of the Great Lakes Basin Commission as a coordinating agency appeals to me as being an excellent one.

While there may be disadvantages in having all our begs in one askit this way, there are also advantages that could accrue to enhanced coordination and expedition of the fisheries program.

We would ask that careful consideration be given to channeling all Federal funds for assistance in rehabilitation of the Great Lakes fisheries through one department or agency and, if possible, through one agency in this department.

In summary, the alewife nuisance is a symptom of tremendous exologic changes that have occurred in the Great Lakes produced by:

1. Enrichment or pollution of the waters.
2. Overharvest of the climax predators.
3. Further decimation of the climax predators by a parasitic exotic, and
4. Irruption of native and introduced forage species.

Our recommendation to aid in solving the problems:

1. Accelerate lamprey control.
2. Reestablish and encourage the historic predators.
3. Add new predators to fill the niches not occupied by the historic predators.
4. Monitor and modernize commercial fishing operations in the Great Lakes Basin to complement rather than compete with the sport fisheries.

Thank you very much.

Senator HART. Thank you very much, Doctor. The testimony from the MUCC, as always, is a design to jangle some nerves or remind people of earlier mistakes, but it is always welcome, and I am sure serves to help us.

Dr. KITCHEL. I think we have to live with our history, you know. People who ignore their history are condemned to repeat it.

Senator HART. Right.

Senator GRIFFIN. I share your views about the problems involved in creating more and more agencies and commissions. There are so many papers and reports to file that after a while it seems like we are spending all of our time trying to keep track of these various agencies. To the extent that we can put the program in one place, I think it worthwhile.

Senator HART. Thank you.

Dr. KITCHEL. If you have any other questions, I will try to respond to them.

Senator HART. How does Australia solve its problem of having introduced rabbits to do something or other, and now are overrun with rabbits?

Dr. KITCHEL. They have tried a lot of solutions, but I don't think we want to recount them all at this time.

Senator HART. Ray Clevenger told me about that.

One who has, for years been connected with the problems of the Great Lakes Basin, who has carried more than his fair share of the burden for fish producers is the next witness.

He is from Escanaba, and is the executive secretary of the Michigan Fish Producers Association, Roy Jensen.

Maybe the weather was so beautiful up there, as Mr. Clevenger insists that it always is, that he never got here.

I would ask that the record remain open in order that the statement of the Michigan Fish Producers Association may be made a part of it.

Dr. KITCHEL. Senator, Roy Jensen's brother died earlier this week. That may be the reason he is not here.

Senator HART. He was associated with him in the business, wasn't he?

Dr. KITCHEL. That I don't know.

85-294—67——5

Senator HART. Before calling our next witness I think the committee should acknowledge the welcome that was extended to us this morning, and the continued presence through the hearing of the mayor of the city of Muskegon.

He was here earlier, and is hanging on to the bitter end. Mayor Johnson, we are very grateful.

Mayor JOHNSON. Thank you.

Senator GRIFFIN. I think there are some other city officials, too, aren't there, Mr. Mayor?

Mayor JOHNSON. Yes. We have Chase Hammond, who is scheduled.

Senator HART. That is the reason I sort of slid into the next witness.

Mayor JOHNSON. I would like to introduce our new city manager, Bob Pulscher, to both of you Senators.

Senator HART. As Senator Griffin said, there are some other city officials here, and one is the next schedule witness, the director of parks and recreations for the city of Muskegan, Chase Hammond.

STATEMENT OF CHASE HAMMOND, DIRECTOR OF PARKS AND RECREATIONS FOR THE CITY OF MUSKEGON

Mr. HAMMOND. Mr. Chairman, Senator Hart, and Senator Griffin, I know there are some other areawide officials here, too, and on behalf of all of them I am sure we want to welcome you here for this occasion.

We appreciate the fact that you chose Muskegon to have this hearing. Well, gentlemen, I would like to present the problem as local communities face it.

We have seen in the past 10 to 15 years considerable changes in the patterns of use of our Lake Michigan beaches.

For many years we had a great use of our channel areas for fishing, especially perch fishing. In fact, at some times the walls would be lined with fishermen who would enjoy this particular kind of leisure time activity.

Over the years this has gradually diminished to the place now where practically no fishermen enjoying this wonderful hobby.

At the same time we have seen a gradual delcine in the participation of people using our beaches and, of course, we know the main reason for this—the alewife problem.

Muskegon is extremely fortunate, as you know, of having many wonderful natural facilities in lakes, rivers and so on, but one of the greatest assets we have in this area, are our wonderful beaches.

It so happens that my responsibility as director of the department of parks and recreations is to maintain and operate about 2 miles of this beach in two particular parks and, therefore, we have become very concerned and involved in the cleanup problem.

In fact, this last year the problem has become so great that it has sort of taken me off the hook.

Until this last year we would get constant calls from people who would say, "Why don't you do something about the alewife problem?

And now everyone knows that it is not a local problem, and it is an areawide and statewide and national problem; and therefore, it relieves me of a little of the criticism that we have gotten over the years, because we weren't keeping the beaches as clean as people thought we should.

The problem has gotten progressively worse for the last 6 to 8 years, and I think you should know that this difficulty is a rather long season.

It starts in the neighborhood of June 1 and runs until August 1. We are still doing some cleanup then, but the basic problem is for about 2 months, and it reaches its peak somewhere between July 1 and July 15.

I appreciate the fact that there has been some emphasis on bringing in Job Corps workers to do this cleanup job. This has been a rather spectacular kind of thing, but I want to emphasize the fact that this is a daily cleanup problem that every community has if it has beaches.

I share the extent of the problem with Petoskey and Bay View, because theirs is even greater than ours in the fact that their beach areas have a lot of stone: To rake alewives out of stone areas is an extremely difficult problem. We have sand, and therefore the problem is not quite as great as it is in some other parts of the area.

The problem that is created is simply one of fish in the water and, of course, depending on the amount of wind and wave action, these fish can lie out in the water for a considerable period of time, and when the waves come, they will wash onto shore. Sometimes as much as a 25- or 30-foot-wide area is scattered with these fish, and you multiply this by 2 miles which we are trying to clean up, and you can see one or two men can't cover this problem very well.

In addition to this fish problem on the beaches is the problem that is created by the fish that lie in the water for long periods of time, and gradually disintegrate in the water. If the waves are not severe enough the fish will just churn around right along shore, decay, sink to the bottom, so you have a considerable problem right in the water. A new problem that has developed this year for us is the fact that as these fish decay, and heavy waves come a little later on, the bones will accumulate on the beach to the place where you have a mat of bones left from these decayed fish.

The maggot problem which occurs as the fish lie on the beach is very offensive. If we are not able to pick them up right away, the maggots develop, crawling all over, and, of course, creating a health problem as well as a smell problem.

At times I could even smell the fish in my office downtown, and you can see this is very obnoxious to all the people as this problem develops.

I would like to mention just a bit about the problem financially for local communities.

During this past summer we have not been able to keep up to it entirely because we just haven't had enough manpower and equipment.

The extent of this problem was not anticipated and we were not budgeted for it, and therefor, we have had to spend between $5,000 and $6,000 over and above our budget to handle manpower and equipment which has been brought to the beach this year to do a cleanup job.

We have averaged three to four men 5 days a week on this area, as well as trucks, high-lift equipment, and other types, special dump trucks hauling these fish to the dump.

In fact, it got so great a problem to us that we couldn't continue to haul to the dump, and we then started to dig 4- to 5-foot trenches, bury the fish with a 2 to 3 feet of sand cover. This is not desirable, and yet the problem became so great that we couldn't do much about it.

We have hired private contractors to help us, and extra manpower, and we have used some Neighborhood Youth Corps boys, and a special local employment program that we have been able to work out.

Now, these is some mechanical beach cleaning equipment available, and so far today, I haven't heard too much said about the immediate problems.

We have tourist people here that are running resorts and small park systems that can't really afford to apply too much to this problem. The city of Muskegon has been advertising lately for mechanical beach cleaning equipment, and specialty equipment is available. The Jackson Beach Leach from Dudington, the Beach Sanitizer of the Allis Chalmers Co.; and the Scavenger of the Lockwood Division. These are all available now for use by local communities and other groups.

But the cheapest of these runs around $9,200, and this is without a tractor or a piece of equipment to tow it. So we are talking about an investment of between $16,000 and $24,000 for a piece of equipment to cover these beaches.

Now, as I mentioned, this is a daily problem. This equipment should be available to work on these beaches right on the waters edge every day during the fish problem season so we are talking not only about the investment problem, but also the operating problem of between $8,000 and $10,000 a year to operate one of these machines.

We hope to have one of these sand sifters next spring on the Muskegon beaches.

The solution, of course, is beyond the immediate kind of thing I am mentioning here.

The program as outlined today I think is terrific. We have got to do this, and we encourage your committee to give all the support you possibly can to it. But I can see no immediate relief from this problem.

We are talking about a program that is 5 to 10 years before it shows much effect. What can we do soon to help relieve this problem locally, and to encourage our tourist and resort business?

We have seen it fall off tremendously this year. Our beaches have been bare, so we need to be thinking about as many immediate steps as we can.

I don't know if there is any help possible to purchase this kind of equipment. I know the State parks have been looking into it, but this, as I see it, is one of the immediate solutions.

Somebody else mentioned the possibility of a water borne pickup system, and we have been thinking about some type of a program along this line where they can be netted, or where some piece of equipment can be used to get them before they get to the beach to decay. This is very important.

I think the damage is done before August 1. If you could see our beaches now you would find that they are very clean. The water is clean. There are very few fish coming in now, but the damage has been done, and in August the weather starts cooling off, and we have lost our tourists, and our people have gotten out of the pattern of going to the beach. They know this problem exists. They dislike the smell and everything related to it indicates that we have lost our users, and we have lost a great source of recreation potential.

We appreciate your interest; we hope you enjoy your stay in Muskegon.

Thank you.

Senator GRIFFIN. I would like to ask a question.

Senator HART. Go ahead.

Senator GRIFFIN. At the present time you are just using manpower and rakes; is that right?

Mr. HAMMOND. We are using manpower and rakes, and a high lift which has a loader bucket on the front. We go along and rake them up and throw them in the bucket, and either take them to the dump—which in our case is almost 10 miles away, and either that or digging big trenches and burying them. We don't like to do this. We would like to get rid of them from the beach area.

Senator GRIFFIN. I don't know the names of the various pieces of equipment, but I am aware of the fact that Ludington and some of the other communities to the north have such equipment. I have heard glowing reports about how effective it has been in some instances.

I know Traverse City has been able not only to clean up its own beaches, but to rent the equipment to some smaller communities in the area for short periods of time.

I would be interested in knowing what the conservation department has done and how they have handled the situation with respect to the the State parks.

Dr. MACMULLAN. Glenn Gregg here is responsible for that program. I would like to introduce him. He is department director, and perhaps he would comment on this.

Senator GRIFFIN. I think we may have more questions for you. It's the same problem, just different agencies, different levels of government.

STATEMENT OF GLENN GREGG, DEPARTMENT DIRECTOR, AND COORDINATOR WITH THE YOUTH CORPS

Mr. GREGG. Senators, I think maybe I could add a little bit to this. The Governor had appointed me as the coordinator with the Youth Corps to help clean up our beaches, and they were only responsible, or could only work on public beaches.

But in order to tackle the whole problem, the entire problem, the private as well as the public beaches, I gathered a few facts and figures.

For instance, we used Grand Haven State Park as a trial area where we had kept track of the manpower, the equipment used, the supervision, everything that was necessary to clean up that beach during the period of the die-off.

Taking this length of beach and multiplying it by 508 miles of beaches on Lake Michigan from the Straits of Mackinac to the Indiana State line, I come up with a figure for cleaning of—$2,250,000 per year. This does not include any purchase of equipment; this includes the rental, contract rental price and handtools that should be purchased. This is a manpower situation.

Specific questions that have been raised regarding beach cleaning equipment; the State purchased during the height of this program one piece of equipment and put it to use. We found out that it did a relatively good job on the alewife during the time that they were fresh and had just washed up on the beach; but we found out when they reached the state of decomposition as stated by Mr. Hammond here, that it becomes almost an impossibility to pick up the bones, the juice, the maggots, the stinking mess, let's put it that way, that was created.

I do have the feeling that on our beaches where we have sand and not rock beaches, but sand, that they could do a very good job if we had equipment available during the period that alewives were coming in.

You can't go in after it has been done, when they have started to rot. As the die off progresses, that would be the time to do it.

I would be glad to answer any specific questions you may have.

Senator HART. I thought we were able to get the Federal Youth Corps and others onto the private beaches, too.

Senator GRIFFIN. I don't think so.

Mr. GREGG. We were issued an order that they could only work on the public beaches, and the public beaches of the area that we are concerned with comprise approximately 30 miles of public beaches in State, Federal, township, county, city ownership, and some of these, of course, do not require cleaning.

I am thinking of some of our big areas, like the upper beaches at Ludington, our beaches of Wilderness State Park, where the public were not using the entire beach, so it boils down to a point where we could only clean up 12 to 14 miles of beach out of the 508 miles.

Senator HART. So the problem to which you address yourself admittedly is not the sort of thing that this bill contemplates, but in that task force that Dr. Cain described, one of the things I asked him is to make some suggestions of the short term. I hope we will hear from them.

Mr. GREGG. Very definitely the conservation department would like to play a part in this, within the knowledge and abilities we have.

Senator GRIFFIN. In order to get ready for next year, and we all know that the problem will reoccur to one degree or another, I would like to make a recommendation: I would like to receive a report from the State government concerning the use and effectiveness of the Job Corps people. This might give us some basis for making a recommendation in advance or setting up some cooperative arrangement rather than waiting until the last minute as was necessary this year.

Do you have any comments now in this respect, or do you want a meeting first?

Mr. GREGG. I subscribe to your theories, Senator. Certainly you will get a report. In fact, I have all of the information here of all the contacts we made, all the manpower we spent, and on what beaches. This is being compiled, and you will be furnished a copy.

I would rather wait until we have had a meeting. Mr. Clevenger suggested discussing the entire problem with local units of government, as well as the State, before we make any definite recommendation.

Senator GRIFFIN. I am not sure we can convince the Federal people that this ought to be an annual chore of the Job Corps operation, and I am not convinced it should be, but at least it is one aspect we will have to look at.

Mr. GREGG. I might add the Job Corps had 250 men available to us; there were more as backup. These are the prime people that were made available. In my figures, figuring out what it would take to do all the beaches, I came up with the figure of 2,250 men that would be required over the length of the period of the cleanup to handle all the beaches.

Senator GRIFFIN. Did the Wisconsin beaches get any of this help?

Mr. GREGG. They certainly got some of it but not as much because our prevailing winds come out of the northwest, and they were blowing on the Michigan beaches. We found this true, in Lake Huron, where we have had some difficulty, but our beaches were not littered like Canada's.

Senator HART. I know Indiana got plenty of it.

Senator GRIFFIN. If these colors here are supposed to indicate the density, it looks as if the worst was in the Chicago area.

Senator HART. Thank you very much, gentlemen.

Then from Congressman Hutchinson's home at Fennville, our next witness is Clare Harrington.

Mr. HARRINGTON. I would gladly pass my time to the next person.

Senator HART. Our next witness is from Milwaukee. It is Mr. James Miller of Lake Industries, Milwaukee, Wis.

Mr. MILLER. Well, I am down here just as an observer. I would like to just say we are happy to be here. We were supposed to have had a hearing in Milwaukee yesterday, but because of the emergency situation existing in Milwaukee, the hearing was called off. We came here more as observers, and are enjoying the Michigan hospitality, and I think that we are going back with much information that we did not have prior to coming here, and we are happy to be here, to take back with us some of this information to some of the people in our State, and get ready for the hearing, I guess, within the next 4 weeks, I believe.

Senator HART. I think a date has not been set, but I know that Senator Bartlett intended to get into Milwaukee.

It was nice of you to come over. I hope you did enjoy it.

Mr. MILLER. Thank you.

Senator HART. Speaking for the Fisherman's Co-op at Saugatuck, Southern Lake Michigan Fisherman's Co-op, is Keith Chambers.

STATEMENT OF KEITH CHAMBERS, SOUTHERN LAKE MICHIGAN FISHERMAN'S CO-OP, ACCOMPANIED BY MR. CARBINE

Mr. CHAMBERS. I want to thank the chairman of the committee and both you Senators for allowing me to come here, and we have a few ideas that have been made public, pertaining to this, which we can get into later. I just brush on it partially here, but later, if there are any questions, between ourselves and Mr. Miller, we could probably clear this up.

In the fifties of this century, Lake Michigan had alewives in alarmingly vast numbers. In the winter of 1959 and the spring of 1960, the alarmed few of us in the commercial fishing industry had laws changed to allow trawling for the taking of these species. All of these changes that have taken place in the Great Lakes are not news or history to us. It affects our livelihood to the extent of how to operate, what type of equipment, and what species to fish for. As I am of the fifth generation in the commercial fishing business, this is not news to us.

This year, April 1 through June 31, three trawlers operating out of Saugatuck caught 3½ million pounds of alewives. We could have produced twice that or more but a new 5-million-pound freezer was not completed until June 4 of this year. These fishes were cleared from the lake at no cost to the State or Federal Government.

This year, between Wisconsin and Michigan trawlers, they will produce over 50 million pounds of alewives. They are being utilized in fish food and the pet food industry. In the future, they may be used for a protein concentrate. An older freezer at dockside holds another three-fourths million pounds, totaling 5¾ million pounds freezing capacity. These past 7 years we have and are constantly improving and developing skills, knowledge, research, equipment, facilities, and markets.

United States Steel Corp. at Gary, Ind., hired our three trawlers from Saugatuck to keep their water intakes clear of alewives during the spawning run. We did this successfully as long as the trawlers stayed there. This was from April 15 through May 2 of this year.

The floating dead alewives can also be utilized with different types of nets and gear that we are now using. Fishmeal plants would be needed, larger and more vessels. This could all be done profitably with money loaned to the industry. Or should tax money be used to plant trout, salmon, and to build hatcheries to feed on the alewives?

I agree that there is no shortcut or magic formula, but I think that our plans are beneficial to all parties concerned. This again is at no cost to the taxpayer.

Seventeen million dollars have been spent on the lamprey control in the Great Lakes. This was done through research, trained personnel from the State and Federal agencies, and many industries and, of course, tax money.

This was done to revive and rehabilitate the trout, which was once the mainstay of the fisherman, both sport and commercially.

Now, the Michigan Department of Conservation is asking for $10 plus $30 million to plant salmon, trout, and to build hatcheries. These fish would then eat the alewife problem away, when and if they become abundant. This is to be done with tax money.

A salmon's life in the lake is 3 years; that is Coho salmon. Upon spawning, they all die, the young fish and bear feed upon the dead salmon. Will the rivers and the shorelines be any better with large dead fish instead of alewives? For $40 million? The Michigan Department of Conservation claims that they can control this die-off of salmon by yearly plantings of salmon and the sport fisherman. There will be no commercial fishing; only if and when there is a surplus to the sport fisherman. Alaska and Washington need the commercial fisherman, but Michigan does not feel this need.

On July 19 of this year, the Fish Division of the Michigan Department of Conservation advised us to utilize our present vessels, and only invest in short-range programs. If and when the salmon and trout are plentiful, the sport fishermen will catch them, not the commercial fishermen.

The alewives will be needed for food for the salmon and trout. All commercial fishing would be stopped.

If and when the salmon were in surplus, would the commercial fishermen be able to resume operations? By this time, all commercial fishing operators will have moved to different States or professions so again the beaches and rivers are a problem of pollution by dead fish. This tax money is going to be used against free enterprise.

Senator HART. I am glad I mentioned that story about Australia and the rabbits. This is a complicated world.

Mr. CHAMBERS. I have a photograph pertaining to these floating alewives. The problem, we feel, should be taken before they hit the beach. Now, there are some photographs of some work that has been done this spring already, larger vessels to cope with and haul the dead fish away. That net there is 1,500 feet long.

Senator HART. How many pounds will it hold?

Mr. CHAMBERS. 200,000 pounds in one net there.

Senator HART. How many?

Mr. CHAMBERS. 200,000.

Senator HART. Pounds?

Mr. CHAMBERS. Right.

Senator HART. How many millions of pounds of alewife die-off were there?

Mr. CHAMBERS. Estimated this year?

Senator HART. Yes.

Mr. CHAMBERS. Mr. Carbine could answer that, but from the information we had, it has been between 100 to 200 million pounds die-offs this year.

Senator HART. It would take a lot of these things, wouldn't it?

Mr. CHAMBERS. It would take more than one net. They can be utilized in fishmeal—the floating ones—if they are brought in immediately upon floating. When you have your windrows, those are usually dead 24 to 30 hours, but they cannot be used in pet food, so it would be two different operations.

Senator HART. Did you notice the slide that Dr. MacMullan and the State conservation commission included in that list, that group of slides we saw earlier this morning? My memory is not clear, but it showed on one side 50 pounds or—I think it was 50 pounds of alewives, the equivalent of 5, was it, a 5-pound——

Mr. CHAMBERS. Five-pound salmon, correct.

Senator HART. Then underneath somehow or another, they derived the economic benefits from the two.

Mr. CHAMBERS. Right.

Senator HART. Do you quarrel with that?

Mr. CHAMBERS. To a certain degree, yes. I will hedge that for just a moment here.

Say, we take the program the way it is, we should operate our present equipment, do a wonderful job up until a point. We are getting a bad taste in our mouth. They say, "You boys do a good job now, but later on we are going to put you out of business," and they are going to use tax money to do this.

Senator HART. I have the same reaction, even if I wasn't a fifth generation fisherman. I know how you feel. I am just trying to get your reaction on that statistic.

Mr. CHAMBERS. We take care of it with salmon and trout, and what is the difficulty of the salmon going to be? Who can answer that, but it is a question that just can't be overlooked.

All right, say that we took this long program, we do not do anything immediately. The tourist trade is going to be ruined in 5 years without some immediate action, and we have been the ones who have lived with this for 7 years, so we are in somewhat of a decent position to know what we are talking about also.

Senator HART. Almost a footnote to your testimony, I noted you said that the steel plant in Indiana had engaged three vessels to keep clear its intakes. Has that plant planned that it would need some sort of service or——

Mr. CHAMBERS. They have had trouble previously.

The steel company uses in a 24-hour period three times the amount of water that the city of Chicago does to cool their plant for their water supply. Now, we kept their intakes clear. They have three of them. We kept those clear from the live fish, and when the spawn run, or they felt it was no longer needed, we were there for a period of 17 days during the heavy spawning run, and they had no trouble whatsoever.

Senator HART. That figure you gave us of three times the city of Chicago's water use every 24 hours—what is the quality of the water after they turn it back?

Mr. CHAMBERS. I would say it is clearer than when it is taken in. The only difference is that it is warmer.

Senator HART. And that has some implication, doesn't it?

Mr. CHAMBERS. That may attract the fish.

Senator GRIFFIN. Thank you very much.

Senator HART. The Bureau of Commercial Fisheries has been careful and attentive in its presence this morning. I want the record to show that Mr. Carbine has been here.

This concludes the list of persons who had been scheduled and/or who arrived this morning and asked to be witnesses. Is there anyone here who would care to add anything?

STATEMENT OF JOSEPH ENGEMANN, ASSISTANT PROFESSOR OF BIOLOGY AT WESTERN MICHIGAN UNIVERSITY

Dr. ENGEMANN. My name is Joseph Engemann.

I think the testimony this morning indicates pretty well that there is a need for some balance in any program that is attempted and I am fully in agreement from one point of view with the commercial fisherman, in that there is a value to removing the alewives. I mean, 10 pounds removed of dead alewives rather than 1 pound removed as trout has a value in removing much of the nutrients that are flowing in as pollutants now in our Great Lakes. It is more effective than it is by some other method.

Senator HART. Will you run through that again? I am sorry, I missed it.

Dr. ENGEMANN. Well, some of the rundown in the quality of water in the Great Lakes is due to runoff from streams—I mean, fertilizers from farmland and sewage treatment plants effluents, and all sorts of things. Some can be considered as nutrients. Some of this is tied up in good food that is available in these fish, and in removing this most effectively, I think removal of alewives plays a part.

Another factor is that the alewife is food to the coho salmon.

If control is restricted to salmon plantings—I mean, if they build up the hatcheries to too great an extent, I would assume that they could plant enough to reduce the alewive population so that they would be then presented with too many hatchery facilities—I don't know what the best level of planting is. It seems to me the projects they have

are correct, but in any event, we assume the alewife is going to be here. It is an asset not only to the commercial fisherman, but in terms of sport fisherman as food for the salmon. The alewife does have this tendency to die off and so I think you are going to have to realize that this cleanup is going to be a continuing problem.

Mr Clevenger pointed out, and also some of the other people, how picking them up in the water can perhaps salvage the tourist industry in terms of having reassurances that there are facilities made for this.

We are going to be faced with continuing alewife dieoff, I think. The alewife does have this natural dieoff not only before it spawns, based on evidence from Lake Cayuga, but also after spawning. I think that it is a problem that will be continuous, only at a reduced level once the coho salmon has reduced the numbers, so I think that aiming for practical janitorial facilities is one of the problems.

Senator HART. Thank you very much. For the record, would you state your address and your background?

Dr. ENGEMANN. I am assistant professor of biology at Western Michigan University, Department of Biology. Is that sufficient?

(The following information was subsequently received for the record:)

WESTERN MICHIGAN UNIVERSITY,
Kalamazoo, Mich., August 19, 1967.

* * * * * * *

I did not include in my statement the idea that projected hatcheries do not seem to make allowances for natural reproduction that will probably occur. Also, removal of alewifes by commercial fishermen either before or after the fish are dead may eventually lower the population by preventing recycling of their substance as nutrients in the lake (thus reducing yield as in continued overcropping of the same crop in the same field without fertilization).

Bill S. 2123 of the 1st Session of the 90th Congress seems a good instrument to accomplish some of the desired control. Please call attention of the appropriate person to the fact that lines 1 and 2 of page 2 of the bill should be corrected to read: "trolling the alewife (know biologically as *Alosa pseudoharengus*), and other fish and aquatic animals which affect". Scientific names (genus and species) in zoology are always italicized. Only the first part is capitalized. No. "v" in *pseudoharengus*.

Thank you.

Sincerely,

JOSEPH G. ENGEMANN,
Assistant Professor of Biology.

Senator HART. Yes, indeed. Thank you very much.

STATEMENT OF DONALD JOHNSON, MAYOR OF MUSKEGON, MICH.

Mayor JOHNSON. I am Donald Johnson, mayor of Muskegon. I would like to make two or three observations, if I might, and I wish to thank you very much, Mr. Chairman, and Senator Griffin.

As one who is interested primarily in the effect of the dead alewives on our tourist industry and the effect that it has had on our citizens who reside year round in the area, I am a little bit dismayed that the attempt at cleaning up the fish after they arrive on the beaches seems to take a greater emphasis here.

What good, after all, is cleaning the beaches, if people are not interested only in clean sand, but rather would like to use the water. Hardly anybody enjoys entering the water and being smacked in the face or on the body with these floating dead fish, so I would suggest that greater

emphasis ought to be made on cleaning them out of the water before they reach the bathing or swimming areas.

Secondly, an observation I wanted to make in response to Senator Griffin's remark about the Job Corps: I am sure they have done a wonderful job, but it doesn't seem to me that that is performing a training task for the Job Corps. I am equally sure that is one of your concerns as well.

We have had a suggestion locally. If you will notice, those of you when you are leaving the building, we have the *Aquarama* tied out there at the dock and a suggestion has been offered both in public print and private conversations that there might be some possibility of converting some of this lake shipping that we have that is not being used, into some kind of a trawler arrangement, and/or a floating factory that can take the raw product and convert it into whatever use it might be made. I thought this might be something that, from a layman's standpoint, a nontechnican in the field, and interested in the effect on the average person that uses our beaches, this might be something that should be put into the record for the committee's overall consideration. Thank you very much.

Senator HART. Every one of these items is a practical consideration. You are right.

Senator GRIFFIN. I agree; I think that whatever attention can be given immediately to the problem of collecting them before they hit the beaches, ought to have priority.

Mayor JOHNSON. Well, I submit I haven't any solution to the problem. But I think that the committee's attempt at solving the overall problem should attend itself to this as an immediate goal, while perhaps trying to solve the more technical aspects of the problem for the future.

I appreciate your coming to our city for this hearing.

Senator HART. Spoken like a mayor with a beachfront and tourists. We got the message.

STATEMENT OF ROBERT WESLEY, WHITE LAKE IMPROVEMENT ASSOCIATION, MONTAGUE, MICH.

Mr. WESLEY. I am Robert Wesley of the White Lake Improvement Association, and I notice that you said that the speaker from Michigan Conservation Clubs was here to jangle some nerves; so am I.

I think we've got our heads in the sand. We have a problem of alewives, but that is just the manifestation of the entire problem of the Great Lakes Basin, and until we stop using the Great Lakes as a garbage pit, we are going to be involved in this kind of a problem.

The reason we have the alewives is because we have polluted the natural predators out of the lakes, and instead of worrying about cleaning up the beach we should be worrying about cleaning up the water and bringing back the ecological balance of the Great Lakes system so that we won't have a problem like this occurring in the future.

Now, it is going to take a long time to do this; I realize that, and I have no quarrel with any of the programs that have been suggested this morning, because they are immediate, and would give immediate good effects to bring back our tourist business and so forth.

But we have lost track of one great thing; the Great Lakes Basin, especially Lake Michigan, is our drinking well for this entire area, and we have discussed fisheries, and we have discussed recreational facilities, and we have neglected the big thing that we have to worry about. We are ruining our drinking water by using it as a disposal pit for our waste materials, and rather than spend millions of dollars trying to establish another species of fish, I would suggest that we spend those millions in cleaning up some of the pollution problems we have in this area.

We are pouring out of the west Michigan shoreline alone—this survey was made on the basis of 1 mile back from the beach line on population only, excluding entirely all of the industrial wastes—the west Michigan shoreline is putting somewhere in the neighborhood of 3,000 tons a day of solid waste materials into Lake Michigan.

This is a drop in the bucket compared to what is coming in from Indiana and the industrial areas down there, and from our own Corps of Engineers, who last year removed some 400,000 tons of sludge from the bottom of the Chicago River and dumped it into Lake Michigan. When you do a thing like this you ruin the ecology of the lake.

Spawning beds are being removed, and I can't understand how we feel that Coho salmon will reproduce and will take hold in the Great Lakes when our natural predators, the lake trout, the whitefish, the sturgeon have been polluted out of the water by man's misuse.

Now, you do find the Coho taking hold nicely in the northern end of the lake, but this pollution area has moved north year after year. I have watched it come from St. Joseph to Grand Haven to Muskegon to White Lake, and farther north.

Our die-off of alewives originally was in the southern end of the lake; now it has moved clear up to Petoskey. The pollution in the lake moves up constantly and we are continuing to pour hundreds of thousands of tons of waste material into this tremendous asset, and we are trying to spend money to establish new fish, instead of taking care of the real problem, which is getting back our water quality.

We have to have decent water. You can't plant salmon in a sewer, and that is what we are trying to do, I am afraid.

One of the things that completely ruined the lake trout situation in this lake for fisheries was that when they got low, in their ebb, because of the silting out of their spawning beds in the southern end of the lake, they moved farther north, and you not only ruin that area for spawning but you kill most of the female trout in the area because if they can't find a proper place to lay their eggs, they retain them and they spoil and kill the fish very quickly.

Now, this happened; the catch dropped. The Federal Government or the State government, I don't know which, but somebody allowed chub netting in the lakes.

When you plant a 6- or 7-inch trout in an area where there are chub nets you might as well throw them out, because they are going to get caught. The chub net has a 2½-inch gill opening; when they are caught in those gill openings they are dead. You can't sell them, you have to throw them away. They are of illegal size.

As long as you continue to pour pollution in the lake and allow chub netting to kill off the fish you do stock, I don't know what size they are planning to stock, but I understand 6- or 7-inch salmon, they

are going to get caught in a chub net after they grow up just a little, and you are going to remove them as fast as you put them in.

I would like to know, for instance, the fish that were caught by the Indiana fisherman last year, the Coho salmon, what size were those, and how did they catch them? I think they caught them in a chub net.

Now, if we are going to do this we are just wasting money, where we should be making an all-out effort to solve the basic problem of restoring water quality.

I don't say there is anything wrong with the program in the northern end of the lake, to get a good predator fish program started, and I see that the beaches have to be cleaned because we have been hurt very seriously in this area, and it is not only the fish on the beach that do it; it is the quality of the water in our beautful inland lakes.

All over this area of Michigan our lakes have become open sewers, just because we have neglected the one thing we have to face: Stop using this great asset for a garbage pit. Clean out these chub nets. Now, if you have to subsidize the fisherman to do that, it would be better than allowing them—not because they want to, but because it's the normal nature of the fish to swim into a chub net. They don't know if they are a chub or a salmon; they don't have to, since once they get in they are dead. I think this should be given serious consideration.

Senator HART. After hearing your testimony, I think you described exactly what would happen. Before you started you said you would jangle nerves, and the hard truth is that that is what we have got to do to ourselves.

Mr. WESLEY. I feel we have got to let the public know the true story, and we have got to get the public mad, because this is going to cost one hell of a lot of money.

Senator HART. Well, this is the practical problem.

The first year I got to the Senate, in 1959, the Senate created a Senate Select Committee on National Water Resources. I was privileged to sit on it. Senator Kerr of Oklahoma was the chairman, and at the end of a year and a half we made a report which I hate to acknowledge, Bob, was responsible for two of these commissions that you suggested we could review now. One of the questions that we sought to answer was: Having identified the water needs of this country in the year 2000, what would be the cost to meet them?

The principal cost was an item that you are talking about, water quality, and the figure that we estimated in 1960—this would include private as well as public investment—was $210 billion.

I tried to peddle that idea, and political survival is almost nil when you talk like that. But it's true; the people in the Southwest and the Rocky Mountain West, they know how to price water. It's life and death for them. And we have been sitting on a resource here fat, dumb, and happy; and all of a sudden we wake up to the realization, as you have tried to underscore, that this thing doesn't last forever abused as we are abusing it.

Mr. WESLEY. It can't possibly.

Senator HART. This billion-dollar cost which is involved in responding seems to overwhelm us, but the cost if we fail to do so, for our children, will be——

Mr. WESLEY. Will be tragic.

Senator HART. Yes.

Mr. WESLEY. We have run into this problem, of course in—I don't know whether you followed our progress on White Lake Improvement Association, on our own White Lake pollution problem, but I believe that every community—I don't see how this can be handled in a national, or even a statewide basis when you start talking billions of dollars. Everybody runs the other way.

Now, if each locality, each community would do its own share, we could clean this up—and we are not talking in boxcar figures. We are talking about a half a million dollars to do our job on White Lake.

Senator HART. But the fellow says, "The fellow across the line will do it for me. I will wait until he does it."

Mr. WESLEY. We are in court right now trying to decide that issue. We have done all we can.

However, until the public realizes that it isn't just some dead fish on the beach that we have got to face, we have to face the complete ruination of an asset that we couldn't buy, we couldn't possibly replace if we don't take care of it. It just has to be done. We have to face this cost, but we have to get, I know, in the political community your hands are tied because of the public's apathy. They will sit there and watch it happen.

Senator HART. It's not apathy; when you talk about $200 billion it's a very aggressive reaction. It's not apathy.

Mr. WESLEY. On that side, but they are pretty apathetic on the other side, in getting around to doing something.

But I want it in the record that in our estimation the problem is one of cleaning up our water sources, getting them back to a possible balance again so that nature can take over. She has given us a wonderful asset, and she will replace it and take care of it if we give her half a chance, but we have overwhelmed nature.

Senator GRIFFIN. A very valuable statement to have in the record.

Senator HART. It's a great way to wind up, on a little higher note.

Mr. WESLEY. Thank you, gentlemen.

Senator HART. May I thank those who made the arrangements here.

I particularly thank you, John, for your preliminary work, and to all of you who helped make what I believe will be a worthwhile record for the committee, you have our thanks.

We are adjourned, to resume Monday morning next in East Chicago, Ind.

(Whereupon, at 1 p.m., the meeting was adjourned until 10 a.m., Monday, August 7, 1967, at the Elks Club ballroom, 4624 Magoun Street, East Chicago, Ind.)

ECOLOGICAL IMBALANCE OF THE GREAT LAKES

MONDAY, AUGUST 7, 1967

U.S. SENATE,
COMMITTEE ON COMMERCE,
SUBCOMMITTEE ON MERCHANT MARINE AND FISHERIES,
East Chicago, Ind.

The subcommittee met at 10 a.m. in the Elks Club ballroom, 4624 Magoun Street, East Chicago, Ind., Hon. Vance Hartke presiding.

Senator HARTKE. The hearing will come to order.

This hearing is being held here in Indiana in order to gather evidence on S. 2123, which was introduced by Senator Gaylord Nelson of Wisconsin and cosponsored by Senator Bayh, other Senators, and me. The bill provides up to $5 million for study, research, and corrective measures to restore the ecological balance of the Great Lakes.

The record we establish here today will assist the Senate Commerce Committee deliberations on the control of alewives and other fish and aquatic animals in the waters of the Great Lakes which affect adversely the ecological balance of the Great Lakes.

This is the second in what may be called a series of field hearings on the problems associated with the massive mortality of exploding population of alewives in Lake Michigan.

The crises resulting from the tons of dead alewives on the beaches extends to many areas of the Great Lakes, and also affects the economy as the dead fish have virtually destroyed recreational facilities of these areas, and have caused a dangerous health hazard at beaches in the form of pollution of the water. In addition the cities and industries have to bear the heavy cost of removal of dead fish from the water intakes.

This is a serious problem indeed. We are hopeful the legislation we have before us for discussion in Senate bill 2123, can help alleviate the situation.

The witness list today is rather lengthy. It is distinguished, and we are going to try to move through it as rapidly as we can. I am hopeful we can build a good record not only as to the extent of the problem, but also as to the area of some good solutions.

We have a great need, in my opinion, for swift action by the Congress in this matter, and I think that if it can be demonstrated that congressional action is necessary there is no reason why the Congress cannot act quickly. The so-called jellyfish bill which the Congress passed in a matter of weeks to relieve the Atlantic coast beaches and tributaries, was a demonstration that in situations of this kind we can act with deliberate speed.

Hopefully, as these witnesses point up the nuisance factor of alewives and the tremendous cost in cleaning up, and the health hazard,

85-294—67——6

the loss of work and time by industry in the 12 intake systems of the municipal water systems, as well as those of industry and the economic loss to those whose livelihood depends on tourists and recreational facilities, we will realize that the alewife has replaced almost all other fish in the Great Lakes.

Today as we hear not only from these people who are scheduled on the witness list, we are going to try also to hear some additional witnesses who were not on the original list, and hopefully if any of you people desire to be heard, we will hear you to the extent that time allows us.

We plan to continue until approximately 12 o'clock noon, at which time we will break and reconvene at roughly 2 o'clock.

The first witness that I want to call on this morning is the distinguished Congressman from the First Congressional District of the State of Indiana; a man who is a ranking member of the Rules Committee.

He has been the Representative of Indiana's First District since 1943, and we are pleased at this time, Mr. Madden, to hear from you.

STATEMENT OF HON. RAY J. MADDEN, U.S. REPRESENTATIVE FROM THE FIRST DISTRICT OF INDIANA

Congressman MADDEN. Thank you, Senator Hartke.

First, I want to commend Senator Hartke, the chairman of this senatorial committee, for the extra work that he is doing in coming out to Indiana and Michigan, and other States, to assembly testimony for the purpose of Federal legislation in order to do something about this gigantic scourge of these alewife fish that have accumulated on the shores of the Great Lakes.

For several years the Interior Department has been fearful of a gradual accumulation of this species of fish which formerly was identified with the waters of the Atlantic Ocean.

Upon the construction of the St. Lawrence Seaway and the other improvements on Great Lakes navigation, this species of fish entered the Great Lakes from the Atlantic Ocean and have now increased in such numbers that water conditions in Lake Michigan, caused by pollution or otherwise, annually bring about the scourge of billions of these alewives to die and be washed upon the shore of Lake Michigan and other of our Great Lakes.

A great number of opinions and theories have been submitted by recognized experts as to the reason for the bulk destruction of this type of fish in such numbers that the dead alewives on our shores adjacent to cities and areas of population have become an extreme health hazard.

Unless our Government finds a means of exterminating or preventing this menace, it might create a pestilence throughout the cities and towns in the Great Lakes area.

The purpose of Senator Hartke's hearings, and the work of the Commerce Committee of the Senate, is to solve this problem if possible.

Your committee is proceeding in the right direction, Senator, and taking the proper steps by holding hearings and listening to the testimony of experts on fish life, both as it pertains to fresh, salt, and polluted waters in which they live.

The accumulation of these dead alewives by the million in certain localities adjacent to industry and factories create a health hazard and also these dead fish block up water intakes and water outlets to industries and steel mills, and other manufacturing.

In some cases their bodies are siphoned into the machinery operation to the detriment of steel mills and factory production.

The alewife is having an affect on industries and municipalities as well as being a health menace through air and water pollution of the Great Lakes.

One steel plant—and there are several on the southern shores of Lake Michigan—estimated a loss of approximately half a million dollars per day for about 10 days in April 1966, when cleaning screens on the cooling water system were unable to cope with dead alewives entering the intakes.

The screening system was inadequate, even though it removed 60 tons of fresh fish per day.

Electric power generating plants in Illinois were seriously affected at about the same time when it became necessary to alternately shut down half of the generators while cooling water screens on the other half were being cleaned.

Chicago's new central district water filtration plant, the second largest of its kind in the world, operated at reduced capacity in April 1965, when dead fish caused breakdowns to 20 percent of the cleaning screens which were handling 10 tons of dead fish per hour.

