



B. Pearce

NEW YORK CHAPTER — AMERICAN FISHERIES SOCIETY

P.O. Box 316, Cape Vincent, New York 13618

August 1, 1974

PROPOSED JOINT ANNUAL MEETING OF NEW YORK STATE FISHERIES AND WILDLIFE  
SOCIETY CHAPTERS

Since our last joint meeting, I have heard rumors to the effect that the Wildlife Chapter would like to hold a separate meeting from the Fisheries Chapter. I also heard similar suggestions from Fisheries members. Apparently the rumors from the Wildlife Chapter were not sound, for Stu Free contacted me on 7/25/74 as Wildlife Program Chairman and wants to hold a joint meeting again next winter. Would you kindly put your name at the bottom of this memo, and indicate whether you would like a joint Fish and Wildlife Chapter Meeting or a separate meeting, and if you would attend a meeting.

There are a few pertinent points we should keep in mind when deciding whether or not to shoot for a joint meeting:

(1) It is doubtful that we would have a very large turnout if we held a separate meeting. Response from the questionnaires sent out concerning individual interim Fisheries Chapter meetings indicates a separate annual meeting might not attract enough people to cover the expenses involved. A combined Fish and Wildlife Chapter meeting enables us to pretty much cover expenses.

(2) We can hold a joint meeting with the two Chapters and still have an independent program. One reason besides sharing expenses for holding a joint meeting is to attract good outside representation for the program with a minimum of expense. It also helps to have two program chairmen working together on a joint program to share the workload. We can, however, have a completely independent Fisheries meeting in a separate room from Wildlife during the same time frame.

(3) In recent years a Division meeting has been held immediately prior to our joint Chapter meeting. This has proven beneficial to the Division and helped the Chapters insure a good attendance. I expect that if we plan a joint meeting this year, Division will at least seriously consider holding a meeting in conjunction with it.

(4) There was interest in holding a seminar-type fisheries meeting, possibly at Cornell. There is no reason why we cannot hold two meetings in the course of a year if there is strong interest in other than a joint annual meeting.

Will you kindly detach the form below and return it to me at the above address by August 20, so I can appoint a Program Chairman to work with Stu Free if a joint meeting is approved.

William A. Pearce  
William A. Pearce, President  
New York Chapter  
American Fisheries Society

WAP/ja

Would you prefer a joint or separate meeting? Joint ✓ Separate \_\_\_\_\_

Would you attend such a meeting? Yes ✓ No \_\_\_\_\_

\_\_\_\_\_  
(Signature) Date \_\_\_\_\_

April 19, 1974

Mr. William Pearce  
President  
New York Section of the  
American Fishery Association  
New York State Fishery Station  
Cape Vincent, New York

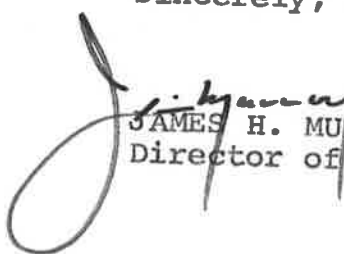
Dear Mr. Pearce:

Last week while in Albany I had the pleasure of sitting down and saying hello to Harold Loeb, your Past President of the Association, relative to future plans that could possibly include a Grossinger Conference.

Harold suggested that I contact you relative to this thought and with that in mind, I am wondering if you can advise me by way of a few informative words at the bottom of this letter as to how we might proceed in being considered for the next open conference.

Many thanks in advance for your consideration.

Sincerely,

  
JAMES H. MURRAY  
Director of Marketing

JHM:rc  
PF/WI

**GROSSINGER**  
**CONFERENCE**  
**CENTER**

GROSSINGER, N.Y. 12734  
914-292-5000  
212-565-4504



NEW YORK CHAPTER — AMERICAN FISHERIES SOCIETY

P.O. Box 1169  
Cortland, New York 13045

December 18, 1974

Mr. William A. Pearce, President  
New York Chapter - American Fisheries Society  
P.O. Box 292  
Cape Vincent, New York 13618

Dear Bill:

We should consider hitting the Chapter membership prior to the February meeting with questions to be discussed at the meeting. This would give them time to think about the various items prior to the meeting. Those who don't plan to attend could mail in replies, those who plan to attend could bring replies and discuss the items. If there is a question as to whether annual meetings should continue we should get member input. I can't see how we can justify a Chapter and have no meetings.

Do you feel that such a discussion is part of the business meeting or a separate agenda. Stu Free seems to think the Program Committee considers this type of discussion separate from the business meeting. In any case it seems desirable, one way or another, to let the membership know what topics will be discussed. This is especially true of new members who will attend.

Did Bill Shepherd ever consider a program for our Chapter outside of the joint program? Stu is amazed that we don't have something developed similar to Wildlife.

Another sheet could be added to the joint program announcement, possibly as follows:

Fisheries Chapter Membership

The annual business meeting will be held February 6, at 2:00 p.m. in the Hotel Syracuse. As usual any interested individuals may attend but only members in good standing may vote. It is expected that those attending the joint society meetings on February 7, will register since the registration fee is needed to cover hotel costs, coffee breaks, etc.

No special Fisheries Chapter program has been developed. During the afternoon of February 6, either at the business meeting or following it, a discussion on various topics will be held. If you don't plan

Mr. William A. Pearce

-2-

December 18, 1974

to attend but want to express yourself on these or other topics, address your comments to the Secretary.

Some topics are:

We should continue to meet at least once a year as provided in the By-Laws. Yes\_\_\_\_\_, No\_\_\_\_\_, No Comment\_\_\_\_\_.

We should meet more often. Yes\_\_\_\_\_, No\_\_\_\_\_, No Comment\_\_\_\_\_.  
(Obviously, if "yes", suggestions are needed as to meeting content.)

We should have a formal program on some phase of fisheries aside from any joint meeting that may be planned. Yes\_\_\_\_\_, No\_\_\_\_\_,  
No Comment\_\_\_\_\_.  
(Again, if "yes", program suggestions are needed.)

We should continue joint meetings with formal presentations. Yes\_\_\_\_\_,  
No\_\_\_\_\_, No Comment\_\_\_\_\_.

Other

As a matter of information, I note that our By-Laws state that one month prior to the annual meeting each member will receive notice of the meeting.

And finally, shouldn't we invite or at least let the parent society know about our coming meeting. Johanna may still be around. This could be done when the brochure is available.

Very truly yours,

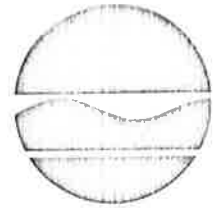
*ACP*

A. C. Petty  
Secretary-Treasurer  
New York Chapter  
American Fisheries Society

mvd

**New York State Department of Environmental Conservation**

Region 7  
Fish and Wildlife Office  
P.O. Box 1169  
Cortland, New York 13045  
(607) 753-3095



Henry L. Diamond,  
Commissioner

January 17, 1974

MEMO TO: Syracuse Area News Media  
Attn: \_\_\_\_\_  
FROM: A. C. Petty  
SUBJECT: Joint Meeting of New York Chapters of  
Wildlife Society and American Fisheries Society  
Hotel Syracuse January 31-February 2, 1974

Enclosed is some material that may be of help in your  
coverage of the meeting noted above.

- (a) Program
- (b) Albany Press Release 1/10/74

For additional information locally you may contact:

Arch Petty *ACP*  
Region #7 Fisheries Manager  
Box 1169 (Fisher Ave.)  
Cortland, N. Y. 13045  
Tel: AC607-753-3095

mvd  
Enc.

*cc: B. Pearce ✓*



NEW YORK CHAPTER — AMERICAN FISHERIES SOCIETY

January 7, 1974

Dear Colleague:

Enclosed you will find the program for the 1974 winter meeting of the New York Chapter of the American Fisheries Society.

This year we are highlighting regional land use planning and the role of fish and wildlife professionals in this process.

We were very fortunate in being able to put together for you an outstanding group of knowledgeable participants. We feel that this year's meeting will be very stimulating and will provide you with additional insight into the problems and opportunities of regional land use planning.

Dr. William Webb will lead an action planning session at the end of the day designed to put some of the ideas generated into action. Come prepared with concrete suggestions.

In addition, a technical session is planned for Saturday morning which will deal with forage fish and salmonid management.

This year the meeting will be held in the Hotel Syracuse in downtown Syracuse. Free parking is available. We hope you will be able to attend.

Robert G. Merener  
Program Chairman  
N.Y. Chapter  
American Fisheries Society



New York State College of Agriculture and Life Sciences  
a Statutory College of the State University  
Cornell University

Department of Natural Resources  
Fernow Hall, Ithaca, N. Y. 14850

*Old Business*

Fishery Science  
Forest Science  
Wildlife Science  
Natural Resources  
Outdoor Recreation  
Environmental Conservation

November 19, 1974

Mr. Rod Serling  
County Road 153  
Interlaken, New York 14847

Dear Mr. Serling:

The New York Chapter of the American Fisheries Society has asked me to send you this token of our appreciation for your major part in making our recent film "The Aquatic Ecologist" a success. The film has been well received in its present format, having made it to the finals in the American Film Festival last season. In addition, it has been translated into several foreign languages and excerpts suitable for TV viewing have been used on over 200 occasions.

Please accept this "Leaping Trout" tie tac handcrafted locally by Sid Bell on behalf of the Chapter, with especial thanks being tendered by current president, Bill Pearce; immediate past president, Martin Pfeiffer; and the Professional Standards Committee, Steve Simkins, Chairman.

Sincerely yours,

*Daw*

Dwight A. Webster  
Professor of Fishery Science and  
Technical Advisor to the Committee

DAW:cw

Enclosure

cc: W. Pearce ✓  
M. Pfeiffer  
S. Simkins  
A. Petty, Secretary

*Dec 1, 74*  
*to Warner: If you haven't already, you'll probably get a bill on this from Webby.*  
*Bill*

**TELENEWS<sup>®</sup>**  
**FILM PRODUCTIONS**

235 EAST 45TH STREET,  
NEW YORK, N.Y. 10017

THE SCIENCE REPORT  
ROBERT FOSTER, PRODUCER

212-682 7690

November 19, 1974

Mr. William A. Pearce  
President  
New York State Chapter  
of the American Fisheries Society  
P.O. Box 316  
Cape Vincent, N.Y. 13618

Dear Bill:

Enclosed is the script for the second Science Report story from THE AQUATIC ECOLOGIST. I have not put a credit in for SUNY or New York Chapter of the American Fisheries Society. I'm not supposed to give credit to contributing institutions within a year, but if you feel strongly about it, I'll work something out. As it is, the story promotes the field in general, as a new sub-science.

If you could phone me with any corrections by November 25th, it would be a great help. Thank you again for this additional use of your excellent film.

Cordially,

*Bob Foster*

Robert W. Foster  
Producer

RWF/ld  
encl.

*Phased - Albany*  
*11/26/74*



Proposed Script For Condensation

Of

AQUATIC ECOLOGIST

To Be Shown In

USIA SCIENCE REPORT

Television Series

SUNY Contact:

Dr. David Hanselman  
SUNY College of Environmental  
Science and Forestry  
Syracuse, N.Y. 13210  
(315) 473-8611

Science Report Contact:

Mr. Robert Foster, Producer  
USIA Science Report  
235 East 45th Street  
New York, N.Y. 10017  
(212) 682-5600 Ext. 393

American Fisheries Contact:

Mr. William A. Pearce, President  
New York State Chapter of the  
American Fisheries Society  
P.O. Box 316  
Cape Vincent, N.Y. 13618  
(315) 654-4541

## AQUATIC ECOLOGIST

Montage of aquatic  
research

1. American Fish Soc.  
oldest Professional  
organization in  
U.S. - celebrated  
Centennial Water  
Wild. History NYC  
1970?

Man in boat

called  
Aquatic Biologists  
same ecologists  
" fish

Large boat on lake

WHEN DEEP CONCERNS FIRST AROSE OVER THE  
CONDITION OF THE NATURAL ENVIRONMENT IN THE  
UNITED STATES, A NEW SUB-SCIENCE, CALLED  
"AQUATIC ECOLOGY" WAS CREATED TO DEAL WITH  
AN IMPORTANT ASPECT OF THE PROBLEM. AS A  
RESULT, A LARGE BODY OF WATER BIOLOGISTS,  
RESEARCHERS AND HATCHERY TECHNICIANS IS NOW  
ENGAGED IN THE WORK OF FINDING NEW WAYS TO  
REVIVE, REJUVENATE AND RE-STOCK THE WATERS  
THAT PRODUCE FISH AND SHELLFISH.