This water supply to some 2.7 million people was successfully protected in 1966 by a BCS designed alewife diversion system.

The economic loss occasioned by the littering of harbors and beaches with alewives which have completed their life cycle is difficult to assess; however, many communities have been forced to initiate daily sweeping operations to clean alewives off the beaches.

Doctors in these areas report that over half of their summertime business involves the removal of fish bones from the feet of bathers.

Most lakeside communities are reluctantly living with the obnoxious sight and the odor of these dead fish floating around in the harbors.

No doubt your committee, Senator, will have food experts testify as to what can be done by way of utilizing the dead alewife as a bulk food for animals, or as a fertilizer material which can be used properly in certain areas of our land.

The Department of Natural Resources of Indiana has stated that this fish could be a valuable commercial product and serve as forage for more desirable fish, such as salmon, lake trout, whitefish, and so forth.

Uncontrolled as it is now, the alewife is a pest. It is estimated that by reason of the short life of this type fish, about half the adult alewife population die off annually. The dead bodies litter the beaches, clog the intakes, cause odor problems in or near the business districts and harbors of the cities on the shores of the Great Lakes.

This fish seldom grows more than 9 inches long, and some are the size of a small-size perch.

I have contacted Secretary Udall asking that the Federal Government take immediate steps to cooperate in an emergency undertaking

to secure information as to the best way to eliminate, dispose, or use this gigantic accumulation of dead fish.

I have introduced a bill myself, along with Senator Hartke and others, and I do hope we will get aid in getting immediate action to eliminate this menace to help industry, and also to the waters of our Lake Michigan.

There is no reason why the several States which adjoin the Great Lakes cannot collectively match their influence and resources to aid the Federal Government in getting immediate action so that this scourge of dead fish will not jeopardize the communities and industries, and the health of our citizens.

The newspapers, television, and other news media have aided greatly in alerting the American public and our Congress to the critical emergency existing for action on this, Federal action on this legislation.

I thank you, Senator.

Senator HARTKE. Thank you, Congressman Madden, and I want to commend you for introducing your legislation on the House side.

Congressman MADDEN. If you will pardon me, Senator, I think this would be interesting for the record.

This, from yesterday's Gary Post-Tribune, a dispatch from Muskegon, Mich.:

> The Michigan Conservation Commission outlined Saturday a $29.5 million five-year program aimed at stemming the flood of alewives in the Great Lakes.
>
> The proposal was explained at a hearing of the Senate Merchant Marine Subcommittee in Muskegon. About 70 persons attended the hearing, including Michigan Senators Robert Griffin, a Republican, and Philip Hart, a Democrat.

And then it goes on to state the proceedings.

Senator HARTKE. All right. We will include this as part of the record.

Representative MADDEN [continues reading]:

> As outlined by a commission spokesman, the five-year program calls for the stocking of Lake Michigan with coho salmon, which feed on the alewives, a herring fish. Under the plan, five new hatcheries would be built in Michigan, doubling the present number.
>
> Countless alewives died off this summer and piled upon Lake Michigan beaches, seriously damaging the lakefront tourist trade.
>
> A commissioner spokesman said that the State hopes to finance the program with Federal and State matching funds. Since Michigan has jurisdiction over 70 percent of the Great Lakes waters, he said, it felt an obligation to assume the leadership in attacking the alewives problem.
>
> The conservation agency was represented by Wayne Tody, chief of the Fisheries Division and Dr. Ralph Mac Mullan, Director of the Conservation Department.
>
> They said the five hatcheries would cost $14 million to build, plus $1.5 million yearly to operate. Only three men would be needed to operate each hatchery, they said, with electronic controls used to perform most of the work.

Senator HARTKE. I would like to note that last Saturday's hearing was conducted by Senator Hart and Senator Griffin was present.

Maybe you might be interested in what Senator Griffin said about—I am quoting from Benjamin Franklin—he said that fish and visitors smell in three days, but he said when the visitors smell we are likely to grin and bear it. After all, that is one thing. But the smell of decaying fish we cannot stand.

I know Congressman Madden does have other activities to which he is going to attend, and we are certainly pleased to have you stay, Congressman, as long as you want to stay.

At this time we would like to say we are in the city of East Chicago, and delighted to be here, of course. And would like to pay special tribute to the Elks Club for the use of these fine facilities.

The mayor is out of town, but we do have the acting mayor here, an old friend of mine, Bob Pastrick.

At this time we will be officially welcomed to East Chicago. Off the record.

(Discussion off the record.)

Senator HARTKE. Back on the record.

Mayor Pasterick, acting mayor of the city of East Chicago, we are delighted to see you here, and we want to thank you for extending the hospitality of East Chicago to the Commerce Committee of the U.S. Senate.

STATEMENT OF HON. ROBERT PASTRICK, ACTING MAYOR, EAST CHICAGO, IND.

Mayor PASTRICK. I thank you very much, Senator Hartke.

Senator Hartke, Congressman Madden, and other distinguished guests, it is my pleasure to welcome you to East Chicago, and on behalf of all of us here thank you for your efforts to help solve a problem which is affecting every community and industry located on Lake Michigan.

As I am sure the testimony here will point out the cost of alewife pollution to industry has been millions of dollars and the cost in terms of loss of recreational resources for millions of persons on Lake Michigan cannot begin to be counted in dollars.

By your bringing the Senate investigating committee to develop the facts in this matter, not only can we participate but we are also allowed to see our Federal Government in action.

Again, may I say welcome, and may I express the wish of all of us that your committee, if it cannot find the answer to the problem, that at least these hearings will provide the method of allowing you to formulate legislation to help find the answer to the problem.

During your stay if there is any way we might assist or serve you, please feel free to call upon us. You have every facility in the city of East Chicago at your call.

I personally wish you much success in this endeavor and extend the greetings of our mayor, Dr. Nicosia, who is unable to be here with us today. Thank you very much.

Senator HARTKE. Thank you, Mayor.

With us also today is Mayor Katz, from the city of Gary.

I might say that the reasons for these hearings really resulted from a personal visit I had here not so very long ago, at which time Dr. Nicosia, the mayor of East Chicago, took me down to the beach. Mayor Katz joined us at the beach and I stepped on, I picked up, and I personally smelled the dead fish. I saw the maggots and the flies that they attracted, and they also smelled.

I just want to tell you that really, after I had held the fish in my hand, which one of the television people encouraged me to do, that even after I had washed my hands, I still thought I smelled the fish. One of the distinguished visitors here gave me a statement today.

He said that flying in a Bonanza from a vacation in Canada, when they got close to Lake Michigan even in this Bonanza they could smell the dead alewives. This will give you a little bit of an idea of the type of situation we are facing. Mayor Katz, we are delighted to meet you and have your statement at this time.

STATEMENT OF MAYOR KATZ, GARY, IND.

Mayor KATZ. Thank you, Senator.

Senator Hartke, members of the staff of the Senate Subcommittee on Merchant Marine and Fisheries, Congressman Madden, as mayor of the city of Gary, Ind., which is located in Lake County, Indiana, I am here this morning to provide my thoughts, the thoughts of the city of Gary, for the matter of control of the alewives and other fish and aquatic animals in the waters of the Great Lakes.

The problem of the alewife is not new, although it certainly has not been as explosive, demanding, and costly in previous years. I can best illustrate my contention by facts and figures from our own city's operations.

Since the advent of the St. Lawrence Seaway, we have been plagued by pilings of dead alewives on our public beaches. Each year the problem seems to grow in dimension. Initially it required several weeks to clean the beaches. This year we began in early May and only as I speak to you today do I feel that we have the problem partially resolved.

Since the vast majority of our lakefront is occupied by industry I shall not presume to talk about their costs or the exaggerated costs to the recreation industry and overall economy of the area which I know will reach well into the millions of dollars.

Our city is directly responsible for 3½ miles of beach front. The alewives cost us well over $25,000 per mile in lost revenue and cleaning costs. More than $15,000 has been lost from regular summer revenue and another $65,000 spent to remove the alewives.

Albeit, removal may not be and has not been as great a task as disposal. While the alewives reputedly have some commercial worth, it is not practical nor is it basically economical for every subdivision, firm, or private owner along the miles of beach front to realize commercial worth from the piles of alewives drawing maggots and introducing flies to their portion of lakefront.

I must consider this year's invasion as merely an introduction to the avalanche anticipated in future years. Hence, the proposal of Senate bill 2123 is a welcome relief to our besieged lakefront residents and bathers.

We in the city of Gary urge the passage of this measure in its present form which poses a flexible solution to the Great Lakes problem. We do not feel that we have a better solution nor do we feel that a community of political subdivisions could solve the problem with more expedience or dispatch. We call upon you to examine the plague on our lakefront industries to appreciate the almost total destruction of the summer vacation industry and the diminishment in value of homes within one-half mile distance from the shores of the southern tip of Lake Michigan.

Senator Hartke of your committee can well relate the stench and unbelievable odor emanating from decayed alewives on a beachfront. The honorable gentleman from Indiana visited and inspected our beaches shortly after a herculean cleaning operation was completed, but the situation was no less dramatic in effect, although we stood more than a thousand feet from the lakefront and attempted to ignore the smell of the alewives.

We have heard many solutions posed by experts but the only true and encompassing remedy which offers an acceptable result and not a superficial alleviation is the bill which draws you here today.

The cleaning operation to this point in time has cost each man, woman and child living in the city of Gary $0.50 each. This merely to clean a few miles of the beach front in Gary. Unless Federal assistance is received, the costs will rise rapidly in 1968 and the years following, and I don't know if we can afford the massive costs. At our geographical location, the costs rise amazingly over what it would cost to eliminate the problem at its source. We have no power nor means to eliminate the alewife—we can only remove and dispose—that can only be done at an exorbitant price.

In closing, I ask your consideration of our community, our neighbors and all of the other pockets of civilization along the Great Lakes by enacting into law Senate bill 2123. It offers the only solution guaranteeing positive results.

Thank you, Senator.

Senator HARTKE. Thank you very much, Mayor Katz.

Mayor KATZ. Senator, with your permission, I would like to introduce and present for some remarks of their own the health commissioner of the city of Gary, Dr. Philip Rosenbloom, and when he concludes, then Mr. Jack Moore, who is acting head of our air and water polution department. Dr. Rosenbloom, would you come up here, please.

Senator HARTKE. Dr. Rosenbloom, you may proceed, sir.

STATEMENT OF DR. PHILIP ROSENBLOOM, HEALTH COMMISSIONER, GARY, IND.

Dr. ROSENBLOOM. Thank you, sir. I want to leave the financial arrangements, the number of man-hours and the ecological part to the experts who are greater than I, and I speak only from the standpoint of the health hazards that are incurred in our community, and all other communities in this other end of the lake.

Forgetting the odors, and forgetting the amount of devastation that is done to our beaches, I will keep my remarks strictly to the point of the health hazards that are incurred in this area.

As you know, Senator, some of the northern portion of Indiana, and especially Lake County, clear up to Michigan, is an open area where people come to bathe and come to live during the periods when they are on their sojourns down into the dunes and in this particular area there are great numbers of open hazards that will be subject to the flies and the maggots which have been inspected by our groups and by the various other groups that have to do with the cleaning of our beaches.

These areas that I speak about are not serviced by a sewage system, but mostly by open privies and by a cesspool which may be opened

and will cause the great swarms of maggots and flies to become infected and carry with them all other infections into this area to the big cities, into the areas of all of the State of Indiana.

Besides the odor, besides the feeling that we have of disgust, besides all the difficulties that have to come with it, this area has to be sterilized and the part—the department of the city of Gary, in conjunction with the health department, have sprayed this area many times, trying to rid ourselves of the maggots and the incipient health hazards which everybody will recognize.

My statement will be short because all of this will be taken up by greater experts. All I can say to you, Senator, to Senator Bayh, to Congressman Madden, to all those that will go forward to rid us of this menace, that not only will the citizens of the city of Gary and all its neighboring cities thank you forever, but their children whose summers have been tremendously shortened, where they can't get to the beaches, will thank you forever, and will remember you if you can do something to eliminate this infestation.

Besides the question of the health and the bones that are pulled no longer from the throats of people, but from their feet, one thing is the question of the sporting area. This whole area has become infested. There was a time when fishermen came into the lake to get perch and other fish, which now have been entirely swarmed out by the vast, vast groups of alewives which have sped into this area and made this a complete infestation, and so in closing all I want to say is that whatever the Congress may do to be able to give us relief will be greatly appreciated by everybody clear up to the northern half of the State of Indiana, and they will remember you forever. Thank you.

Senator HARTKE. Thank you, doctor. Mr. Jack Moore, is he here? Mr. Jack Moore of the Air and Water Pollution Department of Gary.

STATEMENT OF JACK MOORE, AIR AND WATER POLLUTION DEPARTMENT, GARY, IND.

Mr. MOORE. First of all, Senator, I would like to thank you for the opportunity of testifying here today, and as Dr. Rosenbloom has said, the citizens of Gary and many of our surrounding communities have for many years been fortunate in having recreation areas, such as the Lake Street Beach and Marquette Park, which is located in Gary.

Some of our neighboring communities are in the position of making use of these facilities because past neglect has closed the areas which they have used.

A study of the quality of the water will show that the bacterial count are gradually climbing. Only recently our good mayor's wife, Mrs. Martin Katz, spearheaded the drive to beautify Marquette Park, and I might say that she has made this probably one of the most beautiful showplaces in northwest Indiana. This was done with very little cost to the taxpayer, was done by donation of the citizens, businessmen, and so forth.

There has been a tremendous sum, however, of money being spent, not for the beautification, but for the removal of alewives which have been piling up on our beaches, and it seems as though this is going at the problem backward.

If this practice of money spending is continued and the funds that are normally being funneled into the beautification and progression of our parks will no longer be available, then, of course, our parks are going to go on the downward grade.

As many of the people who have testified here this morning have said, the problem is beyond the scope of the local communities here, and the assistance that can be afforded by Senate bill 2123 is our only answer.

I assure you that from the standpoint of the local health department and all the citizens of the city of Gary, that we will afford you all of our assistance, all of our efforts, but we do urge the passage of Senate bill 2123 be completed as a start in the progression. Thank you very much.

Senator HARTKE. Thank you very much, Mr. Moore.

To complete the testimony from the city of Gary, Mr. Ted Nabhan, the Councilman from the first district.

STATEMENT OF TED NABHAN, COUNCILMAN OF THE FIRST DISTRICT, GARY, IND.

Mr. NABHAN. Now, first I want to thank you, Senator Hartke, for coming into our community. I know you have seen the problem.

I have lived in this area all my life. The Gary beach lies in the first district of the city of Gary. It is one of the best recreational areas in the country, which we have not been able to utilize this year because of this problem.

The loss of recreation, loss of funds to our community, as far as parks and recreation, and for all the people who have utilized the beaches, the nuisance is very bad to us in Lake County, the community and the State of Indiana.

There are homes in the area from $25,000 to $100,000 that have been built on the beach because of the beach, and the recreational area there. They have not been able to utilize it at all because of these fish, the smell, the nuisance, the flies, the maggots, and we ask and urge you for the passage of Senate bill 2123.

I know the citizens of Lake County in the State of Indiana would appreciate it very much, but I want to thank your committee, and urge them to do all in their power for the passage of this bill.

Thank you very much.

Senator HARTKE. Thank you very much, Mr. Nabhan.

We have here a representative of the Honorable Robert McClory, U.S. Representative from the 12th District of Illinois, I understand, Donald E. Deuster, assistant to the Congressman.

Mr. DEUSTER. Yes, Senator. I am Donald E. Deuster. I am the administrative assistant to Congressman Robert McClory of the 12th District of Illinois.

Congressman McClory asked me to present his statement to you, and the Congressman's statement follows:

STATEMENT OF HON. ROBERT McCLORY, MEMBER OF CONGRESS FROM THE 12TH DISTRICT OF ILLINOIS

Mr. DEUSTER (for Representative McClory). Mr. Chairman and members of the subcommittee, I am pleased and privileged to appear

before this distinguished panel today, especially since I do not consider myself an expert on the alewife problem. Instead, I want to voice my belief and that of countless of my constituents in the 12th Congressional District of Illinois—which borders on Lake Michigan—that some relevant Federal action is necessary to restore a more beneficial ecological balance in the Great Lakes.

Experts tell us that the alewife problem will probably disappear in approximately 40 years even if we do nothing now. Nature has ways to deal with overabundance of given species. But this fact is scant comfort or reassurance to the thousands of people whose businesses are slowed down or vacations ruined because swarms of alewives clog water intakes—thus necessitating costly delays and repairs—or because rotting heaps of alewives clutter our otherwise fine beaches.

I do not think that we should be overly critical of the Federal agency now burdened with how to control the alewife—the Bureau of Commercial Fisheries in the Interior Department. The Bureau has undertaken several indirect steps to alleviate the intolerable situation. Research has been conducted at the Ann Arbor Aquatic Laboratory that aids in determining the interrelated causes of the increase in alewives in Lake Michigan. The Bureau also encourages the development of commercial alewife fisheries which, by producing fertilizers and pet food from alewives, would help keep the number of these fish at a more manageable level. Moreover, the Bureau aids the States in their programs to stock Lake Michigan with lake trout and coho salmon—predators of the alewife—now that the lamprey eel has been somewhat controlled. Lastly, I was heartened by Secretary Udall's summoning of a Federal task force chaired by Dr. Stanley A. Cain, Assistant Secretary of the Interior for Fish and Wildlife and Parks, to study problems created by alewives in the Great Lakes.

Nevertheless, Mr. Chairman, it is obvious to anyone who has recently traveled the Lake Michigan shoreline from Zion to Highland Park in my own district that the alewife problem far exceeds the capability of any single local, State, or Federal agency to handle the situation by itself. In fact, as the Waukegan, Ill., News-Sun of July 26, 1967, pointed out—

> The situation is so critical that 25 Job Corpsmen from Wisconsin were assigned to help clean Illinois Beach State Park lest the alewife stench drive off vacationers.

However, this is only a futile delaying action. A shift in the wind and in the tides brings tons of new alewife debris onto the beaches.

Accordingly, I believe that additional research and more intergovernmental cooperation to control the alewife must be stressed. Senator Nelson's bill, S. 2123, and Congressman Reuss' bill, H.R. 11485, seek these two objectives. These measures specifically emphasize the desirability of compacts or agreements between States, and their $5 million appropriation will stimulate fresh study of the overall situation and help to pay for local or State cleanup and control operations.

The many well-qualified experts who have been called to testify at these special field hearings will undoubtedly develop more technical points for the subcommittee's consideration. Still, Mr. Chairman, this Member of Congress deeply feels that one basic fact should never be lost sight of—that thousands of citizens in our State and district areas right now are experiencing annoyance and inconvenience from a prob-

lem which has so far defied solution. I therefore urge subcommittee approval of S. 2123 as a hopeful means of finding a solution to the alewife dilemma.

That concludes Congressman McClory's statement, and he asked me to make a couple of informal observations for the record, Senator.

Senator HARTKE. Fine. You may proceed, sir.

STATEMENT OF DONALD E. DEUSTER, ADMINISTRATIVE ASSISTANT TO CONGRESSMAN ROBERT McCLORY

Mr. DEUSTER. Yes. The 12th District of Illinois includes eight communities that have Lake Michigan shorelines; they are Winthrop Harbor, Zion, Waukegan, North Chicago, Lake Bluff—which is the Congressman's home community—Lake Forest, Highwood, and Highland Park.

The 12th Illinois District has two large Federal installations. We have Great Lakes Naval Training Center, the largest in the world, and Fort Sheridan, which houses the Fifth Army Headquarters.

In addition to a number of industries, one important recently announced plan is for Commonwealth Edison to develop a gigantic atomic energy generating plant at Zion. This will utilize a pressurized water reactor with an initial capacity of 1,050,000 net electrical kilowatts.

Norman Litz, for years the beach director at Waukegan, has asked me to convey his thoughts.

Waukegan has only 880 yards of beach, but he considers the shoreline an interarea matter. From many points of view, primarily health, he is greatly concerned. A contributing factor is the breeding of flies, which he has noted developing along with the alewife problem since, at least, 1960. He feels that in 1968, or by 1970, it will overcome the community.

Even though Waukegan or some other city might do an excellent job of cleaning, if someone up the beach or down the beach does not do likewise, a shift in the winds or the incoming tide will just redistribute the dead fish and frustrate local efforts.

Lastly, I have been accompanied here today, Senator, by Mr. Nathan B. Bederman, who resides at 22 Lakewood Place, in Highland Park, which is on Lake Michigan.

Mr. Bederman is the presidentof Riparian Landowners' Association of Highland Park, which represents 86 homeowners and three private beach associations. He is also a member of the Highland Park, Ill., Harbor Commission, and has been authorized by the city manager to represent the city of Highland Park today.

If your time permits, it may be that Mr. Bederman would have a short statement.

Senator HARTKE. Do you have a statement?

Mr. DEUSTER. Or he would be happy to respond to any questions you may have.

Senator HARTKE. If he has a statement, we will be glad to hear from him.

STATEMENT OF NATHAN BEDERMAN, ON BEHALF OF THE CITY OF HIGHLAND PARK, ILL.

Mr. BEDERMAN. Thank you, Senator Hartke and Congressman Madden.

I didn't come prepared with a statement, but I just want to say that I live on Lake Michigan, and I present—represent the Riparian Landowners' Association, as Mr. Deuster pointed out.

We have found that the odors of the decaying fish have traveled as far as a mile from the beach when the winds are favorable—or unfavorable, as the position might take.

In order to help to control this situation, our association, in conjunction with the city of Highland Park, have taken to aerial spraying. We spray by helicopter every week to kill the excess flies which are generated from the maggots which are disposed in the fish, and we have even sprayed the fish in order to kill the maggots.

Unfortunately, everyone does not have a facility to dispose of the fish. The public beaches carry them away and dispose of them in land fills, but it's almost impossible to bring vehicles on the private beaches, so for that reason we bury them. And in order to keep the maggots from developing into flies, which will then come through the sand, we spray them with chlordan to kill the maggots first, and we have found that to be of some help.

The first week that we sprayed for flies, we found dead flies more than an inch thick covering all pavements around the beach area, to give you an idea of how bad the situation is.

Senator HARTKE. Dead flies an inch thick?

Mr. BEDERMAN. Dead flies an inch thick on the terraces along the beach.

Since then we don't have flies, as many dead flies, because we are spraying every week, but we have controlled them to a certain extent.

The city of Highland Park has cooperated with us, because they feel it is a definite health hazard and, of course, one thing that we all seem to be stressing is the health hazard to the people on shore and the condition of the beaches.

But for every fish that comes on the beach there are probably a thousand that sink to the bottom and continue to pollute the lake, probably worse than sending raw sewage into the lake.

Senator HARTKE. I want to raise that question now, for the U.S. Fish and Wildlife Service.

I hope they do not ignore the question of whether or not there is pollution as a result of the dead fish going to the bottom, because there seems to be somewhat of a dispute about this item. I am glad you mentioned it, because it concerns me, too.

Mr. BEDERMAN. Well, that is about all I have to say, and thank you very much for allowing me to be here.

Senator HARTKE. All right. Fine. We are glad to have you, sir.

At this time we have with us the distinguished Lieutenant Governor of the State of Indiana, Robert Rock.

Mr. Rock represents not alone the responsibility of promoting the business and enterprise of the State of Indiana, the commercial aspects of it, but also represents tourism.

So, Bob, you may proceed.

STATEMENT OF ROBERT ROCK, LIEUTENANT GOVERNOR OF THE STATE OF INDIANA

Mr. ROCK. Thank you, very much, Senator. I am very happy to have the opportunity to come before your hearing and to express the full

support of Senate bill 2123, from my standpoint as Lieutenant Governor, and director of the department of commerce charged with promoting tourism in Indiana, and also as an exofficio member of the Natural Resource Commission of Indiana, and also as chairman of our legislative council.

I know of—I know that two of our Senators are here in the room; Senator Christy, who has been very active in natural resources and conservation in our State, and also Senator Taylor from nearby LaPorte-Michigan City area.

I know we also have Mr. Perry Miller from the Indiana Board of Health, and also Woody Fleming, who is our expert in the natural resources department on fish.

Mr. Fleming, incidentally, is the one who taught me what a red-eared sunfish is.

I know that all of Indiana is concerned about this problem which we have been following; we know that it is a complex problem that needs the best minds put to it, and I think you have assembled here today, Senator, and I compliment you and the committee for coming right here to the area, and having all of these people here given a chance to express themselves on this point.

And, as you know, Indiana has just recently announced a plan of improvements in our park there, a $2½ million investment.

The area all along our shore in Indiana is not only a vacation land for Hoosiers, but attracts visitors not only from the Midwest, but around the country.

I am very concerned about the possibility of their being damaged by this unusual situation. I know that it's one that is not easily solved, and does require the kind of comprehensive approach that I think you are making with Senate bill 2123.

I would say that anything my office or department or legislative council, or any of our subcommittees could do in cooperation with this study—and I know they, the natural resource people, are going to say this, and Mr. Miller—Indiana certainly wants to cooperate with its neighbors and the surrounding States of Illinois, Michigan, and Wisconsin, and all others who may be affected, that we appreciate your efforts, Senator, Senator Bayh's efforts, and all of our own, Congressman Madden here working to solve this problem.

Senator HARTKE. Let me ask you, Governor Rock, in regard to the dunes, should I ask you about the attendance figures, or is that better directed to a later witness?

Mr. ROCK. I couldn't give you the exact figure, Senator Hartke. I know it is the largest money making State park in the State of Indiana.

Senator HARTKE. I understand that, but I wonder if the attendance has been affected this year as a result of the fish?

Mr. ROCK. I would leave that to a representative from their—I do know they have made an excellent effort on their own part to clear the beaches as rapidly as possible. However, I am sure that publicity and the knowledge that the alewife were there in abundance probably kept many campers and visitors to the park away.

Senator HARTKE. Do you have any funds which are available in the State department of tourism and commerce, which would be available for any short-range elimination of this problem, or for any long-range elimination of the problem, as of now?

Mr. ROCK. Not in my department of commerce, but through legislative council, I think as far as establishing a study committee, the State of Indiana could put some money into this, or work cooperatively with other groups.

There is not, to my knowledge, sufficient funds to make the kind of attack that you are trying to do here.

Senator HARTKE. The point is I am wondering if you think the State of Indiana would respond with matching funds if the Federal Government would provide funds. Would they respond with matching funds from the State government to attack this problem?

Mr. ROCK. I think very definitely they would.

Senator HARTKE. Thank you.

Mr. ROCK. Thank you very much, Senator.

Senator HARTKE. I think Congressman Kluczynski has a representative here; is that correct? He was here earlier.

Congress Kluczynski is from the State of Illinois.

Mr. PINZAK. Thank you, Mr. Chairman.

Senator HARTKE. Will you identify yourself, please?

Mr. PINZAK. My name is Edward Pinzak. I am the administrative assistant to Congressman Kluczynski, from the Fifth District, the State of Illinois.

Congressman Kluczynski regrets his personal absence from your hearings.

He pledges complete cooperation in the House, since he has introduced a similar bill and wishes you a successful hearing.

He has a prepared statement and wishes that it be admitted in the record.

Senator HARTKE. The entire statement will appear in the record as though it were read in its entirety, sir.

Mr. PINZAK. Thank you.

STATEMENT OF HON. JOHN C. KLUCZYNSKI, A REPRESENTATIVE IN CONGRESS FROM THE FIFTH DISTRICT OF ILLINOIS

Mr. KLUCZYNSKI. Mr. Chairman, I am indeed grateful for the opportunity to make a statement at these hearings on Senate bill 2123, providing for the control of the alewife.

My particular interest is in obtaining adequate funding to permit control of the alewife, a species of fish that has infested the Great Lakes region. Uncontrolled, as it is now, estimates of several billion die off annually, polluting the water, littering beaches, clogging intakes, causing ociferous odor problems in or near the business districts and harbors.

The stench is of such magnitude that city beach employees have left their jobs in disgust after fighting a losing battle with the invasion of these dead fish.

Industrial and municipal plants relying on water intake suffer a colossal financial loss in shutdown when cleaning screens of the cooling system.

The economic loss occasioned by the littering of harbors and beaches with dead alewife is difficult to asses.

Moneys spent by the fishing industry in clearing their nets of these fish and resulting low harvest of profitable species comes to unbelievable amounts.

The industry is gradually investing in the marketing of the alewife.

The Interior Department expenditures on this problem have not been raised in the current budget report, in spite of the fact an increase has been recommended.

In 1966 Congressman Zablocki received a letter from Secretary of Interior Udall acknowledging the alewife had the upper hand in the Great Lakes region and that a "sustained and massive effort was necessary to bring it under control."

May I also remind the committee that the daily use of our beaches for recreational purposes has been greatly curtailed creating a hardship for local neighborhood facilities to accommodate the youth. This situation may lead to hostile unrest amongst our peoples.

There have been many differences of opinion and many proposals from interested groups to find ways to remedy the problem.

I sincerely hope the information gathered at the hearings will be genuinely explored, resulting in a solution to move swiftly on legislation to cope with the alewife.

This calamity is of such magnitude that no State or community is capable of handling it alone.

This situation calls for a crash program. This legislation provides for such an effort. We have had marked success with a similar program initiated against the lamprey.

I believe cooperation among our country's brilliant scientific minds, a cooperative fishing industry, and dedicated State conservation officials will arrive at a solution satisfying all.

I do believe that expenditures are needed and that the proposal of the Midwest Federated Fisheries Council is worthy of your consideration.

I am not adequately experienced with this problem to confirm this is the best or most efficient way to dispose of the alewife problem.

At this point, therefore, I would like to add my endorsement of the proposed Senate bill 2123 and urge the attention of the subcommittee to it.

I have also introduced a similar bill in the House as have many of my colleagues.

Thank you, Mr. Chairman, for allowing me to make this brief statement.

Senator HARTKE. Give my best wishes to the Congressman.

At this time I would also like to introduce for the record a letter from the mayor of Chicago, Richard J. Daley.

I think that Commissioner Jardine is present, is that right?

Mr. JARDINE. Yes, sir.

Senator HARTKE. All right, sir.

This letter from the mayor will be introduced in its entirety, and Commissioner Jardine, you may appear and make such statements you deem appropriate.

AUGUST 4, 1967.

Hon. VANCE HARTKE,
Chairman, Senate Commerce Committee Field Hearing,
East Chicago, Ind.

Dear SENATOR HARTKE: Commissioner James W. Jardine of the Chicago Department of Water and Sewers is present today to give you any information and to answer any questions regarding the alewives problem in Chicago.

The billions of alewive fish that died in Lake Michigan and other great lakes this summer has become a serious menace to the health, recreational and eco-

nomic well being of the citizens of the Great Lakes States. Each year for the past seven years the adverse effects of the imbalance of aquatic life has become more serious.

It is a problem that must be dealt with on two levels; first the long range scientific program of reducing and ultimately eliminating this increasing hazard and secondly, during this interim, while scientific investigations are underway, the program of giving financial assistance and aid to local authorities who must bear the responsibility of protecting the community.

The experience suffered by Great Lakes States this summer certainly emphasizes the need for immediate federal action. The people in the Great Lakes area are looking to your committee for legislative recommendations that will contribute directly to the elimination of this serious problem.

Sincerely,

RICHARD J. DALEY,
Mayor, City of Chicago.

STATEMENT OF JAMES W. JARDINE, COMMISSIONER OF WATER AND SEWERS; ACCOMPANIED BY JAMES VAUGHN, ENGINEER, WATER PURIFICATION, AND MR. BAKER, PARK DISTRICT, CHICAGO, ILL.

Mr. JARDINE. My name is James W. Jardine. I am commissioner of water and sewers for the city of Chicago. I am accompanied by Mr. James Vaughn, who is the engineer of water purification for Chicago, and Mr. Baker, who is with the Chicago Park District.

Senator HARTKE. Good to see all of you this morning.

Mr. JARDINE. Mayor Daley has asked me to express his regrets on his not being able to be here today.

Unfortunately, the invitation to appear arrived too late for him to prepare a formal statement to your distinguished committee.

The mayor asked me to be present to answer any questions regarding the alewife problem as it relates to Chicago.

As I say, I have no formal statement.

Mr. HARTKE. Let me ask you: Do you have any estimate at all as to what has been the cost to the city of Chicago in cleaning up the beaches with regard to these fish?

Mr. JARDINE. The total cost—I don't know whether Mr. Baker has it with him, but it cost approximately $4,500 a day.

Senator HARTKE. $4,500 daily?

Mr. JARDINE. Right.

Senator HARTKE. That is just for cleaning up?

Mr. JARDINE. This cost is for the forces of the Chicago Park District and the department of water and sewers.

Senator HARTKE. This will be over and above the normal operation of cleaning the public beaches?

Mr. JARDINE. Correct.

The park district cost was about $171,000; that was the direct cost to them for this operation, and the additional cost would be about $35,000 from the department of water and sewers.

We have a twofold problem, as you know; when the fish are dead, of course, the park district has this tremendous problem of cleaning 28 miles of lakeshore.

Senator HARTKE. How many miles of lakeshore?

Mr. JARDINE. Twenty-eight miles of lakeshore.

Senator HARTKE. Yes, sir.

Mr. JARDINE. As to the operation of the water department, we of course, are seriously concerned about clogging of these water intakes.

Congressman Madden mentioned back in 1965 if we hadn't had an alternate source for shore intakes at the central district filtration plant, which is the world's largest filtration plant, with a capacity of 1,700 million gallons a day, it would have been shut down completely. We were collecting approximately 60,000 pounds of alewives a day in those screens and these were live alewives.

Senator HARTKE. 60,000 pounds live?

Mr. JARDINE. Right.

Senator HARTKE. What did you do with them?

Mr. JARDINE. We removed them.

Senator HARTKE. To where?

Mr. JARDINE. To a dump, a regular dump disposal site. Of course, disposal presents quite a problem since the alewives won't burn——

Senator HARTKE. I know that.

Mr. JARDINE (continuing). And most private dumps won't take them, but we were able to find a public dump that would take them.

Senator HARTKE. Has there been any attempt whatsoever to turn them over to commercial institutions?

Mr. JARDINE. We have made offers.

Senator HARTKE. Did you have any takers?

Mr. JARDINE. No interest whatsoever.

This is a real serious problem because they are like a herd of buffalo when they are alive and intact. They not only damage the screens but also caused an 8-inch I beam supporting the screens, to buckle.

Senator HARTKE. How big was that I beam?

Mr. JARDINE. Eight inches in diameter; this indicates the tremendous force exerted by the alewives.

It was a serious problem, because this particular plant furnishes water for 2,700,000 people. But as I say, we were fortunate to have an alternate intake. We have crib intakes out in the lake over and above the shore intakes; otherwise, we would have been shut down at that plant.

Senator HARTKE. The reason I ask these questions is to determine if you have any plans for taking care of them in future, any different than what you have been doing in the past?

Mr. JARDINE. No. Our present plan—and we assume it has been successful, because in 1966 we installed nets not to catch the fish, but to divert them. We——

Senator HARTKE. Were you diverting them to Indiana?

Mr. JARDINE. Only when the wind blows that way. The fish don't know any geographic boundaries. They travel all around.

These nets are 1,000 feet long, and in connection with the nets, we had a water jack to discharge air bubbles alongside the net, and we think it has proved successful. We can't be sure.

In 1966 and 1967 we did not have the problem at the intake at the filter plant.

Senator HARTKE. This dealt with them at the water intake, but not on the beaches?

Mr. JARDINE. That is correct.

Senator HARTKE. Have you had any type of system that works with regard to the beaches?

Mr. JARDINE. The Chicago Park District has been responsible for collection and disposal of them.

Senator HARTKE. Has it been worse in the past or is it getting worse? I know it's alleviated somewhat at this time of the year, but——

Mr. JARDINE. Each year it has been worse. I think this has been the worst year.

Mr. BAKER. That is right.

Mr. JARDINE. Perhaps Mr. Baker could give you a little more information on this.

Mr. BAKER. This year has been the worst that we have experienced since 1960. We disposed of over 4,600 cubic yards of them on our 28 miles of beaches, the Chicago Park District did.

Senator HARTKE. How many truckloads?

Mr. BAKER. Well, that would be pretty hard to estimate because we use various size trucks, but we have estimated the total truckage would run about 4,600 cubic yards. We disposed of some of them by burying them in the sand and digging holes 4- to 5-feet deep, burying them in that and then covering them with lime to prevent the flies from working on them.

We were also prepared to stay and spray with DDT or chlordane should maggots appear, but fortunately we did not have too many maggots on the beaches. The rest of them we had to dispose of them by hauling them to the dump, as Mr. Jardine spoke of.

We plan on getting two pieces of equipment this year if we can incorporate it in our budget, which will cost us about $60,000 apiece, manufactured in Wisconsin, in which we are going to try to pick up these fish before they get into the beaches, and dispose of them.

We may have a source of disposing of them in Wisconsin at a factory. They are making negotiations with us that sometime during the summer, but as far as being processed for fertilizer when we get them up on the beaches with all the other debris that comes in from the Lake, beer cans and other debris and stuff, they are unsuitable for fertilizer.

Senator HARTKE. Yes. I can certainly see the problems the alewives have caused to the city of Chicago, the largest city in this area.

I might point out to you that my concern for the pollution of Lake Michigan also extends to the action taken by the Army Corps of Engineers last year when they took the sediment from the Chicago River area near your sewage disposal plants and dumped it out into Lake Michigan. You recall that I protested that very vigorously, and finally they did start to take that dredged sediment and move it up into land disposal areas. I am hopeful that the people of the city of Chicago will recognize that they have a responsibility to the neighboring communities, that they are a big city. They like to have fresh water. They like to have clean beaches, but we do, too, and there is a great danger of pollution from this sewage sediment that they were dumping out there right beyond your water intakes.

Are you familiar with that?

Mr. JARDINE. Oh, yes; I am familiar with it. The city of Chicago opposed it.

Senator HARTKE. I hope you will oppose it more vigorously next time. Don't even let them start.

Mr. JARDINE. My understanding is that they are still doing it in that part of the lake that is Indiana. We have opposed it from the beginning, and right now they are looking for an alternate disposal place.

Senator HARTKE. All right. Fine. Thank you. You may continue.

Mr. JARDINE. We are as interested in the elimination of water pollution as anybody else.

We have no sewage outlets in the entire shoreline of Chicago into Lake Michigan.

Senator HARTKE. Thank you. Fine. We appreciate that.

I have no other questions, gentlemen.

I want to thank you for coming. Give my best wishes to the mayor for doing a great job.

Mr. JARDINE. Thank you, sir.

Senator HARTKE. We have a representative also from Mayor Dowling, Cordell Pinkerton. Is he here?

Mr. PINKERTON. Good morning, Senator Hartke.

Senator HARTKE. Good morning, sir.

STATEMENT OF CORDELL PINKERTON, REPRESENTING MAYOR DOWLING, OF HAMMOND, IND.

Mr. PINKERTON. On behalf of Mayor Dowling, I do not have a prepared statement for the purpose of supplying you with a record; I only have this comment to say.

In Hammond we have less than a half mile of beach—probably closer to a quarter of a mile.

We have been affected by the accumulation of the alewives. Our park department has had difficulty in trying to remove them and obtaining the necessary labor and equipment.

Their budget is limited. I talked to the president of the Hammond Board of Water Works. At the present time we have had no difficulty with our water filtration plant, largely, I believe, because it is out in the lake over a mile, and the cribs are so constructed that they have not presented a problem.

However, anybody with any good olfactory senses can detect this rotten decayed fish in the area when you get next to the lake, and it's a problem that no one community can solve. It does not do any good to just keep cleaning them.

So the city of Hammond certainly joins in and supports the efforts on this bill to be handled on an areawide basis, and remove the cause, we hope, and keep our lakes fresh and pure.

Thank you.

Senator HARTKE. The next witness is the Honorable Clarence F. Pautzke, Deputy Assistant Secretary for Fish, Wildlife, and Parks, Department of the Interior, and Commissioner of the Fish and Wildlife Service, Washington, D.C.

Mr. PAUTZKE. I have two assistants. May I have them sit with me please?

Senator HARTKE. Yes. Would you identify them, please.

Mr. PAUTZKE. On my left is Mr. Fenton Carbine, the Director of Region 4, Bureau of Commercial Fisheries.

Senator HARTKE. Tell us where region 4 is.

Mr. PAUTZKE. Region 4 has its headquarters at Ann Arbor, and that serves how many States?

Mr. CARBINE. Sixteen.

Mr. PAUTZKE. Sixteen States.

Senator HARTKE. Does that include Indiana?

Mr. PAUTZKE. That is right.

On my right is Dr. Stanford Smith, the senior scientist from the Ann Arbor laboratory.

I have a statement that I would like to enter into the record.

Senator HARTKE. The entire statement will appear as though it were read, and you may cover such parts as you deem important and that we should have at this time.

STATEMENT OF HON. CLARENCE F. PAUTZKE, DEPUTY ASSISTANT SECRETARY, DEPARTMENT OF THE INTERIOR, AND COMMISSIONER ON FISH AND WILDLIFE; ACCOMPANIED BY FENTON CARBINE, REGIONAL DIRECTOR, BUREAU OF COMMERCIAL FISHERIES; AND DR. STANFORD SMITH, SENIOR SCIENTIST, ANN ARBOR LABORATORY

Mr. PAUTZKE. Thank you very much.

Mr. Chairman and members of the committee, the massive dieoff of alewives in southern Lake Michigan this year is the most serious incident of this kind to occur in the Great Lakes since the establishment of the alewife in Lake Ontario during the late 1800's. The spring dieoff during recent years has caused great losses to municipalities and industries along the southern shore of Lake Michigan. Many beaches, as you well know, were covered with dead and decaying alewives. Property owners and municipalities were faced with expensive and nearly hopeless cleanup problems, as Congressman Madden pointed out, and I will not reiterate it again, the losses, the inconvenience, and the cost, the price of labor of cleaning screens and the loss of certain revenues from the standpoint of tourist trade. I would like to go over and refer to one chart, and I will do this for the benefit of the chairman.