THE MEN AND WOMEN WHO HAVE TURNED TO THIS  
FIELD ARE CALLED "AQUATIC ECOLOGISTS."

SOME OF THEIR RECENT WORK CONCENTRATED ON  
THE HUGE GREAT LAKES REGION THAT FORMS  
PART OF THE BORDER OF CANADA AND THE  
UNITED STATES.

ON BOARD RESEARCH VESSELS, BIOLOGISTS EXAMINE  
THE INTRICATE RELATIONSHIPS AMONG CREATURES  
SEEN AND UNSEEN, THAT FORM THE ECOSYSTEM.  
MICROSCOPIC PLANKTON AND LARGER ORGANISMS  
ARE THE FOOD OF SMALL FISH, WHICH, IN TURN,  
ARE FED UPON BY THE LARGER FISH THAT ARE  
HARVESTED BY BOTH COUNTRIES. ALL THE  
CREATURES STUDIED ARE A MEASURE OF THE GENERAL  
HEALTH OF THE FOOD CHAIN...AND HOW PRODUCTIVE  
IT IS.

for future present and  
future use

CU-Biologist in lab

FIVE TO SEVEN DAYS OF LABORATORY WORK FOLLOW EACH DAY SPENT ON THE WATER. A GAS ANALYZER REVEALS THE LEVEL OF PESTICIDES AND INDUSTRIAL POLLUTION FOUND IN FISH TISSUE. ANOTHER DEVICE MEASURES THE AMOUNT OF MERCURY AND OTHER HEAVY METALS. THIS SYSTEMATIC INVESTIGATION RECENTLY HELPED TO BRING ABOUT A LARGE INCREASE IN LAKE TROUT IN LAKE MICHIGAN.

CU-Trout with lamprey

A PARASITIC KILLER NAMED THE SEA LAMPREY HAD FOUND ITS WAY INTO THE LAKES <sup>from the ocean</sup> THROUGH INLAND CANALS. ATTACHING ITSELF TO THE TROUT LIKE A SUCTION CUP, IT EATS INTO THE FLESH...AND THE VICTIM HAS NO WAY OF DISLODGING ITS ATTACKER.

CU-Man with electro-shocker

~~UNBORN~~ <sup>non parasitic larval</sup> LAMPREYS WERE COLLECTED FROM MUDDY SHALLOWS WHERE THEY GROW UNTIL LARGE ENOUGH TO ENTER THE LAKES AND FEED ON THE TROUT.

LS-Two men with testing equipment

IN A SYSTEMATIC PLAN OF ATTACK, SCIENTISTS POURED A HARMLESS DYE INTO NEARBY STREAMS TO OBSERVE THE FLOW PATTERNS. THIS HELPED TO DETERMINE THE PRECISE AMOUNT OF CHEMICAL THAT SHOULD BE RELEASED IN EACH STREAM IN ORDER TO KILL THE LAMPREY LARVAE, WITHOUT HARMING OTHER WATER CREATURES. THROUGH THIS CHEMICAL CONTROL, THE SEA LAMPREY POPULATION WAS REDUCED BY EIGHTY-FIVE PERCENT IN A <sup>(ONE)</sup>~~(TWO)~~ YEAR PERIOD. ADDITIONAL STUDIES--INCLUDING STERILIZATION OF MALE LAMPREYS ARE CONTINUING.

MS-Two men shovel  
dead alewives

CU-Young fish in net

CU-Map

<sup>ocean</sup>  
ANOTHER SPECIES CALLED THE ALEWIFE FLOURISHED  
WHILE THE TROUT WERE GONE. THEY OVERPOPULATED  
THE LAKES AND DIED BY THE THOUSANDS, CREATING  
A HEALTH PROBLEM FOR HUMANS ON THE SANDY SHORES.

<sup>and chinook</sup>  
THEN, YOUNG COHO SALMON FROM THE PACIFIC  
OCEAN WERE INTRODUCED INTO LAKE MICHIGAN.  
THEIR VORACIOUS APPETITES QUICKLY BROUGHT  
THE ALEWIFE PROBLEM UNDER CONTROL...AND THE  
SALMON THEMSELVES PROVIDED SOME OF THE BEST  
SPORT FISHING <sup>and economic boom</sup> EVER KNOWN IN THE AREA.

<sup>great lakes</sup>  
FED BY A MIXTURE OF FRESH WATER FROM RIVERS  
AND SALT WATER FROM THE OCEAN, A SEMI-ENCLOSED  
COASTAL ESTUARY IS TRULY UNIQUE. THE DEGREE  
OF SALTINESS VARIES CONSTANTLY. CHESAPEAKE  
BAY ON THE ATLANTIC COAST OF THE UNITED  
STATES IS BOTH A MAJOR SHIPPING LANE AND A  
HIGHLY PRODUCTIVE FOOD CHAIN FOR OYSTERS, MANY  
SPECIES OF FISH...AND BLUE CLAW CRABS.

**Estuary area**

AN ECOLOGICAL STUDY IS NOW UNDERWAY WHICH CHEMISTS, MATHEMATICIANS AND BIOLOGISTS HOPE WILL ENABLE THEM TO PREDICT IMPORTANT FLUCTUATIONS IN THE MARINE POPULATION. WATER FROM THE ESTUARY IS FILTERED TO REMOVE ALL BUT THE ORGANISMS SELECTED FOR STUDY. THEN THE WATER AND THE LIFE FORMS ARE PLACED IN THE BAY IN CONTAINERS THAT ALLOW THE LIFE CYCLE TO BE OBSERVED IN ITS NATURAL ENVIRONMENT. AS A RESULT, MARINE SCIENTISTS ARE NOW LEARNING THE RATES OF BIRTH, GROWTH AND DEATH AMONG VARIOUS SPECIES...AND WHO EATS WHOM...AND HOW FAST THAT HAPPENS.

**CU-Crab in hand**

BLUE CLAW CRABS ARE NETTED NEAR THE SHORE, WHILE A TRAWLER DREDGE IS USED TO SAMPLE THE SAME SPECIES IN DEEPER WATERS. BY DETERMINING SEX AND AGE, BIOLOGISTS ARE DEVELOPING BETTER WAYS TO FORECAST INCREASES IN CERTAIN CRAB AGE GROUPS...AND TO MAKE INTELLIGENT RECOMMENDATIONS FOR REGULATING THE HARVEST.

**Fisherman on boat**

THE LARGEST SINGLE FISH CROP FROM CHESAPEAKE BAY IS MENHADEN, USED FOR FISH OIL AND FOR A HIGH-PROTEIN ADDITIVE THAT MAKES CATTLE AND POULTRY FEED MORE NUTRITIOUS, THE WORLD OVER.

**Aquatic ecology montage**

UNIVERSITIES, PROFESSIONAL SOCIETIES AND  
DEPARTMENTS OF THE GOVERNMENT IN THE UNITED  
STATES ARE DEEPLY INVOLVED IN THE NEW FIELD  
OF AQUATIC ECOLOGY. SHARED WITH THE  
INTERNATIONAL SCIENTIFIC COMMUNITY, SOME OF  
THE RESULTING INFORMATION <sup>will</sup> ~~could~~ ACT AS ...  
THE "SEEDS"...FOR A NEW INCREASE...IN MARINE  
FOOD PRODUCTION.

November 9, 1973 Draft

Program - Winter Meeting

N. Y. Chapters

of

The Wildlife Society and American Fisheries Society

Hotel Syracuse

January 31 - February 2, 1974

Theme: Fish and Wildlife Management in Regional Planning:

The Adirondacks and Beyond

- Objective:
- a. Review land use plans for public and private lands in the Adirondacks as a case study;
  - b. Consider the effects of such plans on land management programs, and develop ideas for increasing the effectiveness of those plans for fish and wildlife management;
  - c. Identify political and economic problems in extending such land-use development plans to other areas of the State; and
  - d. Determine the proper role of the professional to increase the effectiveness of such plans, especially for fish and wildlife resources.



## NEW YORK CHAPTER — AMERICAN FISHERIES SOCIETY

### PRESS RELEASE

The New York Chapter of the American Fisheries Society has finally culminated a project, three years in the making, in the completion of its new film "The Aquatic Ecologist." This 16 mm, 32 minute length, sound film was completed by the Audio-Visual Unit of S.U.N.Y. College of Environmental Science and Forestry at Syracuse. The film crew logged over 10,000 miles to depict the work of dedicated scientists, resource managers and technicians who are doing something about the aquatic environment. While it was originally conceived as a career promotion film, ideal for Junior and Senior High School use, the film also has obvious, broad general appeal to ecology-minded college and adult audiences.

Copies of the film will be made available at cost, \$188.00. Previews can be arranged at a nominal charge of \$10.00, applicable to purchase price. New York State residents who are not ordering for tax exempt organizations will be obliged to pay the requisite sales tax. Those interested in obtaining a copy or several copies of the film are urged to contact Dr. Robert Werner, Box 86, Colvin Station, Syracuse, New York 13205.

Martin H. Pfeiffer  
President  
New York Chapter of the  
American Fisheries Society



## ANNUAL MEETING PLANS COMPLETED!

The Program Committee for the New York Chapters of the American Fisheries Society and The Wildlife Society set up what they felt was an outstanding program for the winter meeting. Then they selected what they felt was an ideal panel of participants. The Committee was realistic in expecting that some of their first-choice speakers would be too busy to accept, and had some contingency names in mind.

However, we are happy to announce that every one of those first-choice speakers has accepted. We believe you will want to attend and participate in the very timely program on:

### FISH AND WILDLIFE IN REGIONAL PLANNING:

#### THE ADIRONDACKS AND BEYOND

The speakers and their topics are:

Senator H. Douglas Barclay - "The Adirondack Model:

Wave of the Future or Political Bombshell."

Assemblyman Glenn H. Harris - "Political and Economic

Problems in Regional Land Use Planning: An on the Spot View."

Richard Persico (Director, Adirondack Park Agency) -

"What We Have Learned From Experience."

William M. Roden - "A Sportsman's Concern for the Fish and Wildlife Management Aspects of the Adirondack Land Use Plans."

Albert G. Hall (Executive Director, Temporary State Commission to Study the Catskills) - "Extension of Regional Planning to Other Areas of New York."

Herbert Doig (Director, Division of Fisheries and Wildlife, Department of Environmental Conservation) - is organizing a panel to discuss "Why Plans Don't Get Implemented".

Moderators of the two sessions will be Philip Thornton, Deputy Chief of the U.S. Forest Service and Robert Hennigan, Department of Policy and Program Affairs, College of Environmental Science and Forestry.

The Program will start with a panel of students, coordinated by Larry VanDruff, from Syracuse, Cornell, and Cobleskill reviewing the Adirondack Park Land Use and Development Plan.

The end of the day will be devoted to an action planning session under the leadership of Bill Webb. This session will give an opportunity to put together a set of action proposals for presentation to the Chapter membership for vote. This will

be an attempt to get our professional societies to do something concrete rather than simply viewing with alarm!

Plan to Attend January 31 - February 2, 1974

Place - Hotel Syracuse

The Fisheries Society will have its Business meeting on Thursday evening, January 31.

A technical session is planned for Saturday morning, February 2nd. The title will be: The Role of Forage Fish in Salmonoid Management. We are planning to bring together as much information as we can on the use of alewives, smelt, cisco, and dwarf suckers as forage for lake trout, brook trout and other salmonoids. We hope that some useful ideas and recommendations will arise out of this session.

In addition, the film "The Aquatic Ecologist" that the chapter prepared is now ready and we will all have an opportunity to view it Friday evening, February 1st.

Further details and information about reservations will be sent later.