Senator HARTKE. All right, fine.

Mr. PAUTZKE. Mr. Chairman, you will see the heaviest concentration of alewives from the dieoff here in the southern end of Lake Michigan. Of course, we have had from Ludington and Muskegon some very strong protests, but if they would have had the concentration of alewives that was swept by the winds and undoubtedly lake currents that was experienced in Michigan City, East Chicago, Chicago, and the lower end of the lake here, they would have had great cause for more distress than they had at the present time because the tremendous concentration of these alewives was washed up on the shallow area here, and you can see the concentration.

Senator HARTKE. Now, as I understand it, this was a survey made on June 29, 1967; is that right?

Mr. PAUTZKE. Yes, Mr. Chairman. This is an aerial survey of the alewife concentration during that period.

Senator HARTKE. In other words, the area of the darker blue, is the heavier concentration which indicates that the major portion was right on the bottom of the lake?

Mr. PAUTZKE. That is right.

Senator HARTKE. That is because this is at the end of the lake?

Mr. PAUTZKE. Well, it has the benefit of the wind blowing——

Senator HARTKE. The benefit?

Mr. PAUTZKE. The benefit of the wind blowing this way, and, undoubtedly, certain currents in the lake.

Senator HARTKE. Yes, all right, fine. Thank you, sir.

Mr. PAUTZKE. One of the several steel plants in this area estimated a loss of aproximately half a million dollars per day for about 10 days when self-cleaning screens could not keep alewives clear of the cooling water intakes. Electric power generating plants in Illinois were seriously affected because it became necessary to alternately shut down half the generators to clean cooling water screens.

Before corrective measures were taken Chicago's new water filtration plant, the second largest in the world, operated at reduced capacity because alewives caused breakdowns of the cleaning screens.

The alewife is an ocean fish native along our Atlantic Coast where it enters streams to spawn. However, it has also been able to complete its life in some freshwater environments. The alewife first became established in the Great Lakes in Lake Ontario. It may have entered via the St. Lawrence River or it could have been introduced accidentally when shipments of shad were released in the lake in the early 1870's. The alewife was very abundant in Lake Ontario by 1890 and continues to be the most abundant fish of the lake today.

Niagara Falls would have blocked movement of an alewife into the upper Great Lakes but it was able to pass through the Welland Canal which connects Lake Erie and Lake Ontario. The locks of the canal make upstream migration difficult and it was about 60 years before the alewife was first recorded in Lake Erie in 1931. From Lake Erie the alewife had free passage into the upper Great Lakes. It was first recorded in Lake Huron in 1933, in Lake Michigan in 1949, and in Lake Superior in 1954.

The reason, Mr. Chairman, that there is difficulty for this fish to go through the lock systems is that as they empty a lock there is a tremendous velocity of water pouring downstream out of that lock, so the fish must force itself through this tremendous head of water. We feel by our observations that the alewife was more easily introduced by other means than coming up through a series of locks.

Senator HARTKE. In other words, in regard to the St. Lawrence Seaway, now there has been a lot of talk that the fish came in as a result of the opening up of the seaway. It is your belief that this is not the way they came in; is that right?

Mr. PAUTZKE. From our observations, and knowing the swimming ability of fish, these locks have almost acted as dams to their entrance.

Senator HARTKE. All right. Where did they come from?

Mr. PAUTZKE. They probably were introduced with other species of fish. State agencies brought the shad in and young alewives are found in the same locality as shad fry so they could have been introduced then.

Senator HARTKE. Are they basically a salt water or fresh water fish?

Mr. PAUTZKE. Basically a salt water fish.

Senator HARTKE. Now, let me ask you this. I know you are saying they are basically a salt water fish, but how are they able to reproduce? This is not a salt lake. This is all fresh water.

Mr. PAUTZKE. Evidently there are sufficient salts in these Great Lakes so in this environment they were able to reproduce, but it probably wasn't a completely suitable environment.

Senator HARTKE. Let me ask you this. In regard to that, is it possible that maybe your scientists can help me? Is it possible that you could conduct an experiment with the water, say, from the Great Lakes, to see whether or not there is enough saline, enough salt in the water? I am going to ask Dr. Smith. Have you done anything in that regard?

Dr. SMITH. No, we haven't, but we anticipate such experiments. I want to point out that the alewife is a salt water fish, but it does enter fresh water streams to spawn.

Therefore, its spawning and early life are in fresh water streams, and, of course, because of this it is able to spawn and carry out its early life very successfully in the Great Lakes.

Senator HARTKE. Let me back up a moment. Now, as I understood Mr. Pautzke to say, you contend they did not come through the St. Lawrence Seaway. Where else is there salt water? Where would they come from?

Dr. SMITH. Well, the shad were introduced—see, the alewife and the Atlantic shad are very close relatives, and the young occur together. The shad also migrate into the streams and spawns. If they collected the shad, which they tried intentionally to introduce into Lake Ontario in 1873 or thereabouts, they could have accidentally included the alewife. The shad was not successful.

Senator HARTKE. Yes; you say they became established first in the Great Lakes in Lake Ontario; is that right?

Dr. SMITH. Yes.

Senator HARTKE. The shad was introduced there in 1873; is that right?

Dr. SMITH. The alewife was first recorded there in 1873. The shad were also introduced shortly before.

Senator HARTKE. Have they continually tried to bring this shad in since then?

Dr. SMITH. No.

Senator HARTKE. The shad is also a salt water fish?

Dr. SMITH. Yes; it is an anadromous fish that lives in the ocean and migrates into the streams to spawn.

Senator HARTKE. All right. Now, what happens to that? What has happened to the shad? Are they in great supply now in all the lakes?

Dr. SMITH. No; they were not successful.

Senator HARTKE. They were not successful. This is what I am getting to now. Do you see what my problem is?

Dr. SMITH. The alewife—I see what your problem is—I think that I can answer it.

Senator HARTKE. Fine.

Dr. SMITH. The alewives' reproductive cycle in the Great Lakes is extremely successful because this reproductive cycle in fresh water is the same as they experience in their natural habitat when they move out of the salt water into the fresh water and spawn, and after the eggs hatch, and the young develop in the fresh water, they move to the salt water.

The adults in the Great Lakes have no salt water to live in, and, therefore, they experience some differences that the ocean alewives do not experience.

They are not well adapted to fresh water. They are able to survive in sizable quantities to spawn but——

Senator HARTKE. Let me ask you. Let me interrupt and see if I can understand what you are telling me. You are telling me that the alewife can reproduce in fresh water, but their lifespan is considerably shortened over what it would be in a normal circumstance if they could go back to the salt water?

Dr. SMITH. That is right.

Senator HARTKE. But they are able to keep enough of their reproductive cycle going that they still are reproducing in the fresh water. Is that what you are telling me?

Dr. SMITH. Very true. As the fish reaches adulthood, maturity, they run into extreme difficulty because they are in fresh water.

In salt water they do not run into these difficulties, and this is the cause of the dieoffs.

Senator HARTKE. Now, of the fish that die, are these fully matured alewives?

Dr. SMITH. These are fish that are entering their first time of maturity. This is when they run into their difficulty.

The spawning has something to do with the dieoff. That is because alewives when maturing have a very strong demand on certain physiological processes to prepare themselves to spawn. Their fresh water environment does not have the constituents that are necessary for them to fulfill this need, and the major dieoff occurs before spawning, not during or after spawning.

Senator HARTKE. I think I understand what you are saying. Now, I just wonder whether you can prove it.

Dr. SMITH. We have some preliminary studies that have been done actually some time ago, which illustrate that they do encounter these difficulties.

We have not been able to conduct the laboratory studies which would be the "proof of the pudding."

Senator HARTKE. I am not criticizing you for it.

Dr. SMITH. Yes.

Senator HARTKE. I am hunting for information.

All right, you may proceed.

Mr. PAUTZKE. Mr. Chairman, the alewife did not dominate the fish population in Lake Erie as it did in Lake Ontario. Conditions in Lakes Huron and Michigan were better suited for the alewife, however, and it increased rapidly until it became the most abundant species of these lakes.

It reached its maximum abundance in Lake Huron about 1961 and appeared to be near maximum abundance in Lake Michigan during 1966–67.

Senator HARTKE. Since that time in Lake Huron has it subsided, or just continued at its maximum of 1961?

Dr. SMITH. No. The population did subside, but we have found out through experience in Lake Huron and Lake Ontario that once the alewife gains dominance of the lake it goes up to a peak, and it goes down somewhat from that peak, but it does not subside very much and if you read the newspaper articles of Lake Ontario and Lake Huron you will find that they have experienced a distressing alewife dieoff, and they have had this every year.

Senator HARTKE. All right, continue.

Mr. PAUTZKE. The alewife has spread through Lake Superior but it has not yet reached abundance there. Certain differences distinguish alewife of the Great Lakes from the marine form. For example, it matures and dies earlier and does not grow as large. It also is characterized by an annual dieoff in the lakes where they become very abundant.

The alewife occurs in dense schools and is seemingly abundant in various sections of the lakes during different periods of the year. Adults are concentrated in the deepest waters in mid-winter, they move toward shore during late winter and early spring, then are concentrated in the shallow areas and rivers in the summer where they spawn. They are found at intermediate depths in the fall. The young hatch during the summer and spend most of their first 2 years in mid-depth in the lake.

The alewife occupies only part of a lake during any given period, and has dominated species that were permanent residents in most sections of the lake. Consequently, some of these environments are now almost devoid of previously abundant fish, and it appears that the alewife has seriously reduced the total fish productivity of the Great Lakes.

I am going to ask Dr. Smith to go over to one of our charts and hold it up, and point out how we have had these other species more or less segregated into the various areas of the lake.

Dr. SMITH. The alewife spends the winter in the deepest water of the lake. It has to do this because the alewife is a warm water fish, and in the middle of the winter this is where the warmest water of the lake is. It actually isn't very warm, but it is warmer than it is elsewhere. This was previously occupied——

Senator HARTKE. May I ask you, what is the approximate temperature required for that?

Dr. SMITH. Actually, we believe, and here again we have not conducted the experiments in fresh water, it is about 34° F.—the least that they can stand.

This was previously occupied by a chub species that we call kiyi. This species has been virtually eliminated from the lake.

Senator HARTKE. When was that eliminated?

Dr. SMITH. We first noticed that it had disappeared in 1960. It disappeared sometime between 1955 and 1960. We don't know when.

In the spring and the fall the alewife occupies the intermediate depths of the lake, and this was earlier occupied by another species of chub, which we call hoyi, commonly referred to as the bloater. Previously when we lost the lake trout we had an explosion of the bloaters in Lake Michigan, and we had a bloater die-off, but nothing like the alewife die-off.

The bloater seems to be disappearing very rapidly from the lake.

These species, the hoyi and the kiyi, occupied about 90 percent of the lake. This represented the greatest fish productivity of the lake, and the alewife has essentially eliminated them from the lake.

In the summer the alewife concentrates, as we all well know, in the inshore waters, where they do die off, and here they have eliminated the lake herring, which was previously the most abundant species in all of the lakes, and the lake herring is virtually gone in Lake Michigan.

As a matter of fact, in commercial production it is used to account for sometimes one-half of the total production of all of the Great Lakes. It was tremendously abundant.

The lake emerald shiners, which I am sure the people who live around the lake will remember, the little minnows that used to clog the water intakes, were tremendously abundant, and have virtually been eliminated.

Yellow perch, the favorite sport fish, has been reduced greatly, and the smelt is declining very sharply.

At the bottom of the chart here you see that the young of the alewives spend all year in the midwaters of the lake, and this is for their first 2 years of life. This area was previously occupied by the young of the lake herring, and the chubs, which are now almost extinct or decreasing to very low levels, and the smelt, which is decreasing very sharply; therefore, the alewife has also replaced and dominated the areas that were previously occupied by the young of these very important species that were in the lakes before.

I feel sure that if we add up the abundance of all these other species they would equal more than we now have as the alewife, but they were spread throughout the entire lake. They were year-round residents of all parts of the lake, whereas the alewife moves from area to area, and in a sense has taken over the lake very inefficiently.

Senator HARTKE. Let me ask you about the kiyi, hoyi, emerald shiner, yellow perch, smelt, chubs, and the lake herring; are any of those commercial fish?

Dr. SMITH. The lake herring and the chubs were very important commercial species.

Senator HARTKE. And they are now for all intents and purposes eliminated; is that right?

Dr. SMITH. Yes.

Senator HARTKE. All right.

Mr. PAUTZKE. Most scientists believe that the only lasting solution is to reduce the alewives to a level where it cannot compete with the more desirable native species. This would then permit restoration of the previous multiple species complex. This ambitious goal requires a thorough understanding of fish populations in the Great Lakes, especially how the alewife was able to dominate the lake by eliminating other abundant species. With such knowledge it should be possible to manage the fisheries, and to determine the numbers and kinds of predator and prey species to be introduced to restore ecological balance and full fishery productivity of the lakes.

I might interject, Mr. Chairman, if you will hold up that chart with the various colored circles on it, I would like to describe how the alewife took over between 1960 and 1966, and why bringing back this multiple complex is going to be extremely difficult.

Take for instances the chubs, which were of great economical value in the smoked fish trade. They have been competing with the other species to hold everything on an equal ecological balance. The chubs have gone under a, we will say, genetic change. I would believe that the chairman would be interested in the fact that most of the chubs are now females, and we have only an occasional male. We are going to lose this species even if we eliminate the alewife. They have as a result

of the stress of alewives genetically changed to where a greater portion of them are females and you can see them slowly dying out.

Senator HARTKE. Let me ask you, why would that be so?

Mr. PAUTZKE. This is part of a stress. We have seen under certain conditions where a shrimp or other species can be all males 1 year, and males the next year, and all females the third, but here is one that is changing into nothing but females as a result of—very possibly as a result of a genetic change caused by the pressure of these other tremendous populations of fish.

Senator HARTKE. In other words, what you are showing here is that from 1960 through 1966 you have come from an area of what——

Mr. PAUTZKE. The chub population was probably 80 percent or more.

Senator HARTKE. Eighty percent.

Mr. PAUTZKE. Alewives were probably less than 20 percent.

Senator HARTKE. And now the alewives are probably 80 or 90 percent. All right.

Mr. PAUTZKE. Recognizing the serious threat to the fishery resources of the Great Lakes and sociological problems caused by the Great Lakes alewife invasion, Secretary of the Interior Stewart L. Udall recently named a Federal task force to consider corrective measures. The chairman is Dr. Stanley A. Cain, Assistant Secretary for Fish and Wildlife and Parks, and the members are Frank C. Di Luzio, Assistant Secretary for Water Pollution Control; Commissioner James M. Quigley, Water Pollution Control Administration; Director H. E. Crowther, Bureau of Commercial Fisheries; Director John S. Gottschalk, Bureau of Sport Fisheries and Wildlife; and Dr. Milner B. Schaefer, science adviser to Secretary Udall.

The task force will evaluate carefully all suggestions to alleviate the alewife problem, including Federal-State cooperation in cleanup campaigns, harvesting of alewives for manufacture of fish meal, pet food and perhaps human food products, stocking of Lake Michigan with predators such as lake trout and Coho salmon that will eat alewives, and improved methods of collecting dead alewives before they reach the beaches.

Although the Department of the Interior feels that the lasting solution to the alewife problem will be the restoration and maintenance of ecological balance in the Great Lakes, it recognizes that long-term research effort to accomplish this must be complemented with interim control measures to alleviate problems of large annual die-offs.

It also recognizes that the problem is broader than that of any one State and that a high degree of coordination and cooperation will be required for full and continuing success. The Department's alewife task force will shortly propose measures on what the Federal Government can do to help solve problems caused by the alewife.

Now, Mr. Chairman, you asked one of the former members who testified here, that you hoped they would give some idea of the effect of sunken fish and the quantity.

Senator HARTKE. That is right. In other words, I want to know how much, what happens to them, do they pollute the lake?

Mr. PAUTZKE. Our scientists are unable to give you that figure. I have had some former experiences in lake rehabilitation, in which I felt that for every one fish that floated about five sunk.

Now, this is different for each species, but I think it is a good rule of thumb.

So far as more information of this, I am not going to dwell on that, since you are later going to have an expert.

Senator HARTKE. Who is that expert?

Mr. PAUTZKE. I think you have present here Grover Cook, from the Chicago Regional Office, Federal Water Pollution Control Administration, Chicago.

Senator HARTKE. He is No. 2 after you.

Mr. PAUTZKE. Right now, as you remember, in the shallow end of the lake fish piled up as a result of lake current and wind. There was a great degree of enrichment here.

Now, where enrichment stops and pollution starts is——

Senator HARTKE. Let us take that word "enrichment." Really then what you are doing is fertilizing, is that correct?

Mr. PAUTZKE. Fertilizing, yes—a number of cities that are located on Lake Michigan have been fertilizing this lake for years, and now they are harvesting nature's abundance.

Senator HARTKE. Yes, they are harvesting things that they don't want to, though.

Mr. PAUTZKE. Well, that may be so, but they are harvesting the results of these added nutrients to the lake.

Senator HARTKE. In other words, they are putting in the nutrients, but you get that from sewage disposal?

Mr. PAUTZKE. That is what I am referring to.

Senator HARTKE. In other words, disposal of raw sewage, or in some cases, treated sewage if it is not treated sufficiently?

Mr. PAUTZKE. This is right, sir.

Senator HARTKE. Also when you take this, as the Army Corps of Engineers did when they took the sludge, or whatever that material was from the bottom of the Chicago River——

Mr. PAUTZKE. This is right; this is nutrient.

Senator HARTKE (continuing). And dumped that out into the middle of the lake, all they were doing was—what was the word you used?

Mr. PAUTZKE. Enrichment.

Senator HARTKE. "Enrichment"—that is a peculiar word. I understand what you mean, but I think we ought to understand that it's not enriching the future conservation of the lake.

Mr. PAUTZKE. Well, now, that would be a matter of judgment. If these fish were all 12-inch Coho salmon or rainbow trout—and people were able to catch them—then this enrichment would end in a desired product.

Senator HARTKE. All right. Fine. I follow you.

Mr. PAUTZKE. Mr. Chairman, that concludes my statement.

Senator HARTKE. Let me ask you a question; this joint committee that was appointed by Secretary Udall, how much money do they have available to do this work with? Do they have any additional funds, or are they operating out of their normal funds of the Department?

Mr. PAUTZKE. As I stated in my last paragraph, this task force is going to recommend a series of possible approaches which should be developed; then it is going to be up to Congress to what degree they are going to fund them.

Senator HARTKE. All right. Now, is Lake Michigan the hardest hit of all of these lakes with alewives, at this moment?

Mr. PAUTZKE. At this moment I would think that the alewives in Lake Michigan have been at their alltime high. It has been the most critical.

I might say, as Dr. Smith said, that there have been die-offs in Ontario, but the people have more or less come to live with it there.

Senator HARTKE. I don't know how you would come to live with it and live with it satisfactorily. Was it anticipated by the Department that these were going to come into Lake Michigan in greater abundance?

Mr. PAUTZKE. I didn't quite understand.

Senator HARTKE. Was it anticipated by the Department that they were going to come—in other words, that they were going to gradually build up in Lake Michigan?

Mr. PAUTZKE. This is true. By our charts you can see that we have been illustrating this year after year, that alewives were on the increase. You might view the end chart of the commercial catch.

Would you hold that, Mr. Carbine?

This will give you an idea of the increase in commercial catch by the trawlers.

Senator HARTKE. Now, this is the commercial catch of alewives?

Mr. PAUTZKE. Alewives.

Senator HARTKE. All right.

Mr. PAUTZKE. And this should be a very excellent index of it.

Senator HARTKE. Yes. Now, I have a reference here to the Bureau of Commercial Fisheries publication from region No. 4, and it shows on the chart that the base year of 1965 was 100; 1966, it went up to 400; 1967, to 5,000 or 50 times as much.

Now, it shows 1968 back to 3,900. Is that your anticipation, that it will drop for 1968?

Mr. PAUTZKE. Can I ask——

Senator HARTKE. I am referring to Bureau of Commercial Fisheries publication from region 4.

Dr. SMITH. You are looking at the information concerning the recruitment of the year, the young of the year. This is the success of the hatch of the various years.

Senator HARTKE. I see.

Dr. SMITH. And the chart against the pillar illustrates this, the top line illustrates the recruitment, and as the population explodes, the recruitment always exceeds what the lake can handle, and below the line which is labeled "Young" you see another line labeled "Adults." These are the adults that survive from that recruitment, so you see that the greatest increase in recruitment was a point at which the lake was overpopulated with young, and actually these did not contribute any more—actually a little less, to the adult population.

Senator HARTKE. I understand you have a boat called the *Kaho*.

Dr. SMITH. We have; yes. The *Kaho* is the exploratory vessel, and the *Cisco* is the biological research vessel.

Senator HARTKE. Could they have warned these people that this was coming? That the increase in alewife fish population was going to be this bad?

Dr. SMITH. Well, the dieoff this year actually is something different than the dieoff in previous years. We don't understand what was different. We could not have anticipated the extreme dieoff that we have had.

This dieoff actually began in the middle of the winter; this was the first time that we recorded a dieoff that began in the middle of the winter, so other than usual factors were involved.

This is the greatest dieoff of alewives at any time in the Great Lakes, and we have had them reach peaks in succession in the other lakes. Never before have they occurred to this extent.

Senator HARTKE. Is there any chance that we could have sent out any nets and stopped these fish before they got to the beaches. Would that have been a physical possibility?

Dr. SMITH. This could be a possibility in local situations. As a matter of fact, this was done to protect the water intakes of the steel plants this year in Chicago.

Senator HARTKE. Has any money been appropriated, Mr. Pautzke, for control of alewives specifically?

Mr. PAUTZKE. To my knowledge, Mr. Chairman, no money has been appropriated for the control of alewives, and it has only been in our normal work, under Mr. Carbine here, where so much money is allotted to carry on exploratory fishing, and under Dr. Smith the scientific work on various fish species.

Senator HARTKE. Now, Mr. Carbine, you have allocated some funds for this study?

Mr. CARBINE. Yes, sir.

Senator HARTKE. About how much have you allocated so far?

Mr. CARBINE. This past year we spent about $80,000.

Senator HARTKE. And where were the funds spent?

Mr. CARBINE. Most of this money ws spent for biological research to find out more about the age composition and growth, and whatnot, of the alewife.

Some was spent on locating these fish at various times of the year, so we would have some warning, as you might say, of what to expect.

Some was spent in determining possible uses of the alewife as industrial fish, or for human use.

Still further work was done in locating plants and manufacturers and other users of these fish.

Senator HARTKE. Let me ask you, is there something in regard to a thiamin deficiency that was covered in regard to the alewife?

Mr. CARBINE. Yes, sir.

Senator HARTKE. Would you explain for us, please?

Mr. CARBINE. One of the difficulties in using the alewife as an animal food was the presence of thiaminase in the fish. This causes a vitamin deficiency, and if the alewife is fed to animals, such as mink, uncooked—that is, raw fish—a certain vitamin deficiency appears in the mink, and the animals die.

So one thing that we have been working on is a method of destroying this thiaminase so that the alewife could be used as animal food, and this we have succeeded in doing.

Senator HARTKE. I see. Now, there is, though, a commercial value to alewives; is that correct?

Mr. CARBINE. Yes, sir. At the present time a good many millions of pounds of alewives are being used as canned cat food; some are being used as mink food, and many millions of pounds are being manufactured into fish meal and oil. The oil is being used in paint and other industrial uses.

The fish meal itself goes into chicken feed, largely. That is one reason chickens are relatively inexpensive in the market place, and why chickens grow very rapidly nowadays.

There is a growth factor contained in this fish meal that causes the chickens, say, to grow much faster than it would otherwise.

Senator HARTKE. Mr. Pautzke, you act anxious. Go right ahead.

Mr. PAUTZKE. All I was going to say, Mr. Chairman, you are painting your house, perhaps, with alewives.

Senator HARTKE. They are using it in paint, too, right?

Mr. PAUTZKE. Yes.

Senator HARTKE. But let me ask you this; isn't this true, that even with all of the commercial projects you have going at the present time, it is estimated you can use only about 75 million pounds by 1975? Or just how much?

Mr. CARBINE. Let me go back just a second here.

As you see, in the early days very little use was made of the alewife, because we didn't know what good they were. In recent times we have found a use for them, and they are being used to a greater extent.

Senator HARTKE. It is estimated you had a commercial use of less than 30 million pounds; right?

Mr. CARBINE About that; yes, sir.

Senator HARTKE. Yes. And estimating up to what, to about 75 million, 76 million by 1975?

Mr. CARBINE. We don't know just how far it could go, but the manufacture of fish meal runs into the hundreds of thousands of tons.

Senator HARTKE. I understand that, but it is also estimated you have between 3 and 5 billion pounds of alewives in these lakes; isn't that right?

Mr. CARBINE. That is right.

Senator HARTKE. You can feed a lot of fish and chickens, and paint a lot of houses with that.

Mr. CARBINE. Yes, sir.

Senator HARTKE. All right. Is the Government at the present time encouraging more commercial processing plants?

Mr. PAUTZKE. This is one of the things that we have not encouraged, more commercialization. As you know, some of the bordering States are advocating them as a food and converting them into coho salmon, and into lake trout. We have not advocated more commercialization; this would be part of the task forces functions, to look into this program.

Senator HARTKE. Let me ask you, in regard to Lake Erie, it has been said that there is a certain section of Lake Erie which has become practically absent of any fish whatsoever. Is there any truth to that story?

Mr. PAUTZKE. I will have to ask Dr. Smith.

Dr. SMITH. You are talking about Lake Erie?

Senator HARTKE. Yes.

Dr. SMITH. This has nothing to do with alewives; this has to do with enrichment or overenrichment.

Senator HARTKE. I understand that, but this is the problem—what we are dealing with here is the whole fact that we may, if we are not careful, destroy the lakes as far as fish and the fishing area is concerned entirely; isn't that true?

Dr. SMITH. Very true. As Mr. Pautzke mentioned in his report, there are parts of Lake Michigan which are practically devoid of previously very abundant species, and this is illustrated on the chart of the winter distribution of alewives.

When the alewives are not in the deepest part of Lake Michigan, and the fish that once occupied that area are gone and no abundant fish lives there. This is why, in reducing the alewives, to restore the ecological balance that we want, and the former fisheries productivity of the lake, we have to reintroduce and restore these other species that the alewives have displaced.

Senator HARTKE. Let me ask you, in regard to the cooperation from the States, are you receiving cooperation from the States and the departments?

Dr. SMITH. Yes, indeed. We are working very closely with the States in this matter.

Senator HARTKE. All right. How much stocking is done of the lake, of Lake Michigan at the present time with fish, other fish?

Mr. PAUTZKE. Well, you know that has been the big program, the big push has been the restocking with lake trout.

Senator HARTKE. And coho salmon?

Mr. PAUTZKE. Two years ago salmon eggs received from the Pacific coast were hatched here in local hatcheries. These fish were then released at a size where they could compete and act as predators on the species of fish that were in the Great Lakes, and they have made substantial growth. I am not as optimistic on this item as some people are because I have seen salmon, which are anadromous fish, coming from salt water and going into fresh water to spawn and then die. I have seen plantings that were successful, and I have seen recurring populations that tended to die out, and which required additional plantings.

Now, I only hope other surrounding States take action because cohos are a wonderful game fish, and I do hope that the environment is favorable to them.

Senator HARTKE. In other words, what you are saying is substantially that you don't really know how much effect this stocking is having, and whether this is a real counteracting force to the increase in alewives or not; is that true?

Mr. PAUTZKE. No; that isn't what I said.

I said that these fish of this first planting were very successful. They grew.

Senator HARTKE. I see.

Mr. PAUTZKE. Now, the proof of the success of this stocking will be in a continuous increase in the number of spawners migrating up stream to spawn successfully.

Senator HARTKE. I see. All right.

Do you have any estimate of how much you think it is going to cost to solve this problem of alewives?

Mr. PAUTZKE. Well, Senator——

Senator HARTKE. Either short term or long term?

I know I am asking you for a good answer, but we sometimes have to come up with a problem of whether you are going to spend any, and if you are going to spend any money, how much.

Mr. PAUTZKE. Mr. Chairman, I would think this would be a decision of the task force, and this should be coming out in the very near future.

Senator HARTKE. All right. Now, we have several groups here—I wonder if you can just give briefly for the record, for the benefit of the committee, the different functions of these groups and their limitations; there is a Great Lakes Commission, the Great Lakes Basin Commission, the Great Lakes Fishery Commission and International Joint Commission.

Mr. PAUTZKE. I am going to ask Mr. Carbine to comment on that.

Mr. CARBINE. First of all let's start with the one commission that really has done a great deal for the Great Lakes; that is the Great Lakes Fishery Commission. They are actively engaged, and have been for a number of years, in sea lamprey control and research, in lake trout rehabilitation, and they are also urging States, universities, and other groups to participate on other types of fishery research on the Great Lakes.

They have prepared a prospectus.

Senator HARTKE. Now, under whose jurisdiction are they?

Mr. CARBINE. That is the International Commission, composed of Canadians and people from the United States.

Senator HARTKE. But this is called the Great Lakes Fishery Commission?

Mr. CARBINE. Great Lakes Fishery Commission.

Senator HARTKE. Is Canada bothered with these alewives as much as we are?

Mr. CARBINE. Not to as great an extent as we are.

Senator HARTKE. All right.

Mr. CARBINE. The second commission——

Senator HARTKE. What about the Great Lakes Commission?

Mr. CARBINE. The Great Lakes Commission is—I think Colonel Goodsell is here, who is going to tell you more about this, but I can say that this commission is at least 10 years old. It is a compact group; all eight Great Lakes States are members.

They have a fisheries committee and a pollution committee, and they have looked into the alewife problem and the pollution caused from the death of these fish.

Senator HARTKE. What about the Great Lakes Basin Commission?

Mr. CARBINE. It's a brand new commission. They have met twice, and through a resolution made by the head of the Conservation Department of the State of Indiana, they have asked Secretary Udall to give a report to the commission by September 1.

Senator HARTKE. This is not an action commission; it's an advisory commission?

Mr. CARBINE. Well, I am not sure. I guess they do have—they can take action to some extent.

Senator HARTKE. What about the International Joint Commission?

Mr. CARBINE. The International Joint Commission has not been brought in on the sea lamprey or the alewife problems. They have been brought in on studies of pollution—that is, water pollution and air pollution—and boundary disputes, and that sort of thing.

Senator HARTKE. Who solved the lamprey eel problem?

Mr. CARBINE. This was a joint effort by the United States, which consisted of the eight Great Lakes States, a number of universities in the States, the Bureau of Commercial Fisheries, the Bureau of Sport Fisheries and Wildlife, and the Canadians; so this effort has been joint, and a cooperative effort over the years, sir.

Senator HARTKE. That is all the questions I have.

Do you have any questions, Mr. Wedin?

Mr. WEDIN. No.

Senator HARTKE. I want to thank you gentlemen.

Mr. PAUTZKE. Mr. Chairman, before you leave the subject, the Great Lakes Fishery Commission is funded jointly by the United States and Canada on a two-third-one-third basis respectively.

Senator HARTKE. Yes, sir. All right. Thank you.

One-third from Canada, and two-thirds from the United States; is that right?

Mr. PAUTZKE. Yes.

Senator HARTKE. Now, let me say to you, gentlemen, that I think you are doing a fine job. I am very concerned about the future of the Great Lakes in many areas.

I do not think we are giving enough attention to this great body of water, which is such a valuable asset to the United States and to Canada, not alone in the question of fish and wildlife, but in its total impact upon the midwestern part of the United States.

After all, it is something which nature and God gave to us, and we haven't treated it very kindly. Now we are going to reap some of the unfortunate results of lack of attention, and lack of conservation, and we are probably going to spend a great deal more money to try to clean it up and try to make it safe and usable. If we had just taken care of the problem in the first place—it's one of those great natural resources that has been neglected in the United States.

Mr. PAUTZKE. The Senator has put his finger on the problem.

Senator HARTKE. All right. Thank you.

At this time I have been advised that Mr. Tully Friedman is to present the views of Senator Charles H. Percy.

Good morning, sir.

Mr. FRIEDMAN. Good morning, Senator.

Senator HARTKE. We are delighted to have you with us this morning.

STATEMENT OF HON. CHARLES H. PERCY, A U.S. SENATOR FROM ILLINOIS, AS PRESENTED BY TULLY M. FRIEDMAN

Mr. FRIEDMAN. Thank you, sir, for allowing me to appear at this time.

Mr. Chairman, Senator Percy has asked me to come here and to present his views, and express his support, of S. 2123.

The alewife problem is all too familiar to everyone who lives within close proximity to the Great Lakes, or has so much as glanced at a newspaper in this area at any time this summer.

For this reason I shall spend a little time describing the problem except to say that it presents an ever-growing health hazard, as well as a massive hindrance to the enjoyment of water and beaches in the Great Lakes area.

For a number of reasons the alewife problem has escaped solution by present Federal and State agencies with present legislative tools, and with the funds available at this time.

This is partly a problem of lack of resources, and partly a lack of awareness of the seriousness of this problem.

Along with the other Great Lakes Senators, yourself included, Senator Percy commenced exploring every conceivable avenue to get some action on this problem, and this was prior to the month of June when lakeside residents became all too aware of the billions of decaying fish.

On May 22, 1967, a letter was written—with which you are familiar, sir—it was signed by yourself and by Senators Dirksen, Percy, Proxmire, Lausche, McCarthy, Young, Nelson, Mondale, and Bayh. It was written to a subcommittee of the House Committee on Appropriations urging support for an amendment approved by the Senate Appropriations Committee to add $410,000 to the fiscal 1968 research and development budget of the Bureau of Commercial Fisheries in the Department of Interior. The appropriation was refused.

Subsequently, inquiries were made to the Department of the Interior. Secretary of the Interior Udall replied that some research projects had been begun, but that—and I quote—

> It would be misleading to tell you that a solution is just around the corner. Controlling the size of the alewife population and reducing the polluting effect of seasonal dieoffs is a difficult task which will require sustained and massive effort.

And I emphasize the Secretary's words "sustained and massive effort."

I might add here that while Secretary Udall was recognizing that sustained and massive effort was needed, the administration cut by 10 percent the requested appropriation for the Great Lakes Fisheries Commission, which is jointly run with Canada, and which should be exerting more, not less, effort in this area.

We have made inquiries to the Army Corps of Engineers and the Coast Guard, and they have replied that they lack authority to do anything about the alewife problem.

The Agriculture Department reports that it has no ideas and no plans for the use of alewives for fertilizer; the Office of Emergency Planning says that it has no jurisdiction; likewise the Public Health Service says that it has no jurisdiction; and the Small Business Administration also seemingly lacks jurisdiction to aid resort owners injured by this disaster.

Only the Water Pollution Control Administration has not foreclosed action, and they have promised to study the problem in the near future.

But they have also indicated that because the dead fish eventually wash up on shore, this may be very well out of their jurisdiction as well.

It would seem that one of these agencies could have taken the lead and begun a program to eradicate this problem, instead of disclaiming authority and passing the buck.

Particularly, the Department of the Interior would seem to have jurisdiction, and seemingly could have found some money somewhere in view of the crisis dimensions of the alewife infestation.

But this has not been the case, and Senator Percy has asked me to make known to you his view that S. 2123 must be enacted into law as a partial response to these serious problems, and to the present lethargy of existing Government agencies.

In addition, existing legislation for research and treatment of other Great Lakes problems must be given more priority.

The long range picture for remedying the proper fish balance in the Great Lakes looks very bad. If existing legislation had been funded and implemented years ago the balance might well have been maintained.

If such an attitude persists, in another few years there will not be any fish at all in Lake Michigan—so we have been told by a scientist at the Bureau of Commercial Fisheries at Ann Arbor, Mich.

Senator Percy also strongly urges that the Great Lakes Fisheries Commission appropriation not be cut as the administration has requested.

It has an excellent record in lamprey control, and should be given every resource in dealing with the alewife problem.

I might add that, as you know, sir, the Great Lakes Senators, including yourself, I believe, are presently preparing a letter on this to the appropriate Senate committee.

The research contemplated under S. 2123, and the rearrangement of priorities which must take place under existing programs, will go a long way toward solving the alewife problem; but there is another and more immediate problem which must be dealt with before next summer.

Means must be provided for ridding our beach of dead alewives when they reappear next summer—as they surely will.

Something must be done for the people who must otherwise endure the unendurable, the stench of fish-littered beaches and waters. We have been informed that the machinery for a sufficient cleanup operation is not prohibitively expensive. It seemingly is available, although there is some question on this.

Senator Percy urges this committee to explore the possibility of providing funds to purchase and operate such machinery before next summer.

S. 2123 calls for a 50–50 matching grant program. There is some indication that there is simply no State money available to match Federal appropriations, or if there is State money, it is quite probably inadequate.

For this reason it might be highly appropriate for this committee to closely examine the 50–50 matching grant provision in light of this situation.

The alewife problem is bad and getting worse; unless S. 2123 is enacted, and more research is conducted under existing programs into not only the alewife infestation, but the whole problem of lake pollution, our Great Lakes, once bodies of clean water inhabited by a balanced fish population, now in ferment, may soon be nothing but dead seas, liabilities rather than assets.

Senator Percy urges action now.

Thank you.

Senator HARTKE. Do you have any idea as to the number of complaints that Senator Percy has received, or do you have any information on that?

Mr. FRIEDMAN. I don't have that information, sir.

Senator HARTKE. All right. Thank you. And I want to express my appreciation for Senator Percy being on this bill. He is very concerned with the work. We are delighted to have you here.

Mr. FRIEDMAN. Thank you, Mr. Chairman.

Senator HARTKE. We are approaching the hour of 12 o'clock. We will proceed immediately at 2 o'clock sharp.

If there are any people here who want to merely submit statements, it is perfectly all right; they can be included, and we can do that at this time. Otherwise we will adjourn for luncheon, and proceed this afternoon as rapidly as we can.

(Whereupon, at 12 o'clock noon, the meeting was recessed to 2 p.m. the same day.)

AFTERNOON SESSION

Senator HARTKE. The committee will come to order.

The next witness we will hear from will be Col. Leonard J. Goodsell, the executive director of the Great Lakes Commission, from Ann Arbor, Mich.

Colonel GOODSELL. Mr. Chairman——

Senator HARTKE. Just a moment. Before you begin, I would like to ask if Mr. Pautzke wishes to add a word concerning the statement made by Senator Percy.

One moment, sir.

Mr. PAUTZKE. Would you yield to me?

Colonel GOODSELL. Yes, sir.

Mr. PAUTZKE. Mr. Chairman, in order in order that the record may be accurate, I wish, with relation to the statement made by the administrative assistant for Senator Percy in regards to alewife programs, as early as 1956 there were requests for appropriations.

That was during the buildup of the alewives in Lake Ontario, and it was—there was an appropriation asked for at that time, and it was denied, and in the last 3 years, our Ann Arbor lab has diverted funds appropriated for other purposes to study alewives, all of which you have the data this morning.

Senator HARTKE. All right. Thank you, Mr. Pautzke.

Now we will proceed with Col. Leonard Goodsell.

STATEMENT OF COL. LEONARD J. GOODSELL, EXECUTIVE DIRECTOR, GREAT LAKES COMMISSION, ANN ARBOR, MICH.

Colonel GOODSELL. Mr. Chairman, ladies and gentlemen, my name is Leonard J. Goodsell. I am the executive director of the Great Lakes Commission.

It's a pleasure to have the opportunity to appear at this hearing in support of S. 2123, a bill designed to control the alewife in the waters of the Great Lakes.

I have prepared a statement which I turned over to the reporter.

Senator HARTKE. The entire statement may appear in the record. You may highlight such places as you deem appropriate.

Colonel GOODSELL. I think this is a very good hearing, Senator Hartke, because we have a problem on our hands here, and there is no dispute about the problem. The only thing is we will have problems on how to resolve this problem, and these are the things I think we are going to hear about more and more today as we go along.

First a word about the Great Lakes Commission.

The Great Lakes Commission is the operating entity of the Great Lakes Basin Compact, ratified and approved by the legislatures of and wholly supported by the States of Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin.

You asked earlier this morning about the various commissions; ours is wholly a State commission. We are wholly supported by the States I mentioned. We have been operating as the advisory and recommendatory agency for the eight Great Lakes States on regional water resources matters for 11 years.

Ours, we like to think, was and is a real pioneer effort in interstate cooperation and consideration on water resources matters.

Indicative of the commission's interests are the fields of activity of its five standing committees: Pollution control, water resources, fisheries and wildlife, shoreline use and recreation—and our fifth listed here, but certainly not the last in importance—is the seaway navigation and commerce.

We keep abreast of activities and developments which occur or need to be undertaken.

Since the time of pioneer settlement, the Great Lakes—with about one-quarter of the world's fresh water—have been looked upon as huge reservoirs with an inexhaustible supply of unpollutable water abounding with delectable game and pan fish and providing an unexcelled traffic artery for huge lake carriers and ocean vessels, as well as almost limitless areas for pleasure craft to navigate.

More than a decade ago the States of this region saw that the old concept of the Great Lakes enduring forever in pristine purity was fallacious, and began to move to meet the problems and effect solutions incidental to the wise use and conservation of the water of the Great Lakes.

The States recognized the lake waters as a natural, usable and reusable resource, and raw material, and that man must make use of these waters and related land areas as a place to live, a place to play, and a place to work. All of these things are interrelated.

Now, almost all citizens are becoming aware of the need to manage the waters of the Great Lakes and to keep these waters available and usable for the generations to come.

Senator Hartke, you emphasized a little earlier this morning the fact that there are other conditions, many conditions under investigation and study here in the Great Lakes, all of which are most—all of which are more or less directed toward water quantity, control of water quantity, or water quality, and these are two major problems in the lakes, and water quality is affected, of course, by the alewife, which are our particular concern today.