Robert Werner  
Program Chairman  
N.Y. Chapter, American  
Fisheries Society

William L. Webb  
Program Chairman  
N.Y. Chapter, The  
Wildlife Society



NEW YORK CHAPTER — AMERICAN FISHERIES SOCIETY  
P.O. Box 316, Cape Vincent, New York 13618

*file*

June 14, 1974

Mr. A. C. Petty  
Dept. of Environmental  
Conservation  
P.O. Box 1169  
Fisher Avenue  
Cortland, New York 13045

Dear Arch:

For your records, a quick follow-up of our phone conversation the other day, primarily concerning the status of our film sales.

Bob Werner informed me that we had sold 24 copies of the film, which is very good and about halfway through our goal of 50+ copies required to come close to breaking even. Bob also mentioned we continue to have a problem with films being rented for \$10 per preview and subsequent damage to the film. I suggested Bob curtail the preview system, except for very special requests, at least until we recoup more of our debt.

I believe I sent you copies of the letter to Mr. Robert Foster, Telenews Services, in which we gave him permission to edit our film to 6-7 minutes for the United States Scientific Information Agency. Distribution will be made throughout most countries of the world. Hopefully this will get us some foreign sales. There is a possibility we might also be able to get \$250 from Foster's outfit via Dave Hanselman's office at SUNY.

I'll send out a notice to the Regional Offices suggesting that Regions who haven't ordered a copy of the film should do so. Some of the Regions and Rehbaum's office already have a copy.

Hopefully I'll see you in Rochester June 18-20 during the Great Lakes Fishery Commission Annual Meeting. Then would be a good time to discuss a possible Chapter fall field meeting. I also have to get hot and check with the proposed program chairman. I've heard nothing from the Committee members, other than Steve Simpkins, who asked to be relieved of his commitments.

I don't think I'll be going to the Society's annual meeting in Hawaii unless somehow or other somebody comes up with some help for the President to attend. I don't know if anyone from our Department will be allowed to go on expenses. I'll drop a note to Carl Parker and Herb Doig and see what the story is. It would be nice if someone could go from the Chapter, particularly in view of our film sales needs, but we sure as hell don't have the money in our budget to send anyone, although it might be possible to come up with a few bucks to help defray expenses if someone did go that represented our Chapter.

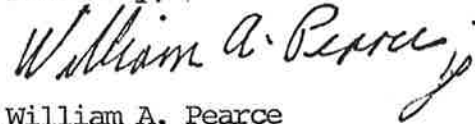
A. C. Petty

-2-

June 14, 1974

I would like to hold another Executive Committee meeting and I am open to suggestions for meeting places (note Fife, Werner) some time in July. If any of you have any suggestions, drop me a line or give me a call and we'll try to put it together.

Sincerely,

A handwritten signature in cursive script that reads "William A. Pearce".

William A. Pearce  
President  
New York Chapter  
American Fisheries Society

WAP:jss

cc: Martin Pfeiffer  
Robert Werner

PAUL SMITH'S COLLEGE  
PAUL SMITHS, NEW YORK 12970

4/25/74

Dear Bill,

Please excuse the pen but I am between classes & must get a test ready and set my lab up for this P.M.

Evidently they are misinformed in Washington - I opened the envelope before I saw the complete address (which is enclosed). After I saw the material I looked at the complete address & realized the material should have been sent to you.

Your executive committee report looks good. However, after serving for 6 years as chairman of the Professional Standards Committee, I beg you to give me a rest & let someone else take a shot at the job. I do appreciate the honor of being appointed to continue but I must respectfully decline the appointment.

With very best wishes,

P Keith?

Sincerely,  
Steve Jenkins

# **NORTHEASTERN DIVISION NEWSLETTER**



**- 1974 -**

## PRESIDENT'S MESSAGE

The Northeast Division is alive and well. Much of the credit for this goes to the interest and support that has been shown by the membership at large. Another large measure of credit goes to those hard working members who are providing special services to keep the patient healthy. Drs. Hatch and Reed, our Secretary-Treasurer and Newsletter Editor, respectively, deserve special commendations here. Their conscientiousness, generosity, and hard work for us all, over an extended period of years, have supplied the level of continuity, communication, and effectiveness so necessary to maintain viability and growth of this Division.

The Salmonid Workshop got off to a flying start with their first program last October at Boiling Springs, Pennsylvania, organized by Del Graff and his committee, and featuring guest speaker Robert Hunt from Michigan. The Warmwater Workshop will be deferred this one year in favor of the National Bass Symposium at Tulsa, Oklahoma on February 3-6, 1975. With the kind of advance planning exemplified by the Salmonid meeting, these workshops can provide increasingly important opportunities for professional contacts and communications within our Division, and I believe they will. In the future we must find means for publicizing them more widely, perhaps utilizing media such as the A.F.S. Newsletter or Sport Fishing Institute Bulletin.

The problem of Time and Place of meetings - still acute and increasingly divisive at the National level - has been greatly eased recently within our Division, and this year's meeting at the Sheraton-Park Plaza Hotel in New Haven on February 23-26 represents the kind of compromise solution to the problem that was so badly needed. This is a fine tribute to the wisdom of those who selected the time and place for this meeting, and I'm hopeful that we can continue on this middle path.

'Previews' of the program for this year's meeting are most stimulating. Featuring a Symposium on Fisheries and Energy Production, it's clear that the program planners recognize the fishery biologist's mandate to take an active role in environmental decision-making. With Saul Saila and Cole Wilde and their committees handling the program planning arrangements, it's not surprising to see it shaping up so well.

Putting all the symptoms together, the Northeast Division seems to be in exceptionally good health, and the prognosis is highly favorable.

See you in New Haven.

Al Eipper  
President, 1974-1975



evaluation of the habitat requirements of the swamp darter; and ROBERT SAMPSON (M.S.), evaluation of fish sampling techniques in the freshwaters of Connecticut.

#### Degrees Awarded

DIANE ASHTON, M.S. Ecology of two sympatric species of silversides.  
STEVE ELLS, M.S. A summer study of the trout population in Quaduck Brook, Conn.  
ROBERT KOSKI, Ph.D. Life history of the hogchoker.  
REED OSTRANDER, Ph.D. Effects of diurnal fluctuations of temperature, dissolved oxygen, alum, and sodium chloride on the growth of white catfish.  
PAUL MARSH, M.S. Seasonal diversity and abundance of fishes of the upper Thames Estuary, Connecticut.

U.S. DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
National Marine Fisheries Service  
Biological Laboratory--Milford, Connecticut 06460

The recently completed chronic holding facility saw heavy use this past year, providing the means for considerable physiological (F.P. THURBERG) and biochemical (E. GOULD) data on lobster, Homarus americanus; cummer, Tautoglabrus adspersus; and striped bass, Morone saxatilis, exposed to either cadmium or mercury, both as chlorides (A. CALABRESE). Tissues from the exposed animals were also furnished to scientists in other disciplines within the Center (histopathology, genetics, immunology, chemistry).

Current experimental work on the effects of pollutants on phytoplankton food-chain species is undergoing a change of direction and emphasis. The work will now be with aspects of molluscan aquaculture, with pollutant studies in a minor role. Initial work will center on the physiological and nutritional factors significant to the cultivation of micro-algae, and how these affect the nutritional requirements of certain molluscs (R. UKELES).

Studies have continued on the probable mutagenicity of some marine pollutants. Genetic work in the field of marine aquaculture is being reinstated (A. LONGWELL).

Work on culture methods that are commercially feasible has focused on the American lobster; the blue crab, Callinectes sapidus; and the rock crab, Cancer irroratus (E. RHODES). Also under development are culture methods for the surf clam, Spisula solidissima (W. CABLE). With the move back to aquaculture, emphasis is expected to fall upon the bay scallop, Argopectens irradians, and the surf clam (W. LANDERS).

The immunology group is examining immune response in marine animals, focusing primarily on the effects of pollutants on antibacterial immunity in finfish (R. ROBOHM).

A study was completed on ozone-inactivation of red-tide toxins, and work continued on the waste-treatment plant for the chronic-holding facility (W.J. BLOGOSLAWSKI).

Microbiological aspects of the finrot syndrome are currently under study, using finfish specimens collected from the New York Bight and from Long Island Sound (J. GRAIKOSKI). Extensive chemical analysis of substrata and marine animals, both random samples and experimental, is a continuing support program (R. GREIG).

white perch, Atlantic croaker, weakfish, bluefish and several panfishes such as yellow perch, black crappie and largemouth bass.

Because of their value to both sport and commercial fishermen, special emphasis is being placed on white perch, Atlantic croaker and striped bass.

Samples taken by plankton nets in the spring are dominated by striped bass eggs and larvae which were spawned in the western end of the Canal and Elk River. Bay anchovy dominated the catch throughout the rest of the year. One of the major aspects of this study is to evaluate the impact, if any, that the Summit Plant will have on striped bass eggs and larvae and the adult population they could represent.

Since October 1973, fishermen along the Canal have been interviewed in an attempt to evaluate the sport catch. These interviews have shown that white perch and channel catfish are the most abundant species in the sport catch.

Raytheon Corporation is investigating the zooplankton, phytoplankton, benthic organisms and water chemistry in the vicinity of the proposed Summit Station intake and discharge.

The terrestrial program includes studies of amphibians, mammals, birds and vegetation on the Plant Site and surrounding areas. Snakes, turtles and mammals are captured, marked and released to determine population sizes and individual movements. Of the 300 species of birds reported for Delaware, 110, most of which are migratory, have been observed on the Plant Site. A breeding bird census was carried out to determine the density and species of breeding birds on the Site.

Trees, shrubs, and other vegetation found on the Site were identified and their populations monitored from year to year.

These studies will continue into the post-operational phase of the Plant construction to assess any impact.

#### MAINE DEPARTMENT OF INLAND FISHERIES AND GAME AND ATLANTIC SEA RUN SALMON COMMISSION

STU DEROCHE reports that with the completion of the fish passage facility in Chutes dam on the Northwest River, all major salmon spawning and nursery areas for Sebago Lake are now accessible to landlocked salmon. The legal length on salmon in Sebago was changed from 14 to 17 inches in an attempt to increase the recruitment of salmon into older age groups to provide a more desirable fishery for larger fish. Lake trout recently introduced at Sebago are showing exceptionally good growth and survival to the creel.

RAY DESANDRE is coordinating a study to evaluate success of rainbow trout introductions in selected waters. In view of success in most of 6 ponds (20-60 acres) and 2 rivers, the project was expanded to include ponds in the 100 to 1,000-acre category where food fish other than smelt are abundant and establishment of salmon fisheries have failed.

ROGER AUCLAIR is continuing his eighth year of study of the salmon, brook trout, and lake trout fisheries of Moosehead, Maine's largest lake. During the past 7 years, total estimated angler trips per year ranged from 28,500 to 36,000 (mean 32,000). Mean annual catches were 13,000 salmon, 4,000 brook trout and 7,000

ductions, is now producing good numbers of fish 14-18 inches in length (length limit 14 inches) for those who know how to fish for them. At South Branch Ponds (Baxter State Park) a creel census in 1974 showed good fishing success for skilled anglers. Information was also gathered on comparative growth, catch rates, and food habits of Sunapees and brook trout. Floods Pond was stocked with 9,000 known-age fall fingerlings for age and growth evaluations.

URBAN (Sonny) PIERCE is studying the role of hatchery-reared fish in establishing populations of and fisheries for brown trout in southern Maine ponds containing competing warmwater fishes. Comparative catches, growth, survival, and population levels are being evaluated for two ponds stocked with fall fingerling and fall yearling browns.

KEITH HAVEY and DAVE LOCKE are continuing their evaluation of a brook trout brood stock developed through selection to provide progeny of great longevity.

PAUL JOHNSON has begun a research project to evaluate the fisheries and propose management measures for a wild landlocked salmon population in the West Branch, Penobscot River.

Ever-greater amounts of time are being spent on investigations concerning environmental laws by both field and administrative personnel of the Fishery Division.

Fisheries Resource Planner OWEN FENDERSON reports that after a slow start, the writing of long-range (15 year) management plans for the 15 major freshwater game fish species is underway. Two species plans (lake trout and sunapee trout) have been prepared in first drafts and others are in progress. Individual plans are being written by 12 members of the Fisheries Division's research and management staff who have accumulated knowledge and expertise in management of particular species. These plans will include (1) the past, present, and future status of the species with respect to habitat, abundance, supply and demand, and use opportunities, (2) future goals and objectives, (3) problem analysis, and (4) establishment of priorities and recommendations for management programs.