Now, some of the related activities that are going on in the lakes which are incidental to some of the other problems:

In 1964, the Great Lakes Commission recommended to the Secretary of State that the International Joint Commission, another one of the

commissions you mentioned this morning, established under the provisions of the treaty of 1909 with Canada, undertake studies on what can be done, (1) to reduce the range in the water level fluctuations in in the Great Lakes—this would have to do with water quantities in the Great Lakes—we have variations in water levels in Lakes Michigan and Huron of about 6 feet, and this is rather hard to live by when we reach the maximum fluctuation level, either high or low.

The second item for consideration by the International Joint Commission was to investigate and recommend measures to alleviate the pollution problem in Lakes Erie and Ontario, and the international section of the St. Lawrence River.

These two items are, of course, of regional, national, and international concern, and they are now being pursued vigorously by the International Joint Commission.

In 1965, a study was completed by the U.S. Public Health Service and State of Michigan relative to the contribution of the metropolitan Detroit area to the pollution of the Detroit River and western Lake Erie.

A similar study was undertaken for the Illinois River and the tributaries, and the southern portion of Lake Michigan. Both studies have resulted in corrective actions which are now underway to control and abate pollution.

Also, in 1965, a Federal water pollution control conference was held for Lake Erie with hearings at Cleveland, Ohio, and Buffalo, N.Y.—which were mentioned earlier this morning, and which brought out the lack of dissolved oxygen in areas where fish can't live very well.

The House Government Operations Committee has held hearings throughout the Great Lakes region to determine what can best be done to correct the pollution menace in the Great Lakes. Again corrective actions are underway.

The Water Quality Act of 1965 requires States to establish water quality standards for interstate waters, and to prepare and implement a plan or plans to accomplish water quality objectives. All Great Lakes States have responded promptly, including Indiana; all have submitted water quality criteria and their plans for meeting or achieving the standards to the Federal Water Pollution Control Administration. These water criteria, when approved, will then become the standards for waters on the Great Lakes.

I mentioned these selected examples to point out several actions now underway which stem from the realization that the Great Lakes waters are not as they were once thought to be—inexhaustible and unpollutable.

We must continue our efforts to enhance, improve, and use wisely this most important water resource.

As a part of the overall problem of managing the waters of the Great Lakes, we have the matter of interest before the committee today—the overabundance of alewives which are giving us so much trouble in Lake Michigan.

The alewife, a prolific little fish, a native of the Atlantic was first reported upstream, up Niagara Falls and Lake Erie in the early 1930's, and appeared in Lake Michigan in the late 1940's. Since the mid 1950's the alewife has become increasingly abundant, and has become a nuisance in Lake Michigan, fouling water intakes, adversely affecting

the habitat and growth of high value fish species, reducing the availability and size of high quality species for sport and commercial fishing, and becoming so abundant that, in die-off, they become a pollutant, littering beaches and making beaches and beach property unusable because of the health hazards and the stench involved.

One indicator of the extent and growth of the alewife in Lake Michigan is its commercial production over the past decade, which has gone from 220,000 pounds in 1957 to 29 million pounds in 1966.

During just the past 5 years, alewife landings have risen more than sixfold, with the 4.7 million pounds taken in 1962 representing 20 percent of the total Lake Michigan catch, and last year 29 million pounds, accounting for 68 percent of the total for the lake.

In terms of dollar value during the last 5 years the alewife catch has risen from 3.5 percent of the total to about one-sixth of 1 percent of the total, and I have appended here a table that will give you some more information on that.

The recent growth in alewife landings is primarily indicative of increased commercial interest in this species, rather than serving as a prime indicator of the rate of increase in number, but this rapid gain does show that an expanding market is developing to use this resource to the extent that it becomes available.

Presently, the Lake Michigan production is utilized by three processing plants—these are your alewife processing plants trying to make use of this animal, which is presently a menace, or a pest, and we hope that maybe we can get some utility out of it and make it into a resource to the extent that it remains available.

They are using the alewives through processing plants for fishmeal and oil, and by cold storage plants which serve the pet food industry.

It is estimated that these facilities could utilize a million pounds of alewives daily. Whether a market is now available to utilize two or three times the present output of alewives products is not known, but as pointed out, a little earlier, the indication is that uses can probably be made of this product if it is processed and offered for sale in the markets.

To meet such a production level, additional commercial equipment will be required to supplement the pound nets and some 19 available trawlers now being used.

The present vast number of alewife is related to the invasion of another ocean specie, the sea lamprey, which was first noted in the western Great Lakes in the early 1920's.

The lamprey pursued its parasitic way of life, attacking the lake trout and whitefish and, for all practical purposes, eliminating these species from Lake Michigan, Huron, and Superior, with lake trout disappearing from Lake Michigan about 1950.

Prior to this development, the lake trout and other predator species which feed on small fish served to help limit the number of alewives.

However, with the sea lamprey depredation, one of the balancing mechanisms was removed, and in this very favorable environment the geometric progression of alewife population increase became, in fact, an explosion.

Presently, fishery experts look upon 1962 or 1963 as the years when the maximum number of alewives were hatched. With a 3- or 4-year life cycle to mature, spawn, and die, it appears that we are now

witnessing the demise of the year class of 1963 or 1964 in the tremendous accumulation of alewives which have fouled the beaches and offshore waters of Lake Michigan.

The Great Lakes Commission has a very keen interest in the enhancement and improvement of the Great Lakes Fishery. This is reflected in the many matters considered by the commissions' Fisheries and Wildlife Committee, and the actions proposed by the members and advisers of this committee, which subsequently have been supported by the commission as a whole.

The commission's early awareness and concern about the needs and developments of the Great Lakes fishery are reflected by some of the matters considered by its fisheries and wildlife committee chairman, Mr. Gerald Eddy, in 1963. At the meeting of the commission he reported on the need for:

1. Further control of the sea lamprey and rehabilitation of trout. These activities are underway full scale now.

2. Technological and economic studies to further the utilization of underexploited species and to improve the quality of the—improve the quality of fishery products for the Great Lakes. Unhappily, this hasn't been followed, to a great degree.

3. The development of improved understanding and relationship between commercial fishermen and sport fishermen. And we have this relationship still with us today. This item concerns itself with species most adaptable for commercial harvest, species in demand for the angler or sport fisherman, areas adaptable for commercial fishing and sport fishing, a need for balance in fish type or species, and commercial and sport fishing exploitation to achieve an acceptable balance.

And this, then, in turn, would eventually assist in achieving the ecological balance that we hear so much of today.

4. Development and testing of procedures for estimating the catch made by sport fishermen.

5. Development of adequate sampling and analytical procedures of wide applicability to the fishing problems of all of the Great Lakes.

The Great Lakes Fishery Commission was mentioned earlier today. This was established in 1955. It's an international-type organization having members on it from the United States and Canada. It has concentrated its efforts on an international program to control the sea lamprey.

The Great Lakes Commission has continuously supported the work being done by the Great Lakes Fishery Commission in its efforts to control the sea lamprey, and continues to do so.

I mentioned earlier the House Subcommittee on Appropriations, in reviewing the budget of the Department of State for the fiscal year 1968 cut the U.S. contribution to the Great Lakes Fishery Commission by $100,000—almost a 10-percent cut in its appropriation.

We feel that this is a serious mistake, and we recommend full requested funding for the sea lamprey control program of $1,057,000 for fiscal year 1968. That is the U.S. portion of the costs, which is applied to support of the Great Lakes Fishery Commission.

In 1965 the Great Lakes Commission recommended that the Great Lakes Fishery Commission undertake the studies and programs for control of the alewives, much in the same fashion as that commission,

the Great Lakes Fishery Commission, functions with respect to the control of the sea lamprey.

This will, as time goes along, become more and more of an international problem, we feel.

In November 1965 and again in June 1967, the Great Lakes Commission advocated and passed formal resolutions requesting that the authorized anadromous fish program, which includes the Great Lakes, be adequately funded.

Authorizing legislation—Public Law 89-304—provides $25 million for the program over a 5-year period. Several Great Lakes States, Michigan, Minnesota, New York, Pennsylvania, and Wisconsin—are eager to pursue this program and to provide required matching funds.

This program will assist in further establishing the high-value species of fish in the Great Lakes—your coho, your Chinook salmon, lake trout, and things of that sort, that are the types of fish that eventually we would like to see predominate as the large predator-type species in the lake. They will be there ready for the angler, and, as a primary benefit, they will be feeding on the small alewives and limiting their numbers.

In May 1966, the Great Lakes Commission requested the Secretary of the Interior to conduct a survey—development and action program for the effective control of alewives in the Great Lakes.

In 1966 the Great Lakes Commission endorsed the fish concentrate bill, S. 2720, which would authorize the construction of five demonstration plants set up to reduce little-used or low-value fish, such as the alewife, into a fish protein concentrate, and urged that a demonstration plant be established in the Great Lakes area to process the alewives.

Now, this should be as a supplement to those processing plants presently in existence, and we don't know where it would be located, but it should be somewhere in the area where we can make maximum use of it to get rid of the excess alewives we have.

It also should be one that would show the way for the best way to process these little-used fish to make maximum use of them.

In June 1967, the Fisheries and Wildlife Committee of the Great Lakes Commission urged Congress to include $410,000 in the budget of the Department of the Interior for basic biological research, as a forerunner to subsequent programs designed to control the alewife in the Great Lakes and to correct imbalance. Unhappily, here again, this money was not included.

In June 1967, the Great Lakes Commission, alarmed by the menance to health and sanitation posed by the alewife die-off and accompanying beach littre problem, requested the Secretary of the Interior, as head of the Federal executive department having jurisdiction over both fish and pollution control, to take immediate action to determine measures that can be taken to alleviate the condition.

Taken together, these foregoing actions combine very nicely into an action program worthy of serious consideration. The anticipated problems are wth us.

Our recommended program, in summary, is a pragmatic program, one that we think can do something for the very near future, the intermediate period, and also the long-range period. It's designed to meet today's problem of millions of alewives which annually plague the people of the Great Lakes States.

Item No. 1, in order to help control the alewife, we should take maximum tonnages of alewives through commercial fishery operations, and process them for sale. In this way we will get rid of the alewife to a degree, we will utilize the resource, and might even get a few dollars out of the operation—a highly desirable objective.

Another thing has been brought up—that I don't have in this particular paper—but the alewife, in growing and feeding on the plants and algae and things of that sort, they pick up a lot of the nutrients that find themselves in the water, and when you remove the alewife from the water you are, in fact, removing some of the nutrients that might otherwise be there.

This is the type of process that also is being recommended, I think, at the University of Kansas, for the removal of phosphates and nitrates, wherein they actually grow algae in large quantities, feeding the sewage effluent to them, and then removing the algae and the material, and in that way they take out the phosphates and nitrates—the nutrients.

Along with this business of taking maximum amounts for the commercial fisheries, we need to enact legislation to authorize and fund fish concentrate plants, something similar to S. 2720, of the 89th Congress, and we should at least have one of these plants as a going concern here in the Great Lakes region.

Incidentally, as a result we should promote the sale of products from these processing plants so we get rid of them, and make a little money on the side.

We ought to enact legislation which would permit on a temporary basis the charter or purchase of non-U.S. fishing boats which might be readily adapted for use in commercial trawling for the alewife in Lake Michigan.

This could be just a temporary arrangement. At least the legislation should be enacted which would permit this on a temporary basis. Additional boats could be available and the fishermen could use them to take out the alewives.

The second item in this program would be to make maximum use of the alewife as a food for predator fish, such as Coho salmon, lake trout, and fish of this kind.

We should have a program, and appropriate and allocate funds to the States of the Great Lakes region under Public Law 89-304 to support the anadromous fish program to continue the stocking program. We can see how the stocking program is going, whether or not the plantings that are put into the lake are going to remain there, whether the fish planted will reproduce, and things of that sort.

We should provide funding support for States to construct and operate hatcheries for high-value species for planting in the lakes.

No. 3, and this is more or less the intent of the bill, S. 2123, we should institute a program aimed at controlling the alewife population beyond the needs of the commercial fishery and sport fishery, the two items just ahead.

We should appropriate funds for basic biological research on the Great Lakes fishery to include fundamental data and intelligence on the alewife and monitoring its major movements.

We should support the Great Lakes Fishery Commission's work and encourage them to undertake an international alewife control program similar to that undertaken in connection with control of the sea lamprey.

In connection with item three, certain bills are now before Congress. We have H.R. 4793, and like bills. This is one that would be oriented more toward elimination or eradication of the alewife. Your bill here, S. 2123, and others, are broad scope and are directed toward a program for control of the alewife.

Our States and private enterprise have begun work on commercial utilization of processed alewives. It is estimated that it will reach a commercial utilization of 50 to 70 million pounds in 1967. We don't know the exact amount for 1967. These people need further assistance and encouragement so they can actually remove alewives even more as time goes on. I don't want to eradicate the alewife and I will touch on that very slightly a little later on.

Our States, and Michigan is the leader in this, are doing an outstanding job in conjunction with Federal and other agencies in rehabilitating the high-value sport fishing species to the lakes.

These efforts must be reinforced and promoted. As a matter of fact, the high-value predator fish are showing excellent growth in numbers and size in Lake Michigan and their effect, hopefully, will soon become apparent, in the reduced number of alewives.

Again let me say we don't know what the long-range picture might hold for these species, but so far it looks good.

There are signs, however, that we may have a few problems in connection with this.

It is recognized that action on three fronts proposed above—maximum commercial utilization of the alewife, utilization as forage for highly prized predator game fish, and curbing the present alewife population—will doubtlessly lead to changes in the present situation.

We may be on a collision course. It may be that commercial fishermen may take too many of them; we might run out of fish for forage food for the high-value species. This is a program that must be kept under surveillance, and we must continually monitor it; we must see which way the program is going, how the fish are surviving, how they are multiplying and growing, and what is best for the Great Lakes.

Then we should pursue that course of action which appears to be the one with the greatest good for all concerned. One day then, we can look on these alewives and decide whether we have a problem on our hands, or whether the alewives are, in fact, a resource that can be used.

Short term corrective actions, as you know full well, are those that have been described already. You have to collect—once these fish die, you have to collect them. You can do it in the water through water borne collecting gear, or you can do it on the beach. Both of them are rather difficult. You can exclude the fish by erecting nets and barriers, such as some have already done in the water, put nets around the beaches so they don't float in. The third action is, no matter how you collect them, you must dispose of them, and the best method thus far seems to be a burial type of operation. This is going to be a problem we are going to have through the summer, and for some time to come.

In the meantime we hope some of these other things will come into being, and reduce or eliminate the problem.

Thank you.

ALEWIFE PRODUCTION IN THE LAKE MICHIGAN FISHERY, 1962 TO 1966

POUNDS

Year and species	Total	Michigan	Wisconsin	Illinois-Indiana
1962:				
All	23,475,300	7,584,300	15,595,000	296,000
Alewife	4,742,300	1,394,800	3,436,400	1,100
Other	18,733,000	6,189,500	12,284,600	294,900
1963:				
All	21,021,300	6,382,200	14,348,000	291,100
Alewife	5,396,400	1,578,100	3,818,300	----------
Other	15,624,900	4,804,100	10,529,700	291,100
1964:				
All	26,201,100	8,562,700	16,982,500	655,900
Alewife	11,743,300	3,329,700	8,410,200	3,400
Other	14,457,800	5,233,000	8,572,300	652,500
1965:				
All	26,994,100	8,336,600	18,470,000	187,500
Alewife	14,006,700	3,140,200	10,866,500	----------
Other	12,987,400	5,196,400	7,603,500	187,500
1966:				
All	42,454,800	11,522,200	30,852,900	79,700
Alewife	29,001,800	6,438,200	22,563,600	----------
Other	13,453,000	5,084,000	8,289,300	79,700

DOLLAR VALUE

1962:				
All	$1,899,448	$819,711	$1,041,314	$38,423
Alewife	67,503	17,295	50,195	13
Other	1,831,945	802,416	991,119	38,410
1963:				
All	1,870,833	730,544	1,107,474	32,815
Alewife	102,220	25,854	76,366	----------
Other	1,768,613	704,690	1,031,108	32,815
1964:				
All	2,601,134	1,175,473	1,311,846	113,815
Alewife	218,865	50,611	168,202	52
Other	2,382,269	1,124,862	1,143,644	113,763
1965:				
All	2,425,906	1,179,552	1,204,137	42,217
Alewife	252,121	56,524	195,597	----------
Other	2,173,785	1,123,028	1,008,540	42,217
1966:				
All	2,762,316	1,239,560	1,508,731	14,025
Alewife	435,028	96,573	338,455	----------
Other	2,327,288	1,142,987	1,170,276	14,025

Source: U.S. Department of the Interior. Bureau of Commercial Fisheries, Great Lakes Fisheries (annual).

Senator HARTKE. All right. I have no questions.

Mr. Squarcy of Inland Steel.

Mr. SQUARCY. My name is Charles M. Squarcy, assistant to the vice president, Inland Steel Co.

Senator HARTKE. I just want to express our regret at the loss of your chairman of the board, Mr. Randall.

Mr. SQUARCY. Thank you very much, Senator. Thank you for your kind thought on Mr. Randall.

I wish to offer a prepared statement for the record of this serious problem to our plant, and the recreational facilities of our employees.

Senator HARTKE. All right.

STATEMENT BY CHARLES M. SQUARCY ON BEHALF OF INLAND STEEL CO., CHICAGO, ILL.

Mr. SQUARCY. The presence of large numbers of alewives in Lake Michigan has caused extraordinary problems for Inland Steel Co. The problems aren't new, just greater, since fish always presented problems in the operation of water systems. For this reason, Inland has electric fish screens to discourage fish from entering intakes, and traveling screens to prevent fish from being drawn into pumps. These measures were adequate to control fish problems until late spring of 1966.

The alewife run in 1966 was so heavy that large numbers of fish were able to get past our screens, causing serious problems. Although there was no loss of production, many man-hours at overtime rates were required for cleaning fish from equipment to prevent shutdowns.

After this unpleasant experience with alewives in 1966, and after being warned by people in the Bureau of Commercial Fisheries that the problem would be eight to 10 times worse in 1967, we decided to take further protective measures. Air bubblers were installed upstream of the electric fish screens and a 275-foot net was placed across the main intake. These measures were effective—the largest problem this year was the removal and disposal of approximately 400,000 pounds of dead alewives from water intakes.

We were able to overcome problems caused by alewives this year and last, but only at substantial cost.

Although we have had problems with alewives at our water intakes, these problems have been mainly caused by live alewives. A greater problem, and I'm sure the problem which most concerns you, is dead alewives. Inland is also concerned about dead fish—not because they cause operating problems—but because many of our employees live along the shores of Lake Michigan. Inland has more than 25,000 employees who live near Lake Michigan, and many of them and their families look to the lake as a prime source of summer recreation. These people have been denied the use of beaches for a large part of this season. It has only been within the last 2 weeks that the beaches could be fully enjoyed.

Prior to that time anyone who ventured near the shores of Lake Michigan was subjected to foul odors, swarms of flies, and sand alive with maggots. Boaters could escape most of this unpleasantness only to be faced with water dotted with dying alewives, dead alewives, and rotting alewife corpses.

We concur in your desire to get action on this problem—and soon.

Thank you very much, sir.

Senator HARTKE. Thank you sir.

We have a group here from Michigan City. Florence Murray will introduce them.

STATEMENT OF MRS. FLORENCE MURRAY, MICHIGAN CITY, IND.

Mrs. MURRAY. Thank you, Senator Hartke. To my immediate right is Mr. Robert Cargile, general manager of the Washington Park Amusement Corp., on the shores of beautiful Lake Michigan.

To my immediate left, our superintendent of Michigan City area public schools, Mr. A. K. Smith; and to his left, our new executive vice president of the Chamber of Commerce in Michigan City, Mr. Jerry Ginthner.

Senator Hartke, thank you so much for allowing a woman to also be heard at this time, and I wonder if I may pose two questions rather than give a statement, because I am wondering since it was possible for the alewives to enter the Great Lakes through the St. Lawrence River, could it not also be possible for them to continue swimming downstream or upstream into large outlet rivers? They could then have as a natural habitat rivers, including the Mississippi, as well as streams and brooks, and affect large areas that would affect many States in addition to our Great Lakes States.

My second question, Senator, would be is it possible that the change from the former abundant fish life to the takeover alewife has also changed the vegetation in Lake Michigan?

Excessive amounts of seaweed have saturated our shallow beach waters this summer of 1967, causing discomfort to swimmers and bringing a new problem in addition to the dead fish, and, Senator, dead fish stay on the beaches, but the flies penetrate all of our communities.

It has been brought to my attention currently that there are new sections of wilderness under consideration for recreational development to accommodate our population growth, and increased leisure time.

Property is important to these investors and actually they will not want to proceed if, instead of people, the only visitors to their beaches shall be dead fish and maggots.

I refer you now to Mr. A. K. Smith, our superintendent of schools.

STATEMENT OF A. K. SMITH, SUPERINTENDENT OF SCHOOLS, MICHIGAN CITY AREA SCHOOLS

Mr. SMITH. Thank you. The Michigan City area schools has three school attendance districts bordering on Lake Michigan.

Beverly Shores School	142
Central School	547
Long Beach School	447
Total	1,136

Added to this enrollment would be that of Notre Dame elementary school, 291 pupils. Altogether this represents 1,427 elementary pupils living in the polluted air zone. The enrollment in secondary schools from these same areas is 44 percent of the elementary enrollment, or 450 pupils. Altogether, 1,586 pupils of school age are being denied their recreational area at the beach.

The total enrollment in the Michigan City area schools and in the parochial schools is 14,866, all being adversely affected by the present condition on our beaches, since all the youth of this area use this recreational facility.

In behalf of (1) the 58,000 people living in the Michigan City area schools incorporated area, being denied their most important recreational area, and (2) the people living in the immediate area, whose health at home or on the lakefront is imperiled by the polluted water

and air, we ask that S. 2123 receive favorable consideration by the Senate. The Federal Government must accept responsibility to its people to remove the contamination.

We live in a town that has a residence front rather than an industrial front. This brings out the fact that we have three of our public schools within the stench area caused by this problem.

Not only are the children in this area affected when they are at school, they are in this area when they are at home, or when they attempt to go to the beach.

There are 1,136 of these public school elementary children in this area. Added to this, the people in secondary schools, brings the population of school-age people within this danger area, who are imperiled by the polluted water and air, to some 1,500 people.

This, together with their parents creates, even in Michigan City alone, a health hazard to a considerable number of people. I am confining my remarks today about people, not only from Michigan City, but from the hinterlands of Michigan City.

Customarily thousands of people have found their way to our recreational beaches. They do this at Michigan City, at Beverly Shores and the State park, and will come to the recreation area on the shores of the Federal park.

I think it is extremely necessary before we solve the problem of eradicating the source of the fishes, that here we should eradicate the fish that pile upon the beaches.

Literally, the fish are in high wind rows deposited there to rot and to be consumed by maggots, a situation that the human physique cannot tolerate.

People have fled their homes, fled the beaches, to seek relief from this problem, so we would earnestly suggest a sanitization of the sand.

Michigan City has one such operation going, but the machinery we have at present is only in the dry sand. Something needs to be invented that would operate in the wet sand near the water, and then I think that the collection of fish under water is equally necessary.

One of the Navy destroyers or small craft came into Michigan City for a group of people to go to Milwaukee and they were scarcely out of this dead fish area on the surface water between Michigan City and Milwaukee. It was that bad.

Thank you very much.

Senator HARTKE. In other words, you think the immediate need is to take care of the short-range problem of the dead fish and their accumulation?

Mr. SMITH. We can't wait. Nothing has been said today that convinces me that they are about to solve the problem of the presence of these fish.

Senator HARTKE. I think you are quite right.

Mr. SMITH. Nor do I get any encouragement from the fact that we should make this a fish hatchery for alewives to produce some kind of industrial operation.

Senator HARTKE. I quite agree with you. I don't think we should wait until we commercialize all these fish. I don't think we can wait for 20 years to come to a solution either. I think we need a long-term solution, but some immediate action is necessary. I quite agree with that.

Mr. SMITH. Now, I would like to introduce Mr. Jerry Ginthner.

STATEMENT OF JERRY GINTHNER, EXECUTIVE VICE PRESIDENT, MICHIGAN CITY CHAMBER OF COMMERCE

Mr. GINTHNER. Senator Hartke, very quickly, we have the problem just referred to from the invasions—I guess you might say attack—of this fish, and I don't think we at Michigan City fully realize what the economic effect and social effect of this has been, but in just delving into this in the last few days, I do think we have come up with some things that give us an indicator, at least, and we will go ahead and do our studies to verify it.

I was interested this morning when they were talking about the effect at the Dunes State Park, and had they taken count there perhaps their findings would be similar to ours.

Let me give you some of these. We in Michigan City have our lakefront area, it is owned by the park department, divided we might say into two groups. One is reserved for people from Michigan City who wish to use the facilities at no charge, and of course, no count, and that type of thing.

Then we have what you might call a public beach at which anyone can come and on weekends and on holidays only, and this is important to know because of the statistics I will give you—on just those days we have a dollar per car charge.

As of July 31, which is just about halfway into our season, the parking lot revenue—I remind you once again, this is only collected on holidays and weekends, Saturdays and Sundays was down $5,000, which means 5,000 automobiles and if you can see them come in, I would say it would be a conservative estimate to say that there are four to a car, so there would be some 20,000 people and this wouldn't include the people who live in Michigan City and they don't like this any better than the people coming in, so it involves thousands of people that would normally come to our beaches and to our community that have not come this year.

The cost of cleaning the beaches is a problem, and, as Mr. Smith stated, we have a sanitizer. We have spent around $9,000 this year to clean our beach area. When we say we are cleaning our beach area, it is around a mile and a half.

I was interested in one note from the director, and I have this letter here for the record, but as I said the superintendent of parks, he said, "Our beach has been used very little this year. We would not have had to have life guards before last week. They were not guarding; they cleaned the beach of fish along with maintenance crews."

He also goes on to say, if something isn't done—this is our park superintendent, Mr. Osos—he said, "I can honestly say, our lakefront will be all but deserted by 1968."

Bob Cargile is much closer to this, but I just happened to jot down some of these statistics. He manages the Washington Park Amusement Co. and the public beach there at Michigan City. He writes that the increase in ride income to June 15, 1967, over the same period in 1966 was 55.1 percent increase in income.

From June 15, 1967 to July 31, it was only up 19.9 percent.

The food services at Washington Park were down this year up to July 31, 37.1 percent.

Dressing room facilities, and this really gets us into the deep, because you can go to our park area and ride on the rides and if the wind is not blowing you will not be too much bothered by the fish problem, but the dressing room facilities for which there is a charge are down 75 percent up through July 31, 1967.

With this, then, there is no question of the extremely harmful impact upon the publicity and economies which the alewife situation has had in our area and I might say if I might interject into the record also, we don't have the alewives now; they have all left us, so come on back.

The alewife situation has been hard on our area. I have no doubt that the full consequences will be felt much greater next season because of this year's experiences. I think we will be affected next year if we don't have any back, and if we have some back it will be worse. In other words, we have consequences beyond this year until this problem is solved, and we will suffer great losses.

We urge every consideration be given to the speedy action of Senate bill 2123.

Thank you.

STATEMENT OF ROBERT CARGILE, GENERAL MANAGER, WASHINGTON PARK AMUSEMENT CORP.

Mr. CARGILE. I am Mr. Cargile, Senator Hartke.

I have nothing other than that to say except we have a prepared statement on some of our financial records at the park this year, and which will be submitted.

Senator HARTKE. Give them to us for the record.

Mr. CARGILE. Yes; and our figures definitely indicate since June 15, when these alewives started appearing on the beach, that our income definitely has reduced considerably, quite considerably.

Senator HARTKE. Thank you.

Let me say to the Michigan City Chamber of Commerce, it was sort of a mixed emotion I had when I went to the beach to crown Miss Indiana that night. I want to compliment the chamber of commerce for the fine work they do on this Miss Indiana contest, but next time if you would just clean up the beach on that day I will be happier.

Mr. GINTHNER. So will we.

(Letters and financial statement referred to by preceding witnesses follow:)

AUGUST 7, 1967.

HON. VANCE HARTKE,
United State Senate,
Washington, D.C.

DEAR MR. HARTKE: One indicator that was very apparent to our office as being affected by the alewife problem was the almost complete stoppage of inquiries from outsiders regarding our resort facilities. These inquiries, which run quite heavy during the summer (50–60 a week), were reduced to around one a day after publicity on the alewife had been released.

We are also sponsors of the Miss Indiana Pageant, which is held in July. Several events which were scheduled for the beach area had to be cancelled. This is to say nothing of the many people, visiting Michigan City for the Pageant, who planned on using our lake facilities and were not able to do so.

There is no question of the extremely harmful impact, both publicity and and economic-wise, the alewife situation has had on our area. I have no doubt that the full consequences will be felt much greater next season because of this year's experiences.

Until this problem is solved, the Michigan City area will suffer great losses. We urge every consideration be given to the speedy enaction of Senate Bill 2123.

Respectfully,

JERRY D. GINTHNER,
Executive Vice President.

AUGUST 4, 1967.

Mr. JERRY GINTHNER,
Chamber of Commerce,
Michigan City, Ind.

DEAR JERRY: I am writing this letter to the Michigan City Chamber of Commerce to inform them, and all concerned, of how the alewives have affected the attendance at Washington Park.

Our parking revenue, as of July 31st, is approximately $5,000.00 less than 1966 at the same time. This would be 5,000 cars, with an estimated four persons per car.

Our beach has been used very little this year. We would not have had to have life guards before last week. They were not guarding; they cleaned the beach of fish along with maintenance crews.

I think we would have had a great year if it had not been for the fish. It has cost the Parks and Recreation Department approximately $9,000.00 to clean the beaches, $9,000.00 that was not anticipated. I have been told that we may receive Federal Assistance to combat this problem. If not, I can honestly say, our lake front will be all but deserted in 1968.

All those I have talked to have given the fish for the reason they have not come to the beach. When the tourist stays away it affects the economy of Michigan City.

I am hoping that Federal Assistance will come to our aid. It is the only way to combat this problem.

Sincerely yours,

ROBERT J. OSOS,
Superintendent, Department of Parks and Recreation, City of Michigan City, Ind.

AUGUST 1, 1967.

GENTLEMEN: I hear that there is going to be a meeting concerning our fish problem in Michigan City.

The dead fish and maggots in the water have had a definitely adverse effect on my business. Because of the national publicity and papers still carrying news that the fish are still bad, I am having calls from Indianapolis, St. Louis, Chicago and etc., asking if the fish are all over the beach.

The situation has cleared temporarily and still they are calling. We now have seaweed for a great distance out as a result of the fish I hear.

My main selling point for the summer resort I have here is the fact that I have the only private beach in Michigan City.

Even though I keep my beach area clean, the lake was infested with dead fish and maggots and now seaweed.

The beach is Michigan City's greatest asset and the local businesses thrive from it.

I definitely think it is up to the government to do something about it.

Sincerely yours,

RAMONA SPENCER,
Manager, Ramona Cottages on Lake Michigan.

MICHIGAN CITY, IND., *August 2, 1967.*

M.C. CHAMBER OF COMMERCE,
Michigan City, Ind.

DEAR MR. GINTHNER: The Golden Sands has been a member of the Chamber of Commerce for years and you seem the logical one to voice our gripe to.

The alewives fish situation this summer has been unpleasant for the people who enjoy the beach, but has been a problem for those of us in business who depend on the three to four months of summer to do the largest portion of our yearly business.

We have a band six nights a week, plus two entertainers at the piano bar. This was all contracted for on the strength of all the people being here this summer.

We have had numerous good summer customers drop by to say, "Hello" and to tell us they were not opening their place or just coming up for the weekends. The motel used to have loads of people come to our complex for a week or two vacation, but that is way down this summer.

Anything you can do to help remedy this situation for the business places who rely on the tourist and summer residents for business, we will more than appreciate. If this is going to be a yearly problem, something can surely be done.

Sincerely,

CHARLES NAUMANN,
Golden Sands Restaurant & Lounge.

WASHINGTON PARK AMUSEMENT CO.

Compared Figures for the Years 1967–68 Due to Alewife Problems

	Percent
Increase in ride income to June 15, 1967, over same period 1966	55.1
Increase in ride income June 15, 1967, to July 31, 1967, over same period for 1966	19.9

This drop of 35.2% in revenue amounts for $14,970 in money on ride operation.

Food operation has actually shown a decrease of 37.1% over last year. Had food increased at same rate as rides in the 1967 income from food would have amounted to $14,326 more.

Income from dressing room facilities has decreased 75% from $1,273 in 1966 compared with $363 in 1967 through July 31.

ROBERT CARGILE,
General Manager, Washington Park Amusement Corp.

Senator HARTKE. Also from Michigan City we have Mrs. Bernice Shreve, who is the president of the League of Women Voters, and representative to Lake Michigan Interleague Water Commission.

Is she here?

(No response.)

Senator HARTKE. All right. Then, from Michigan City also we have Jim Vine, chairman of the Port Authority, Michigan City. Is he here?

(No response.)

Senator HARTKE. What about Mrs. Helen Liddy. Is she here?

(No response.)

Senator HARTKE. Mr. Roger H. Joers, Michigan City. Is he here?

(No response.)

Senator HARTKE. Any of these other people from Michigan City here?

(No response.)

Senator HARTKE. Have we finished with Michigan City?

All right. We have Mr. Woodrow Fleming, director, Division of Fish and Game, Indiana State Department of Natural Resources, and Mr. Fleming, will you identify the people with you?

STATEMENT OF JOHN MITCHELL, DIRECTOR, INDIANA DEPARTMENT OF NATURAL RESOURCES, PRESENTED BY WOODROW FLEMING, DIRECTOR, DIVISION OF FISH AND GAME; ACCOMPANIED BY PERRY MILLER, STREAM POLLUTION BOARD, AND JIM BARRY, FISHERY BIOLOGIST

Mr. FLEMING. Thank you, Senator. This is Perry Miller on my right, Indiana Stream Pollution Control Board of the Department of

Health; and on my left Mr. Jim Barry, who is a fishery biologist with the Division of Fish and Game of our department, and he has been assigned and spending most of his time in recent months on Lake Michigan.

I have a prepared statement from the director, John Mitchell, director, Indiana Department of Natural Resources, who is out of the State and unable to be here today, Senator, and expresses his regret.

Senator HARTKE. I am very glad to receive his statement in the record. We are sorry John couldn't be here. He is doing a fine job.

Mr. FLEMING. It is not long. I would like to read it.

Senator HARTKE. All right, you may do that.

Mr. FLEMING. A statement of recommendations for increased efforts in research and management of the Great Lakes fishery, submitted by the Department of Natural Resources of Indiana, John Mitchell, director.

Due to the destruction of desirable predator species of fishes of Lake Michigan, primarily due to the invasion of the sea lamprey, other less desirable species of fish have invaded the lakes and undergone population explosions.

Senator HARTKE. Everyone is talking about the population explosion. Has anyone suggested a birth control pill for the alewife?

Mr. FLEMING. You may have something there.

Senator HARTKE. Go right ahead.

Mr. FLEMING. One species commonly called the alewife has been most successful in adapting itself to the fresh water habitat. As a result, the die-off of a portion of this species litters our shorelines causing serious health and environmental problems. I recommend:

1. That the present lamprey eel control program be maintained at a high level of activity and that sufficient additional appropriation be made available to the Bureau of Commercial Fisheries of the U.S. Department of Interior so that this program can proceed at that high level. It has been suggested that an addition of $100,000 per year to the present lamprey control budget would be sufficient for this purpose.

2. Continue and increase the program by the Bureau of Commercial Fisheries in research on the fish of the Great Lakes. It is recognized that a worthwhile research program has been and is being conducted by this agency. I suggest that an additional $400,000 per year be appropriated to provide for additional efforts along this line.

I think that figure was suggested to Mr. Mitchell in previous discussions of this problem.

3. It is recommended that special attention be given to determine all of the alternative methods of alewife control including commercial uses of alewives. Consideration should be given to subsidization of alewife commercial fishermen to insure a continued use of this species by the industry.

4. It is recommended that increased emphasis be placed on a research program to determine which of the sport fishes can be most effective in providing a biological control of the alewives, and that, as a result, increased efforts toward management of the most desired sport fishery species be made.

5. It is recommended that financial assistance be made available to those States bordering the Great Lakes to assist them in their individ-

ual and joint efforts to improve and increase the desirable predator sport fishes in the lakes. Programs of enhancement, improvement, or introduction of predator sport fishes would be subject to approval by the various lake management committees of the Great Lakes Fisheries Commission.

In short, this is a biological problem, and the eventual solution will be biological. Meanwhile, such more or less stopgap measures, and they are needed, such as subsidization of the harvest for commercial purposes, assistance in the cleanup of the dead fish and continued efforts to improve the water quality of the lake, are certainly solutions that should receive immediate attention.

The water quality—Mr. Miller is a specialist on that—we understand is improving, and we want to point out that the desirable sport fishes, which not only can destroy alewives as part of their food in a natural way, but have a potential recreational value that we can hardly estimate, that they will come back in greater numbers and with much more success as we are able to continue the quality of the water.

That's all.

Senator HARTKE. Let me ask you, what has happened to the Dunes revenues as a result of the beach use, do you know?

Mr. FLEMING. I am not familiar with the State park statistics on that. I believe that——

Senator HARTKE. Isn't that under the Indiana——

Mr. FLEMING. Department of Natural Resources, but it is the State parks, and I am not that familiar with it.

Senator HARTKE. Can you supply that information? Can you obtain that information and furnish it to me, have it supplied for the record?

(The following information was subsequently received for the record:)

Listed are the revenues received from the operation of the park from and including the Memorial Day weekend to August 13 for the years of 1966 and 1967.

For week ending—	1966	1967
June 4	15,085.00	13,171.60
June 11	18,833.60	16,968.60
June 18	22,972.40	20,458.80
June 25	28,785.80	23,186.60
July 2	11,582.35	8,616.05
July 9	12,312.85	9,295.70
July 16	10,118.45	7,248.92
July 23	48,154.60	37,981.00
July 30	52,041.80	41,704.00
Aug. 6	8,887.05	8,563.70
Aug. 13	58,052.40	48,620.20

We would hesitate to attribute any of the changes in income to the alewives; however, there is no doubt that they did affect our patronage. It might be assumed that, in both years, our income in early and mid-July should have increased smoothly.

I would add the comments that State park revenues in general have been down this summer, and the mild temperatures may have influenced the drop in attendance at the Dunes State Park and Beach even more than it has influenced attendance at all State parks.

Mr. FLEMING. Yes, sir; I do know they have been pretty much able to stay on top of the cleanup problem.

Senator HARTKE. I want to know specifically what effect it has had on the use of the beach. I understand there is a proposal to use a million and a half dollars there. Is that right?

How much is going to be—two and a half million dollars? I was wondering, of that two and a half million dollars, is any part of it to be utilized for this problem, or is it to be for the development of the State park? Do you know?

Representative ANGEL. Senator——

Senator HARTKE. Identify yourself for the record, please.

Representative ANGEL. Senator, my name is Nick Angel, a State legislator. Two and a half million dollars has been appropriated by the last general assembly, and it has been authorized by the budget agency to be used in construction funds alone at the State park here on the north shores of Lake Michigan.

These are additional construction funds, not operating funds.

Senator HARTKE. Not operating, not maintenance funds? They would not be utilized for anything to do with the alewives?

Representative ANGEL. No, sir.

Senator HARTKE. Thank you very much.

Do you know, Mr. Fleming, if any money is being allocated by the department of natural resources in the State for the immediate problem? I am not talking about long range now, but immediate problem, with which we most assuredly are going to be faced again next year.

Mr. FLEMING. Mr. Miller will answer that.

Mr. MILLER. Senator Hartke, in working with the department of natural resources, and our inspection of the beaches, we have been making two inspections each week of the beaches from Michigan City to Hammond.

It is my understanding that the department of natural resources is purchasing one of these beach sanitizers for the purpose of cleaning.

Senator HARTKE. Is that for dry sand or wet sand, too?

Mr. MILLER. I understand that in Michigan City they had some problems using this in the wet sand, but I also understand it has worked very well at the State park, so that they are using this and can clean it.

Senator HARTKE. Does that pick up the fish off the beach?

Mr. MILLER. This takes up the sand, the tin cans off the beach, screens it, puts the sand back on the beach.

Senator HARTKE. Yes, but, now, quite honestly, I was out there on this beach myself and walked, and unless you went through, you are going to have one——

Mr. MILLER. I couldn't answer. I know that we have purchased one.

Senator HARTKE. How many miles? I know Indiana has the shortest coastline. How many miles do you have?

Mr. MILLER. About 3 miles, or 3½ in the State park, roughly from Michigan City to Hammond, is 35 miles, of which there are 22 miles of beach area and according to our information about half of this is public beach and about half of it is private beach area.

Senator HARTKE. The fish smell just as bad on private beaches as on public beaches.

Mr. MILLER. That's right.

Senator HARTKE. I would be interested in finding out, if you could, and document for the record, what proposals you have in regard to the actual elimination of the fish from the beach for next year.

I think this next year we are going to have a very serious problem. I would like to see if we couldn't come up with some type of recommendation, either jointly or individually. I know that the people of Indiana are going to be very concerned about that.

The inspections alone—are not sufficient, in my opinion, to provide a real relief. I was there where they had been cleaning some places in the morning, and yet these same places were so bad by afternoon that I had difficulty walking on the beach. It would be especially bad for walking barefoot. Impossible to walk without stepping on fish.

I don't know, but I would have to want to swim awfully bad in that lake to go into that type of water, especially when all the dead fish surround you.

Mr. MILLER. I would agree with you, Senator. There is no question of this, but, on the other hand, I think we do have to have the surveillance to know what the situation is.