#### New Employees

MICHAEL SMITH joined the Fishery Division as Fishery Technician in the newly created Penobscot Region. FOREST BONNEY was hired as Assistant Regional Biologist in the Fish River Lakes Region, replacing STEVE TIMPANO.

#### Promotions

CHUCK RITZI was promoted to Environmental Coordinator for fisheries and has transferred to the Planning Division. ROGER MARIN is acting Regional Biologist, replacing Ritzi in the Belgrade Region. STEVE TIMPANO was promoted to Regional Biologist in the newly created Penobscot Region with headquarters in Enfield.

#### Moves

PAUL JOHNSON is taking a one-year leave of absence from his duties as Assistant Regional Biologist (Moosehead Region) to fulfill requirements for his Master's Degree at the University of Maine.

Major projects underway this year (in addition to student projects listed below) include expanded hydrographic monitoring in the Penobscot River estuary and studies on biological and physical factors bearing on restoration of Atlantic salmon in the Mattawamkeag River. The estuarine study involves continuous surface temperature monitoring at three sites and semi-monthly cross-channel profiles of temperature, dissolved oxygen and salinity along five transects. PHILIP HULBERT has joined the Unit as a Research Associate to carry out the Mattawamkeag field work assessing water quality, distribution of fish-food organisms, composition and distribution of forage and game fish populations, physical and chemical obstacles to salmon outmigration and relative survival of stocked fry, parr and smolt salmon. The Unit also continues to cooperate actively with the Craig Brook NFH in studies on salmon rearing methodology.

#### Degrees Granted

- DUGANS, SANDRA E. M.S. Characteristics of a stunted yellow perch population and interspecific competition with white perch in South Branch Lake, Maine, May 1974
- KOCH, PETER M.S. Distribution of pelagic fishes in a Maine estuary subject to thermal pollution, January 1974
- RICHARDSON, NANCY M.S. The effect of extremely low frequency electric and magnetic fields on the locomotor activity of Atlantic salmon (Salmo salar) in various light conditions, May 1974
- ZIMMERMAN, MARION M.S. Orientation of elvers of American eels (Anguilla rostrata) in weak magnetic fields, May 1974

#### Students in Residence

- FRIED, STEPHEN, Ph.D., The distribution of demersal fishes in the Sheepscot River-Back River estuaries Wiscasset, Maine.
- GATELY, GLENN, M.S., Food habits of landlocked alewives and landlocked smelt and their status as forage fishes and competitors of landlocked salmon and brook trout.
- LEONARD, JONATHAN, M.S., The morphology and ultrastructure of cutaneous sensory receptor organs of salmon and eels.
- MCCABE, GEORGE, M.S., Age, growth, and angler harvest of the chain pickerel in South Branch Lake.
- MEARS, HAROLD, M.S., Effects of fin excision on survival of fingerling brook trout.
- OTTO, ROBERT S., Ph.D., Enzymology of striped bass and congeneric Percichthyid fishes.
- TARBOX, BRIAN, M.S., An evaluation of the temperature regime of the Mattawamkeag River to determine its suitability of habitat for the Atlantic salmon (Salmo salar).
- TRIAL, JOAN, M.S., Effects of zinc culverts on vertebrate and invertebrate faunas in selected Maine streams.
- WILSON, J. SCOTT, M.S., Survey of the copepods and cladocera of the Penobscot River estuary.

#### MASSACHUSETTS

##### Division of Fisheries and Game

During the past year fisheries research and management programs continued on Quabbin Reservoir, stream investigations, warmwater fish studies, and special study projects involving thermal outfall from three steam electric stations on the

An outbreak of Paralytic Shellfish Poisoning resulted in an 8-week closure of all shellfish flats from Boston Harbor north to the New Hampshire state line. Toxic levels began to occur in late August. Blooms of *Gonyaulax* were apparent and organism counts were noted in excess of 17,000,000 cells per liter of water. Detoxification was more rapid than in 1972 when many shellfish areas were closed for the entire winter. All shellfish areas were reopened by the middle of October.

Personnel changes during the past year include ARTHUR CHESMORE from Research Analyst to Assistant Director (Administration); CHARLES ANDERSON from Assistant Director (Administration) to Research Analyst; MARY PATTERSON from Laboratory Technician to Assistant Marine Fisheries Biologist; and MANDO BORGATTI from Skilled Conservation Helper to Fisheries Manager. LAWRENCE GIL joined the Division as an Assistant Marine Fisheries Biologist.

#### University of Massachusetts

The Fisheries Program at the University of Massachusetts recently accepted with regret the resignation of JAMES E. JOHNSON who is returning west to work with the Bureau of Land Management in the sensitive problem of shale-oil development in Colorado versus the fragile fisheries resources and other amenities which need to be protected. During Dr. Johnson's stay at UMass he has been singularly effective as a teacher in both professional fisheries courses and as a leader in the general education course entitled "Conservation of Natural Resources." This fall this course has over 300 enrolled. His research program involved co-sponsorship of the Parker River alewife program and a number of master's student projects on river populations in western Massachusetts. We will be conducting a search for a freshwater fish ecologist beginning in early December.

The undergraduate program has now passed the 100 student mark; along with 21 graduate students this keeps Holdsworth Hall active. A problem of large proportions is the integrating of a large number of transfer students entering fisheries at the beginning of the Junior year. A further interesting development has been the large influx of women into the program. Currently four are working on their master's degrees and 19 are working on bachelor's.

#### Massachusetts Cooperative Fishery Research Unit

The Assistant Unit Leader position remained vacant during the 12-month period. This situation should be corrected on or about 1 February 1975.

ROGER J. REED, Unit Leader was successful in preparing a research proposal for federal funding to evaluate effects of channelization on aquatic insect diversity in selected Vermont streams; additional funding by power companies on American shad behavior in the Connecticut River at the Northfield pump storage hydroelectric plant and the proposed thermonuclear plant site at Montague Plains; and a Soil Conservation Service funded survey of the Ten Mile and Quaboag River watersheds. He continues to investigate the suitability of subcutaneous tagging of brown trout, rainbow smelt and Atlantic salmon presmolts. Finally, he served as Program Chairman/President-Elect, Southern New England Chapter AFS; editor of the Northeastern Division Newsletter and is a member of the Program Committee for the Division's New Haven meeting in February.

#### Degrees Granted

BURNS, THURSTON S., M.S., A comparison of digestive procedures for determining total mercury concentrations with applications to the white sucker of Lake Warner, Massachusetts.

- LIBEY, GEORGE S., Ph.D., A predictive model of alewife production as a factor in optimizing cost effectiveness of river management.
- MURAWSKI, STEVEN A., M.S., Population dynamics and movement of anadromous rainbow smelt in the Parker River, Massachusetts.
- NEVES, RICHARD J., Ph.D., The effect of low-flow augmentation dam construction on the downstream aquatic insect fauna of Factory Brook, Westfield River Watershed, Massachusetts.
- PETERSON, SUSAN J., M.S., Seasonal distribution and abundance of fish eggs and larvae in the Merrimack River estuary, Massachusetts.
- PHILLIPS, JAMES W., Ph.D., The embryological effects of elevated and shock values of temperature and water pressure on shad and other selected eggs.
- STIRA, ROBERT J., M.S., American shad egg sinking rate and drift distance in the Connecticut River, Massachusetts.

New graduate students include MARK BENEDICT, MARY ELLEN HUBER, MICHAEL JAMES, DORIS JIMINEZ, JAPAHUGE JINADASA, ALICE KLINGENER, and DANIEL KUZMESKUS.

#### COOPERATIVE FISHERY RESTORATION PROGRAM FOR THE CONNECTICUT RIVER BASIN

Seventy-six thousand Atlantic salmon smolts were released into three tributaries to the lower Connecticut River during 1974. Most of the smolts were released from streamside imprint-stockout pools located on the Salmon River (Connecticut) and Tarkill Brook (Massachusetts). Fifty thousand of these fish carried tags. Twenty-four of these fish were caught from the Atlantic Ocean and the tags returned during 1974. Tags came from fish caught off the Rhode Island coast during the second week of May; from the Nova Scotia area during the third week of June; and from the Newfoundland area during July and August. Cold branding again was used to mark non-tagged smolts in 1974. An examination of 1,600 salmon branded with various letter and numeral combinations during 1973, then held in freshwater until 1974, revealed that 97 percent of the fish could be identified from brands applied 10 months previously.

The number of American shad passed upriver over Holyoke Dam again increased during 1974, with the passage of approximately 55,000 adult shad. Studies conducted at the Northfield Mountain Pumped-storage Hydroelectric Plant during 1974 indicate a low survival of 6-12 inch trout passed up through the system into the upper reservoir.

The construction of step-and-pool type fish passage facilities in the Connecticut River basin was initiated during 1974. At year's end, the construction of fish passage facilities were well in progress at the Rainbow Dam on the Farmington River in Connecticut. It is anticipated that the facilities will be completed during 1975. The modification of the lift facilities at Holyoke, Massachusetts, continued during 1974. Constructions of fish passage facilities at other Connecticut River dams have yet to be initiated.

GEORGE E. DIVINE, Coordinator for the Connecticut River Anadromous Fish Program with the Division of Fishery Services, transferred to the Office of

Copenhagen (Denmark), as well as in joint ICNAF-ICES-FAO meetings in Paris (France). The ichthyoplankton sorting center in Poland is well under way and the testing and evaluation at the Narragansett Lab of an automatic plankton sorting system using differential sedimentation rates in gradients of colloidal silica suspensions is nearing completion.

Rounding out the NEFC activities in 1974 were participations in state/federal programs for lobster and shrimp and the assistance provided to the New England Fishery Development Program on squid, offshore crabs, and mixed finfish.

#### NEW BRUNSWICK

Fisheries Research Board of Canada--Biological Station, St. Andrews, N.B.

During the past year further changes have been made in our internal organization in order to integrate all research projects into one of the following functional sections--Inshore and large pelagic fisheries, population dynamics and stock assessment, fisheries biology, fish capture, applied ecology, toxicology and aquaculture. As mentioned in the 1973 Newsletter, we want to indicate this year and in each ensuing year the scope of the work being carried on in one specific section.

The Applied Ecology section, headed by H. E. WELCH, was established as a separate entity in 1973 to consolidate into a comprehensive study of water systems the previously fragmented environmental coverage. The major thrust of the overall program is an investigation of the effects of agricultural, industrial and forest management practices and domestic sewage disposal on environmental quality, ecology and utilization of streams, rivers, estuaries and adjacent coastal waters. It seeks to predict the effects of changing environmental quality on general ecology, with special emphasis on commercially and recreationally important species and by advice to management, lead toward conservation of important species, rehabilitation of degraded areas, and rational alternate use of resources.

Current projects include surveys of estuarine benthos carried out in conjunction with estimates of bacterial biomass in order to measure the response to organic pollution and studies of the relationship between pulp mill wastes and marine/estuarine phytoplankton from which predictive models can be made. Studies of the effect of clearcutting, road construction, and agricultural practices on siltation in New Brunswick streams are tied into studies of the effects of siltation on survival of salmon eggs and fry, and related to the proposed restoration of the St. Croix River as a salmon breeding ground. Work on the effect of water currents on coarse fish and salmon and on the interaction of the two species will contribute to the restoration program. Also included here is the field rearing of specially developed salmon fry receiving supplementary feeding.

Detailed studies of the toxic and behavioural effects of fenitrothion have been carried on for several years and are now being expanded to include toxicity tests of oil carriers used in aerial spray application.

During the year G. M. HARE joined the Fisheries Biology section and PATRICK LETT, Population Dynamics and Stock Assessment, while A. V. TYLER left to take a teaching position at Corvallis, Oregon. D. J. SCARRATT has been appointed Deputy Director for the station. S. N. TIBBO and J. S. BECKETT have been seconded to the International Fisheries and Marine Directorate in Ottawa.

Construction continues on our anadromous fish hatchery in Milford, New Hampshire.

The New England Atlantic Salmon Restoration Conference will be held January 14-16, 1975 in Boston, Massachusetts.

UNIVERSITY OF NEW HAMPSHIRE  
Durham, New Hampshire 03824

Jackson Estuarine Laboratory

The following fisheries-environmental activities and projects have been conducted at/or in association with the Jackson Estuarine Laboratory.

Sea Grant-Coho Salmon project with STROUT, RINGROSE, and SAWTELE from the Univ. of New Hampshire, cooperating with New Hampshire Fish and Game. In other words, a variety of rearing-nutrition studies have been conducted in order to develop this fishery.

Flounder-mariculture project with SAWYER and HORNBECK, conducting this project--i.e., another Sea Grant Study. They are attempting to initiate "hybrid vigor" in flounders by selective breeding programs and cold-shocking methods.

A variety of fishery-type projects are being conducted by Zoology Department graduate students. One of the major projects is to evaluate the effects of heavy metals (i.e., chromates) on flounders.

General studies of thermal enrichment on benthic communities are being conducted in the estuary and in the laboratory.

"Baseline" studies of salinity, nutrients, dissolved oxygens, as well as a variety of other pollutants are being studied throughout the Great Bay Estuary System and adjacent open coast.

Sea Grant-mariculture studies of economic seaweeds (Irish moss) have continued under the direction of DR. MATHIESON.

Specific details of a variety of other activities are summarized in the "Annual Report of Sea Grant--Jackson Estuarine Laboratory--Engineering Design and Analysis Lab--Sea Grant--Raytheon Project," which can be obtained from J. SAVAGE of the Sea Grant Office, Kingsbury Hall, University of New Hampshire.

Fish and Wildlife Service, Division of River Basin Studies  
Concord, New Hampshire

DAVID RACKLEY joined this office in July 1974. He is a M.A. candidate at the College of William & Mary. MS. JANICE HILL, Fishery Biologist, received a promotion to GS-9 in April 1974.

ROY LANDSTROM, Fish and Wildlife Biologist, transferred in June to the Division of River Basin Studies, Portland, Oregon, as a GS-11. Ms. Janice Hill was selected for the Interior Department's Manager Development Program in Washington, D.C. Janice left the CAO in August.



Other investigations involving electric power facilities are proceeding at New Haven and Bridgeport Harbors, CT, with long-term monitoring programs continuing on both the Merrimack and Piscataqua Rivers in NH. These studies are designed to assess the effects of generating facilities, in various stages of completion, on existing fauna and flora.

The NAI staff is also involved in studies for the petroleum industry and the U.S. Army Corps of Engineers. A petroleum industry project currently underway in the vicinity of Portland, ME is centered on examining the potential effects of petroleum transfer and the disposal of dredge spoils in the Gulf of Maine. These investigations include studies of benthic ecology, demersal fish communities, and the analysis of sediments and currents in Portland Harbor, the near-shore vicinity, and several sites in outer Casco Bay.

A recently completed study for the U.S. Army Corps of Engineers evaluated the potential, immediate and long-term impacts of various waste-water management alternatives on the Merrimack River watershed. The study, involving intensive baseline investigations of terrestrial, aquatic and marine environments in the Massachusetts portion of the watershed, was coordinated closely with engineering and socio-economic consultants. Detailed literature investigations served to incorporate data from past technical records into the final report.

Most recently, NAI concluded a dye and water quality study in Ocean City, MD, to project the dispersion and effects of proposed increases in the discharge of effluent into Assawan Bay. NAI has also been selected to participate in one of the 12 regional assessment studies sponsored by the National Commission on Water Quality. The Merrimack and Nashua Rivers comprise the focal point of the New England study. The environmental portion of the study will be the responsibility of NAI.

The NAI staff has continued to grow in the last year both in breadth and depth of expertise. Among the new additions are WADSWORTH OWEN, Physical Oceanographer, previously with Westinghouse Underseas Division, Raytheon Marine Research Division and the Research Corporation of New England; THOMAS SHEVENELL, Geological Oceanographer, and Ph.D. candidate at Columbia University, NY; CHRISTOPHER SCHMITT, Fisheries Biologist with an M.S. from Michigan State University; ROY L. SANFORD, Ph.D. from the University of Minnesota, Biometrician in charge of Statistics Department; and BENTLEY GREGG, Ph.D. candidate at Virginia Polytechnic Institute in limnology. FRED KUSS came to NAI as Projects Manager last spring from the graduate faculty of Pennsylvania State University. He has held management positions with the chemical divisions of Standard Oil of California and FMC Corporation.

#### NEW JERSEY DIVISION OF FISH, GAME & SHELLFISHERIES

State Fish Hatchery--ROBERT WILLIAMS, Principal Fisheries Biologist

Because of the third mild winter in a row, trout survival and growth at the Charles O. Hayford Hatchery in Hackettstown was acceptable. However, a cataract problem in the yearling brown trout resulted in the destruction of a large number of fish. This loss will be partially offset by Federal brown trout which were delivered in the spring and are being held over for stocking in 1975.

In our anadromous fish inventory, 190 rivers and streams were investigated to confirm spawning runs. Of these, 31 alewife herring and 6 blueback herring runs were confirmed.

During the spring of 1974 we had an opportunity to evaluate the State's only fish ladder. This was installed in the dam on Lake Shenandoah on the Metedeconk River to provide for anadromous fish passage. A fish trap was operated at the head of this ladder during the entire month of May and the results showed at least the beginnings of an alewife-blueback run.

A good bit of the biologists time this year was spent in the review of Environmental Impact Statements as well as NPDES applications, sanitary landfill applications and stream modification projects. This phase of our work is increasing each year.

NEW YORK  
DEPARTMENT OF ENVIRONMENTAL CONSERVATION  
Division of Fish and Wildlife

Bureau of Fisheries--CARL PARKER, Chief

A fishing access site program plan prepared by BONNIE JACKSON of the Inland Fisheries Section, identified a ten-year need for 286 public launching sites on lakes and large rivers across the State. In 1975 funds were approved for the purchase of 19 sites in seven regions. Additional funds from the 1972 Environmental Quality Bond Act were available for purchase of two access sites on Long Island. Under the same bond act, three million dollars was allocated for purchase of public fishing easements on game fish streams throughout the State. By September 20, 1974, 132 contracts involving 34 miles on 24 streams had been signed by our Regional Fisheries management unit staffs.

Twenty trout streams in 13 counties affected by Tropical Storm Agnes have been partially restored with federal funds. These were allocated to New York by the Soil Conservation Service under Section 216 of the Flood Control Act of 1950. About \$461,000 in restoration projects were completed on schedule by June 30, 1974 under an agreement which called for installation of rip-rap, log cribs, log deflectors, log brush cover, seeding and tree planting to protect trout habitat.

Under a new program, lucky anglers catching exceptionally large fish in New York next year will get official recognition for their feat. In addition to awarding certificates for large fish, the program will also illustrate the variety and quality of sportfishing in the State. Twenty-six freshwater and twenty-seven saltwater species will be eligible for recognition. Junior anglers, fisherman under 10 years of age, will also be eligible for awards covering eight non-game fishes.

Inland Fisheries Section--PAUL NETH, Supervisor

DOUGLAS SHEPPARD has followed HOWARD LOEB as head of our Special Studies Unit. In this capacity he will be responsible for fisheries research projects and will be working closely with regional staffs in design and evaluation of regional studies. Doug came to us from the Washington Cooperative Fishery Unit where he had been working on steelhead. One of his jobs was to serve as leader of the

In a continuing effort to improve the quality and diversity of trout fishing, three new special fishing areas were established this spring. BILL KELLY, Regional Fisheries Manager in Region 3, was instrumental in setting up areas on East Branch Croton River and extended an existing area on Willowemoc Creek. Through the efforts of RUSS FIELDHOUSE, Regional Fisheries Manager in Region 4, a section was established on Schoharie Creek. On Long Island, recommendations by AL KELLAR, Regional Fisheries Manager in Region 1, led to a one-month season extension on 14 trout streams to give anglers an opportunity to harvest sea-run brown trout. Al has also been working on pilot studies which may lead to development of steelhead and coho salmon runs to the Island. These efforts are directed at establishing alternate, in-state egg supplies, with low pesticide levels for the Great Lakes salmonid restoration program.

LEIGH BLAKE has returned as Regional Fisheries Manager in Region 6 and BURRELL BUFFINGTON, Senior Biologist, is again handling fisheries field program activities in that Region. LEIGH BLAKE, ARCH PETTY, NED HOLMES and CHUCK FRISA and their staffs are contributing very substantially to the Great Lakes program in addition to handling inland programs.

#### Great Lakes Section--WILLIAM PEARCE, Supervisor

The developing salmonid fishery in New York's Great Lakes waters continues to be a major topic of conversation and interest to New York's fishermen. In 1973 brown trout were introduced to Lake Ontario. By June-July of 1974 some of these fish had reached the seven-pound class. Even more important, they move right inshore when the water cools off and are available to shore fishermen and inshore boat fishermen in depths of 5-10 feet of water.

Rainbow trout or steelhead runs in Lake Ontario tributaries were better than expected in the spring of 1974, with fish in the 5-10 pound class rather common. It looks very encouraging for a good rainbow trout-steelhead fishery in the spring of 1975 and future years.

The 1974 fall Pacific salmon run started in late August this year in the Salmon River system. The run has been much larger than previous years, and the fish are averaging larger size. By mid-September the average size of the adult cohos was 7.1 pounds, as compared to an overall average of 5.1 pounds in 1973. Two-year-old chinooks also averaged about a pound more than in the previous year, and are now averaging 5.1 pounds. Chinook adults in the three- and four-year age group are running 10 to 20+ pounds. Many fish in the 10+ pound class are being caught. The largest chinook salmon handled to date came from Sandy Creek near Rochester. It was 23 pounds. We expect that one day we will reach the 30-pound size in our chinook from Lake Ontario. It is felt that the increase in numbers and average size of large fish is primarily due to lamprey control. It is quite certain that lampreys single out the larger fish to attack. Therefore, the mortality rate on the larger fish is very heavy until the lamprey populations are reduced.

The above information does not mean that we have reached home plate on our lamprey control program in Lake Ontario. It is a continuous job, and it appears quite certain that we will have to intensify control on the lake, for wounding rates are still quite high on the large fish, although the overall total of scars and wounds is much lower the past two years, after lamprey control, than prior to lamprey control.

Site selection and design of a 200,000 pound Great Lakes salmon hatchery advanced into a contract with Kramer, Chin and Mayo Engineering Firm of Seattle, Washington, for a detailed groundwater investigation and evaluation whether sufficient quantities of adequate quality water are available and to develop a Master Plan Report from results of the study.

Several projects were initiated at various hatcheries that advanced our modernization plans. Budget requests were submitted for funds to continue expansion and modernization of the hatchery system.

Bureau of Environmental Protection--JOHN SPAGNOLI, Chief

Responsibilities of segments of State government vary but none seem greater than that of environmental protection. Within this small but diverse Bureau past, present and future impacts are analyzed in both the theoretical and practical sense. Where feasible and experimentally sound numerical limits are set. In other instances professional expertise may suggest the probability of negative impacts and indicate the need for mitigation. In order to react to the varied needs, environmental protection programs must be broad yet restrictive, requiring a generalist within a specific discipline.

Pollution monitoring remains as one of our strongest controls against the addition of contaminants to the environment. Samples of tissue thought to contain heavy metals and pesticides are analyzed at Rome by that facilities staff chemists (RALPH KARCHER and CHARLES FISCHER) under the direction of Associate Analytical Chemist EARL HARRIS. In addition to this statewide monitoring program, Earl and his staff are collaborating with our Avon Laboratory personnel and fisheries staff to address the problem of muskellunge fry mortality at the Chautauqua Hatchery. This staff expertise is projected in the immediate future to reinforce Wildlife Pathologist WARD STONE's work in accidental wildlife mortalities where toxicants are suspected and assays required.

LEE COOPER, Associate Aquatic Biologist and JOSEPH SPODARYK, Associate Analytical Chemist are continuing their work as project leaders of the fish mortality assessment teams in conjunction with biologist GARY NEUDERFER and chemist BOB BAUER. These teams continue to travel throughout the State in response to fish kills in all but marine environments. In order to better understand the mechanisms of pollutants encountered, Joe and Lee are attempting to work out the problem associated with a new bioassay system. Hopefully, that portion of the laboratory will be operable by early 1975. A second major involvement of the Avon facility is the macroinvertebrate study funded by EPA. We were fortunate this year to obtain three permanent positions (Biologist, TIM PREDDICE and Technicians LAURA KINNEY and FRED ANGOLD) to continue the work on a year-round basis. These reports are forwarded to the Division of Pure Waters for submission to EPA as part of the State's pollution monitoring system.