Senator HARTKE. I am in favor of the surveillance and the inspections. I would just like to see it followed through with some action.

Mr. MILLER. Of course, as far as the State board of health and stream pollution control board are concerned, we do not have any funds for this.

Senator HARTKE. The situation is alleviated—pardon me.

Mr. MILLER. We do not have funds for this sort of thing.

Senator HARTKE. Does the department of natural resources have any funds for that?

Mr. FLEMING. Well, there are no budgeted funds that I am aware of for cleaning up alewives along the shores of Lake Michigan.

Senator HARTKE. Something is going to have to be done some place. The city can't continue spending this extra money either. They have problems with taxes, too. You can't do it for nothing either, I understand that.

I want to thank you, Mr. Fleming, for coming in. I appreciate it and if you can supply the information, we will appreciate it.

Mr. Grover Cook, Chicago Regional Office, Federal Water Pollution Control Administration, Chicago, Ill.

STATEMENT OF GROVER COOK, CHICAGO REGIONAL OFFICE, FEDERAL WATER POLLUTION CONTROL ADMINISTRATION, CHICAGO, ILL.

Mr. COOK. Mr. Chairman, I will be very brief. I don't have a prepared statement.

We have observed the alewife problem in the lower part of Lake Michigan—in fact, the entirety of Lake Michigan, for about the last 8 years. It has gotten worse, doubled or tripled every year, as the figures by the Bureau of Commercial Fisheries showed you.

In 1962 and 1963, during the mortalities, we made studies of the water quality of Lake Michigan to determine whether or not pollution might be responsible. We could not find any evidence that pollution was responsible for the die off.

Senator HARTKE. Can you find evidence to the contrary? In other words, you say you could find no evidence that pollution was responsible; did you find any evidence that pollution was not responsible?

Mr. COOK. No, sir.

Senator HARTKE. In other words, you didn't find out either way?

Mr. COOK. We did not pinpoint the cause of mortality.

Senator HARTKE. What I am trying to discover is, you made a finding that pollution——

Mr. COOK. There was no pollutant present that would have killed the fish. We went through the——

Senator HARTKE. In other words, there was—but on the contrary, you could not disestablish the fact, as well, that pollution might be a factor still; isn't that true?

Mr. COOK. Only by circumstantial evidence.

For instance, the map you saw of Lake Michigan this morning showed where the heavier density of the die-off occurred. Perhaps you noticed Green Bay was not one of those areas.

Senator HARTKE. Yes.

Mr. COOK. That is because Green Bay is so polluted already——

Senator HARTKE. Pardon me?

Mr. COOK. That is because Green Bay is so polluted already.

Senator HARTKE. Green Bay is polluted?

Mr. COOK. Yes.

Senator HARTKE. Very heavily?

Mr. COOK. Yes, sir.

Senator HARTKE. What are you doing about that?

Mr. COOK. We are doing our best. Unfortunately, right now, it's an intrastate problem.

Senator HARTKE. Why is Green Bay an intrastate problem? Do you mean you don't have any control?

Mr. COOK. Under the present act, we are unable to enact enforcement in intrastate waters.

We will when water quality standards for the area are promulgated. This will then be an interstate water under the Water Quality Act. That is as far as——

Senator HARTKE. Who has to promulgate those regulations?

Mr. COOK. They are in the process now of being promulgated. They are being reviewed.

Senator HARTKE. By whom?

Mr. COOK. By our agency.

Senator HARTKE. And how long has this been in process?

Mr. COOK. Oh, the review has been taking place for about 1 month.

Senator HARTKE. When did this begin?

Mr. COOK. Approximately June 1.

Senator HARTKE. It began June 1?

Mr. COOK. Yes.

Senator HARTKE. When was this organization formed?

Mr. COOK. What organization is that, sir?

Senator HARTKE. The Federal Water Pollution Control Administration.

Mr. COOK. You got me there. In May 1965, I believe.

Senator HARTKE. Yes. And you had authority since then to establish these, and promulgated them?

Mr. COOK. No, sir. The States were given the responsibility first for establishing standards.

Senator HARTKE. And if they fail?

Mr. COOK. If they fail, the Federal Government establishes them.

Senator HARTKE. The State of Wisconsin has not promulgated this?

Mr. COOK. They are in the process now, Senator.

Senator HARTKE. I see.

Mr. COOK. They are under review.

Senator HARTKE. What about the State of Indiana? What have they done?

Mr. COOK. Indiana standards have been approved.

Senator HARTKE. They have been approved?

Mr. COOK. Yes, sir.

Senator HARTKE. They were the first approved?

Mr. COOK. That's right.

Senator HARTKE. That is what I thought, typical Indiana. In other words, we look out for Lake Michigan, the rest of them pollute it.

Mr. COOK. Having worked in Indiana for a long time, I appreciate that.

Senator HARTKE. That's right. I mean that is typical. We have justifiable Hoosier pride, and I wanted to point it out.

Mr. COOK. Yes.

Senator HARTKE. What you are saying is, with the heavy pollution of the water around Green Bay, they got rid of the alewives in that manner?

Mr. COOK. No, they didn't get rid of the alewives. The alewives don't penetrate those waters. The alewife is a sensitive fish.

Senator HARTKE. What we should do, then, is pollute the waters?

Mr. COOK. That would take care of it.

Senator HARTKE. Let me ask you a question. If that is true, there must be something in that pollution that is detrimental, or is somewhat offensive to this fish.

Mr. COOK. That's correct.

Senator HARTKE. All right. Do you have any scientists that could develop something which would actually not pollute the water, but have the same effect on this fish as the pollutant?

Mr. COOK. It isn't that easy.

Senator HARTKE. I am not asking that it be easy. We are asking for $5 million of Federal funds, so we are not thinking it's easy.

Mr. COOK. What I mean to say is this; the alewife will not live out its entire life in shallow water. Green Bay is shallow, and so is Saginaw Bay where they don't exist.

They are polluted because it is shallow. It's a rather complex, vicious cycle.

Senator HARTKE. In regard to this, about the pollution, do the dead fish, in effect, pollute the waters?

Mr. COOK. We consider the dead fish pollutants; yes, sir.

Senator HARTKE. They are a pollutant?

Mr. COOK. Because they restrict several uses of the water. If we use the definition of "pollution," that is restriction of uses, and certainly this is a pollutant, and a very serious pollutant. It restricts recreational use and water supply.

Senator HARTKE. Does it have any detrimental effect upon the general overall quality of the water?

Mr. COOK. No, sir.

I started to say a while ago, in 1962 and 1963, when we were studying the entire Lake Michigan for water quality, we could find no deterioration of water quality during the die-off of the fish.

At the same time, this year, we immediately took steps after the die-off started to determine whether or not water quality was deteriorating, and we could find no evidence of that.

We tested for pesticides and other toxic substances. We tested for bacteria. We could find no high elevation of bacteria.

Senator HARTKE. In other words, the mere fact that there were large numbers of these alewives dying, and even a lot sinking to the bottom, probably, of the lake, they had no real effect upon the quality of the water as far as its use?

Mr. COOK. That's right, sir.

No measurable effect.

Senator HARTKE. No measurable effect?

Mr. COOK. That's right.

Senator HARTKE. That is a fact.

What about the dumping of that sludge?

Mr. COOK. Well, I will correct you a little bit. I heard you this morning——

Senator HARTKE. All right. You correct me.

Mr. COOK. The principal pollutants involved in the dredging of material are those from industry.

Senator HARTKE. From industry?

Mr. COOK. From industry, iron, oil, other byproducts of manufacture.

Senator HARTKE. Wait a minute. You are talking about the pollutants from the sludge from industry?

Mr. COOK. Principally.

Senator HARTKE. Or the principal pollutants of the lake——

Mr. COOK. No, the pollutants in the sludge that is dredged from the harbors and rivers are principally industrial pollutants.

Senator HARTKE. Well, now, this stuff they were taking out of the Chicago River, isn't that where it was taken from?

Mr. COOK. No, sir, not this year. Not to my knowledge.

Senator HARTKE. Where was the Army Corps of Engineers taking it from?

Mr. COOK. From the Calumet River.

Senator HARTKE. Calumet River?

Mr. COOK. Yes.

Senator HARTKE. From the Calumet River. Now, wasn't this the sludge that was left after the water had gone through the filtration plant?

Mr. COOK. No. I think the analyses show most of these were industrial pollutants. There were some materials, organic sludge, from sewer overflows, but I think the large bulk of the pollutants were industrial.

Senator HARTKE. Will you do me a personal favor on that? Will you go back and examine that, and I will go back and we will find out, and one of us is going to stand corrected, and I am not sure which one.

Mr. COOK. We have a report on that, sir. I will make it available to you.

Senator HARTKE. All right. Let me ask you a question. When that sludge, no matter what the pollutants are, whether industrial waste or human waste, are taken and dumped out into the so-called deep part of Lake Michigan, what does that do to the water?

Mr. COOK. Well, actually, it has two or three effects. You are not only stirring up pollutional material that was settled where it was in the harbor or river, but you are stirring it up and altering water quality there. Then you are trailing the stuff into the lake and then you are polluting the water where you are dumping it, so you are creating it where it didn't exist before.

Senator HARTKE. Do you have any authority to intervene in such actions?

Mr. COOK. We have intervened, Senator. We now have a two-department agreement on how we proceed from here.

Senator HARTKE. Is the Army Corps of Engineers still dumping that stuff from the river——

Mr. COOK. Yes, sir. They are.

Senator HARTKE. Out in the lake?

Mr. COOK. Yes, sir.

Senator HARTKE. Right now?

Mr. COOK. I think so.

Senator HARTKE. Can you go into court and obtain an injunction against them?

Mr. COOK. No.

Senator HARTKE. Why not? Could we give you a law to do that?

In other words, if we secured the authority, would you be the proper authority to go out and do that?

Mr. COOK. I couldn't say, sir. I would rather you would go to somebody higher in my Department than me for an answer to that.

Senator HARTKE. Do you have any lawyers in your Department?

Mr. COOK. In Washington, we have a solicitor; yes, sir.

Senator HARTKE. You don't have any here in the regional office?

Mr. COOK. No, sir. We haven't.

We have a two-department agreement that they will proceed——

Senator HARTKE. Which are the two departments?

Mr. COOK. The Department of Interior and the Department of the Army——

Senator HARTKE. Yes.

Mr. COOK. Have worked out an arrangement whereby they will continue dredging under studies by us as to the effects, and studies to find alternative methods of disposal.

Senator HARTKE. Now, they could take that and dump it down some of those old wornout quarries around Chicago?

Mr. COOK. No, sir.

Senator HARTKE. Why not?

Mr. COOK. They would pollute the ground water in some cases.

Senator HARTKE. What are they doing? Part of it, they are being diked——

Mr. COOK. We have two projects.

Senator HARTKE. Doesn't that pollute the ground water?

Mr. COOK. No.

Senator HARTKE. But it just lays out there, and in the middle of no place, and dries?

Mr. COOK. They have actually created land, islands or peninsulas by this diking off method.

Senator HARTKE. In other words, what they are doing, though, is creating land. They are diking off a part of the lake——

Mr. COOK. Yes.

Senator HARTKE. And pushing out further into the lake?

Mr. COOK. Yes; that's right.

Senator HARTKE. And there are no adverse effects of that whatsoever?

Mr. COOK. These are being studied—I don't say there are no adverse effects.

Senator HARTKE. Who is studying this?

Mr. COOK. The Department of the Army.

Senator HARTKE. I don't trust that Department of Army. They dumped that stuff out there in the first place.

Mr. COOK. I can't speak for them, sir.

Senator HARTKE. I know, but you people are charged with water pollution——

Mr. COOK. Right.

Senator HARTKE. The Army is charged with the dredging of the river for commercial transportation——

Mr. COOK. Yes, sir.

Senator HARTKE. And for transportation; that is their responsibility.

Mr. COOK. Right.

Senator HARTKE. They do not have a primary responsibility concerning pollution control, so I would hope that you people would keep us fully informed, and I am disappointed, very disappointed to find out they are still dumping that in the lake.

Mr. COOK. I would like to add our real concern is to eliminate the pollution in the first place.

Senator HARTKE. Yes. Now, let me ask you about that: If you had a secondary treatment plant, would that eliminate that problem?

Mr. COOK. Not entirely; no, sir.

Senator HARTKE. Well, is the fault now that there is not a secondary treatment plant?

Mr. COOK. No, we have secondary treatment plants and they are well operated.

Senator HARTKE. This is in Chicago?

Mr. COOK. Throughout the entire Calumet area.

Senator HARTKE. Throughout the whole Calumet area, they all have secondary treatment plants?

Mr. COOK. Yes, sir. Unfortunately——

Senator HARTKE. What else would they have to do?

Mr. COOK. If they removed 95 percent of the solids and sewage, this is very good.

Senator HARTKE. Yes.

Mr. COOK. When you are handling volumes in the billions of gallons, you see, even 5 percent of it is deposited, and we have the problem of sewer overflows during storms.

Senator HARTKE. I see.

Mr. COOK. I would like to mention one other thing, Senator. It was brought up by the lady from Michigan City and I think it perhaps is a more important problem to us than even the alewives, and that is what she called seaweed.

Actually, it's filamentous algae, the principal one being called *Cladophora*. I think within 2 or 3 weeks, we are going to be faced with

this littering our beaches with somewhat the same effect, where the flies lay their eggs and the maggots grow, and they develop more flies, and the odor is very bad.

Senator HARTKE. What causes this?

Mr. COOK. Over fertilization, pollution; yes, sir.

Senator HARTKE. Over fertilization. That is just——

Mr. COOK. The nutrient——

Senator HARTKE (continuing). Another way of saying pollution?

Mr. COOK. Nutrients in sewage, agriculture——

Senator HARTKE. Let me ask you, in regard to that, how much of the Lake Michigan area does not have secondary treatment?

You say everything in the Calumet area has——

Mr. COOK. As far as I know, every treatment plant in the Lake Michigan Basin has secondary treatment. I could be wrong. There may be two or three that are not.

Senator HARTKE. What about in Green Bay. You mentioned that a moment ago; why is that so bad?

Mr. COOK. Green Bay receives, and has for many, many years, the wastes of the pulp paper industry along the Fox River Mills, and millions of gallons a day of heavily fertilized material such as phosphates, sulfates and all of that, they grow slime and algae in the bay.

Senator HARTKE. Are they under any type of order to cease and desist?

Mr. COOK. Those that have faulty treatment are under orders by the State of Wisconsin.

Senator HARTKE. Somebody raised a question about seagulls and said that there is an absence of seagulls and they would be a help.

What about seagulls?

Mr. COOK. I have seen the seagulls turn down a meal of alewives.

Senator HARTKE. All I can say is that anyone who suggested we ought to keep these things around for some future use, I certainly question that.

My opinion is that we should eliminate them.

Mr. COOK. I agree.

Senator HARTKE. Eliminate this fish and start with something else——

Mr. COOK. Yes, sir.

Senator HARTKE (continuing). Start all over again.

All right. Well, I want to thank you, Mr. Cook, for coming. I just hope you will keep us posted, because you have a big job on your hands and it's going to get bigger as the population grows here.

Bill Babinsack, State legislature.

STATEMENT OF WILLIAM BABINSACK, SPOKESMAN FOR THE LAKE COUNTY DELEGATION; MINORITY CAUCUS CHAIRMAN

Mr. BABINSACK. Senator Hartke, ladies and gentlemen, my name is Bill Babinsack. I am minority caucus chairman; also I am the spokesman for the Lake County delegation, and also a member of the legislative council.

As our Lieutenant Governor had suggested, if in any way we can cooperate in setting up any committees to help in this problem, I assure you we will be glad to assist.

Speaking for the Lake County delegation, with us this morning we have Representative Marion J. Bushemi, Nick Angel, Senator Christy, Representative Paul Kric, and Representative Adam Benjamin, each and every one of us from the Lake County delegation, which consists of 11 State representatives and five State senators, have had considerable and numerous amounts of telephone calls with the problem of the alewives that have been affecting our area.

I am very much interested in what this alewife situation can do to the lakes of our surrounding area, if the alewives could go into the tributaries from Lake Michigan, into our lakes, and cause a considerable amount of damage to our fish in our respective lakes. This is a matter which has not been brought up, and I am just wondering if this could cause a problem for our recreational facilities, besides Lake Michigan, and if you can get the answer for that, Senator, I believe that this should be taken into the records and studies made, because I know in Cedar Lake they had a considerable amount of shad, and I suspect probably in many times they have traveled through—they could catch onto these fish and then drop them into these different lakes, and through the winds and storms that we are having, and I think this is a serious problem, not only for Lake Michigan, but I believe this could become a serious problem for all of the other lakes in the particular area.

Senator, I don't want to take up much more of your time, but on behalf of the members of the legislature, we appreciate and we thank you for the assistance which you are trying to do for not only Lake Michigan but the State of Indiana, in having a solution to this problem.

Thank you, Senator.

Senator HARTKE. Thank you, Bill. Thank you and the delegation. We will check into that and by having it in the record, I am certain that these other agencies will make a note of it.

Averill C. Colby, division superintendent, Power & Fuel Division, Gary Steel Works, United States Steel, Gary, Ind.

STATEMENT OF AVERILL C. COLBY, POWER AND FUEL DIVISION, DIVISION SUPERINTENDENT, GARY STEEL WORKS, UNITED STATES STEEL

Mr. COLBY. First of all, I appreciate the privilege of appearing here today in support of statements that have been made prior in regard to the tremendous cost that the alewife problem has caused industry; specifically, the problems that it has caused United States Steel, the Gary works.

Briefly, I would like to express this by a brief recitation of our experiences in 1966, our preparations for 1967's problem, and our evaluation of what we have found.

In 1966, we had the first major problem with the fish that caused major facility outages which amounted to over 200 hours combined of major facilities being down between April 12 and April 30 due to fish entering one of our four pumping station inlets and congesting the water distribution system.

Gary works uses approximately 600 million gallons per day—almost a third of the quantity of water that the Chicago filtration plant han-

dles in a day, so this point out the importance of water to our Gary plant.

After this experience in 1966, we were informed by the bureaus, and by the other organizations around Lake Michigan that we could expect from 10- to 12-percent increase in the problem in 1967. Therefore, in preparation for that, we have installed air screen facilities; we have investigated the installation of nets in front of our harbor, and also we have contracted for commercial fishermen.

Because of the storm situations that occurred during the period from April 13 of this year until approximately the first of May, we did not experience the great rush that we had experienced in 1966.

Through sonar equipment we followed the path of the fish, and we found that, on the approach of these storms, the fish would disappear from our harbor and our slip area and go into deeper waters of Lake Michigan and, as I say, the sequence of storm conditions protected us mostly, and over this 2-week period that we had expected the large run of fish; we have found it difficult to evaluate the effectiveness of the air screen.

We found that this lake is not favorable to the use of nets for our purposes because of the storm conditions. We feel it's almost impossible to maintain net installations along the southern shore of the type that we require.

Certainly we appreciate the interest of the commercial value of the alewife, but our concern, of course, is mostly with the protection of industrial facilities. We feel, therefore, that attention and methods of handling or harvesting the fish alive should be prime interest rather than the dead fish.

We also recognize that the dead fish will certainly be a problem next year. We hasten to add that our evaluation of commercial fishing as we know it, and have experienced it at Gary, is not the answer.

We feel that a much more sophisticated method or fishing fleet would be necessary to protect the southern end of the lake in future alewife runs.

Well, I think in brief, that gives our story; we are much concerned about 1968.

Senator HARTKE. Do you have any estimates at all, Mr. Colby, as to how much additional expenses were incurred by United States Steel?

Mr. COLBY. In the preparation——

Senator HARTKE. In the control of the alewives.

Mr. COLBY. Well, our efforts run into the six figures, in the installation of the air screen, the contract costs of the fishing fleet, and so forth, have run, as I say, into six figures.

Senator HARTKE. Did you actually contract with fishing vessels?

Mr. COLBY. That is correct, sir. We contracted for the fishing with a company headquartered in Milwaukee.

There were six fishing boats available; fortunately, we didn't require this number, but our experience in the techniques that they used, and the time, and so forth, we feel that it would not protect us during such a run as we experienced in 1966.

In 1966, we handled in excess of 300 tons of fish in one of our four pumping stations, that we were able to weigh.

This year, the commercial fishermen fished within our harbor and in our slip at Gary, about 300—close to 350 tons.

But, as I say, with the time and the handling techniques, we feel that a much more sophisticated type of fishing—so when we talk about commercial fishing and putting small fishing boats in the lake, we don't feel that that is the answer for next year.

Senator HARTKE. Thank you, sir. I appreciate your coming on in.

Mrs. Charlotte Read is here, representing the Porter County Izaak Walton League. Good afternoon.

STATEMENT OF MRS. CHARLOTTE READ, PORTER COUNTY CHAPTER OF THE IZAAK WALTON LEAGUE OF AMERICA, INDIANA DIVISION

Mrs. READ. My name is Charlotte Read. I am here on behalf of the Porter County chapter of the Izaak Walton League of America, Indiana Division.

On behalf of the members of the Porter County chapter of the Izaak Walton League, I wish to express our appreciation for the interest that you have shown in conducting this hearing, and for the opportunity to express our support of this bill.

The basic problem may be of greater importance than the obvious discomfort to humans caused by billions of decaying fish deposited on our beaches.

The Izaak Walton League has long attempted to point out that fish kills are symptomatic of water resource problems that affect all segments of our society.

Any fish kill is a warning that aquatic life of a body of water has been upset and the cause of this upset or imbalance is of immediate concern to all who live in the surrounding region.

There are, of course, many immediate problems associated with the waves of dead alewives washed upon our shores; the stench from the decaying fish could be noticed not only along the beach itself, but for some distance inland. There was a corresponding increase in flies and other insect life.

These factors not only made life unpleasant for residents of the area, but caused financial loss to the businessmen of the community. I don't know the dollar loss, but I presume it must be considerable.

But from all of this hopefully may come some good; the dead fish made the people of the communities bordering Lake Michigan aware of the results of the progressive change in the composition of the aquatic life. The problem of billions of dead alewives littering our beaches is a comparatively recent one. The population explosion experienced by alewives has been phenomenal within the period of the 1960's.

This imbalance in the aquatic life may portend even greater problems if we do not determine the cause and find a remedy.

All the States bordering the Great Lakes are affected. No one county or State has the resources to determine, evaluate, and make recommendations for corrective action.

We, therefore, urge the Congress to pass this bill as a first step in preventing both present and future problems relating to the overall health of the Great Lakes, and the people who depend upon them for the basic necessities of life.

Thank you.

Senator HARTKE. Thank you.

Mrs. READ. And I might say further, if you are going to pursue a course to stop the Army Engineers from dumping things into the lake, I would be the first one to write a letter supporting you.

Senator HARTKE. You write a letter. I will appreciate your writing. I intend to stop the Army Engineers in this. This is one thing we can do something about. It doesn't take an expert mind to know you shouldn't take pollutants and dump them into the middle of the lake.

Mrs. READ. As the mother of five children who use that lake, I heartily agree with you.

Senator HARTKE. I compliment you on having five, but having seven, you see, I outdo you by two.

Mrs. READ. Thank you.

Senator HARTKE. Thank you, Ma'am.

Leland Chandler, professor, ecologist, Department of Entomology, Purdue University, West Lafayette, Ind

STATEMENT OF LELAND CHANDLER, DEPARTMENT OF ENTOMOLOGY, PURDUE UNIVERSITY, WEST LAFAYETTE, IND.

Professor CHANDLER. Time was so short that no prepared statement was made.

I have been very much interested in the testimony given today, and I find that there is quite a dichotomy——

Senator HARTKE. Is that microphone working?

Professor CHANDLER. There seemingly is a dichotomy which has developed here, which I think shows that the problem as many aspects, and many facets, and I would like to speak only on the biological aspects.

I think the data presented here today by the people directly concerned with the research has been of an excellent quality, and I think it has been truncated only because the situation demanded brevity; I think the background that was given here today on the alewives and related organisms has just been superior.

The dichotomy that I feel has developed has been the dead fish on the shore, and the live fish in the lake. I think these two problems may have to be treated separately.

For one thing, I am afraid that because of public health problems—and these certainly exist—and because of industrial problems—and these certainly exist—that perhaps pressure will be brought to bear on the biologists to engage in a crash program of a biological system which does not lend itself well to crash programs.

For instance, it has not been too many years ago when the major concern of those people around the Great Lakes was the great hordes of May flies that emerged in May and June and caused the closing of the boulevards and so forth.

This was probably the best biological indicator that we had that the water was very good. These were rather short lived, but the time that they did emerge they occurred in tremendous numbers.

Then came the sea lamprey; now we have the alewife. All people who have testified here today have shown that these are interrelated and complex changes of things, and to upset the balance any more triggers almost an unpredictable phenomena in other areas, so inso-

far as the biologist is concerned I think its research is on a high plane, but it must not be involved in a crash program.

Eradication has been suggested. Suppression by several means has been suggested, and these are going to have to be worked out with wisdom and scientific knowledge, and not with some sort of temporal expediency.

Senator HARTKE. Mr. Chandler, let me ask you, is any work being done at Purdue University that you know of.

Professor CHANDLER. Not on the alewife problem directly. We do have a water resources council, which is very active.

Senator HARTKE. Under whose jurisdiction is the water resources council?

Professor CHANDLER. This is U.S. Department of Interior funding.

Senator HARTKE. Department of Interior?

Professor CHANDLER. Yes, sir.

Senator HARTKE. Now, has the Department of Natural Resources of the State of Indiana requested you to do any work in this field?

Professor CHANDLER. No. We have requested the department of natural resources to aid us in certain aspects of our work, and they have always been very glad to do this.

Senator HARTKE. Could you do such work at Purdue? Is there any research that could be conducted at Purdue?

Professor CHANDLER. We could not be involved in the alewife program.

Senator HARTKE. Why not?

Professor CHANDLER. One of the reasons is that we are located geographically too far away.

Senator HARTKE. At Purdue University? Purdue University has an extension up here, do they not?

Professor CHANDLER. This would be our great hope, on our regional campus.

Senator HARTKE. Don't you have a campus here?

Professor CHANDLER. We have two of them. At Michigan City and——

Senator HARTKE. At Michigan City. Where is the other?

Professor CHANDLER. Calumet Center.

Senator HARTKE. I understand that, but I mean just because Purdue is at Lafaytte doesn't mean they can't concern themselves. It happens to be a State university. It is a land-grant college, and money is coming from the Federal Government as well as the State of Indiana.

As a land-grant college, I would think that you have a responsibility here in this field. I would hope somebody at the university would think so.

Maybe they ought to voluntarily give some consideration to paying back Uncle Sam for the fact that they got their original right to exist from the Federal Government in 1862.

Professor CHANDLER. Well, we accept this responsibility, and I am here voluntarily.

Senator HARTKE. I know you are, and I appreciate that. I know it is sort of unfortunate in a way to say this to you. I would hope that you would carry this back to your department head, and let him carry it to the board of trustees, and that they would give consideration to coordinating some type of biological program with the Department of In-

terior, and the department of natural resources. We can save money and utilize those good brains we have there, like yours. We need good people to help eliminate a very serious and longtime problem. We don't have a crash program but whenever you have a situation where one species of fishing has taken over 90 percent of Lake Michigan, it looks to me as if they have already crashed the program, and the question is how to uncrash it. Do you understand?

Professor CHANDLER. Yes, sir.

Senator HARTKE. All right, sir. I really appreciate your coming.

All right. Mr. Carl Broman of the Youngstown Sheet & Tube Co.

STATEMENT OF CARL BROMAN, ASSISTANT SUPERINTENDENT OF UTILITIES, YOUNGSTOWN SHEET & TUBE CO., EAST CHICAGO, IND.

Mr. BROMAN. Good afternoon. My name is Carl Broman, Assistant Superintendent of Utilities at Youngstown Sheet & Tube. I have a prepared statement I would like to enter into the record.

Snator HARTKE. It will be entered.

Mr. BROMAN. Alewives first became a concern during the spring of 1962 when large schools of almost lifeless ones were pushed into the intake in such large numbers that they had to be removed by the ton with a bucket crane. The intake was protected with a skimmer, electric fish shocker, and traveling screens which proved entirely ineffective and great numbers of fish went over the traveling screens into the service water system of the plant. When this occurs, lack of cooling water causes loses to the blast furnaces, open hearths, hot strip, and all hot rerolling operations. This results in either delays or complete shutdown of the mill affected.

Prior to 1966, when a bubbler which sets up an air barrier from the bed of the intake and tends to deny access to our intake, the harbor works annually experienced severe invasions of the alewives.

Within limits, this air bubbler proved effective except during a period of a severe storm when a large school was pushed through the air curtains and did result in shutting down some of the mills.

It is difficult to accurately determine the loss of company product and delays to customers. Monetary costs due to excess maintenance and operation vary with the severity of the problem and can conceivably be extremely high. It has been our experience that the problem is increasing in severity and unless measures are taken to reduce or eliminate these fish our operations will be seriously affected.

Other than that I would like to say on behalf of Youngstown that we favor Senate bill S. 2123 very heartily. While we have been able to cope with this problem up to this year, we are greatly concerned over the situation in Lake Michigan.

While our expenses have possibly been in terms of tens and twenties thousands of dollars, we are very concerned that if this condition continues to exist we may be facing some serious effect to our operation, where damage can go as high as millions of dollars.

Thank you very much.

Senator HARTKE. Thank you very much, Mr. Broman.

Who else care to be heard?

Mr. MILLER. I didn't intend to testify here. I was originally scheduled to testify in Milwaukee.

STATEMENT OF JIM MILLER, PRESIDENT, LAKE INDUSTRIES, INC., MILWAUKEE, WIS.[1]

Mr. MILLER. My name is Jim Miller, and I am president of Lake Industries, Inc., in Milwaukee.

Senator HARTKE. Oh, yes. I'm sorry. Let me say to you, sir, that originally, as you know, there were 2 days of hearings scheduled, which I was going to chair in Wisconsin, and, as I indicated previously, the cancellation was not due to my not being able to go. I would have been there. It would have been held last Friday and Saturday, but due to the situation developing in Milwaukee, over which I certainly had no control——

Mr. MILLER. I don't think any of us did.

Senator HARTKE. Well, you may proceed.

Mr. MILLER. The only reason why I am here is to say I will in the future when you do hold the hearings in Milwaukee give testimony at that time. I don't have any armor along with me now, but I am in the business of utilizing these alewives for fish meal and oil, making a product, making a living off the alewives.

Senator HARTKE. You make a living off the alewives?

Mr. MILLER. Yes.

Senator HARTKE. There is somebody doing all right, thank goodness.

Mr. MILLER. Not too good, but it could be better, and we think we have got a solution that we could at least eliminate the dead ones off the beaches, and someday in the future probably control the population of the alewife through effective use of commercial gear to harvest these things.

We have a real source out here that is worth many million of dollars, and it is going unused virtually, uncapped.

Senator HARTKE. Are you referring to a machine to keep them off the beaches?

Mr. MILLER. We can keep them off the beach by taking the dead ones off the surface is primarily what we do, primarily trawlers. We produce the fish when they are alive, swimming in deeper depths of water, and we do not necessarily produce the dead ones, although we can.

This year we have devised methods of taking these things off the surface of the water.

Senator HARTKE. Yes. Now, in regard to that, the projection on the amounts which can be processced, the total at the present time, for 1967, according to the Bureau of Commercial Fisheries report, is 31 million pounds. They give a production total estimate by 1975 of 76 million pounds, while at the same time it is estimated that there are about 2 to 3 billion pounds of alewives.

Mr. MILLER. It depends on who you get the figures from, and who is doing the figuring. Back in 1958 an advisory commission to the Secretary of the Interior advised him at that time there was somewhere between 2 to 3 billion pounds that should be harvested annually out of Lake Michigan without hurting the reproductive capacity.

Since that time we have had quite a bit more of an increase in the fish. We could potentially produce out of Lake Michigan without

[1] The prepared statement of Lake Industries, Inc., will be found on p. 172.

hurting this reproductive capacity as much fish as what is produced in all the 50 States put together. We have got a great resource here, but it is going for want now, and I think there is one way we could both help the communities, the States that border on Lake Michigan in removing these dead fish.

These fish are all right for processing, too. We process only dead fish; some are just a little bit deader than others.

Senator HARTKE. Well, let me ask you a question on this. You mean we have put up with this all summer and we wouldn't have had to. Is that what you are telling me?

Mr. MILLER. I am saying that.

Senator HARTKE. You are saying that?

Mr. MILLER. If we had known, and if we knew there was an interest. Now, we don't make our living off of taking the dead ones. We can't take that much for a paying proposition. We do make a living off taking live ones. This is prior to the time the heavy influxes come to the beaches.

The fish are normally in deep water, in colder weather, and prior to the month of June. After June normally our business is kind of "dead." Yet we have got the equipment, the talent, we have got hundreds of years of experience.

By the way, I represent all the commercial fishermen that are producing alewife in the south half of Lake Michigan.

After about June 1 and 15 our gear and our talents kind of go wasted because these fish are inhabitating areas that we don't normally fish. We do catch some. We could catch better than 90 percent of all the dead ones that are on the surface, possibly even more than 99 percent.

Senator HARTKE. Have you been in touch with the Department of the Interior, and the Bureau of Commercial Fisheries people?

Mr. MILLER. Yes, we have.

Senator HARTKE. You have worked with them?

Mr. MILLER. Yes, we have. I will have a full report and a written documentation. For example, in Milwaukee we have done a job just in the city of Milwaukee in the harbor of Milwaukee.

We don't have a problem that other places have had, although at one time—this is going back to 1961, the city of Milwaukee and the harbor of Milwaukee picked up off the surface of the water around three-quarters of a million pounds.

Now, don't quote me right to the pound, but this is approximately what is was. In 1962 we did some work in the harbor with traps and trapping these fish before they got in, and only a couple of them on an experimentation basis. The amount of fish that they took this year was approximately 150,000 pounds off the surface, and the population of fish was growing.

We get up to 1965 and 1966, rather, last year, and the amount that they harvested, that the city had to pick up, amounted to 25,000 pounds, so, in other words, our production increased and their production decreased, the city's production, so we have shown that we can effectively reduce the numbers.

Senator HARTKE. What about the beaches around Milwaukee?

Mr. MILLER. I am talking strictly in the city of Milwaukee proper, inside the harbor. The beaches, we have never done anything with.

Senator HARTKE. Did they have alewife problems this summer?

Mr. MILLER. They had a terrific problem. They contacted me, however, like the city of Chicago has contacted me, but right at the end of the season. They didn't know which way to go. I had contacted the city of Chicago going back to——

Senator HARTKE. Have you talked to Mr. Colby out there, from United States Steel?

Mr. MILLER. I worked for Mr. Colby. I am the guy he was talking about that fished for him.

Senator HARTKE. He didn't sound too enthused.

Mr. MILLER. I don't think he was knocking me.

Senator HARTKE. I didn't mean he was knocking you. He just didn't seem to be enthused with that type of result. Am I wrong?

Mr. MILLER. I think he had results. That plant was the only plant that was not shut down in this year when I was there working for him.

Senator HARTKE. All right. Do you have any problems concerning the granting of licenses, or is that a problem for you?

Mr. MILLER. No, not as yet. We have been restricted in certain areas where the people don't want us to go to catch fish that are no longer there, but it is slowly but surely working itself out.

Senator HARTKE. All right. Thank you very much, sir.

Any other witnesses who care to be heard? Yes, come right on.

STATEMENT OF EUGENE PILON, LAKE EXCURSIONS, INC., MILWAUKEE, WIS.

Mr. PILON. My name is Eugene Pilon. I am with Lake Excursions, Inc., Milwaukee, Wis.

First of all, I wish to commend you, Mr. Chairman and the members of the committee, for holding the hearings in Muskegon, Mich., and also here in East Chicago to hear our problems with the alewife in the Great Lakes, especially in Lake Michigan where they are in greater abundance.

I believe that your investigation will serve two valuable purposes: First, it will provide the committee with a better understanding of problems caused locally on Lake Michigan. Other Great Lakes, as we know, have this same problem. Secondly, it will assist your committee in determining what remedies may be best to fight the alewife.

The history of the alewife, and I'm going to condense it, is taken from the booklet that was issued by the Bureau of Commercial Fisheries, Ann Arbor, Mich., called "Lake Michigan Alewife Situation—1966." I quote:

> The alewife is an anadromous marine fish found along the Atlantic Coast from Labrador and the St. Lawrence River drainage in Ontario and Quebec to Florida. It probably was originally landlocked in Lake Ontario and in some tributary lakes. However, it may have been introduced or was a recent immigrant to these lakes. It was known to be well established in Lakes Seneca and Cayuga in New York by 1868, in Lake Ontario by 1873, and has now spread throughout the Great Lakes. The first specimen was taken in Lake Erie in 1931, in Lake Huron in 1933, in Lake Michigan in 1949, and in Lake Superior in 1954. The alewife became abundant in Lake Erie by 1950 and in many parts of Lake Michigan and Huron by the mid-1950's. It dispersed rapidly throughout Lake Superior, but as yet it is not nearly as numerous there as in the other Great Lakes. The alewife is being studied most intensively by the Bureau of Commercial Fisheries in Lake Michigan, because it

has become much more abundant there than in the other Great Lakes. It was not so abundant in Lake Michigan until 1956, but since that time it has increased to phenomenal numbers. A major investigation of its life history has been initiated by the Bureau recently. Although most of the studies are barely under way, certain facts concerning its natural history in Lake Michigan have come to light.

The alewife is successful in freshwater habitats varying from small, shallow, warm lakes to large, deep, cold lakes. They hold up very well under competition with various species.

Landlocked alewives do not make the long upstream spawning migrations characteristic of the marine fish. Some run a short distance up tributary streams to spawn while many simply move into shallower waters. In the Great Lakes these inshore spawning movements begin in April, so that by the end of the month most are in the shallow water of the lake or in tributary streams. Spawning takes place in the streams in late spring and early summer, after which the adults move back out into the lake. By August, adults may be found in almost all areas of the lake; the young begin appearing in the lake soon after spawning begins. By late summer they are spread widely in the warmer waters, mostly in upper surface levels. In the fall large numbers of young are present on the bottom near shore. In late fall all sizes of alewives move into the deeper areas of the lake. The alewife is the first fish species in Lake Michigan's history to have occupied all portions of its waters, top-to-bottom, shore-to-shore, and in the tributary streams. The alewife spends the winter in the deeper portions of the lake, where it occurs in huge concentrations near bottom.

Although the alewife moves into shallow water or ascends the streams in the spring, eggs are not deposited until the water warms up (usually 55–70°F.). The run is not always steady as it may cease for 2 or 3 days if the weather turns cool.

Freshwater alewives have approximately 10,000 to 12,000 eggs per female while marine fish have 60,000 to 100,000 eggs (marine fish have a much larger average size and are older). The eggs are heavier than water, slightly adhesive prior to contact with milt and water, harden at approximately 1 mm. Hatching begins 2 days following fertilization and is completed in 5 days. Eggs incubate 2–4 days at 72° F. and 6 days at 60° F. Alewife eggs will hatch in running water (56–60° F.) and in standing water (60–74° F.) with the incubation time varying between 81–132 hours.

Marine alewives are usually considerably larger than landlocked fish. Both exhibit early rapid growth that decreases as the fish matures. Most of the alewives on the spawning run in Lake Michigan are 5½ to 7½ inches long; few reach a size greater than 8 inches. Sizes smaller than 5½ inches are mostly immature, and for the most part do not enter the spawning streams. The spawning run consists mostly of fish which are 3 and 4 years old, but includes some 2-year-old males. Adult alewives are reported to average 5 inches in Cayuga Lake, 6 to 10 inches in Lake Ontario, and 10 to 11 inches in marine waters.

Alewife mortality has been receiving considerable publicity in Lake Michigan in the past few years. This annual mortality usually occurs in May, June, and the first half of July. The dates may vary somewhat from year to year, but the pattern remains constant. The dieoff reaches a maximum in late June or early July. It is not size specifically, as all sizes (3–6 inches) of fish are affected. The actual causative agent or agents (probably an interaction of several factors) of this mortality have not been isolated.

Definite proof of an adverse effect of alewives in the Great Lakes on other species has not been established, but there is some evidence that its presence has had a deterimental effect on some species. Spectacular increases in numbers of alewives coincided with drastic declines in abundance of lake herring in Green Bay (Lake Michigan), South Bay (Lake Huron), and Saginaw Bay (Lake Huron). The emerald shiner was extremely abundant in Lake Michigan up until the mid-1950's, but its population dropped to almost nothing within the first few years after the alewife had become numerous. Since the alewife feeds heavily on zooplankton, it must be considered a possible competitor with all young fish in Lake Michigan, because all species must subsist on zooplankton in their earlier stages. Such competition might not be detrimental—i.e., there might be enough plankton to go around—but the possibility that some of the natives species could be overwhelmed by alewives cannot be discounted. As regards the competition between alewives and perch, which is of concern to many people, only speculation is possible at present. The possibility of one particularly vulnerable stage

for perch, however, comes to mind. Perch spawning takes place in spring in shallow water, at the same time that alewives are extremely abundant in the same area. Evidence that alewives actually feed on perch eggs or larvae is lacking, and somewhat doubtful, but in any event it seems that newly hatched perch fry would face strong competition from large numbers of alewives in their presence.

End of quoted history.

It has been said that the lake trout slowly coming back will make a hearty meal of the alewife, but I quote from an article in Commercial Fisheries Review, volume 28, No. 8, 1966:

Preliminary information from laboratory feeding experiments designed to determine food preferences of lake trout indicated an apparent dislike for alewives. Lake trout from a hatchery sources, weighing 3 to 5 pounds, quickly caught and killed adult alewives, but did not swallow them. The lake trout readily ate freshly-thawed chunks of chubs (bloaters), but refused similar pieces of alewives. Essentially the same preference of bloaters was shown when the chubs and alewives were fed in freshly ground "soft pellet" form.

The many problems the alewives are causing are tremendous, one of which is the clogging of water intakes during spring spawning runs. The city of Chicago experienced periodic closure of the central pumping stations in 1965 and trouble in 1966 and 1967, while businesses, too, experienced difficulties. Another serious problem is the cluttering of beaches and harbors with the massive die-off, creating a serious pollution and health problem.

Lake Excursions, Inc., 8022 Harwood Avenue, Milwaukee, became interested in this problem in the fall of 1966; and after studying alewife fishing methods now used, proposed a number of changes. These changes were presented to Wisconsin Congressman Clement J. Zablocki. Arrangements were made in December of 1966 for a meeting with personnel from the Bureau of Commercial Fisheries, Ann Arbor, Mich., and the plan was submitted to them for evaluation. The plan was discussed in detail with the Bureau's personnel and also with Colonel Goodsell of the Great Lakes Commission.

On February 2, 1967, Congressman Zablocki introduced the first legislation, H.R. 4793, to fight the alewife. Then, I discussed this problem and plan with Wisconsin Senators Proxmire and Nelson and Wisconsin Congressmen Reuss and Schadeberg, who are interested in this problem along with others. Congressman Schadeberg has introduced legislation, H.R. 11271, and Senator Nelson has introduced S. 2123, and a number of other Great Lakes Senators have introduced bills. All bills have been similar to H.R. 4793 introduced by Congressman Zablocki.

After further meetings with the Bureau of Fisheries (the last meeting a week ago, August 1, 1967) and continued study, Lake Excursions believes it has the only reasonable solution now available to combat the alewife situation. The plan is threefold:

1. A specially designed out skimmer fleet that will skim off from the top of the water the floating die-off in harbors, rivers, hard to get spots and out in the lake. There would be three units consisting of one mother vessel which would have a package fishmeal plant on board for processing the fish and five skimmers which would be able to work in three different ways. When finished with an area or harbor, the skimmers would be ready to move on. The main thought is to be able to reach the die-off in the lake, by watching wind and weather conditions, before it hits the beaches. When the skimmer

fleet is finished with the seasonal die-off, it will be returned to duty as stern trawlers and can work with the main trawler fleet or work as independent fleets.

2. A specially designed in-fleet of beach and water skimmers that will skim off the surface of the water the dead fish in shallow waters of beach areas, and also will clean the beach of dead fish and debris. The special skimmers will also be able to work in the harbor and river areas, if needed. Their normal function would be to work and travel with the outer skimmers, but if need be, can travel by themselves over land.

3. A trawler fleet of larger vessels with a mother factory vessel. The mother vessel will be a floating fish protein concentrate plant with storage facilities and living quarters for trawler fleet personnel. Since the mother vessel will always be near the trawler fleet, many hours of traveling will be saved and the trawlers can be used to the fullest extent. Having the fish protein concentrate plant on board will help offset the expenses of the trawler fleet operation and the operation of the skimmer fleet. The trawlers will have more electronic gear, sonar for one, and will work in coordinated units of from three to five and will use the new electro-motivators in trawls in combination with a new method of midwater trawling. The mother vessel will also have the blessings of the people on land since she will be out in the lake where the smell of fish being processed should be—not on land presenting a very bad odor problem. Commercial fishermen will be invited to work along with the regular fleet with their boats and their catch could be purchased by the factory vessel.

This would be a fully coordinated effort between the B.C.F. and Lake Excursions due to the necessity of further research. A program allowed indiscriminately without a coordinated effort with the B.C.F. would do more harm than good. The alewife will probably never be exterminated, but it must be controlled in order to restore a balance to the Lakes. Since this program is not only for Lake Michigan but all the Great Lakes, the mobility of this operation cannot be surpassed by any other method for cleaning of lake surface die-off, for cleaning rivers and harbors, for cleaning beach areas (a major health and pollution problem) and for controlling the alewife with the main trawler fleet.

Working with the Bureau of Fisheries, we believe that the above plan is the best way known for early action to control this problem, and this program will have to be started soon if we are to be ready next spring for the alewife onslaught. We are now proposing that a Federal grant be made with Lake Excursions. Since the bills in Congress call for a 50/50 Federal and State effort, arrangements would have to make for States' appropriations when the Federal program is ready to be put into effect, so that the skimmer fleet can be started as soon as possible in order to be ready by next spring. Secondly, follow up as soon as possible with the trawler fleet which will take approximately 6 to 8 months to set in motion. I am optimistic that there is enough interest to set this plan in action so that we will not experience another alewife season like the past one.

Figures we have to date show the cost so far this year of cleaning beaches, harbors, et cetera, by States and municipalities amounts to

over $12 million. The estimated cost of the specialized fleets which I am proposing is as follows:

Skimmer fleet	$2,595,000
Skimmer fleet operating cost	1,070,632
Trawler fleet:	
Factory and 6 draggers	1,800,000
Operating cost	938,368
Factory and 12 draggers	2,300,000
Operating cost	1,338,368
Cost both fleets:	
Smaller (6) trawler fleet	4,395,000
Larger (12) trawler fleet	4,895,000
Operating cost (6)	2,009,000
Operating cost (12)	2,409,000
Income to offset cost	1,548,000
Net operating cost (6)	461,000
Net operating cost (12)	861,000

In closing let me thank you again for coming to our Lake Michigan area and we are confident that the hours which you have and will spend here will be worthwhile both for you in your job of legislating against the alewife and for us as beneficiaries of this program.

Senator HARTKE. Thank you very much, sir.

Anything further at this time?

(No response.)

Senator HARTKE. Any other witnesses? If not, these hearings are closed here, and the hearings will be continued at the call of the Chairman of the Committee.

(Whereupon, at 4:15 p.m., the meeting was adjourned, subject to the call of the Chair.)

(The following statements and communications were subsequently received for the record:)

STATEMENT OF HON. EVERETT MCKINLEY DIRKSEN, A U.S. SENATOR FROM THE STATE OF ILLINOIS

Mr. Chairman, I am one of the co-sponsors of S. 2123 to provide for the control of the alewife and other fish and aquatic animals in the waters of the Great Lakes which affect adversely the ecological balance of the Lakes.

I only wish I could plan to attend the hearings to be held on August 7, 1967, in the Elks Club Building Ballroom, 4624 Magoun Street, East Chicago, Indiana. However, the press of Senate business and previous commitments prevent me from traveling to Indiana at that time.

The alewife is now the dominant species of fish in Lake Michigan, and millions have washed ashore which have curtailed if not closed many recreational areas, not to mention the problem and cost of removal, and the great economic loss to many resorts and related business enterprises on the shores of Lake Michigan.

Such problems facing the metropolitan and industrial users of Lake Michigan water by the alewives is the clogging of water intakes during the spring spawning runs. The City of Chicago experienced periodic closure of Central (Downtown) Pumping Station in 1965. About four times as many alewives might be expected this year. The Bureau of Commercial Fisheries with headquarters at Ann Arbor, Michigan, is cooperating with the city and state in an effort to prevent a disastrous water stoppage next spring. Several electric utility companies in Chicago, Waukegan and Green Bay report similar difficulties.

Because of the cluttering of beaches and harbors with dead alewives from massive die-offs that occur with spawning migration, I strongly urge your committee to schedule S. 2123 for consideration in executive session as soon as public hearings are completed. The Great Lakes are the midwest's greatest asset, and it is essential that they remain an asset.

STATEMENT BY SENATOR GAYLORD NELSON

As the author of this bill, I am extremely pleased that the Senate Commerce Committee has moved so decisively on it. My distinguished colleagues, Chairman Magnuson and Senators Bartlett, Hartke, Hart and Griffin deserve high praise for their prompt attention to this matter which is of grave concern to all of us.

The tremendous die-off of alewives this past spring dramatically illustrated the enormity of the problem we are up against. The huge windrows of dead fish which piled up on many Lake Michigan beaches created not only a health hazard but also represented a serious threat to water based recreation.

The Door County Wisconsin Chamber of Commerce has estimated that the county's revenues from tourism this year are some 15 to 20% lower than last year when revenues reached $100 million. Some resorts are reporting cancellations of up to 25% of their pre-season reservations. Bad experiences in 1967 could affect the tourist industry for several years to come. Will the man who has a two week vacation take a chance on his vacation being spoiled by piles of dead alewives on the beach?

Cleaning up the dead alewives is a tremendous job and the expenses of it put a strain on state and local finances. The state of Michigan has estimated that it cost them $2,250,000 to clean up their Lake Michigan beaches. In Chicago during the die-off period it was costing $4500 per day to clean up the beaches. The city of Chicago disposed of over 4,600 cubic yards of dead alewives this year alone.

Gary, Indiana, has about 3½ miles of beach on Lake Michigan and it has been estimated that it costs 50¢ for every man, woman and child living in that city to clean up that small stretch of beach.

The explosion of the alewife population in Lake Michigan and the resultant disruption of the ecological balance have obviously created a serious problem. The die-off this year was the largest ever which has led some people to speculate that next year the population of alewives will be smaller. We have been told, however, that in the laboratory one female alewife produces 10,000 eggs and that 8,000 of them hatch.

There appear to be several ways to approach this problem. One is the introduction into the Great Lakes of predator species such as the coho and chinook salmon and the lake trout. Indications are that plantings made over the last couple of years have been tremendously successful. We must expand plantings of predator species and at the same time continue to look for new species which can not only serve as predators but also as resources for the sport and commercial fisherman.

Another way to help control the alewife population is to expand commercial harvesting and processing of them. In 1966 it was estimated that commercial fishermen and natural predators removed about 28.9 million pounds of alewives from Lake Michigan. At the same time, the Bureau of Commercial Fisheries said that there were between three and five billion pounds of alewives in Lake Michigan and that at least 200 million pounds could be harvested profitably each year.

The need for this bill is obvious. The Great Lakes—the greatest fresh water asset on the face of the earth—are threatened. They are threatened by pollution from various municipalities and industries. We are working to control this through cooperative efforts between state and local governments and the Federal government.

We have devoted a great deal of time and money to controlling the lamprey eel and our efforts have been largely successful. We must continue those control programs. This legislation is aimed at ecological disruptions caused, for example, by the alewives in Lake Michigan or by the smelt in Lake Erie. In order to preserve the irreplaceable resource, we must strive to right the balance of nature in the Great Lakes.

We are not going to solve the alewife problem over night. It can only be resolved by a sustained effort over a period of years, but it is critical that we start now. It is imperative that we implement both our research and our action programs as soon as possible.

STATEMENT OF HON. THADDEUS J. DULSKI, OF NEW YORK, ON THE ALEWIFE PROBLEM IN THE GREAT LAKES

Senator Hartke and members of the Merchant Marine Subcommittee of the Senate Commerce Committee:

I would like to congratulate you for conducting hearings on the important subject of the alewife "invasion" of the Great Lakes. The problem has reached

epidemic proportions in many areas. It has become increasingly obvious that strong action must be taken soon before the ecological balance of the Great Lakes suffers irreparable harm.

I represent much of Buffalo, New York, which is located on the shores of Lake Erie. We have become increasingly concerned with the phenomenal growth of the alewife population during the past few years. In Lake Erie, as in the other Great Lakes, the alewife is fast displacing several previously abundant—and more desirable—species. Evidence shows that their population is increasing in Lake Erie to such an extent that our industries and municipalities as well as the many people who use the lake for recreational purposes will soon be faced with a major crisis.

The population explosion of the alewife warrants serious concern for several reasons. They have a relatively short life-span. The dead fish are increasingly littering the beaches and waterways, creating unpleasant and unsanitary conditions. Dead alewives clog the intakes of large-volume water users such as municipal water systems and large industries. The alewife is also displacing many valuable fish of importance both to industry and the sport fisherman.

Expanded commercial exploitation of the alewife may help somewhat. The fish is used for such diverse products as fish meal and pet food, and the demand for the alewife appears to be increasing.

Nevertheless, expansion of the private sector cannot solve a problem of the magnitude with which we are now faced. Legislation is needed, and needed quickly, to bring the full resource of the Federal Government to the assistance of state and local governments in solving the problem.

S. 2123, I feel, is a step in the right direction and deserves serious study. The initial five million dollars in matching funds called for in the bill should provide a good start in encouraging the growth of Federal, state, and local cooperation to combat this menace to the ecology of the Great Lakes.

HOUSE OF REPRESENTATIVES,
Washington, D.C., August 8, 1967.

Hon. VANCE HARTKE,
Commerce Committee,
U. S. Senate, Washington, D.C.

DEAR VANCE: I appreciate your thoughtfulness in inviting me to testify during the special field hearings you are holding on the problems caused by the population explosion of alewives in the Great Lakes. Unfortunately, Congressional commitments prevent me from joining you in East Chicago, Indiana, for the hearings. However, I do take this opportunity to commend you and your distinguished colleagues on the Senate Commerce Committee for your early attention to the problems caused by the oversupply of these fish.

As you know, I have been long concerned about the maintenance of the proper ecological balance in the Great Lakes. For the past five years I have been privileged to serve on the Natural Resources and Power Subcommittee of the Government Operations Committee, which has held a series of hearings inquiring into the problems of pollution in the Great Lakes. As you can well appreciate, one of the Committee's prime concerns has been the impact that pollution has had on the ecology of these lakes.

The States which abut the Great Lakes now face a problem of crisis proportions as a result of the exploding alewife population. In the light of this fact, there can be little doubt that the legislation now pending before both the House and the Senate, S. 2123 and H.R. 11483 and H.R. 11485, should be enacted in the immediate future.

I have referred to the alewife in terms of crisis. I am certain that those who find their shorelines heaped with dying, dead, and decomposing fish would consider "crisis" a singularly mild adjective. These same people may have never heard of ecological balance, which is the essence of this legislation. But, while they are unfamiliar with the roots of the ecological crisis which they face, they are all too familiar with the problem itself.

This legislation, which authorizes the Secretary of the Interior to determine the exact dimensions of the alewife population and develop methods of controlling it, will hopefully provide us with sufficient knowledge to restore the proper ecological balance in the Great Lakes in the very near future.

The alewife problem is one which has developed at an explosive rate. Lake Michigan, perhaps, offers the best example of this explosiveness. A bureau of Commercial Fisheries publication indicates that the first alewife was identified there in 1949. Then, "It was not abundant in Lake Michigan until 1956, but since that time it has increased to phenomenal numbers." These "phenomenal numbers" represent the crisis which we must now resolve.

Residents of my own community of Rochester, New York, have reported to me that many Lake Ontario beaches have again this year been fouled by dead alewives. However, the problem created by these fish does not end with the matter of sight and smell on the Great Lakes beaches. Their vast numbers have apparently caused some other species of both sport fish and commercially valuable fish, such as the cisco, to virtually disappear from the Great Lakes. Further, during the spawning runs their numbers are so vast that the intakes for Chicago's municipal water supply system, which are located in Lake Michigan become clogged with alewives and the city's water supply is temporarily reduced. Electric power companies and steel mills have experienced much the same problems with their water supplies.

It takes little imagination to visualize the extent of potential damage caused by excessive numbers of alewives when one considers the cost of cleaning beaches; mass cancellations of reservations at beach resort areas; and disruption of both commercial and sport fishing on the Great Lakes.

Conversely, it is apparent from the magnitude of the present alewife fishing industry that we must control and not destroy the alewife population. The processing of alewives for fish meal and pet food has skyrocketed during the 1960's and it is anticipated that the total commercial catch of alewives this year will be approximately double the 29,000,000 pounds caught last year.

Because the vast majority of alewives die in three years or less, it is critically important that any program to reduce the alewife population be carefully conceived if this new segment of the Great Lakes' fishing industry is to be protected.

The research which this legislation would finance will not only serve to resolve the problems now caused by the alewife, but also will provide the information needed to intelligently manage this valuable biological resource.

The funds authorized under terms of this legislation, and the required matching State funds, would be a modest price to pay in comparison with the real and potential losses which inaction entails.

The proposed legislation calls not so much for an expenditure as an investment.

I again compliment you and the other members of the Senate Commerce Committee for your early concern for this serious problem which faces all of the States of the Great Lakes area. Be assured that many of my colleagues in the House share my concern over the alewife situation. I look forward to early House action on this subject and I hope that we will soon see the enactment of Federal legislation to assist the States in dealing with this problem.

With kindest personal regards, I am

Sincerely,

FRANK HORTON.

STATEMENT OF HON. CLEMENT J. ZABLOCKI, OF WISCONSIN

THE ALEWIFE CRISIS: WHERE DO WE GO FROM HERE?

At the outset, Mr. Chairman, I want to commend you for holding hearings on the alewife problem. The people of our state and region appreciate this official expression of interest in a situation which greatly concerns them.

I also want to commend the junior senator from Wisconsin, the Hon. Gaylord Nelson, for the leadership which he has shown. He has done yeoman service in uniting a sizable group of Midwestern senators, of both political parties, behind a single legislative proposal, S. 2123—the measure before the committee today.

As you know, Mr. Chairman, S. 2123 is similar to legislation which I had introduced earlier into the House of Representatives as H.R. 4793. Unfortunately, my efforts to arrange for hearings on my proposal by the Fisheries and Wildlife Subcommittee of the House Merchant Marine and Fisheries Committee thus far have been without success.

It is regrettable, indeed, that the House subcommittee has not shown the foresight and initiative which your committee has, Mr. Chairman. You can be sure,

however, that should the Senate pass S. 2123, we in the House will be exerting every effort to obtain prompt action on our side of the Capitol.

Mr. Chairman, this marks the third time I have testified on the alewife problem before a committee of Congress.

There is a distinct difference this time, however. Today everyone knows what alewives are. There is widespread agreement that something must be done to prevent the kind of inundation which we have experienced in this summer of 1967.

Although gathering the figures would be difficult, I believe that the cost of this summer's alewife inundation may have been as much as $100 million.

Into that calculation must be added such factors as these:

The cost of removing the dead alewives by localities and private property owners.

The loss of business to resorts and beaches forced to shut down, or unattractive to prospective vacationers, because of the inundation.

The cost to cities and private industries alike of keeping water intakes free and clear of alewives.

The loss of revenues to companies forced to shut down because their water intakes became clogged and could not be immediately reopened.

It is my understanding, Mr. Chairman, that at least one steel company along the Indiana shore of Lake Michigan has reported losses of a half-million dollars a day for 10 days during the height of the inundation for a $5 million total.

Given such expenses, it is not difficult to see the cost to our people of this summer's alewife die-off reaching $100 million.

That loss may well be repeated next year—unless prompt and drastic action is taken.

Marine biologists have informed me that although the alewife population is expected to taper off in coming years, the die-off next summer may be as bad, or even worse, than this summer. Apparently there again is a heavy population of the species close to that point in the life cycle during which the die-off occurs.

I might point out that even if the population explosion among the alewife tapers off in the coming decades, as some have predicted, there will still be tremendous problems for lakefront communities and resort areas.

The situation likely will have a cumulative economic effect, that is, vacationers will avoid Lake Michigan resorts and cottages fearing that their beaches will be a mass of dead fish. The stigma might last for years.

It is also likely to have an adverse effect on expansion plans of industries which depend on a large water supply, or any enterprise which might wish to locate near the fresh waters of the Great Lakes.

Given the adverse economic implications of the annual alewife die-off, the amount of money authorized by S. 2123 is small, indeed. Moreover, since it would be granted on a matching basis, the $5 million will promote an actual expenditure of $10 million.

That amount, I believe, should be sufficient to launch the "massive and sustained" effort which Secretary of the Interior Udall has advised me will be necessary to bring the alewife problem under control.

We are all agreed, I think, on the need for a concerted campaign to control the alewife. There have been differences, however, on the approach which should be taken toward this objective.

It would be tragic, indeed, if we allowed such differences to sap our energies and impede our progress toward an effective remedy.

As a matter of fact, I believe that all parties concerned may be closer than may at first be apparent. The goal of all of us, it seems to me, is the restoration of an ecological balance in the Great Lakes.

Alewife control alone, of course, will not do the job. There are problems of water pollution and sewage disposal to be licked before we have restored the waters of the Great Lakes to pristine quality.

At the same time, however, controlling the alewife will be a giant step forward toward ecological balance. All of us look to the day when our lakes once again teem with desirable food and sport fish: lake trout, white fish, coho and chinook salmon.

Such an eventuality is in the best interests of conservationists, sportsmen, and commercial fishermen.

In any such program the stocking of desirable predator fish must definitely have a place. The State of Michigan has shown the way with its vigorous and energetic program of stocking the waters which adjoin its borders.

At the same time, however, it could be decades before the balance is restored through stocking. The predator fingerlings may be in danger of being eaten by the alewives. They may, indeed, compete initially for the same forage.

For that reason, commercial harvesting of the alewife must be fostered as an interim measure until more commercially-valuable fish once again populate the Lakes in sufficient numbers.

Finally, some steps must be taken to assist those communities along the Lakes' beaches which are experiencing littered beaches, clogged intakes and noxious odors because of the alewife inundation.

Predator fish stocking, commercial harvesting, and beach clean-up—all are a part of a balanced and integral program of alewife control.

The bill before the Committee today would foster such an approach. It also would promote cooperation among the states in the form of an interstate compact, should the affected states choose to enter such an agreement.

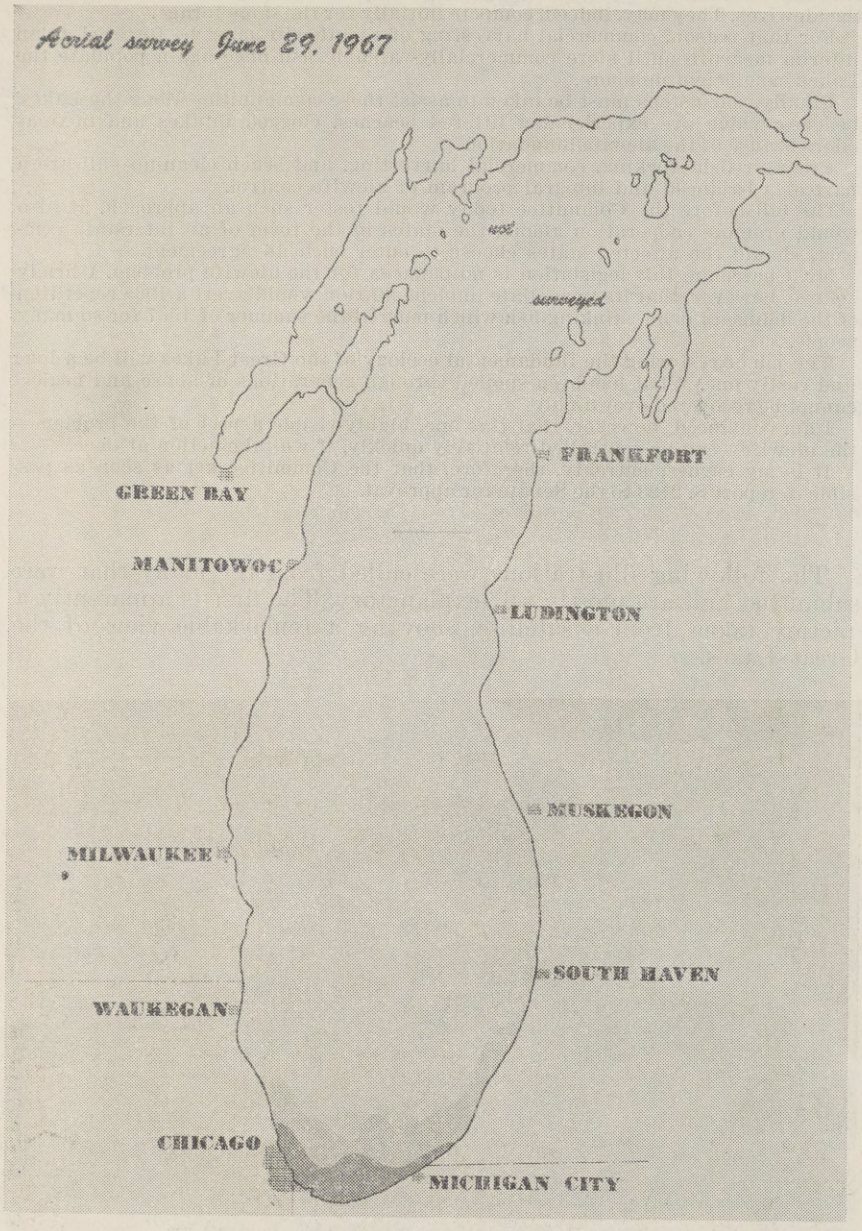
Mr. Chairman, this legislation is no panacea for the alewife problem. I firmly believe, however, that its immediate implementation would avert a 1968 repetition of the deluge of dead, stinking fish which marred the summer of 1967 for so many people.

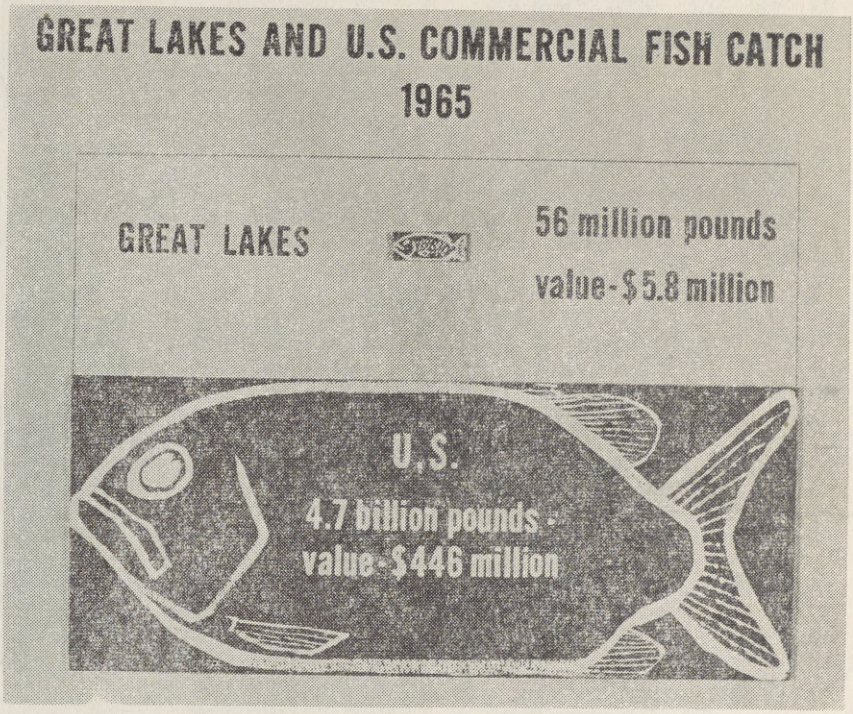
The job of restoring the fundamental ecology of the Great Lakes will be a long and costly one. What has been spoiled through generations of abuse and neglect cannot be recovered over night.

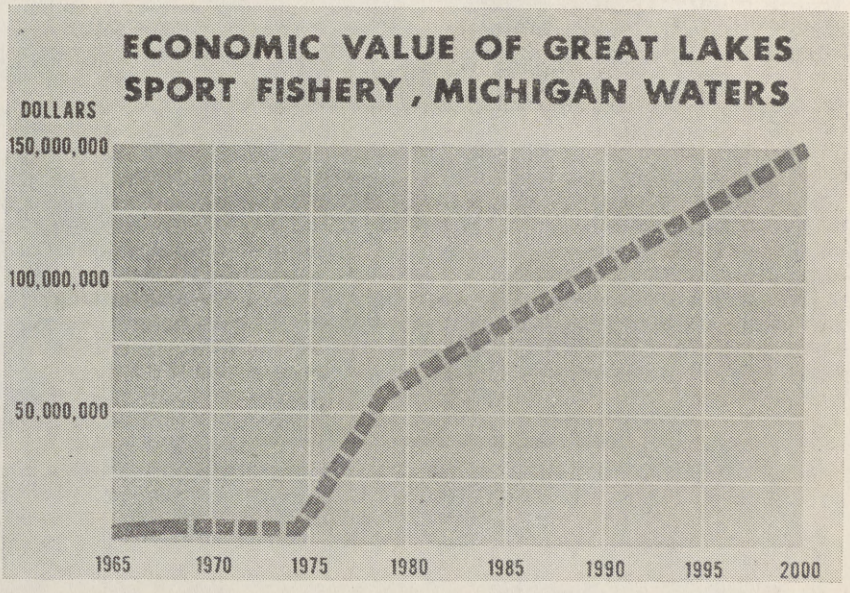
I am convinced, however, that this one, highly-visible aspect of the problem—the alewife—can be controlled relatively quickly, if we take action at once.

It is my earnest entreaty, therefore, that the Committee act as soon as possible to report S. 2123 to the Senate for approval.

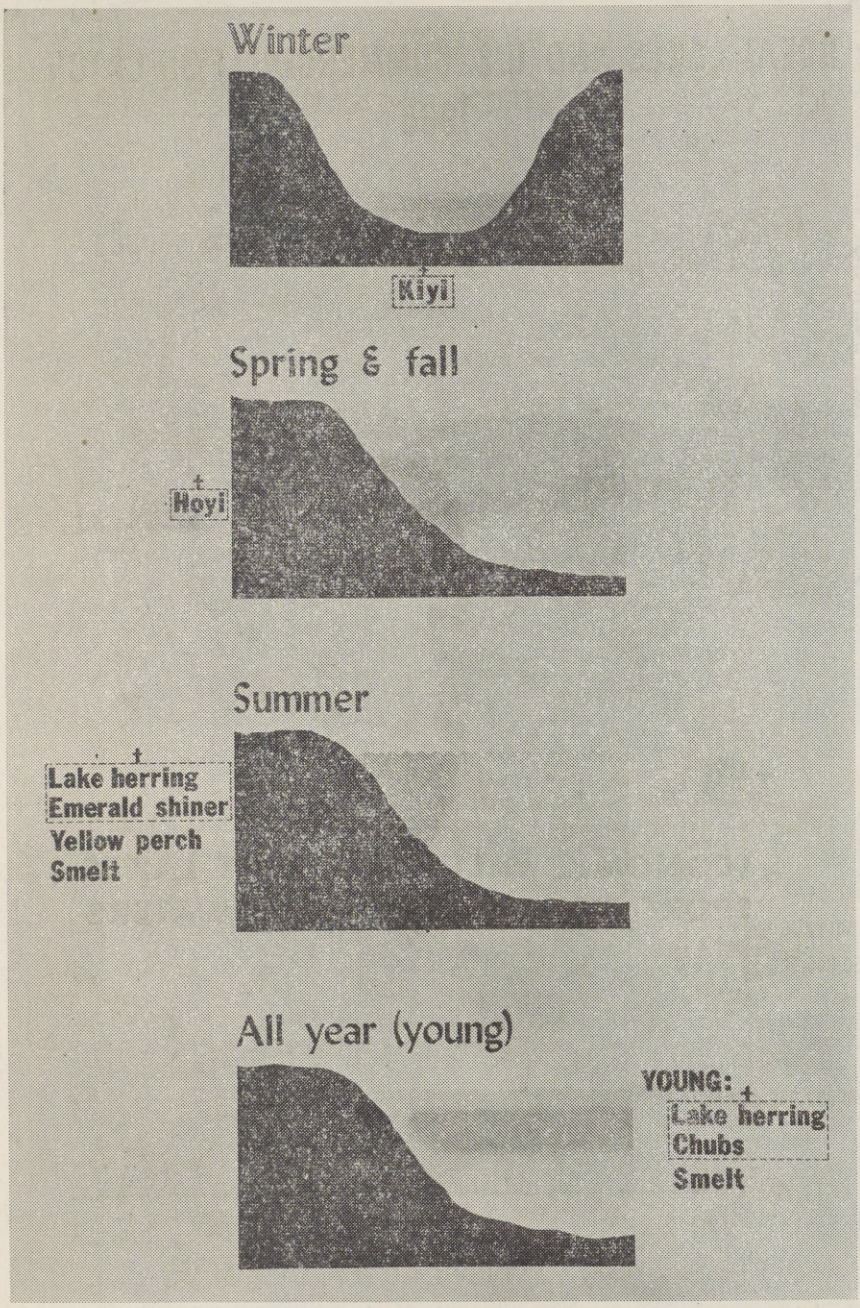
The following illustrations were culled from the many that were submitted and are mostly self-explanatory. The first is apparently a picture taken from a satellite, showing a remarkable view of the Great Lakes.

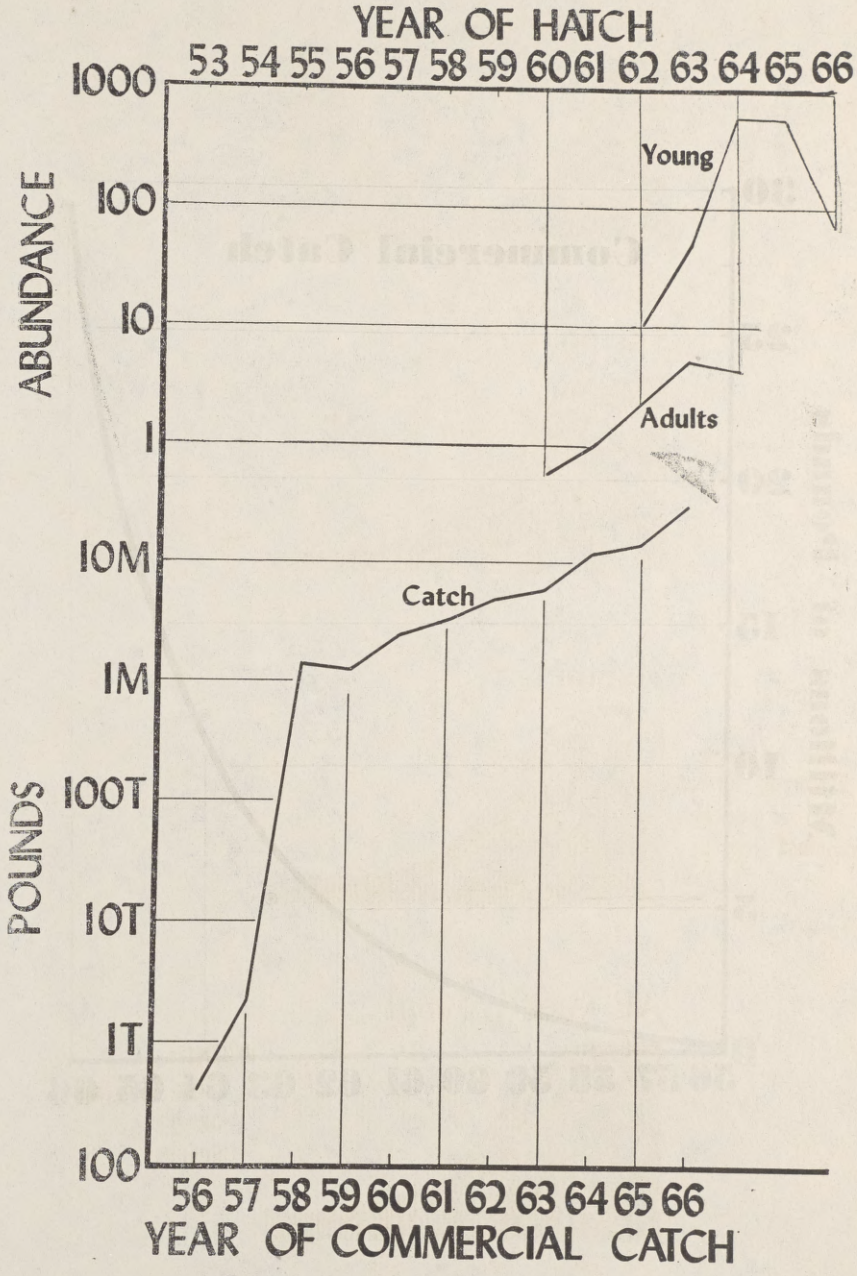

Aerial survey June 29, 1967
not
surveyed
FRANKFORT
GREEN BAY
MANITOWOC
LUDINGTON
MUSKEGON
MILWAUKEE
SOUTH HAVEN
WAUKEGAN
CHICAGO
MICHIGAN CITY

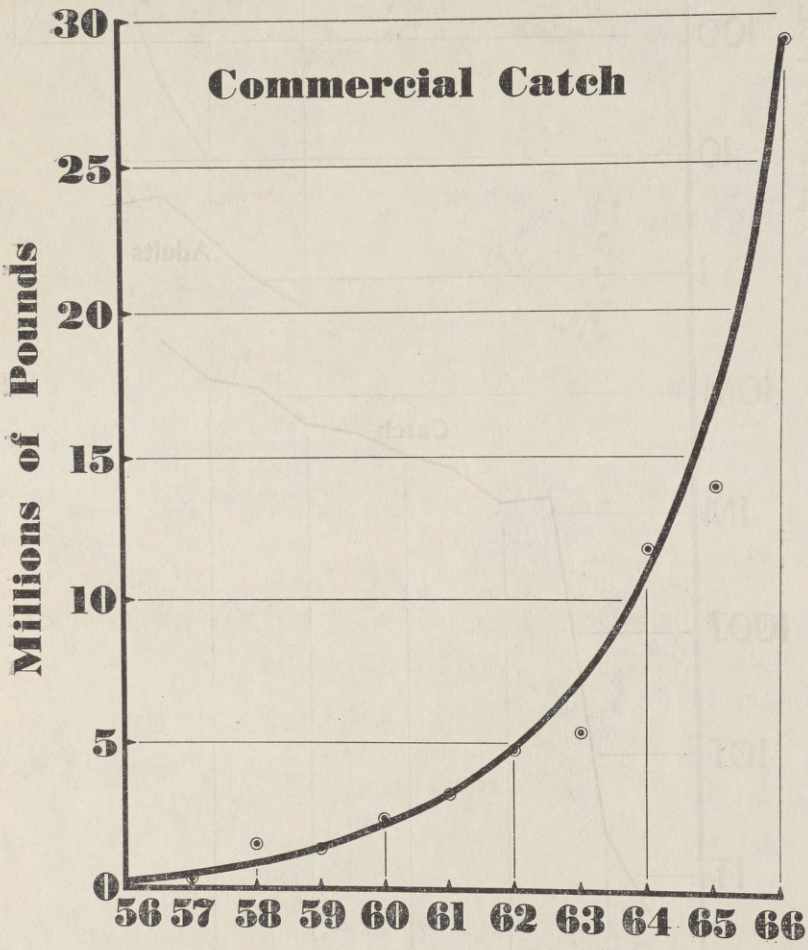

GREAT LAKES AND U.S. COMMERCIAL FISH CATCH
1965
GREAT LAKES
56 million pounds
value-$5.8 million
U.S.
4.7 billion pounds
value-$446 million


ECONOMIC VALUE OF GREAT LAKES
SPORT FISHERY, MICHIGAN WATERS
DOLLARS
150,000,000
100,000,000
50,000,000
1965
1970
1975
1980
1985
1990
1995
2000

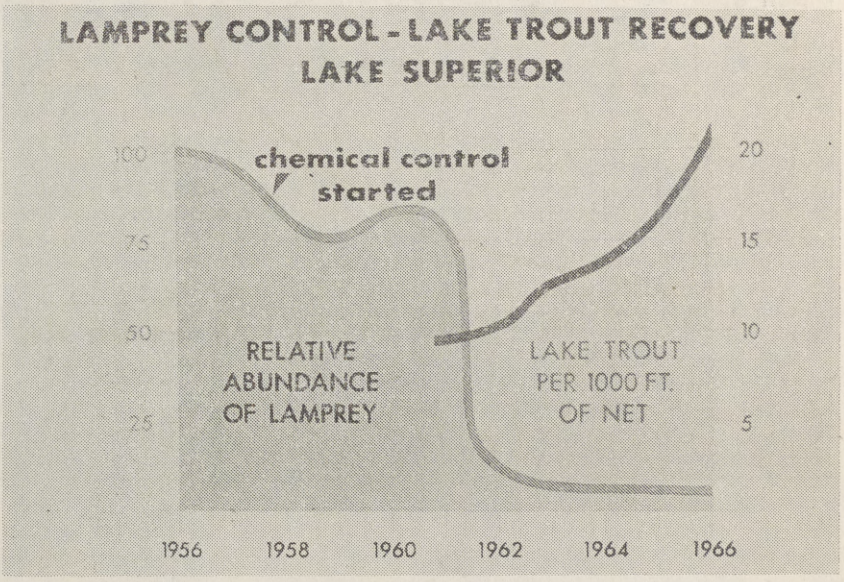
85-294—67——11

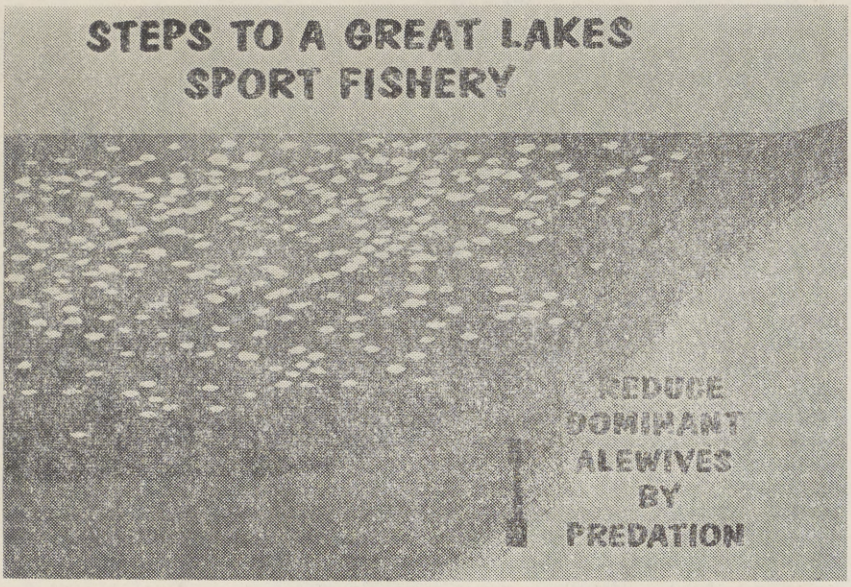

Winter
Kiyi
Spring & fall
Hoyi
Summer
Lake herring
Emerald shiner
Yellow perch
Smelt
All year (young)
YOUNG:
Lake herring
Chubs
Smelt


YEAR OF HATCH
53 54 55 56 57 58 59 60 61 62 63 64 65 66
ABUNDANCE
1000
100
10
1
Young
Adults
POUNDS
10M
1M
100T
10T
1T
100
Catch
56 57 58 59 60 61 62 63 64 65 66
YEAR OF COMMERCIAL CATCH

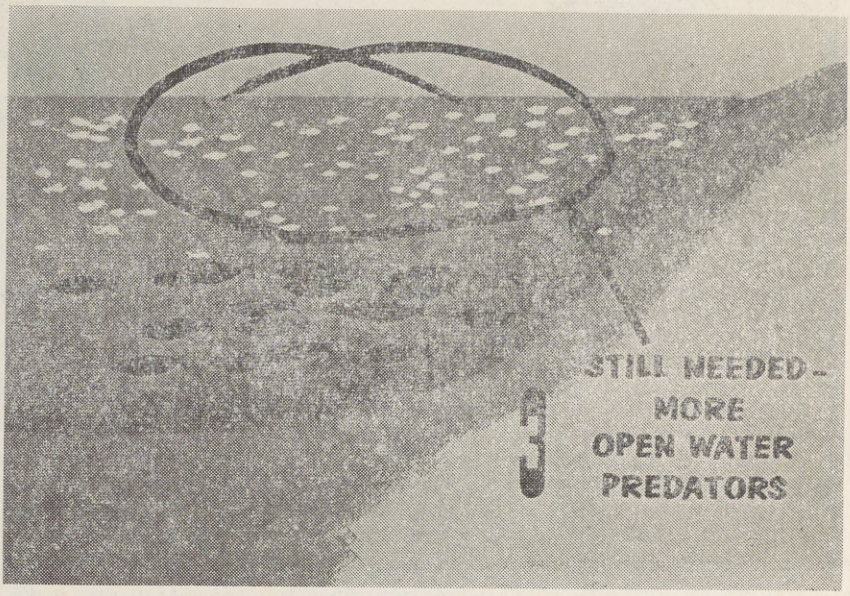

Commercial Catch
Millions of Pounds
30
25
20
15
10
5
0
56 57 58 59 60 61 62 63 64 65 66

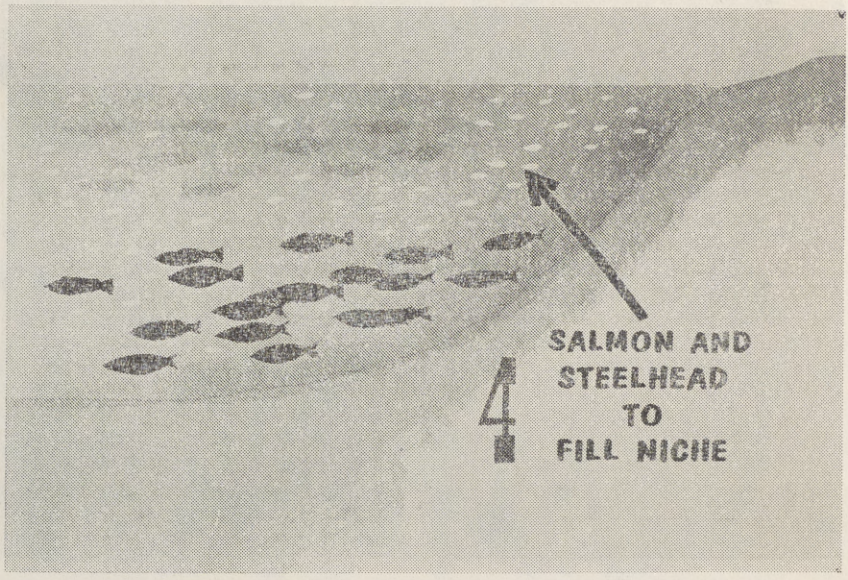
Not so pretty are the thousands of dead alewives that line Lake Michigan shores. Conservationists hope the rising trout population will eat the alewives but that's a lot of groceries. Sonar on the *Telson Lady* based at Sturgeon Bay picked up a school 10 miles by 42 miles by 100 ft. thick.