The vast amount of data generated at Rome and Avon by the Pollution Monitoring Section are incorporated into usable form for the regional managers by LARRY SKINNER, an Associate Aquatic Biologist who recently transferred to Albany from the Warrensburg field office. In addition, Larry is presently responsible for our involvement in the pesticide permitting activities through the Division of Quality Services.

JOHN G. NICKUM, Assistant Unit Leader, was appointed Director of Cornell's new Aquaculture Program. He taught a course in aquaculture to 32 students at the upperclass/graduate level and has started development of research activities in cool-water aquaculture, wastewater aquaculture, and urban recreational fishing.

#### NOVA SCOTIA

Resource Development Branch--Fisheries and Marine Service  
Environment Canada, Halifax, N.S.

The Freshwater and Anadromous Fishery Management Section, headed by BRENT LISTER, was reorganized into Northern and Southern Management Units by GARY TURNER and MIKE ROBERTSON, respectively, and an Artificial Propagation Unit under the direction of TIM CAREY.

From the Northern Unit, JOHN PEPPAR reports that Atlantic salmon management programs on the Restigouche River continued assessment of the effects of the New Brunswick salmon commercial fishery closure. Surveys were also initiated on the winter ice-fishery (commercial) for smelt in the Restigouche estuary and Chaleur Bay, and on the commercial fishery for alewives in the Tracadie and Pokemouche Rivers. TIM LUTZAC tells us that the salmon run to the Miramichi River in 1974 showed an increase of nearly 60% over 1973. A late start by the Newfoundland commercial fishery, because of severe ice conditions, may have contributed to the increase. At the same time, the salmon harvest by anglers from all New Brunswick rivers tributary to the Gulf of St. Lawrence was up over 1973, to an estimated 38,000 fish. Tim also initiated surveys of commercial smelt and alewife fisheries in the Miramichi and Richibucto Rivers. Miramichi field operations in 1974 were in the capable hands of EMERSON SCHOFIELD who transferred to this Branch from the Fisheries Research Board Biological Station, St. Andrews. BOB DUNFIELD is in the final stages of assembling a document describing the history of commercial fishing for Atlantic salmon in North America.

In the Southern Unit, GLEN PENNEY reports that the run of Atlantic salmon to Mactaquac Dam on the Saint John River, New Brunswick, was 13,847 fish, or double that of 1973. Fish of hatchery origin made up 41% and these made possible the largest spawning escapement to the Tobique River tributary since counts began in 1953. The salmon angling catch in Nova Scotia was 8,500 fish or 50% greater than that of 1973. River escapements were also up. RON GRAY indicates that the upper LaHave River, N.S., through hatchery smolt plantings since 1971, realized a run of 475 salmon where previously there were none. Ron reports egg production from reconditioned salmon kelts at the Sheet Harbour, N.S., facilities continued at about the same level. ROSS ALEXANDER continued to assess the survival of yearling hatchery brook trout stocked principally in Nova Scotia lakes and in addition initiated a study of the population dynamics of a pristine brook trout population. BRIAN JESSOP, working with both eels and alewives in the Saint John River, reports that 345,000 pounds of alewives, deemed surplus to the required spawning escapement, were harvested from the fish lift at Mactaquac Dam and sold to bidding commercial fishermen. Basic biological and tagging studies continue to provide insight into the dynamics of alewife and blueback herring populations stressed by commercial fisheries and Mactaquac Dam.

Within the Artificial Propagation Unit, RON HAWKINS, Supervisor of the hatchery program, was unfortunately on extended sick leave in the latter part of

Lake surveys are being conducted on a continuing basis and this year approximately 75 were completed by three survey crews.

A total of 93,440 yearling speckled trout and 1,528 yearling rainbow trout were stocked in accessible waters in conjunction with the stocking done by the Fisheries and Marine Service of Halifax. Our assessment of hatchery returns, native returns, fishing pressure and economic value of trout fishing in the Liscomb Sanctuary was carried out and the data are presently being processed.

#### ONTARIO

##### Fish and Wildlife Research Branch--Ontario Ministry of Natural Resources

JIM MACLEAN, a recent graduate from the University of British Columbia, has taken over responsibility for smallmouth bass research in the Province.

On October 8-10 some 35 former students and associates of Dr. F.E.J. Fry attended a symposium held at the Harkness Laboratory of Fisheries Research in Algonquin Park, Ontario to honor Dr. Fry on his retirement from the University of Toronto. The seventeen papers presented at the Fry Symposium covered a wide range of topics and paralleled to some extent Fry's many involvements with various aspects of aquatic science. There was much spirited discussion at all sessions with more than a fair share being delivered by Dr. Fry.

##### Commercial Fish and Fur Branch--Ontario Ministry of Natural Resources

Activities continue in programs aimed at the development of more efficient and economical fishing and industrial techniques across Ontario. The preferred procedure is to provide funds to share the risk of capital investment or operating cost incurred by a fishery in testing a new procedure.

During this year, exploratory gill-netting for Chub in eastern Lake Superior indicated that this operation would be economically feasible and would not interfere significantly with lake trout.

An experimental 500-foot ladder was constructed this summer on the face of the 100-foot Robert Sanders Dam at Cornwall, Ontario to allow migrating American eels ready access to Lake Ontario. This ladder which criss-crossed the face of the dam on a 120° rise was designed by biologist Russ Whitfield. This highly successful project will be continued.

A successful pair-trawling experiment was conducted this year on Lake Nipissing for coarse fish.

Other investigations include development of a new gear and holding facilities for bait-fish, development of domestic markets for various sucker and burbot products and development of selective harvesting techniques for whitefish in northern Ontario lakes.

##### University of Toronto--Department of Zoology

Professor Emeritus F.E.J. FRY is continuing physical factors research helping to understand thermal and other impacts on fish physiology and ecology and is

Delano Graff and ROBERT HESSER were elected associates of the American Institute of Fishery Research Biologists. JOHN SELCHER was certified as a fisheries scientist by the American Fisheries Society.

Various personnel attended the Northeast Fish and Wildlife Conference and Northeast Warmwater and Coldwater Workshops. VINCE MUDRAK presented a paper at the Northeast Fish and Wildlife Conference.

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IN MEMORIAM

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ARTHUR D. BRADFORD, 1920-1974

It is with much sadness that we inform you of Mr. Bradford's death at his home on the evening of December 17, 1974. He is survived by his wife Mildred, brother Paul and sister Mrs. John Jacobs. Art received a Bachelor of Science degree at Penn State University and took many advanced graduate courses there. He joined the Pennsylvania Fish Commission in February, 1942, and after a tour of duty with the U.S. Army, returned as their fish pathologist until assuming the duties of Chief, Division of Fisheries in 1970.

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PENNSYLVANIA STATE UNIVERSITY

Research emphasis at Penn State continued in the areas of fish behavior, effects of water quality on fish populations, and distributional ecology of Pennsylvania fishes. BOB BUTLER taught courses in fish behavior and cinematography for the study of animal behavior, continued filming of the ecology of a California stream in four seasons, and rebuilt a large stream aquarium in new quarters for studies of the use of space by fish. DEAN ARNOLD continued management studies at the University's Stone Valley Reservoir, and began a new project on methods of improving the productivity of naturally-acid streams. ED COOPER continued field studies at several locations, and completed his term as chairman of the graduate program in ecology.

A M.S. degree was awarded to Ms. ALICE KLINE, who studied the use of cover-seeking behavior in smallmouth bass for bioassay of chronic low dissolved oxygen. The study indicated that fish are adversely affected by much smaller reductions in dissolved oxygen than had previously been thought. Several other theses are near completion: THOMAS HOFF on differential cover seeking in inbred strains of brook trout; RONALD KLAUDA on bioenergetic costs of cover-seeking behavior in smallmouth bass; GERALD LACY on the effects on stream life of clear-cutting hardwoods on the Allegheny Plateau; JAMES MCLAREN on competition among hatchery reared and wild brook trout; EDWARD PETRILLO on cover-seeking behavior of wild brook trout; BARRY ZAPLITNY on evaluation of trout stocking in marginal reservoir habitat; WILLIAM MCCONNELL on population dynamics of the freshwater drum in the lower Mississippi River.

Other graduate studies under way include those of JOHN YOUNG on behavioral and other changes as an indicator of chronic effects of turbidity on fishes, and RALPH MARKARIAN on age structure and community dynamics of aquatic insects in a losing stream. Graduate students not yet committed to a topic are JIM MEAD, TODD SHELLY, and REGAN WILLIAMS.

of the distribution of these nutrients in the lake by currents, precipitation, incorporation by algae and subsequent transfer to higher trophic levels. Levels of primary and secondary production are being determined at various locations along the gradient in an effort to understand the quantitative relationship between nutrient levels and production at various nutrient levels and production under similar physical conditions and at the same instant in time. Ongoing studies include phytoplankton and macrophyte ecology (KALFF); resource subdivision among fishes (GASCON); currents and water movements (INGRAM); nutrient budgets and sediment chemistry (CARLSON); zooplankton grazing and phosphorous dynamics (PETERS); ephiphyte ecology (CATTANEO); sedimentation (SPILLER); rotifer ecology (NOGRADY); phytoplankton succession (CHENEVAL); phytoplankton nutrient assays (SPOULE); algal competition for phosphorous (BRIGHTON); production ecology of individual algal species (KNOECHEL); physiological ecology of flagellates in chemostat culture (MORGAN).

#### Anadromous Fish Program--Director W. LEGGETT

Four projects dealing with the ecology of anadromous fish are now in progress. All are aimed at improving our understanding of the significance of anadromy and homing in determining population strategies.

#### Energetics of the Freshwater Migration of American Shad (B. GLEBE)

This project is examining the metabolic cost of the freshwater migration in the Connecticut River and in the St. Johns River, Florida. Sources of energy, extent and sequence of utilization of energy reserves and the influence of temperature and flow conditions at various stages of the migration and at the two latitudes are being studied. Results to date suggest that the metabolic cost of the migration may be directly related to survival following spawning, and may possibly explain the higher mortality of post spawning shad in southern rivers. Within the Connecticut River shad migrating late in the season when water temperatures are high experience significantly higher depletion of body reserves.

#### Tributary Homing and Related Reproductive Strategies (J. CARSCADDEN)

Three populations of shad spawning in separate tributaries of the St. John River, New Brunswick are being examined for evidence of tributary homing and for reproductive adaptations to the specific conditions of the home tributary. Results to date indicate that homing to specific tributaries within a river system may be as precise as homing to the main river. Distinct differences in fecundity, age at maturity and frequency of repeat spawning are found in all three populations. These differences follow a similar pattern to that found over a larger geographical range (Florida--New Brunswick).

#### Biochemical Genetics of American Shad (E. SHOUBRIDGE)

This project, initiated in 1974, seeks to determine the extent of genetic variance within and between American shad populations in an effort to better quantify the degree of reproductive isolation between stocks and to define the rate of genetic divergence. Atlantic and Pacific coast populations are being investigated.

#### Physiological Ecology of Wild Juvenile Atlantic Salmon (B. RIDDELL)

Seasonal changes in physiological condition of wild juvenile salmon are being studied in two distinct populations. Differences in physiological condition



However, intensive plankton netting failed to turn up any eggs or larvae.

Detailed hydrographic and plankton sampling are being conducted to determine if this area is suitable spawning and nursery habitat.

#### Scallop Hatchery

With the acquisition of the old ferry wharf in Jamestown, Rhode Island, the Rhode Island Division of Fish and Wildlife has embarked upon a bay scallop rearing program. A salt water culture station has been constructed. The facility is equipped with algal culture equipment, rearing and holding facilities with temperature regulation. (The first successful set of scallop seed was produced during 1974 after three or four initial failures.)

The primary objective of this program will be the stabilization of natural scallop populations by augmentation with artificially produced seed.

#### RETIREMENT

TOM WRIGHT has retired after almost 34 years of state service, the last 19 of them as Chief of the Rhode Island Division of Fish and Wildlife.

Tom was the first professional biologist hired by the State of Rhode Island and was in charge of the state's initial programs for both P.R. and D.J. He can take the credit for many programs, but he will be best remembered for his outstanding efforts in the program he started in 1950 to purchase areas for public hunting and fishing. Under his leadership, over 7,000 acres of land and sixty public fishing areas have been purchased.

#### NEW APPOINTMENTS

JOHN M. CRONAN, Chief, Division of Fish and Wildlife. Formerly Supervisor of Marine Fisheries. He has been with the Division for 17 years. Also worked for States of New York and Connecticut and the U.S. Fish and Wildlife Service, Division of Federal Aid.

JOHN A. STOLGITIS, Supervisor, Marine Fisheries. Formerly Senior Fisheries Biologist. Has been with the Division for 7 years.

RICHARD C. GUTHRIE, Senior Fisheries Biologist. Supervisor of Hatchery Programs, Anadromous, Estuarine and Fresh Water Fisheries Programs. Has been with the Division for 8 years. Also worked for the State of Alaska for 4 years as Biologist, Bureau Commercial Fisheries.

JOHN O'BRIEN, Senior Fisheries Biologist. Project leader, striped bass investigations. Mr. O'Brien received a B.S. in Marine Biology from Roger Williams College and is an M.S. candidate in Fisheries Biology at the University of Rhode Island.

ARTHUR GANZ, Marine Biologist. Project leader, Red Crab Investigations. Mr. Ganz received a B.S. in Biology from Nasson College and an M.S. in Marine Biology from the University of Rhode Island.

Investigations continued on the White River Atlantic salmon study and an initial plant of salmon fry in the West Branch was made in May. Growth and survival of this plant appears excellent to date.

In April, Fishery Biologist RICHARD DARROW joined the staff at the Montpelier field station. Richard transferred to this station from the Division of River Basin Studies at Annapolis, Maryland.

#### WEST VIRGINIA

Department of Natural Resources  
Division of Wildlife Resources

RAY MENENDEZ completed the first series of chronic bioassays testing the effects of pH on brook trout. Low pH values reduced egg viability and hatchability, and growth and survival of alevins and adults. Chronic testing with iron and aluminum began, and an extensive literature review was completed.

CLIFF DECKER, a student at Davis and Elkins College, completed bioassay work under the supervision of Ray Menendez, culminating in a technical paper, Acute Toxicity of Iron and Aluminum to Brook Trout, presented at the 1974 meeting of the W. Va. Acad. Sci. Cliff received his B.S. in June and has enrolled for graduate work at Marshall Univ. He will continue his bioassay studies at the DNR Operations Center for his thesis topic.

JIM WOODRUM continued work on his project at Moncove Lake to determine the current status of vertebrate forage species, determine forage prey selection by largemouth bass, and develop guidelines for future management.

BILL TAYLOR, a graduate student at WVU, completed his work on zooplankton, benthos, and food habits of brook silversides, and is now completing his thesis. Work on other physical, chemical, and biological parameters, including primary production, was completed. Three technical papers based on the project were presented at the 1974 meeting of the W. Va. Acad. Sci.

A hypolimnion aeration project under the direction of LLOYD HESS is designed to improve habitat for trout during the summer. Aeration began in late July with detailed evaluations of the physical, chemical, and biological impact. Some modifications in equipment design are planned for 1975. Pre-treatment data on trout distribution feeding, and angler success were evaluated and reported to the W. Va. Acad. Sci. Three graduate students at West Virginia University--TONY JANICKI, RON OCHALEK, and JAMES LaBAUGH--are working on such aspects of the evaluation as primary and secondary production, plankton, benthos, and nutrient cycling.

ROGER SCHOUMACKER, Supervisor of Fish Research, organized and chaired a program module, Lake Aeration in Fisheries Management, at the AFS meeting in Honolulu.

JACK EDMUNDSON completed his thesis, Food Habits, Age and Growth of Flat-head Catfish--in Bluestone Reservoir, West Virginia, and received his M.S. from West Virginia University. His work was part of a fish research project.

BOB DAYFIELD, Fishery Planner for the Division, has the first draft of the strategic plan for fisheries completed, and will have the operational plan ready next year. This work culminates an intensive planning effort that has been ongoing for several years.

## DIVISION NEWS

### Minutes of the 23rd Annual Business Meeting McAfee, New Jersey, February 26, 1974

President JAMES MCCANN opened the meeting at 4:05 p.m. with an address on annual meetings in which he discussed scientific meetings, professional meetings and conventions--the facilities required, differences in programs and objectives for each. He pointed out that substantial numbers of members favoring each type of gathering can be found within the society and there will always be a certain amount of disagreement regarding any meeting site and program. Since these factors influence to a large extent, each member's decision as to whether or not he will attend a given meeting, the affairs of the Society have been governed, in recent years, by those members more likely to attend the professional-convention type of meeting. Attendance at such meetings consists almost entirely of persons whose expenses are paid by their employers and tighter money problems have made it more difficult for many to attend. President McCann announced that the 1975 Annual Meeting would be held in a downtown hotel; a wide variety of accommodations and eating facilities would be available to satisfy many levels of financial ability. He hoped this variety would enable more members to attend on their own, if necessary. President McCann closed by expressing regret that the shortened year between meetings and his reassignment had somewhat restricted his accomplishments in office.

President McCann then recognized past presidents of the Division who were present and introduced national officers: RAYMOND JOHNSON, AFS President; J. CAMERON STEVENSON, First Vice President; EDWIN COOPER, a Past President and RICHARD WADE, Executive Director. President Johnson commented on two fundamental problems within the Society as a whole: the difference of opinion on whether we are a scientific or a professional society; and the problem of individual input into the Society's operation. He felt that the latter problem can be met by committee work at both the Division and National levels, through the chapter and divisions to the Society's Executive Committee, and by direct action of the Chapters and Division. Executive Director Wade called the attention of the membership to committee reports published in the Transactions describing the financial crises within the Society. The current inflationary trend has increased all the costs of the Society much more rapidly than anticipated by the finance committee. Dr. Wade reported that the Society ended 1973 with 6,006 members an increase of 358 and that student membership exceeded the 1000 mark for the second time in history.

Most of the Committee Reports had been submitted before the meeting and were available as handouts at the door, so they were not presented orally. ROBERT JONES reported for the Time and Place Committee that the 1975 meeting would be in New Haven, Connecticut.

ANGELO INCERPI, Chairman of the Resolutions Committee, presented three resolutions for consideration of the membership. Resolution 1 placed the Northeastern Division in opposition to adoption of any changes in the Constitution By-Laws of the American Fisheries Society at the 1974 Annual Meeting to be held in Honolulu. After considerable discussion of expenses and fuel conservation, it was apparent that very few if any members of the Northeastern Division would be in attendance at the subject meeting. It appeared, however, that the Northeastern Division

The meeting was then opened for new business. The Division endorsed the Symposium on Biology and Management of Centrarchid Basses and decided that, to promote attendance at that symposium, the NE Division Warmwater Workshop would not be held in 1974. MATTHEW SCOTT suggested the idea of the Northeastern Division holding a joint session with the American Society of Limnology and Oceanography sometime in the future. At the direction of the Division the Secretary-Treasurer wrote to the Secretary of ASLO expressing our interest but has received no response. A suggestion was made that perhaps the Northeastern Division might want to meet with another society in alternate years, but no definitive action was taken. There being no further business, the Annual Meeting was adjourned at 5:55 p.m.

#### SOUTHERN NEW ENGLAND CHAPTER--AMERICAN FISHERIES SOCIETY

The Chapter's activities during 1974 included two workshops that dealt with timely topics of substantial interest to working biologists and administrators, alike.

Our June 20 program addressed "The Roles of Regulatory Agencies and Private Consulting Firms in Addressing Fish and Wildlife Questions," with near record attendance of 96 participants. In the form of a panel discussion which included private consultants and Federal and State representatives, the workshop attempted to explore relationships between each group as well as common problems and the question of ethics in environmental assessment. Students in attendance were provided a candid illustration of what constitutes the daily activities and frustrations of professionals in the field.

The December 5 program included seven papers dealing with current questions in the fisheries field:

"Effects of channelization on brown trout (Salmo trutta) density in the Housatonic River, Massachusetts," Leo Daly, District Biologist, Mass. Div. of Fisheries and Game, Pittsfield, Mass.

"A creel census evaluation of a fly-fishing-only section on the Swfit River." Peter Oatis, Chief Aquatic Biologist, Mass. Div. of Fisheries and Game, Westboro, Mass.

"Rate of movement of adult anadromous alewives (Alosa pseudoharengus) in the Parker River, Massachusetts." James Beltz, Graduate Research Assistant, Mass. Coop. Fishery Res. Unit, Amherst, Mass.

"Correlations between growth, age at first spawning and mortality of alewives (Alosa pseudoharengus) in the Parker River, Massachusetts." James Johnson, Assistant Professor, Univ. of Massachusetts, Amherst.

"A further study on winter flounder group identification off Massachusetts." David Pierce, Asst. Marine Fisheries Biologist, Div. of Marine Fisheries, Sandwich, Mass.

"Racial investigation of the striped bass (Morone saxatilis) using scale analysis." Edward Taub, Research Assistant, Univ. of Rhode Island, Kingston.

Our Chapter is also involved with planning an international joint meeting for the fall of 1975 to be held in Toronto, Ontario in conjunction with the New York State Chapter, American Fisheries Society; New York State Chapter, Wildlife Society; New York State Chapter, Society of American Foresters; the Soil Conservation Society of America; along with similar Canadian organizations.

I have saved the major accomplishment of our Chapter until last; mainly, the production and sale of the Chapter's film, The Aquatic Ecologist. The film was entered in the American Film Festival this year in the annual non-theatrical national competition sponsored by the Educational Film Library Association. The Aquatic Ecologist shared top honors with three other films. There was no first place award as such.

The Aquatic Ecologist was also accepted for entry into the other major film festival, the CINE Film Festival. Recognition in either of these film festivals is quite an honor. The Aquatic Ecologist has also been selected by the United States Information Agency (USIA) for use in their Science Reports. A short has been made from part of the film and translated into 22 languages, sent to 84 countries, and aired on 535 television stations around the world. A second short is being developed by USIA for similar distribution.

ROD SERLING was the narrator and was sent a special gold tie-tac of a leaping salmon from the Chapter as a small recognition of his tremendous contribution. The tac was designed by SID BELL, a central New York native renowned for his creativity of fish and wildlife tacs. Many other individuals and organizations deserve tremendous credit for the completion of the film. Those interested in obtaining a copy of The Aquatic Ecologist, please contact ROBERT WERNER, Box 86 Colvin Station, Syracuse, New York 13205.

Election results: WILLIAM A. PEARCE, President; ROBERT WERNER, Vice President; and Secretary-Treasurer, A. C. PETTY.



Minutes of Annual Meeting  
New York Chapter, American Fisheries Society  
Syracuse, New York - January 31, 1974

1. The meeting was called to order at 9:45 p.m. by President Martin Pfeiffer. He noted that Al Jensen had resigned as Vice President of the Chapter.
2. A membership count indicated that a quorum was present.
3. The minutes of the previous annual meeting of January 12, 1973 were adopted as read.
4. Secretary-Treasurer Russell Fieldhouse presented his report. Balance on hand, as of January 31, 1974 was \$384.98 in the Chapter account and \$1041.54 in the movie fund. The Secretary-Treasurer's report was approved by the membership.
5. Report of Committees
  - a. Lee Cooper, Chairman of the Auditing Committee, reported that the Treasurer's records were examined and found to be in order. The auditor's report was accepted as read.
  - b. Bob Werner, Program Committee Chairman, reported that it was difficult to develop a joint session suitable for both fisheries and wildlife interests. He suggested that the Chapter consider an independent program for future meetings.
  - c. With the resignation of Al Jensen, the Membership Committee was without a chairman. It was noted, however, that there were now 97 chapter members.
  - d. Steve Simkins, Chairman of the Professional Standards Committee, reported on progress of the career film, The Aquatic Ecologist. The film was completed in the fall of 1973 and will be distributed initially by Bob Werner in order to recover remaining production and promotional costs. With \$7800 donated to the movie fund, the sale of 50 prints at \$188 each will be required to net \$4500, enough to cover the anticipated deficit.
  - e. The Resolutions Committee was not represented at the meeting.
  - f. Licensing Committee Chairman, John Gould reported that legislation would have to be prepared and submitted to the Legislature for adoption to provide for the licensing of fisheries biologist. A motion that such a legislative proposal be prepared for review by the chapter was carried.

g. Bill Pearce, Chairman of the Publicity Committee, reported that a newsletter was mailed to the Chapter membership; publicity regarding the joint program was arranged and he was active in promoting film sales.

h. Howard Dean, Chairman of the Pollution Abatement Committee, said he had attended the Northeast Section, AFS Pollution Abatement Committee meeting, but since only he and the chairman of this committee was represented at the meeting, no business was transacted. He emphasized the need for biological monitoring programs to identify potential water quality problems.

i. The By-Laws Committee chaired by Bill Shepherd proposed a two year term of office for Chapter Officers by deleting Section 4 of the by-laws and substituting new Section 4 which would read: "The officers of the chapter shall consist of a president, vice-president, and secretary-treasurer.