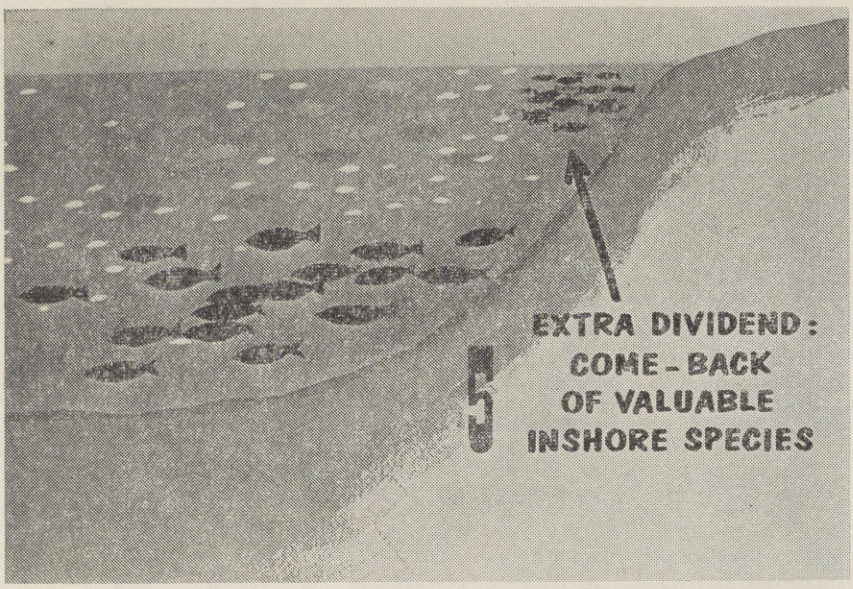


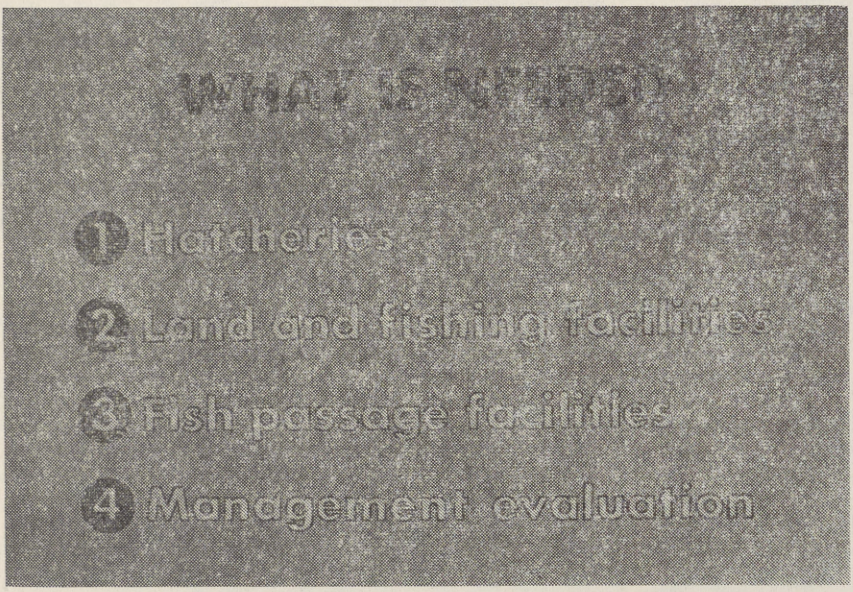

STEPS TO A GREAT LAKES
SPORT FISHERY
1
REDUCE
DOMINANT
ALEWIVES
BY
PREDATION


2
ALREADY
UNDERWAY-
DEEP WATER
PREDATOR
INCREASES


3
STILL NEEDED -
MORE
OPEN WATER
PREDATORS


4
SALMON AND
STEELHEAD
TO
FILL NICHE


5
EXTRA DIVIDEND:
COME-BACK
OF VALUABLE
INSHORE SPECIES


1 Hatcheries
2 Land and fishing facilities
3 Fish passage facilities
4 Management evaluation

DOOR COUNTY CHAMBER OF COMMERCE,
Sturgeon Bay, Wis., August 21, 1967.

Hon. GAYLORD NELSON,
U.S. Senate,
Washington, D.C.

MY DEAR SENATOR: Your immediate recognition that an alewife problem of major proportions exists—and your attack on this problem—Senate Bill 2123—is most gratifying to the people in Door County. As a summer resort area, we are most dependent on our greatest resource—the beautiful waters of Lake Michigan and Green Bay. Every possible effort must be made to keep these waters free of pollution, both from natural and man-made sources.

In 1966, Door County received an estimated 100 million dollars of tourist revenue. Based on criteria such as inquiries to Chamber of Commerce advertising and the number of advance reservations received by major resorts in the area, we had expectations that the 1967 season would at least equal, if not exceed that of the past year. We now know that this will not be true.

The heavy adverse publicity given to the "alewife invasion" of late June and July dashed all hopes of even a good tourist season. As a result of the publicity, reservations were canceled—some resorts reporting cancellations equal to 25% of their capacity—and the normal heavy flow of tourists coming without reservations was greatly reduced. As we now see July, business was down approximately 15 to 20 percent, as compared to 1966. A loss that can never be regained—a loss measured in millions of dollars of revenue.

With over 225 miles of shoreline, our peninsula could have really become a "disaster area" with literally millions of dead and stinking fish washed onto shore. However, the unceasing efforts of our people in constantly cleaning the beaches prevented this. Not a beach was closed and the unpleasantness was held to a minimum. However, a problem did exist—and a problem will undoubtedly exist in the years to come—a problem greater than that with which we can cope on a local level. Your attack on this problem is vital to our future well-being. Your efforts are commended by all of us and we strongly support Senate Bill 2123.

Sincerely yours,

JOHN R. ACKERMANN,
President, Door County Chamber of Commerce.

STATEMENT ON THE ALEWIFE PROBLEM IN THE GREAT LAKES

By A. M. Beeton, Assistant Director, Center for Great Lakes Studies, University of Wisconsin, Milwaukee

The recurring die-offs of alewife in Lake Michigan, especially the large die-off of 1967, have caused considerable economic hardship to many people and greatly limited the use of the Lakes as an important recreational resource. Nevertheless, it should be recognized that the alewife have found a very suitable ecological niche in the Great Lakes and they are an important part of the biota. The alewife population has built up very rapidly in Lake Michigan, since in 1955, when I was working aboard a U.S. Fish and Wildlife Service research vessel, we caught only a few alewife. Today they are probably the most abundant species in Lake Michigan. The attached figure shows the commercial catch of alewife, 1955 through 1965. It is likely that the initial buildup of the alewife population has now reached or perhaps passed its peak and we will probably observe major fluctuations in abundance until some equilibrium is reached.

The rapidly increasing alewife population provides another example of changing conditions in the Great Lakes. Some change in the biota and/or the environment has taken place in all of the Great Lakes and almost all of the changes have been brought about either directly or indirectly by man's activities. The effects of man's activities are obvious in the changing fish populations. Carp and smelt were purposely introduced and construction of the Welland Canal permitted migration of the alewife and sea lamprey around Niagara Falls. The effect of the alewife, carp and smelt on the populations of native fishes is not known, although it appears that decline of the lake herring populations in Lakes Huron and Michigan coincided with establishment of the alewife in these lakes. Rapid decline of the lake trout in each of the upper lakes is undoubtedly the result of predation by the sea lamprey. The near extinction of the sturgeon in all of the lakes was caused by overfishing.

Die-offs undoubtedly will continue, but they may not be as troublesome nor as large as the 1967 die-off. These die-offs seem to be a natural occurrence for the alewife, since they have been observed in Lake Ontario, where the alewife has been part of the fish fauna for many years.

The exact reason for the die-offs has not been established, but die-offs of this nature are not uncommon to fish. Each year a large number of smelt die in Lake Erie after spawning and it is well known that salmon die after spawning. To better understand the problem, we need to know why such large alewife die-offs occur in Lake Michigan, the magnitude of the die-offs, and what segment of the alewife population is affected. It should be noted that in some studies conducted by the U.S. Bureau of Commercial Fisheries it was discovered that fish in Lake Michigan have appreciably higher levels of DDT residue than fish from Lakes Erie or Superior and that the alewife had concentrations of DDT two or three times greater than in other fish in Lake Michigan. From studies on other organisms it has been observed that pesticides reduce the ability of organisms to withstand environmental stress. It is possible that the higher DDT levels in Lake Michigan alewife may be an important factor attributing to the large die-offs in Lake Michigan.

The alewife is now a major component of the fish fauna in the Great Lakes and certainly is here to stay. The possibility of eliminating the alewife is not economically feasible and in my estimation impossible. Control of the alewife is possible, especially if control is tied to some direct economic benefit. We have always been rather successful in reducing populations of fish which we consider desirable for commercial or sports fishing. The increasing world population and the increasing demand for protein may make us change our attitude toward species such as alewife and carp.

A species such as the alewife which builds up such large populations in a short time will probably be considered highly desirable in another twenty years. The idea of controlling the alewife by a large hatchery program to continue the introduction of coho and chinook salmon is intriguing and especially appealing to our present affluent society. It should be observed, however, that it has not been demonstrated that the salmon will spawn in the Great Lakes or tributaries and establish permanent populations. A continued long term hatchery program would be very costly. Furthermore, it is not an established fact that salmon will control the alewife. Nevertheless, more research on the introduction of salmon should be seriously considered. The reestablishment of the native lake trout may be very important for control of the alewife. The lake trout was the major predator in the Great Lakes before its decimation by the sea lamprey. Canada and the United States are still spending over 1 million dollars a year to control the sea lamprey and reestablish the lake trout. Progess in this program should be reexamined and if it is not progressing at the desired rate, then further support should be considered.

Probably the most effective control will be through the establishment of a sound commercial fishery for the alewife. Commercial production in Lake Michigan will be around 20 million pounds this year and could undoubtedly be much higher. Several fish meal plants were established to process alewife, but it is my understanding that they have not been successful for a variety of reasons. Alewife were being used extensively by mink ranchers until reproduction of mink declined seriously. This lower reproduction may be due to the high DDT residue in alewife. The alewife certainly have value for fish protein concentrate. A study should be made of the present commercial fishery and the study should come up with definite recommendations for what needs to be done to establish a sound commercial fishery for alewife.

STURGEON BAY, WIS., *August 19, 1967.*

GAYLORD NELSON,
U.S. Senator,
Washington, D.C.

DEAR SENATOR NELSON: The following is a statement regarding the alewife condition in our area. This is for use at the hearings on alewife control bill S. 2123.

There has to be some immediate action taken to control the alewife population in the Great Lakes because of the damage they are doing both from the standpoint of pollution and from the standpoint of economics.

The water at our beaches in the City of Sturgeon Bay is tested very often to insure the good health of our swimmers. The water has always tested very good with a very low bacteria count. This summer, about two weeks after the dead alewives began appearing, our bacteria count rose to 2400, the highest we have ever tested. This brought us to within an eyelash of having to close our beaches to all swimming.

Door County, whose very livelihood depends on the tourist industry, suffered losses of untold thousands of dollars of revenue because of the many tourists who were kept away by the unbearable stench of dead alewives piled on the shores of the entire area. Fishing, both sport and commercial, has been reduced to a minimum and if the alewives are allowed to continue their population explosion, the waters will be rendered useless for industial and recreational purposes.

I would urge all parties concerned to take immediate steps in finding a solution to this problem.

Sincerely,

RONALD D. BERG,
Member, Door County Water Resources Advisory Committee,
President, Sturgeon Bay Board of Parks and Recreation.

THE ALPINE,
Egg Harbor, Wis., August 19, 1967.

GAYLORD NELSON,
U.S. Senator,
Washington, D.C.

DEAR SENATOR NELSON: Thank you for your letter of August 14th as pertains to the alewife control bill (S. 2123).

Being the largest resort in Door County, and perhaps one of the largest in the State of Wisconsin, we appreciate the opportunity to become involved in this problem.

This summer season has been one of gross disappointment and frustration since from a normal, typical summer season we became exposed to perhaps one of the most serious problems we have ever encountered, namely the dead alewife which washed ashore on our beaches. Altho we had a crew each day on the sand beach to remove the dead fish which had washed ashore, and regularly limed those fish which we could not remove from the stone shore, the excessiveness of the problem put the situation out of control. Because many dead fish laid in the weeds, keeping them in a moist state and hence not subject to lime control, the stench at times became unbearable.

The result was that several guests either cancelled short their stay with us, refused to even check in once they arrived, or cancelled their reservations without even leaving the metropolitan area of Milwaukee and Chicago. This latter situation resulted from the extremely adverse publicity we received in this regard. If one could be assured that this past summer would not re-occur, it is reasonable to assume we and other resorts like ourselves could shoulder the burden. The possibility that this terrible situation of dead alewives will repeat again next year and in the years to follow provides us with a dim future outlook.

With a main lodge of sixty rooms and forty-two cottages, we are in a position to house approximately 375 guests. In addition to our guest capacity, we employ and house approximately 85 men and women. Because of our size this problem over which we have no control is indeed a serious threat to our existence.

Anything that you and the committee can do in the eradication and/or control of the alewife meets with our fullest approval.

Again, thank you for the opportunity to express my concern.

Very truly yours,

W. D. BERTSCHINGER, *Manager.*

MIDWEST FEDERATED FISHERIES COUNCIL,
Milwaukee, Wis., August 21, 1967.

Hon. GAYLORD NELSON,
U.S. Senate,
Washington, D.C.

DEAR SENATOR NELSON: Thank you for the opportunity to review and comment on the bill, S. 2123, "To provide for the control of the alewife and other fish and aquatic animals in the waters of the Great Lakes which affect adversely the eco-

logical balance of the Great Lakes". The Midwest Federated Fisheries Council concurs wholeheartedly with the expressed intent of the bill—the restoration of ecological balance.

Although the restoration of ecological balance will ultimately provide a lasting solution to the alewife problem, this will take time. The extremely serious and costy nuisance problems occasioned by alewife die-off—the littering of beaches and harbors, and the clogging of municipal and industrial water intakes—require more immediate attention. The Council therefore recommends that the Congress provide for treating with the alewife problem on both a short and a long term basis.

With respect to the long range effort—the restoration of ecological balance in the Great Lakes—you will recall, the Midwest Federated Fisheries Council previously submitted to the Congress for consideration an action program (in the amount of $900,000) which dealt in large measure with the alewife problem and related resource ills in the Great Lakes. This proposed program may still be appropriate for the long range research effort but, you may wish to check with the Department of the Interior's Bureau of Commercial Fisheries to determine if the budget level proposed is adequate in light of recent developments. We would suggest that this aspect of the overall program be handled under a separate appropriation, rather than through the alewife control bill, since it does not lend itself to the Federal-State matching fund requirement envisioned in this and other bills we have seen.

As an adjunct to the long range research by the Federal Bureau of Commercial Fisheries and as the results of such research may dictate, we should probably consider the possibility of introduction by the states of predator and prey species which might assist the restoration of ecological balance. This cooperative Federal-State program might best be handled through existing grant-in-aid authorities, such as the Anadromous Fish Act (P.L. 89–304), the Commercial Fisheries Research and Development Act (P.L. 88–309), and the Dingell-Johnson program. The Council strongly recommends that no large scale introductions of exotic predators or prey species be initiated unless such introductions are backed by sound research of the type proposed to be undertaken by the Bureau of Commercial Fisheries.

The short term program would be aimed at reducing alewives in areas where massive die-offs are likely to occur and at providing for measures for handling die-offs when they occur. The commercial fishing industry has the technical expertise needed to deal expeditiously with this aspect of the overall alewife control program. The Midwest Federated Fisheries Council would be pleased to coordinate the efforts of the Great Lakes commercial fishing industry in this regard. I understand that a special Federal task force named by Interior Secretary Udall is currently studying the alewife problem and is expected to advance recommendations in the immediate future to treat with it. Although we do not at this time have the benefit of recommendations being advanced by Secretary Udall's task force, the Council would like to take this opportunity to propose a program covering those aspects which the commercial fishing industry might conceivably handle.

I have personally explored this matter with a number of responsible industry people and we are prepared to propose the following program to treat with the immediate problem of alewife die-off:

1. An industry corporation could be formed, under the auspices of the Midwest Federated Fisheries Council, for the express purpose of controlling alewife populations in Lake Michigan.

2. To supplement existing industry capability and to the extent required to bring the alewife under effective immediate control, this corporation could arrange for the chartef of efficient vessels (probably trawlers from the east coast and gulf area) and could construct and operate necessary cold storage and processing facilities.

3. Funds provided under S. 2123 would be used to underwrite this industry expansion.

4. The vessels chartered by the corporation would be deployed as required to drastically reduce concentrations of alewives in those areas where they are likely to die-off and to sweep areas where die-off occurs so as to prevent dying and dead alewives from reaching the beaches.

5. The alewife thus taken would be processed for industrial use—pet food, mink feed, and fish meal and oil. The possibility of developing a fish protein concentrate using alewives could also be investigated. Also, there is a possibility

that suitable human food products, such as a canned fish product, might be developed.

6. Proceeds from the sale of product, which are in excess of normal operating costs plus a mutually agreeable industry service fee, could be applied so as to reduce the advance made to industry to underwrite this operation. Ultimately, if this proves to be a sound commercial venture, the entire amount advanced by the Government could be repaid out of profits. The industry could then continue operation of these processing facilities without need of Government subsidy.

It is difficult for us to put a price tag on the above program until we know how many pounds of alewives will have to be removed from Lake Michigan to effect control. At such time as a production goal is established, we will be pleased to provide firm cost estimates for this proposed program.

Thank you for providing the Council with this opportunity to comment on the alewife control bill. Please be assured that the commercial fishing industry will be pleased to cooperate to the fullest possible extent in treating this resource problem.

Kindest personal regards.

Sincerely yours,

GERALD I. BOLDA,
President, Midwest Federated Fisheries Council.

STATEMENT OF DR. REZNEAT M. DARNELL, PROFESSOR OF ZOOLOGY, AND SPECIALIST IN AQUATIC ECOLOGY, MARQUETTE UNIVERSITY, MILWAUKEE, WIS., REPRESENTING THE WISCONSIN SCIENTIFIC AREAS PRESERVATION COUNCIL

In the undisturbed condition natural communities of plants and animals coexist in an intricate and marvelous state of dynamic balance. Years of working together have resulted in "filing off the rough edges" so that in place of maladjustment and strife there is balance and harmony. Through environmental editing of genetic writings the individual species become adapted to survive within the physical and biological context so that collectively the group of species comes to represent an organic whole. This unit or biological community is peculiarly adapted to the special set of circumstances which characterize its normal physical environment.

Natural communities of plants and animals exhibit considerable resilience in in the face of outside disturbance factors. Every environmental stress occasions some readjustment among components of the community, but if the stress agents are not too great and their application not too prolonged the community may eventually bounce back to the original equilibrium state. Under conditions of extensive or prolonged stress, however, the regulatory mechanisms may break down completely with the result that the numbers of individuals of the different species may change dramatically from their former levels, some skyrocketing, others dwindling to extinction.

The history of mankind is marked by progressive environmental deterioration. With increasing population and advancing technology the pace of this deterioration has quickened. Among humanity's most destructive practices has been the introduction of species into areas where they were not native. Fortunately, many of the exotics have not survived. A few which have survived have turned out to be beneficial to society, but most of the surviving exotics have proven noxious and have got out of hand. Such species must now be thought of as "weeds". Although some of the weed species were originally introduced purposely (witness the carp in North America and the rabbit which has caused untold damage in Australia), most have been introduced inadvertently. The success or failure of an introduced species depends upon its interactions with the environment and with other species already present, and since the outcome of such interactions is seldom predictable in detail, extreme care must always be exercised when there is danger of species introduction.

The Great Lakes of North America and their connecting waters constitute the largest aggregate of fresh water on the surface of the earth. Research on the Great Lakes requires elaborate facilities comparable to those necessitated by oceanographic investigation, and early ecologists had no such facilities at their disposal. Therefore, our knowledge of the physical environment and the natural communities of these waters has, until recently, been very slight. Now that the

lakes are polluted and inhabited by a variety of weed species, among which the sea lamprey and the alewife are the most well known, the matter has finally reached the attention of the federal legislature.

Funds are now requested for an urgent study of the situation so that some reasonable alleviation of the immediate problem may be effected. Had a fraction of these funds been spent in advance of seaway construction to study the potential biological effects of the seaway, much of the present difficulty could undoubtedly have been circumvented. Every major environmental-engineering project *must* be preceded by adequate ecological study! It can not be stressed too strongly that cures are less effective and infinitely more expensive than preventatives.

The Great Lakes, in general, and Lakes Superior and Michigan, in particular, are notoriously poor in certain mineral elements considered essential for life. The low level of iodine, especially, has resulted in human and livestock deficiencies in the goiter belt of the Great Lakes basin. For years in my own laboratory I have had to supplement the Lake Michigan water of my two hundred and fifty odd aquaria with iodine salts in order to support healthy fish growth and reproduction. It is, thus, a remarkable fact that two fish species which normally pass their adult lives in marine waters have found in these low-fertility lakes an hospitable environment. The blood-sucking sea lamprey has apparently been able to obtain sufficient iodine from the blood of its host fishes, but it is almost certain that the alewife exists in the lakes near the lower limit of its tolerance for this element. If this is the case, then one obvious control measure might simply involve reduction of the iodine content of the lake through extensive commercial harvest of the alewife. Alternatively, perhaps the iodine in the water could be bound into a non-useful form by chemical additives. No one at present knows the solution to the alewife riddle, and one can not know without adequate scientific study. Certainly the rush to stock the lakes with exotic predators in the hope that something will happen for the best is a misguided enterprise which could result in additional weed species with special problems of their own.

A healthy lake is not a polluted lake, nor is it one rampant with exotic forms introduced accidentally or through premature judgment. When we recognize sufficient environmental responsibility to look before we leap we may be able to live in harmony with our resources. Meanwhile, we must continue to legislate by crisis.

ILLINOIS FEDERATION OF SPORTSMEN'S CLUBS,
Blue Island, Ill., August 2, 1967.

THE COMMITTEE ON COMMERCE,
Senate Office Building,
Washington, D.C.

GENTLEMEN: The alewife problem on Lake Michigan has brought about a clamour for drastic measures to be taken. Such measures may well be ones that we will regret for years to come.

Speaking for an Organization, who, for 31 years, has fought for sound conservation measures, we urge caution be utilized in facing this problem. It is our feeling which is also shared by some outstanding fish biologists, the alewives could very well be "silver gold" for the states bordering Lake Michigan.

We feel each of these 4 states should concern themselves with an extensive stocking program of coho salmon and chinook salmon. We further feel they should also explore the idea of possibly stocking the salt water striped bass (roccus saxatilis). Each of these fish specie being a known predator of alewives.

For the economy of these bordering states, we urge a sound consideration be given to a stricter control of the operation of commercial fihing for the protection of salmon and trout in Lake Michigan. Such control could very well result in a great new sport fishery, which, we feel, would add a great deal to each state's economy.

We, therefore, ask for your assistance in accomplishing our desires for a brighter tomorrow for Lake Michigan.

Sincerely yours,

ACE EXTROM,
Executive Secretary.

LEATHEN SMITH LODGE,
Sturgeon Bay, Wis., August 21, 1967.

Senator GAYLORD NELSON,
United States Senate,
Washington, D.C.

DEAR SENATOR NELSON: You have my entire support on your alewife control bill (S. 2123) and of course I cannot stress enough the urgency of the Senate to expedite action on your bill.

For many years tourism has been the 3rd largest industry in Wisconsin and it is rapidly becoming the 2nd largest. There is no question in my mind that the alewife situation this year did irreparable damage to the economy up and down the Wisconsin shores of Lake Michigan. The damage done this year can have lasting effects unless we give evidence of action being taken to correct the situation as soon as possible.

I certainly hope you can get cooperation from the other bordering states because this problem is greater than just exists in Door County or the State of Wisconsin.

Sincerely,

DON FREDRICKSON, *Owner.*

MILWAUKEE COUNTY PARK COMMISSION,
Milwaukee, Wis., August 18, 1967.

Hon. GAYLORD NELSON,
Senate Office Building,
Washington, D.C.

DEAR SIR: Thank you for leading the way with your alewife control bill (S. 2123).

We, in Milwaukee County, are fortunate in having an eighteen mile asset of shore line along Lake Michigan. Of this mileage, some two miles is fine beach shoreline with seven beach areas, including Doctors, Big Bay, Bradford, McKinley, South Shore, Bay View and Grant. Each year, over 400,000 adults and chil- use these areas in pursuit of recreation and relaxation.

As you already know, this department is increasingly concerned with the pollution which is taking place in Lake Michigan and effects it is having on the beach areas. In the late '50s, for example, pollution at Grant Park reached prohibited levels which forced the closing of the beach until 1965 when we were permitted to reopen. The operation of Milwaukee County beaches in the City of Milwaukee are carefully controlled by the Health Commission, and after periods of rain, these beaches are closed for varying periods depending on the amount of rainfall.

Lastly, over the past several years, an increased number of dead alewives and large quantities of algae have been washed ashore causing serious sanitation problems. Fortunately, while 1967 has been the worst summer experience we have had with alewives, it has not been necessary to close any beaches. The stench of the fish has lingered in some of the areas, which caused reduction in swimming and bathing. We have been fortunate, but there is no assurance that conditions such as those that occurred at the Chicago beaches will not affect Milwaukee County. If this happens, fantastic expenses will be faced in the community. Obviously, the most economical solution to a problem of this kind is determination of what causes the alewives to perish and what steps can be taken to eliminate the alewives from the Great Lakes area.

The communities of Milwaukee County have no choice in the matter, nor can they control Lake Michigan. Thus, they must fight the costly battle of alewives after they wash onto the shores. In 1967, for example, our field units have estimated that as much as 450 tons of dead fish have been removed from the beach areas. We have some specialized mechanical equipment, such as a $20,000 beach sanitizer, which was purchased for cleaning the sand and removing debris. This machine has worked successfully with alewives, still a great deal of hand labor is necessary to remove the decaying alewives from stone crevices and rough areas adjacent to the beaches. Once the alewives are deposited in these areas, the stench within hours force the sun bathers and swimmers from the area.

Because of our concern, we have had our staff meet with commercial fisheries and manufacturers of special equipment. All of these meetings and our total effort have been to try and prepare Milwaukee County against anticipated increased

tonnage of alewives being deposited on the shores. In our meetings and exploration of methods, it was determined that additional large expenditures of tax dollars will be necessary to maintain successful attacks against the alewives. In 1968, the Milwaukee County Park Commission is requesting a minimum of $40,000 to purchase additional special equipment which will provide pickup of the alewives from shallow waters. Additional expenditures are anticipated and, if feasible, trolling nets can be designed which will permit lake trollers to operate in shallow depths of water. As in the case of Chicago, if the first lines of defense do not work, additional employment of men, equipment and overtime hours will be necessary to free beaches of alewives. These are, we feel, very positive efforts which will be necessary, but it is a battle plan for solution after invasion. The important battle should be in the areas of control before the alewives wash onto shore areas.

I believe that the seriousness of the alewife problem cannot be overdramatized. The Stats which border along the Great Lakes have a great deal to lose if adequate and successful solution is not found for the serious alewife problem. Our natural resources are a priceless heritage which we, in America, must start to appreciate, but even more importantly do something about.

Your efforts and interest in conservation are well known, and I know that Milwaukee County and all of the States with lake shore lands will be behind you in your fight to eliminate the alewife problem. In our judgment, control of alewives before they wash ashore is a fundamental and economically sound approach to the problem. At this time, the Milwaukee County Government and the Park Commission earnestly look forward to you and your colleagues for the help and eventual solution of the alewife problem.

Best wishes to you! Please call upon us if additional information is required in connection with this matter.

Sincerely,

HOWARD GREGG,
General Manager, Parks.

STATEMENT IN REGARD TO ALEWIFE CONTROL BILL (S. 2123)

The Water Resources Advisory Committee of the Door County Board of Supervisors would like to go on record as giving their full support to the alewife control bill (S. 2123) which would provide federal assistance for additional research and action programs aimed at controlling the alewife population. The die-offs is especially affecting Door County because of its dependence on the tourist industry. Although the situation has improved considerably the last few weeks, the stench of the decomposing alewives during the last part of June and most of July was unbearable in many sections of the county.

The resort and tourist establishments reported that their business this year has been greatly reduced from last year due to the stench of the alewives. Many reservations made months in advance were cancelled when people heard about the situation.

State park employees reported that campers checked out ahead of time and requested a refund of their camping fee. All of the 530 campsites were filled on the July 4th holiday, but their use during the rest of the season has been considerably less than last year.

The attached clippings taken from the local newspapers show how the fish were piled up in windrows along the shore. Tons of fish were raked up in Door County and buried in deep holes. Private property owners found it a daily clean-up task and maintenance crews were assigned to the unpleasant task in the county and town parks and beaches. In rocky sections of the shore, rakes were useless and it was necessary to wait for nature to decompose the fish.

The Door County Water Resources Advisory Committee is very concerned about the lack of information and research that exists on the alewife to date. There is a long-range danger from the alewife which is far more serious than the odor they create on the beaches. Rotting trash fish like the alewife add considerable volumes of nitrogen and phosphorus to the waters of the lakes which are already showing signs of deterioration. Many beautiful sand bathing beaches in Door County are becoming nothing more than weed-crammed marshes.

The tremendous problems caused throughout the Great Lakes states by the massive die-off of the alewife during the last few years certainly requires that some major research and action programs be undertaken immediately. The Door

County Water Resources Advisory Committee urges the Senate Commerce Committee as well as the U.S. Senate and House of Representataives to take prompt action on the proposed legislation. Unless action is taken promptly to initiate new programs to bring the die-off under control, the problem is going to continue for many years to come.

Respectfully submitted.

BERNARD HAGEDORN,
Chairman, Door County Water Resources Advisory Committee.

STATEMENT OF HARRY D. HARMAN, GARY-HOBART WATER CORP.

My name is Harry D. Harman, Vice President and Assistant General Manager of the Gary-Hobart Water Corporation, Gary, Indiana.

I am also chairman of the Indiana Section of the American Water Works Association, an association representing the majority of the water utilities of the State of Indiana.

There is probably little than I can add to what has already been said here, yet I do feel I should state our position as to the problem at hand and it is a problem.

We in Gary have not encountered any problems with our intakes and we have two, one at Gary and the other at Ogden Dunes. The fact we have not had trouble does not permit us any degree of satisfaction based on our observation of the problem and how it steadily has increased. Should the problem continue, unabated we may find ourselves unable to get sufficient water through our intakes to meet the needs of our individual communities.

It is my opinion now is the time to act to attempt to retard the continued expansion of the Alewife life so that we may continue to handle it satisfactorily or solve it completely if possible.

DOOR COUNTY CHAMBER OF COMMERCE,
Sturgeon Bay, Wis., August 22, 1967.

Hon. GAYLORD NELSON,
U.S. Senate,
Washington, D.C.

MY DEAR SENATOR: The 1967 Alewife invasion of Lake Michigan and the resulting die off dealt a severe blow to the travel and vacation industry in Door County, Wisconsin. The Door County Chamber of Commerce estimates that a 7–10 million dollar loss of revenue occurred in May, June and July of this year. While much of this was perhaps registered as gains in other inland vacation areas in Wisconsin some of it was lost to other states and Canada.

The Door County Chamber of Commerce would like to go on record as urging immediate action for alewife control bill (S. 2123). We believe a recurring invasion in 1968 would be most harmful to the estimated Billion dollar tourist industry in Wisconsin.

May we also go on record as commending the efforts of your office and cosponsors for your alert action in this vital matter.

Respectfully,

BARNEY IRWIN, *Manager.*

ESCANABA, MICH., *August 4, 1967.*

Senator ROBERT GRIFFIN,
Senate Hearing on Alewives,
Muskegon, Mich.:

Due to a death in my family I will not be able to attend your hearing. I wish to state for the record that our association is in favor of Federal funds for the alewife problem. We believe that 3 to 5 more fish meal plants should be the first consideration. There is a good market for protein meal. Fish meal and fish protein concentrate are being used to feed the underfed nations of the world. We believe that the planting of salmon is an untried and a long term process to curtail the alewives.

ROY A. JENSEN,
Secretary, Michigan Fish Products Association.

85-294—67——12

JOINT STATEMENT OF DOMINIC H. FRINZI, NICHOLAS C. CATANIA, AND JAMES R. MILLER, LAKE INDUSTRIES, INC., MILWAUKEE, WIS.

We are very pleased to have the opportunity to submit to this Committee the enclosed statement.

We are very grateful to Senator Gaylord Nelson, United States Senator of Wisconsin, for his letter of August 14, 1967, advising us that he would very much like to have us submit a statement so that it may become a part of the record. We also are very grateful to Senators Gaylord Nelson and William Proxmire of Wisconsin as authors of Senate Bill S. 2123.

We wish the Committee to be advised that we support Senate Bill S. 2123. There is no question that the alewife explosion problem has caused considerable distress to tourism, to the uses of the various public beaches, to the conservation of the Great Lakes waters and to the commercial users of Lake waters.

Having attended the hearing of this Committee in Muskegon, Michigan, on August 5, 1967, various solutions to this acute problem were offered. However, it appears that most of the solutions offered were in the nature of long-range programs. It would appear that an immediate solution to this problem is in order. There is no question but that one of the possible solutions for a long-range program is stocking the lakes or the areas affected with other fish, such as the Coho Salmon, Lake Trout and other predatory fish. In using this solution, which probably would help deplete and equalize the ecology of the fish in the Great Lakes area, a large sum of money and at least five years time would be required; and then, we are not definitely certain that this will solve the alewife problem. Any further studies concerning this problem would not solve the immediate problem of the alewives as witnessed during this past summer.

We do know that while the alewife is considered the number one pest of the Great Lakes, at the same time it has great commercial uses. This fish can be economically processed to provide both fish meal, which is a product used in this country as a high protein additive for domestic animals, and fish oil, which is a product used in many of our industries including the paint industry, the leather industry, and the vitamin industry.

Presently, this country imports approximately 50% of its fish meal from Peru and approximately 90% of all fish meal is used in the Midwest. With the availability of Federal funds, a fish meal and fish oil industry could be developed in the Great Lakes area; and this industry would utilize literally millions of pounds of alewives every year and reduce the lake populations to something manageable.

Our plant in Milwaukee, Wisconsin, can handle up to 240,000 pounds of alewives per day; and this figure could be increased with a larger and more efficient plant. Presently the fish meal industry along the Great Lakes has not been developed, principally because financing has generally been unavailable to establish plants. Banks are reluctant to advance large sums to an industry which is generally unknown in their area and without experience.

One other reason why this industry has not been developed is because equipment to capture the alewives at different levels of the lake is simply not now available. The only method that can be utilized at the present time is to drag the alewives off the lake bottom, and this method can only be used during certain times of the year and not in deep water at all. With the availability of Federal funds, boats can be equipped to utilize more techniques in the catching of alewives and put the industry on a more year-round basis.

It would be our suggestion that funds be available to municipalities with beaches along the lakes, perhaps on a 90–10 basis wherein the municipalities could contract with fishermen to fish areas in close proximity of the beaches and thereby prevent large scale die offs which we experienced this year. Our Company has been hired privately to keep alewives away from water intakes and by capturing them in close proximity, and we have done so with success.

We would also suggest that money be available on a loan basis with little or no interest to qualified persons and companies interested in developing both the catching of alewives and the manufacturing of fish meal and fish oil. We feel that the establishment of such an industry would dramatically improve the problems for all concerned in the shortest amount of time.

COMMENTS BY ROSE G. LEVAN, CITIZEN OF EAST CHICAGO, IND.

As a citizen and owner of property near the Lake Michigan shore who has firsthand evidence of the problem posed by alewife littered beaches, I am a staunch supporter of this bill to find and carry out the solution to the problem.

There is, however, another consideration which I should like to bring up. (And this is the reason I am refraining from making this any more than a note.) If the alewives are upsetting the ecological balance of lake life endangering commercial fishing enterprises, we ought to apply the same rule to land animals which endanger life. I refer to the rat problem of highly urbanized areas. The bill for rat extermination was laughed out of passage. But the problem is no joke.

Rats carry death and disease. If the rat population gets out of control, all society could suffer. Societies of the past ages have done so. Ours could suffer a good deal too if no attention is paid to the problem.

Granted that the rat population grows geometrically because tenants are careless with garbage and refuse, because municipal refuse and garbage collectors reduce pickup, and for other reasons that could be locally controlled, it is no solution to say it should be left to local agencies. These may or may not do something about it. If nothing is done, there could be more destruction and death than would result from lack of alewife control.

I should like to suggest, Senator Hartke, that this bill for study of lake organisms be amended to include study of the rat problem and other land animals that upset ecological balances in nature and pose perils for people.

States and cities could help in the same way that this bill expects to collaborate with state in the study of the alewife problem in the Great Lakes.

Rats pose even a greater threat to the health of a nation if uncontrolled than these fish.

Couldn't there be found some way to make fertilizer of the rats—catching them before they bite all the babies to death? Or contaminate the food supplies?

AMERICAN PROTEIN COMPANY, INC.,
Milwaukee, Wis., August 23, 1967.

Hon. GAYLORD NELSON,
U.S. Senate,
Washington, D.C.

DEAR SENATOR NELSON: Our company is pleased to learn of your deep and sincere interest in the alewife problem and to find that you have introduced a bill to control the problem on the Great Lakes. We also note that regional hearings were scheduled on plans to handle the problem.

As the only large successful processor of alewives into protein and oil, we were bewildered that we were not invited to one of the hearings. Many of the schemes and proposals, all made by unproven and unsuccessful proponents, have only recently come to our attention by word of mouth, furthering our bewilderment.

Having worked closely with commercial fishermen, the Bureau of Fisheries, municipalities and knowledgeable conservation men, we recognize and deplore the struggle for government funds between sports fishing proponents, the commercial fishermen, and fly by nighters with unusual proposals.

All tend to forget that the alewife problem is immediate, and very public. The people are demanding a practical approach, with immediate action now if any solution will be ready for early 1968.

The immediate Lake Michigan solution, therefore, must involve fishing and be commercial, while at the same time long range plans are implemented for the exploding alewife problem on the other Great Lakes.

We have definite commercial ideas; we can submit, and would be willing to submit personally, a complete, practical fishing and reduction program which should eventually become self-liquidating and self-sustaining.

This program exists in outline form and can be readied for personal presentation. We prefer to keep this presentation temporarily private because we are simultaneously working with private industries and municipalities commercially to abate their alewife nuisance in early 1968, making commercial products for a profit into a U.S.A. market, where the U.S.A. has to import and further embarrass its balance of payments.

By the time this reaches you, we will already have made an effort through your office to obtain an appointment.

Sincerely yours,

W. ROBERT LOTZ, *President.*

MILLER FISHERIES, INC.,
New Berlin, Wis., August 21, 1967.

Senator GAYLORD NELSON,
U.S. Senate,
Washington, D.C.

DEAR SENATOR NELSON: The alewife problem is the result of the waste of a huge resource. If the alewives are to be controlled, one agency must be given responsibility for lake management. I would recommend the Department of the Interior—Fish and Wildlife Service as the agency to be responsible. Then an effective program can be worked out to eliminate the mess and waste on our beaches.

Giving funds to present jurisdictions, with their conflicting policies, would not solve the problem. They, long ago appraised of the situation, still protect alewife through regulation.

Personal experience with the present cumbersome bureaucratic processes of two states indicate there is no aggressive leadership. Inaction is a matter of policy with them that compounds the alewife problem. A third state, with aggressive leadership, has put forth a policy of eliminating commercial fishermen, and turning their waters into a huge sport fishery reserve. This is tantamount to killing the goose that lays the golden egg. It is inconceivable that sports fishermen could harvest the protein that the lake produces each year.

Therefore, to be ready for the next heavy influx of alewife, one agency with adequate funds and authority should be given responsibility. A study group should be formed that would concern itself with all the ramifications of the alewife situation. A crash program of developing new methods of catching alewife should be started. Efforts should be made to help alewife fishermen and processors.

If the alewife fishery is not inhibited, but helped along, it will attract other fishermen and the problem will solve itself.

Sincerely yours,

FRANK MILLER, Jr.

MICHIGAN CITY, IND., *September 6, 1967.*

Hon. WARREN MAGNUSON,
Chairman, Senate Commerce Committee,
Washington, D.C.

DEAR SIR: Upon recent request of Senator Hartke, I herewith submit a statement for the hearing record on Senate Bill 2123.

The public beach area of Michigan City covers a distance over three miles in length. Some of the finest recreational beach in the world exists in this area.

Michigan City was the only community in Indiana equipped with a large beach sanitizer to keep our beaches clean before the onslaught of the alewives. Even though this machine was operated constantly, the suddenness and amount of dead fish deposited on our beaches resulted in a terrible mess.

In addition to an estimated $25,000.00 in local direct expense, countless thousands of dollars have been lost in resort trade in the Michigan City area. Almost a million dollars has been spent locally in the past three years in improving our water front to provide a recreational area.

Since this problem is interstate (even international) in scope, we urge immediate attention of the federal government to assist in combating this problem on two fronts:

1. A long-range study and action program to discover the reasons for the existence of this problem and a program to eliminate it at its source.
2. An immediate crash program to assist in developing adequate scavenger equipment to remove the dead fish from the water before they are deposited on our beaches.

The City of Michigan City stands ready and willing to assist in anyway possible.

Sincerely,

RANDALL C. MILLER,
Mayor of Michigan City.

STATEMENT OF THOMAS RICHARDSON, DEPARTMENT OF FOOD SCIENCE AND INDUSTRIES, UNIVERSITY OF WISCONSIN, MADISON, WIS.

UTILIZATION OF ALEWIVES

We have been studying various means of utilizing the alewife for approximately nine months. This research was made possible by a modest grant from the State of Wisconsin; however, research funds are limited and if real progress is to be made in newer ways of utilizing the alewife, additional research funds must be forthcoming from other sources.

I feel that utilization research should encompass the basic chemistry and properties of alewife oil and protein as well as the applied chemistry and technology involved in their utilization. Essentially, this is the approach that we have taken.

The oil of the alewife varies from 7.5 to 15.6% and the protein varies from 13.2 to 15.1% over the year. We have analyzed the oil and protein of the alewife for their major components, that is, fatty acids and amino acids, respectively. In addition, we have studied the potential use of alewife oil in the preparation of polyurethane foams.

In the analysis of fish oils, the important component of the oil is the fatty acids. In general, it can be said that fish oil fatty acids range from 10 to 24 carbon atoms in length and contain 0 to 6 sites of unsaturation. Among the fatty acids that are unique to fish oils are the 20 and 22 carbon acids containing 4 to 6 double bonds. The presence of these fatty acids contribute to the high polyunsaturation of fish oils which in turn make fish oils highly desirable in certain processes. The oils in fresh water fish differ from those of marine fish in several ways.

The linoleic acid content of fresh water oils tends to be higher than marine oils; the content of those fatty acids that have 20 carbon atoms and 5 double bonds tends to be slightly lower in fresh water fish oils; and the content of total polyunsaturates that have 4, 5, and 6 double bonds tends to be lower in fresh water fish oils. However, we have analyzed alewife oil for fatty acids using gas liquid chromatography and have found the oil to be high in polyunsaturated fatty acids, particularly linoleic acid, linolenic acid, arachidonic acid, eicosapentaenoic, and docosahexaenoic acids. Our analyses were on a single sample of fish oil. Since the composition of fish oils is known to vary with the water temperature and especially with the lipid composition of the diet, detailed analyses of alewfe oil the year around are desirable. We analyzed the protein of alewife for amino acid composition using ion exchange techniques. Our analyses indicate alewife protein is an excellent source of essential amino acids. Here again, detailed year around analyses would be useful. In this time of protein deficiency throughout the world, alewife protein should offer a good means of supplementing diets poor in protein.

In this country, the principal uses of fish oils are for industrial purposes. In an effort to look for new industrial uses for alewife oil, we have been studying the preparation of polyurethane foams. To prepare these foams we synthesize hydroxylated fish oil which is then reacted with a diisocyanate in the presence of a suitable catalyst and a foaming agent. Here are samples that demonstrate the type of rigid polyurethane foam that we can prepare. Much remains to be done in this area of research. For example, the physical properties of the various polyurethane foams must be evaluated, various methods of hydroxylation of the oil should be examined, rates and maximum degrees of hydroxylation should be studied, fractionated and otherwise modified fish oils should be hydroxylated, hdroxylated fish oils might be treated with other chemicals to produce fire retardant foams. The economics of these various processes should be examined to determine their industrial feasibility.

In addition, to the aforementioned areas of research I would like to see an expansion in research on alewife oil and protein. A detailed study of the chemistry of the oils and proteins would be most helpful to subsequent utilization approaches. Research on the various reactions at the double bonds of alewife oil would be most useful. This could be the prelude to the synthesis of intermediates for the preparation of useful products such as plastics. Characterization of the "fishy" flavor due to fish oils and the permanent removal of this character might allow fish oils to be fed at higher levels in animal rations. In terms of the world-wide protein shortage, studies on the utilization and stability of fish-protein concentrate (FPC) prepared from alewives would contribute to the alleviation of the world protein shortage.

The incorporation of fish protein concentrate into foods and beverages should be perfected to enhance the palatability and acceptability of fish protein concentrate. In addition to food uses for fish protein concentrate, the possible industrial utilization of fish protein should not be overlooked. For example, reaction of some of the soluble proteins with cross linking agents may result in new and useful polymers. Fish proteins may be useful as glues, adhesives, emulsifying agents or as paper coatings. These are just a few of the potential industrial uses of fish protein.

As I indicated to you in my opening statement, our current research budget is quite limited and if meaningful progress is to be made on new products from alewives, more research funds are necessary. We are eager to continue and to expand our research on alewife utilization.

COOPERATIVE EXTENSION PROGRAMS, UNIVERSITY EXTENSION,
DOOR COUNTY OFFICE,
DIVISION OF COMMUNITY PROGRAMS,
Sturgeon Bay, Wis., August 23,. 1967.

Re: Alewife Control—Door County, Wisconsin.

Senator GAYLORD NELSON,
United States Senate,
Washington, D.C.

DEAR SENATOR NELSON: The impact of the late June and early July (1967) invasion of alewife upon the beaches of Door County verged on the brink of being a natural disaster.

Lack of information on the alewife itself, its numbers and local inability to practice county-wide pollution control threatened to inundate the tourist business in Door County.

Fortunately, local resort operators, residents, natural factors, etc., combined to effect a measure of control so that by mid-July the problem was dissipated.

I feel that more information is needed to bring about control of this fish specie prior to their die-off and pollution of our shorelines. A combination of natural predators and rough fish removal holds promise but requires federal monies to make it effective and at an earlier date.

Resorts, cottages, and other businesses experienced heavy loss of income during the period of alewife pollution. Losses may be even higher in the next several years unless effective control measures are forthcoming.

Sincerely yours,

NORBERT D. SCHACHTNER,
Agricultural Agent, Door County.

SMITH BROS.,
Port Washington, Wis.

COMMITTEE ON COMMERCE,
U.S. Senate,
Washington, D.C.

DEAR SIR: This is in regard to the proposed alewife control bill S. 2123. I would like to state the following: Ever since the first alewives were discovered several years ago in Lake Michigan, we have been watching the growth and multiplication of this pest very intently, wondering when and how it would affect our interests. The following is a summary of my observations and opinions on that subject:

My Company, Smith Bros., is a family-owned business, being actively engaged in Commercial Fishing on Lake Michigan and the other Great Lakes since 1848. We have seen the ecological balance of the lakes change tremendously in the last 25 years, primarily because of the invasion of the Sea Lamprey. The invasion of the growth and explosion of alewife is the most recent and probably the most important upset in this balance.

My Company, Smith Bros., besides being actively engaged in Commercial Fishing, is a producer and processor of Fresh and Smoked Fish of various fresh-water species. We, also, own and operate a large restaurant featuring fish dinners. I will try to relate how the alewife has affected both our fishing enterprises and our restaurant enterprise.

As the alewives multiplied in Lake Michigan, the catch of Lake Perch went down and down in direct proportion. The reasons for this are not well-known, although we believe that it is a result of either competition for food or that the swarming alewives are consuming the eggs of the Perch; or in other ways, preventing the Perch from reproducing. Perch fishing has been important to us as a source of the most popular species of fish on this shore of the lake. At the present, we could not even hope to get any Perch from Lake Michigan.

Some Perch are being caught in local, isolated cases; but, in general, there is none for the general public. In addition, the sports fishing for Perch has disappeared. There are just none to be caught. This has adversely affected not only our own restaurant business, which caters to traveling people and tourists and sportsmen, but also has affected many other small businesses in this area, such as restaurants, taverns and the various types of service industries which formerly serviced the thousands of visitors to our city who came here every week to fish for Perch with hook and line off of the docks and piers.

During the summer months when the litter from rotting alewives is particularly nauseating along the beaches, the tourists and summer people avoid the west shore of Lake Michigan like a plague, for they know that they can't get down to the water without running into offensive odors and sight of the rotting carcasses of alewives floating on the waters and laying on the beaches.

Our fishing boats now primarily fish for Chubs, which are used in creating the famous and succulent Smoked Chubs. The method that we use for catching these chubs is the traditional method of gill netting. The alewife has been somewhat of a problem to the gill netting of chubs. Occasionally, great hoards of alewives are snagged in the gill nets, and have to be picked out by hand, one by one. Sometimes, the quantity of alewives caught by accident exceeds the poundage of chubs caught on purpose.

We have had to shift on nets, time and time again, in attempting to avoid these large schools of alewives. Fortunately, through the last few years, we have been able to learn to live with them by setting our chub nets where we are sure the alewives are not present in large numbers. Although this sometimes affects the potential catch of chubs, we have managed to catch enough to supply the growing demand for Smoked Fish.

The presence of alewives seems to have no bearing on the quantity of chubs available to catch, probably because chub is a very deep water, bottom-swimming fish; while alewife inhabits shallower waters, and is generally off of the bottom in schools.

The presence of the alewive problem is a real economic loss to our business, and a loss of the traditional Perch fishing which has been a stabilizing factor for gill net fishing for many, many years; and, also, the loss of the Perch fishing to sportsmen, which has been an important economic factor to this business and to many other small service businesses which are dependent upon the recreational aspects of the Great Lakes.

In spite of the economic loss and the nuisance factor of this problem, I am not of the opinion that the matter can be helped much by the methods outlined in S. 2123 which, as I understand it, would leave study and control work up to the states which are involved.

There is, at this time, a study task force at work under the direction of Secretary of the Interior, Udall, who is preparing recommendations for action in the control and elimination of the alewife pest.

It would seem the wise course to take these recommendations as they are offered and implement them under the existing congressional acts Public Law 88–309, which provides research and development money to participating states for their immediate Commercial Fishing problems; and Public Law 89–304, which provides Federal money to the states for the protection and development of Anadromous Fish.

If these two programs were funded properly, I feel that as much or more could be accomplished in the way of alewife control, inasmuch as these programs are already under way, at least, in our state and within the Bureau of Commercial Fisheries.

Because an investigation by the above referred-to task force is already under way with instructions to present recommendations shortly, it would seem that this would be the best course to follow because the workings of this task force could be carried on within the framework of existing programs. The benefit to the Commercial Fishing Industry and to the public would be that any efforts to

control the alewives would then have the advantage of the head start of working under existing programs, rather than having to be organized and developed from scratch.

I appreciate the opportunity to be able to give you my views. We regard the alewife as a nuisance; although there is a developing trash fish industry on Lake Michigan, which depends on the existence and abundance of alewives. This trash fish industry also is a good control measure; due to the extreme abundance of these fish, it appears that no one control measure will be wholly effective.

The trash fish industry will have to do their part, possible with more aid or subsidies from the Federal Government. Scientists will have to do their part to determine more about the life cycle of these fish; but Mother Nature will probably do more than man, eventually correcting this problem in the way of die-offs and the competition for available food. The balance may be, some day, restored, even without the help of man; however, the years in between will be aggravating, and odorous.

Yours truly,

DAN SMITH.

BIOLOGICAL LABORATORY,
Ann Arbor, Mich., July 17, 1967.

Hon. HENRY S. REUSS,
House of Representatives,
Washington, D.C.

DEAR MR. REUSS: I am enclosing the various reports that you requested during our recent discussions. Brief notes are attached to each item that describe its contribution and significance.

We knew 10 years ago that the alewife would become a problem in Lake Michigan because we had seen what had happened in other lakes where it had become abundant. The article from the *Globe and Mail* tells of the die-off in Lake Ontario that has happened each year for many decades. If research and corrective measures could have been started in Lake Michigan 10 years ago, the problem that we face today would have been avoided or at least minimized. The solution needed now is to restore balance in the fish population. Unfortunately the research that would tell us the best, shortest, and most certain method of reaching this balance is scanty and the need to complete the research expeditiously has never been greater. Once we correct the alewife problem by bringing the fish populations back into balance it will be necessary to keep them that way to prevent similar problems in the future. To do this we must maintain prosperous and well-regulated sport and commercial fishing industries. The commercial fishery will be the key to the success of the management of the fish stocks because it can be managed more effectively and can take the species of little or no sport value that would be favored by a selective sport fishery and throw the population out of balance again.

As I pointed out to you, Lake Michigan may be faced with an even greater and more serious problem from eutrophication in the near future. The enclosed article from *Science* clearly points out that the flushing rate of Lake Michigan is much less than Lake Erie which has already become badly polluted. This means that once the enrichment of Lake Michigan starts, it will progress at a far more rapid rate than it did in Lake Erie, and if Lake Michigan does, in fact, become overenriched (polluted from the ecological standpoint), many generations will be required for it to recover. The seriousness of the problem in Lake Michigan is accentuated by the fact that Lake Erie is flushed by relatively clean Lake Huron water that runs in one end of the lake and out the other, whereas Lake Michigan is flushed less efficiently by rich (often polluted) water that enters from tributaires which drain mostly urban, industrial, and farm areas on the east shore and northern section of the lake. Also, Lake Michigan appears to have built up a firm crust-like layer at least in the southern area which in effect seals off the bottom and may keep nutrients in constant circulation once they have entered the lake. The enclosed paper from *Limnology and Oceanography* shows that Lake Michigan is already on the borderline of being classed as a eutrophic lake, and that enrichment has started.

All of this means that the enrichment that has started in Lake Michigan may be near the brink of the point of sharp increase (as occurred in Lake Erie a short time ago), and that once the increase has started, it may progress at such a rapid rate that any corrective measures may be too late and ineffective.

The time for action is now—the fuse is already lit, and if it is not put out, the

explosive enrichment may take place in the next 10 to 15 years. The frightening thing is that what could take place in this short period would require 100 years or more to correct.

Sincerely yours,

STANFORD H. SMITH,
Fishery Research Biologist.

ATTACHMENT 1. BIOLOGICAL BACKGROUND

LIFE HISTORY OF THE ALEWIFE (*Alosa pseudoharengus*)

INTRODUCTION

The Great Lakes are typical of that group of large waters that occupy relatively new drainage basins of glacial origin. Because of the immaturity of these lakes (8-11 thousand years old), the fauna is rather incomplete, relatively simple, and subject to effects from immigrations and introduction of exotic varieties. Many segments of such environments are not occupied. The close and steady competition among species, so typical of the ocean or older lakes is usually missing. Under such conditions the impact of an introduction or change can have drastic consequences and, in some cases, can start far-reaching changes in the composition of the environment and forms inhabiting it.

Since the beginning of the last quarter of the 19th century, several species have been added to the Great Lakes fauna, either deliberately or fortuitously, that have materially changed interspecific relationships either for the detriment or benefit of man. We need mention but a few to illustrate: rainbow trout, brown trout, carp, smelt, and the sea lamprey.

Devastation of the climax predators (lake trout and burbot) in Lakes Huron, Michigan, and Superior by the sea lamprey is known to all. Accessory effects of the devastation on other species is not so well known but is, nevertheless, of great consequence in the management of the remaining fishery resources.

One of the most recent introductions of a new species to the lakes above Niagara Falls is that of the alewife (*Alosa pseudoharengus*). We do not know whether this marine species was endemic to Lake Ontario. But, since 1931, when it was first recorded from Lake Erie it has joined that horde of primary converters (chubs, minnows, lake herring, smelt, and whitefish) and has been so successful in expansion of its population that it is suspected of threatening or having already eliminated several species that were common to the classical fauna and important to the commercial fishery.

The alewife is an anadromous marine fish found along the Atlantic Coast from Labrador and the St. Lawrence River drainage in Ontario and Quebec to Florida. It probably was originally landlocked in Lake Ontario and in some tributary lakes. However, it may have been introduced or was a recent immigrant to these lakes. It was known to be well established in Lakes Seneca and Cayuga in New York by 1868, in Lake Ontario by 1873, and has now spread throughout the Great Lakes. The first specimen was taken in Lake Erie in 1931, in Lake Huron in 1933, in Lake Michigan in 1949, and in Lake Superior in 1954. The alewife became abundant in Lake Erie by 1950 and in many parts of Lakes Michigan and Huron by the mid-1950's. It dispersed rapidly throughout Lake Superior, but as yet it is not nearly as numerous there as in the other Great Lakes. The alewife is being studied most intensively by the Bureau of Commercial Fisheries in Lake Michigan, because it has become much more abundant there than in the other Great Lakes. It was not abundant in Lake Michigan until 1956, but since that time it has increased to phenomenal numbers. A major investigation of its life history has been initiated by the Bureau recently. Although most of the studies are barely under way, certain facts concerning its natural history in Lake Michigan have come to light and are presented below.

HABITAT AND MOVEMENT

The alewife is successful in freshwater habitats varying from small, shallow, warm lakes to large, deep, cold lakes. They hold up very well under competition with various species.

In their marine range, adults move into streams tributary to the Atlantic Ocean during spring where they spawn in the slow, sluggish parts of streams

and associated lakes and ponds. They return to the ocean immediately after spawning. Young of the year remain in the river system (following hatching) until late August and September. Juveniles remain in the ocean from three to four years until they mature and then migrate upstream to spawn.

Landlocked alewives do not make the long upstream spawning migrations characteristic of the marine fish. Some run a short distance up tributary streams to spawn while many simply move into shallower waters. In the Great Lakes these inshore spawning movements begin in April, so that by the end of the month most are in the shallow water of the lake or in tributary streams. Spawning takes place in the streams in late spring and early summer, after which the adults move back out into the lake. By August, adults may be found in almost all areas of the lake; the young begin appearing in the lake soon after spawning begins. By late summer they are spread widely in the warmer waters, mostly in upper surface levels. In the fall large numbers of young are present on the bottom near shore. In late fall all sizes of alewives move into the deeper areas of the lake. The alewife is the first fish species in Lake Michigan's history to have occupied all portions of its waters, top-to-bottom, shore-to-shore, and in the tributary streams. The alewife spends the winter in the deeper portions of the lake, where it occurs in huge concentrations near bottom.

REPRODUCTION

The age at maturity appears to be quite variable and has been variously reported at from 2 to 4 years. Males apparently mature 1 year earlier than females and landlocked alewives mature 1 year younger (ages II, III, IV) than marine fish. Alewives spawn in consecutive years following maturation. Some of the reported dates of spawning are: late May to mid-August in the Finger Lakes; April to July in Lake Ontario; late June to early August in Green Bay; and early May to mid-June (water temperature 50–60° F.) in Long Pond, Maine. The runs are expected to begin from the first of March to mid-April in the southern Cape Cod area, and from the last of April to the first week of May in central Maine.

Although the alewife moves into shallow water or ascends the streams in the spring, eggs are not deposited until the water warms up (usually 55–70° F.). The run is not always steady as it may cease for 2 or 3 days if the weather turns cool.

Spawning occurred in Green Bay (Lake Michigan) in any slightly protected area in from 2–4 feet of water. Spawning began soon after dark and continued well into the night.

In the Kalamazoo River near Saugatuck, Michigan, spawning alewife concentrate to the extent that 5 to 10 thousand pounds can be caught in single trawl hauls of 10-minute duration. Spawning occurs from early evening, throughout the night, reaches a peak after midnight, and usually ceases by early morning. Two or more fish swim rapidly with their sides touching in a tight circle 8–12 inches in diameter, spiraling upwards until one or two circles are completed at the surface. Participants then swim rapidly toward the bottom and out of sight. Minnows and small alewife usually attend such demonstrations and avidly rush into the area of spawning to eat available eggs.

Freshwater alewives have approximately 10,000 to 12,000 eggs per female while marine fish have 60,000 to 100,000 eggs (marine fish have a much larger average size and are older). The eggs are heavier than water, slightly adhesive prior to contact with milt, and water harden at approximately 1 mm. Hatching begins 2 days following fertilization and is completed in 5 days. Eggs incubate 2–4 days at 72° F. and 6 days at 60° F. Alewife eggs will hatch in running water (56–60° F.) and in standing water (60–74° F.) with the incubation time varying between 81–132 hours.

GROWTH

Marine alewives are usually considerably larger than landlocked fish. Both exhibit early rapid growth that decreases as the fish matures. Most of the alewives on the spawning run in Lake Michigan are 5½ to 7½ inches long; few reach a size greater than 8 inches. Sizes smaller than 5½ inches are mostly immature, and for the most part do not enter the spawning streams. The spawning run consists mostly of fish which are 3 and 4 years old, but includes some 2-year-old males. Adult alewives are reported to average 5 inches in Cayuga Lake, 6 to 10 inches in Lake Ontario, and 10 to 11 inches in marine waters.

FOOD

Alewife feed on materials that are free floating or swimming in the water. Zooplankton is its principal food; however, if other suitable foods are present in abundance, they are readily taken. Terrestrial insects are sometimes an important source of food. On a volume basis microcrustacea made up 46 percent of the alewife's diet, Gammaridae approximately 20 percent, and fish eggs (all were alewife eggs) 16 percent. Plant fragments, insects, Chironomidae, fish, and unidentifiables made up the remaining 18 percent.

Alewives from northern Green Bay prefer insect larvae, pupae, and adults with zooplankton of secondary importance. In other regions of Lake Michigan, alewife feed heavily on zooplankton, especially those that inhabit midwater. During winter and in deep water they eat mostly *Pontoporeia* and *Mysis*, the two major Crustacea of the Great Lakes. As the alewife moves inshore its diet becomes more varied and includes fish eggs, snails, midge pupae, and fingernail clams.

MORTALITY

Alewife mortality has been receiving considerable publicity in Lake Michigan in the past few years. This annual mortality usually occurs in May, June, and the first half of July. The dates may vary somewhat from year to year but the pattern remains constant. The die-off reaches a maximum in late June or early July. It is not size specific as all sizes (3–6 inches) of fish are affected. The actual causative agent or agents (probably as interaction of several factors) of this mortality have not been isolated.

The alewife becomes more delicate as the spawning season progresses and gravid females are more fragile than males. A wide variety of species feed on alewife, Salmon, trout, black bass, rock bass, perch, pickerel, bullheads, northern pike, cisco, lake trout, and eels have been known to feed on alewives.

RELATIONSHIPS WITH OTHER SPECIES

Definite proof of an adverse effect of alewives is the Great Lakes on other species has not been established, but there is some evidence that its presence has had a detrimental effect on some species. Spectacular increases in numbers of alewives coincided with drastic declines in abundance of lake herring in Green Bay (Lake Michigan) South Bay (Lake Huron), and Saginaw Bay (Lake Huron). The emerald shiner was extremely abundant in Lake Michigan up until the mid-1950's, but its population dropped to almost nothing within the first few years after the alewife had become numerous. Since the alewife feeds heavily on zooplankton, it must be considered a possible competitor with all young fish in Lake Michigan, because all species must subsist on zooplankton in their earlier stages. Such competition might not be detrimental—i.e., there might be enough plankton to go around—but the possibility that some of the native species could be overwhelmed by alewives cannot be discounted. As regards the competition between alewives and perch, which is of concern to many people, only speculation is possible at present. The possibility of one particularly vulnerable stage for perch, however, comes to mind. Perch spawning takes place in spring in shallow water, at the same time that alewives are extremely abundant in the same area. Evidence that alewives actully feed on perch eggs or larvae is lacking, and somewhat doubtful, but in any event it seems that newly hatched perch fry would face strong competition from large members of alewives in their presence. Here again, however, there is as yet no proof of detrimental effects.

ABUNDANCE

Experimental trawling in Lake Michigan off Saugatuck in November 1965 took 2.7 times as many adult alewives as were taken in comparable trawling in 1964, and 4.4 times as many as were taken in 1963. Adult alewives were taken at all of the 14 depths fished from 3 to 50 fathoms, and were more abundant at each depth than they were during similar sampling since 1962. The catch of young-of-the-year alewives in 1965, however, was not comparable to the catches of previous years. Young alewives were distributed from 3 to 15 fathoms during the November trawling this year, but were taken as deep as 33–36 fathoms in previous years. The shallower distribution in 1965 may be related to cooler temperatures during the past summer that could have delayed hatch-

ing or the offshore movement after hatching. Large catches of young alewives were taken, however, and for depths where they were caught in both years the 1965 catches per 10-minute tows averaged slightly larger (1,367) than the 1964 catches (1,303). The average 1964 catch of young-of-the-year was 50 times the 1962 catch. The 1963 year class was the major contributor (about 70 percent) to the adults taken this year.

STATEMENT PRESENTED BY HOWARD W. STERN, PRESIDENT, AQUATIC CONTROLS CORPORATION, WAUKESHA, WIS.

Gentlemen, many proposals have been submitted to alleviate the alewife problem in the Great Lakes Area—among them:

I. Massive stocking of salmon and trout.
II. Fishermen subsidies to encourage reduction of alewife population.
III. Beach cleaners to remove dead alewives from recreational areas.
IV. Harvesting with the modified marine scavenger developed by Aquatic Controls Corporation, Waukesha, Wisconsin.

I respectfully submit statements and quotations regarding each method proposed to help alleviate the alewife problem:

I. RE: MASSIVE STOCKING OF SALMON AND TROUT

Quotation: Chicago Tribune by Dr. Stafford H. Smith, Chief, Cold Water Research, Bureau of Fisheries, Ann Arbor, Michigan: "Salmon cannot easily reproduce in the lake because of a shortage of rivers where they can spawn."

Comment: With each fingerling salmon introduced into the water at one dollar per unit—approximately 8,000 alewives will hatch. I. E. the fingerling salmon must consume 22 alewives per day during the first year. The number of alewives the same salmon would have to consume the second year, without its own ability to reproduce, is astronomical.

Quotation: Milwaukee Journal—July 23, 1967, by W. Fenton Carbine, Regional Director, U.S. Bureau of Commercial Fisheries, Ann Arbor:

"Trout and salmon might have little effect, because they live in deep waters. Alewives, at least during the summer, inhabit shallow waters. The deep water fish might starve during the warmer months."

Quotation: Waukesha Freeman—Dr. Smith, Ann Arbor, Michigan:

"The alewife may be timid, and sensitive, but it is among the lake's most efficient food hustlers. This is one reason why the alewife has virtually *replaced the other species that compete with it for food.* [Italic added.]

Comment: Based on the above statements, we believe that stocking fish to alleviate the alewife problem is the most expensive and the least reliable method of solving the problem.

II. FISHERMEN SUBSIDIES TO ENCOURAGE REDUCTION OF ALEWIFE POPULATION

Quotation: Chicago Tribune by Ronald Kotulak, Reporter:

"One boat dragging a huge net can haul 2.5 to 5 tons of fish per hour."

Comment: Our opinion is that dragging operations are too slow and expensive. Establishing new processing plants to utilize the alewife into a new food source, would involve time and huge investments with no assurance that these ventures will be profitable, especially because the processors could not be assured a continuous supply of alewives on a year-round basis.

III. BEACH CLEANERS TO REMOVE DEAD ALEWIVES FROM RECREATIONAL AREAS

Comment: Beach cleaners cannot operate efficiently in wet sand and the approach would be wrong because the primary objective should be to pick up alewives in the water before they clutter and foul up the beaches.

IV. HARVESTING WITH THE MODIFIED MARINE SCAVENGER DEVELOPED BY AQUATIC CONTROLS CORPORATION, WAUKESHA, WIS.

Quotation: Milwaukee Journal—July 23, 1967 by W. Fenton Carbine, Regional Director of the U.S. Bureau of Commercial Fisheries, Ann Arbor, Michigan:

"The ideal solution would involve complete elimination of the alewife and restoration of lake trout and chubs to bring back the biological balance that was here before the alewives and eels arrived from the east."

Comment: We believe that our approach will be the most effective and desirable and coincides with Mr. Carbine's suggestion.

The Aquatic Controls Corporation, Waukesha, Wisconsin, has developed a revolutionary machine for the control of aquatic vegetation such as water hyacinths, alligator weed, milfoil, etc. Since the machine is a "scavenger", it is also capable of harvesting objects floating on the water. The equipment shown in the brochures had limitations—in that it could pick up dead alewives only. However, the problem has been solved, and with adaptations, the equipment could harvest both dead and live fish simultaneously.

The corporation would like to enter into a crash program to work out the details of the special device to pick up live alewives and make other minor modifications on the Marine Scavenger to help solve the problem. The company feels that a prototype of this equipment could be built and ready for testing in a period of thirty days. If the responsible Government agencies approve, sufficient equipment would then be available for next spring to alleviate this problem throughout the Great Lakes area.

Quotation: Waukesha Freeman, by Steve Tatarsky, Reporter:

"An aerial photographer has reported that a ribbon of dead fish 50 feet wide and 40 miles long was floating on Lake Michigan north of Benton Harbor, Michigan."

Comment: It is our opinion that dead alewives should be picked up immediately when they are sighted before the wind and waves bring them to shore to plague the residents of coastal areas.

The Marine Scavengers proposed would be 50 feet long and 12 feet wide—completely automated—one man operation—with a holding capacity of 40,000 pounds or approximately 300,000 alewives (smaller units for major cities). These units could be utilized to pick up large concentrations of dead alewives such as described in the previous quotation. Ocean going barges could accompany the Scavengers to unload and return to work sites and quickly resume pick-up operations. The procedure outlined would *alleviate the major problem of large concentrations of dead alewives drifting to shore.*

When the alewife population has been reduced to a reasonable level—restocking of game fish will be again feasible, and the Marine Scavenger could then be utilized, with minor modifications, to help relieve another major problem . . . Excessive Aquatic Vegetation in our waterways.

SCHILLING FISH CO., INC.,
Oconto, Wis., July 24, 1967.

Senator GAYLORD NELSON,
Senate Office Building, Washington, D.C.

DEAR SENATOR NELSON: I wish to introduce myself as Art Swaer, commercial fisherman, and fish dealer from Green Bay, Wisconsin. I had a personal interview with you this past Spring when I attended the Fish Meal and Oil Convention in Washington, D.C. I have also had an interview with Representative Zablocki at his office in Milwaukee about the Alewife situation in Lake Michigan.

I have spent a great deal of my time and money on research and development of trawling for alewife in Lake Michigan. I own four trawlers that fish on Green Bay during the Summer and Lake Michigan during the Spring and Fall. I am enclosing a copy of a report that I published on the history of trawling in 1963.

Wisconsin newspapers are filled with articles on the Alewife nuisance on the shores of Lake Michigan. People are spending their vacations in other places this Summer.

Now, I feel personally that my fishing efforts have kept the beaches along the Southern West Shore of Green Bay relatively free of dead alewife this Summer. We caught 6 million pounds of alewife in this area during the Summer of 1966. This Summer we expect to catch 8 million pounds of alewife. This means we caught the fish before they could die. In addition to my own boats, I have encouraged other fishermen to start fishing. There are some men interested; but, there is a shortage of capital for them to get started. There also is a shortage of skilled manpower for additional fishing crews.

I also have a fish meal plant that has been operating at Pensaukee, Wisconsin, since April, 1966. Our boats do not produce enough fish to keep our plant operating. We buy fish from other fishermen in this area. My plant has a capacity

of 150 tons of fish in 24 hours. At the present time, I am getting enough fish to operate at less than half capacity. I feel I could do a more effective job on the alewife nuisance if there were more fishermen.

The Wisconsin Conservation Department has a Commercial Fishing Advisory Board that has two meetings a year. This board has Commercial Fishermen from all areas of Wisconsin waters (Green Bay, Lake Michigan, and Lake Superior) as members as well as representatives from Wisconsin's Conservation Department. The meeting also has representatives from the Michigan Conservation Department and the U.S. Fish Wildlife Service from the office in Ann Arbor in attendance.

I am the chairman of this Advisory Board and will set the date of the next meeting to your convenience if you are able to attend. The next meeting will be held in Bayfield, Wisconsin in August or September. I would also like to meet with you if you attend any field hearings in my area on the alewife control bill you have introduced in Congress.

I feel the research as to alewife habitat, quantity, and fishing gear for alewife by the Fish and Wildlife Service at Ann Arbor, Michigan is about completed. They have spent five years in this study and exploration; they have published their reports as to the best areas to fish and quantities to expect to catch.

The research and development of the alewife fisheries I started is being improved each year. I have been devoting most of my time and effort in trawling for alewife since 1957. I feel the research has been completed and now provisions should be made for a maximum harvest of the huge amounts of alewife in Lake Michigan. The market has been developed and now is ready for expansion.

I am enclosing in this letter a report I had published in 1963 about trawling and recent newspaper articles pertaining to my operation. This may help the bill you are introducing. If I can be of any further help to your bill, please let me know. Thank you very much for introducing this bill and your work on the alewife problem.

Yours truly,

ART SWAER.

DEPARTMENT OF NATURAL RESOURCES,
DIVISION OF CONSERVATION,
Madison, Wis.

The Department of Natural Resources, Division of Conservation of the State of Wisconsin is full cognizant of the serious resource problem posed by the alewife invasion of the Great Lakes and the present extreme abundance of the alewife in Lake Michigan.

It is extremely important that immediate attention be given to planning, developing and funding an action program to control the alewife and to restore some semblance of a desirable ecological balance in the fishery resources of the Great Lakes.

We are aware of the progress which has been made through joint governmental agency action coordinated by the Great Lakes International Fishery Commission in control of the sea lamprey and rehabilitation of the highly valuable lake trout fishery.

Briefly, we believe the following items are essential components of an effective approach to a solution of this situation:

1. Continue actively the current programs of sea lamprey control and lake trout rehabilitation in the Great Lakes under the coordination of the Great Lakes Fishery Commission.
2. Continue research efforts by all agencies placing increased emphasis on early life history of the alewife to determine how it can be more effectively utilized in reestablishing a multiple species complex in the fishery.
3. Expand the production and stocking of desirable predator species to aid in the reestablishment of a multiple species complex.
4. Increase emphasis on commercial utilization of the alewife.
   a. Experimental research to develop more effective gear for harvest.
   b. More effective detection equipment for aid to commercial operators in harvesting alewife.
   c. Further develop and increase emphasis on producing a marketable fish meal or comparable product.

5. Increase surveillance to determine status of alewife stocks and plan an emergency program to alleviate possible nuisance conditions created by dead alewives reaching the shore areas. This will require a crash-type immediate. short-term program.

We in Wisconsin recognize the magnitude of the effort involved. We further realize that without supplemental aid and with only current budget authorization our Division of Conservation cannot extend adequate support to this program.

On this basis then and recognizing the involvement of concern in states other than Wisconsin, we most sincerely endorse federal legislation to provide supporting funds for this program. Specific reference is made to Bill S. 2123.

L. P. VOIGT,
Conservation Administrator.

WENNINGER "TOOT'S" FISH MKT.,
Algoma, Wis., August 18, 1967.

Senator GAYLORD NELSON,
Washington, D.C.

DEAR SENATOR: In regards to your letter on the alewife question the first thing Congress should do is put a $50 a ton *tax import* on fish meal so that Americans can compete with foreign labor.

April 1, 1966, fish meal was $196 per ton F.O.B. New York. This year $125 per ton.

We have two meal plants in the Green Bay area and neither one operated more than half the time because they could only pay $17 per ton for fish delivered to the plant.

For example, it takes four men to run a rig to produce 2 million pounds at 1¢—$20,000. You start in April 1st and operate to September 1st, that is 22 weeks.

4 men at 22 weeks=$600 per week	$13,200
Trucking at 25¢ per 100 or ¼¢ per lb	5,000
Operating expense, nets, boats, gas, etc	5,000
Total cost to produce 2 million pounds	23,000

So that is why a lot of men never set their nets this year when they heard the price was down to $17 per ton.

It is not only the alewife that is a question, we also have abundance of carp and other rough fish that could be made into fish protein meal if the meal price was up there as the state of Wisconsin destroys millions of pounds of rough fish each year as they have no market.

In the 30's we produced 10 million pounds of trout in Lake Michigan and did not have a shortage of food for them. It takes 7 pounds of alewife to produce a pound of trout meat and with 15 billion pounds of alewife in the lake we would have to produce 2 billions of trout to eat the amount that die per year.

If there is a favorable market for the fish you will have plenty of fishermen to produce the fish.

There should be some underwater pictures taken to show the public how thick they are on the bottom of Lake Michigan and they have to drink the water. As you know when they die 9 sink for every one that floats.

I produced over a million pounds this year and I know that 90% of the ones in the net May and June would have died in 2 or 3 days. When we let a net go two nights 50% of the fish in the nets are dead and nine out of ten sink to the bottom of the net.

So if we could get some underwater T.V. camera pictures to the public we would get some action on their removal from the public.

As it doesn't make sense to import protein meal when we have such an abundance in this country. But as long as we let them ship it in *duty free* they will price us out of the picture.

According to my cost of production the past five years I know we cannot produce them less than $30 per ton delivered to a plant.

The past five years I have been making them into a liquid plant food with very good results to plant life but the amount one can sell is very limited.

So hoping we can create a demand for the little silvery fish.

Yours truly,

F. L. WENNIGER.

STATEMENT OF C. W. WHEELER, PRESIDENT, TOWN BOARD, BEVERLY SHORES, INC., BEVERLY SHORES, IND.

The havoc played this year by the alewives on the shores of Lake Michigan is too well known to be detailed here. The mountains of rotting dead fish on the beaches of Beverly Shores created a revolting stench, produced miriads of flies and maggots and presented a danger to the health and welfare of the community. In addition the several resort places suffered considerable financial loss because this situation kept away tourists and visitors. A continuation of the presence of alewives in coming years would also tend to depreciate property values.

Since the source of the fish is navigable waters under the control of the Federal Government; since this problem is of such magnitude that the communities are not in a position to cope with them; and since the health and welfare of a great number of people is involved, we feel that the Federal Government ought to take promptly necessary measures to aleviate the situation.

Beverly Shores has seven public beaches in the four and one half miles of lakeshore, between Michigan City and the Indiana Dunes State Park. One public beach is one half mile long; the others are smaller. Approximately three and one half miles of the lakeshore are privately owned. The Town is prohibited by law from working on private property without charging the owners for the work.

The Town of Beverly Shores is not in a financial position to purchase the necessary equipment and to hire the manpower for cleaning the beaches, particularly as the waves bring in more dead fish as soon as the beaches are cleaned. The Town will be glad to cooperate with any agency that will handle the problem.

For the reasons stated we feel that the pending legislation to control the alewife situation in Lake Michigan and on its shores should be passed.

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