Officers shall be elected at an annual meeting and may serve for a period of two years. In case of a vacated position, the executive committee shall appoint a qualified replacement to fill an unexpired term.

In the event of a cancellation of an annual meeting at which election of officers was scheduled, the officers and the members of any committee shall continue to serve until the next scheduled meeting."

The By-Laws Committee also suggested that section 2(1)(b) of the Chapter by-laws, which pertain to affiliate membership, could be left as is until the Chapter resolution calling for affiliate membership status in the AFS is acted upon by the Parent Society.

## 6. Old Business

a. Arch Petty attended a session held to begin planning another joint meeting of the Society of American Foresters, the Wildlife Society, Soil Conservation Service Association, and American Fisheries Society. Discussion centered around whether our Chapter should participate. A motion that the president select a representative to attend the next planning meeting was approved.

b. A motion to change the by-laws to provide for a two year term of Chapter officers as recommended by the By-Laws Committee was approved.

c. Discussion of a paid executive-secretary position was tabled.



7. New Business

a. President Pfeiffer noted that he had written the House Subcommittee on Fisheries and Wildlife in support of extending the Federal Anadromous Fisheries Act. Receipt of the letter was acknowledged by Congresswomen Leonore K. Sullivan, Chairman of the House of Representatives Committee on Merchant Marine and Fisheries.

b. A motion to delete Section 2(1)(b) of the Chapter by-laws which provides for affiliate membership was carried.

8. The Nominating Committee presented the following slate: President - Bill Pearce; Vice-President - Bob Werner; Secretary-Treasurer - Arch Petty. There being no nominations from the floor, it was moved and approved that the Secretary-Treasurer cast one ballot for this slate.
9. After closing remarks by newly elected President Pearce, the meeting was adjourned at 11:30 p.m.

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## NEW YORK CHAPTER — AMERICAN FISHERIES SOCIETY

### AGENDA

#### 1973 ANNUAL BUSINESS MEETING

#### NEW YORK CHAPTER, AMERICAN FISHERIES SOCIETY

1. Call to Order.

President's Remarks

2. Membership Count.

Quorum is 1/3 of voting membership. (96 ÷ 3 = 32)

3. Adoption of Minutes of Previous Meeting.

4. Report of Secretary - Treasurer - Russell Fieldhouse.

5. Report of Committees.

a. Auditing Committee - Dale Huyck, Chairman

b. Program Committee - Dr. Robert Werner, Chairman

c. Membership Committee - Albert Jensen, Chairman

d. Professional Standards Committee - Stephen Simkins, Chairman

e. Resolutions Committee - Dr. Harry Everhart, Chairman

f. Licensing Committee - John Gould, Chairman

g. By-Laws Committee - Bill Shepard, Chairman

h. Awards Committee - Carl Parker, Chairman

i. Heraldic Committee - Bill McGregor, Chairman

j. Publicity Committee - Bill Pearce, Chairman

k. Service Committee - Robert Harding, Chairman

l. Pollution Abatement Committee - Howard Dean, Chairman

m. Historian - William White

n. Technicians Committee - Herbert Eschback, Chairman

o. Executive Secretary Committee - Robert Griffiths, Chairman

66  
22 present  
\$1,040.00

Dr. Robert Werner  
Box 86  
Colvin Sta  
NY 13205  
10  
previous

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New York Chapter, American Fisheries Society  
Syracuse, New York - January 31, 1974

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NEW YORK CHAPTER — AMERICAN FISHERIES SOCIETY

LETTER TO THE EDITOR

Dear Sir:

Through its Committee on Professionalism, the New York Chapter American Fisheries Society has for the past four years been working in cooperation with the Educational Communications Department, SUNY, College of Environmental Science and Forestry at Syracuse, to complete production of a movie about the Fishery Profession entitled, "The Aquatic Ecologist." As you so kindly reported in the last Newsletter, the film is now completed and is being distributed by a Chapter member, Dr. Robert Werner, Box 86, Colvin Station, Syracuse, New York 13205.

Because of the painful effects of an untimely personal tragedy, I failed miserably to fulfill my responsibility in having included in our Promotional News Release public recognition of our gratitude and sincere appreciation for those fine organizations that supported financially our film project over the years.

My Committee and our Chapter owe a large debt of gratitude to these organizations and I personally owe them a most sincere apology for having been so befuddled as to have inadvertently failed to give them the public recognition they deserve.

Thus, on behalf of my Committee and Chapter, I would like to express our sincere thanks to Sport Fishing Institute, New York State Conservation Council and American Game Association Foundation, American Fisheries Society, The A. Lindsey and Olive B. O'Connor Foundation and Trout Unlimited for their financial support to our film project.

Kindly publish this letter in your next Newsletter as a supplement and correction to our previous News Release.

Sincerely yours,

Stephen V. R. Simkins  
Chairman, Committee  
on Professionalism  
N. Y. Chapter AFS

SS/pe



NEW YORK CHAPTER — AMERICAN FISHERIES SOCIETY

March 27, 1974

Dr. Richard A. Wade  
Executive Director  
American Fisheries Society  
1319-18th Street, N.W.  
Washington, D. C. 20036

Dear Dr. Wade:

This is in response to letters sent to Dr. Robert Werner by yourself and by Dr. Richard Stroud, copies of which I have received, and also in response to letters I have received from Dr. Robert Martin. It is my intention to completely absolve Bob Werner from any responsibility or blame in the serious omission that was made in our News Release by not acknowledging the financial support of Sport Fishing Institute to our film project. I am solely and completely responsible for this terrible transgression which has and does weigh heavily on my mind.

In late summer and early fall, progress on the film suddenly accelerated rapidly. Also, at that time, we were shifting over from production to promotion and distribution. Tragically and sadly, also at that time, I was trying to recover from the shock of having lost our son, Gordon. I was preoccupied, inefficient, and useless. My Committee and the personnel at Syracuse graciously carried on for me and did what needed to be done. Thus, the News Release was written and distributed before I even saw a copy.

After discovering what had happened and feeling very badly about it, I wrote a letter of apology to Bob Martin and his Board of Directors and a letter of request to Bob Werner asking that he send me a copy of the News Release distribution sheet so that I might send out a correction or supplement to the original. Unfortunately, Dr. David Hanselman, who was instrumental in writing and distributing the News Release but unaware of the S.F.I. stipulation because I was too far gone to inform him, is now on sabbatical. The list has not been located so I have not yet received a copy.

All I can do now, therefore, is to hope that you may understand why I failed to act responsibly at a time when it was most important to do so and that you will be able to accept my sincerest apology for this inadvertant but serious error. I ask that you please do not blame Bob Werner since he had no knowledge of the situation and that you will use the enclosed Letter to the Editor to help clarify the blunder I have made.

Sincerely,

Stephen Simkins

SS/pe

Enclosure

cc: Dr. Richard Stroud cc: Dr. Robert Martin cc: Dr. Robert Werner  
cc: Mr. William Pearce

DANIEL A. POOLE

President

L. R. JAHN

Vice-President

# WILDLIFE MANAGEMENT INSTITUTE

Dedicated to Wildlife Restoration

709 WIRE BUILDING, 1000 VERMONT AVENUE, WASHINGTON, D. C. 20005 (202) 347-1774

IRA N. GABRIELSON

Board Chairman

HARRY L. HAMPTON, Jr.

Treasurer

February 4, 1974

Mr. C. W. Severinghaus, President  
New York Chapter, The Wildlife Society  
Wildlife Research Laboratory  
Delmar, New York 12054

Dear Bill:

In recent years we have solicited suggestions for the agenda of the North American Wildlife and Natural Resources Conference from the chapter and/or section of The Wildlife Society in the geographic area where the conference will be held the following year. This provides these units of our professional society with an opportunity to pass their ideas to the Program Committee.

The Program Committee will be meeting in early April 1974 to develop the agenda for the 40th conference, which will be held in Pittsburgh on March 16-19. Members of the 1973-74 Program Committee are listed on the inside cover of the enclosed 1974 advance agenda.

Since Pennsylvania does not have a state chapter of The Wildlife Society, we invite the New York Chapter to offer suggestions for the 1975 conference agenda by 6 April 1974. Suggestions would be most helpful if organized according to the following outline:

## Technical Sessions

Topics for sessions.

Names and addresses of candidate chairmen and discussion leaders.

Full names and mailing addresses for each speaker proposed.

Possible field trips to visit localities and review major resource management problems and applied or potential solutions. Each suggested trip should include its duration in days (i.e., 1,2,3). See the enclosed brochure on the 1974 post-conference tour.

Focus on topics and speakers that will highlight critical eastern regional resource problems, issues, and programs having implications for wildlife and fisheries. Forest management approaches and needs, aquatic area maintenance and management, and land use initiatives and experiences seem to be likely subjects warranting consideration. There may be other eastern subjects of major consequence deserving attention at the Pittsburgh meeting. You may wish to determine if other groups, such as the state and federal foresters, have any helpful ideas. Given pertinent and timely subjects and authoritative speakers, possibly up to two technical sessions could be devoted to major regional topics.





THE NEW YORK CHAPTER - THE WILDLIFE SOCIETY

DATE: 4-1-74  
MEMO TO: William Pearse  
FROM: Jeffrey O. Barnes, Secretary-Treasurer  
RE: Society Membership

Enclosed please find your membership card which indicates that you are a member in good standing of the New York Chapter of The Wildlife Society for the year 1974. If you have any questions regarding membership, please do not hesitate to contact me.

Also enclosed please find a letter from the Wildlife Management Institute regarding their planning efforts for the 1975 North American Wildlife and Natural Resources Conference. Please review this at your earliest convenience, and should you have any suggestions, please follow the instructions as they are outlined.

As you know, Ward Dukelow has assumed the responsibility of preparing a newsletter which he wishes to publish on a quarterly basis. This can only be possible with your assistance and cooperation. If you have any suggestions, comments, or newsworthy items pertaining to environmental activities in the State, please inform Ward at your earliest convenience so that this information can be incorporated into the newsletter. With your assistance, the newsletter could provide a valuable means by which all members of The Wildlife Society can do their part in creating an active and aware membership. Ward's address is included below.

Sincerely,

Jeffrey O. Barnes  
Secretary-Treasurer  
The Wildlife Society

JOB/cd

Mr. Ward Dukelow  
NYSDEC  
Route 10  
Stamford, New York 12167



## NEW YORK CHAPTER — AMERICAN FISHERIES SOCIETY

March 20, 1974

TO: Chapter Members, AFS

RE: 1974 FIRST EXECUTIVE COMMITTEE MEETING REPORT

Time and Place - March 19, 1974 - 8-11 P.M., Albany, Hilltop Motel

Attendees - Pearce, Petty, Pfeiffer

### Topics Covered:

#### I. Committee Reviews, Changes, and Proposed Appointments

The following committees were terminated or inactivated until needed in order to make better use of our membership on more vital or mandated committees.

- A. Terminated Committees (1) Service, (2) Technicians, (3) Heraldic (4) Historian.
- B. Inactivated Committees Until Needed: (1) Licensing, (2) By-laws
- C. New Committees: (1) Legislative Committee to keep the Chapter updated on important legislation, to make direct contact with Washington, and develop any proposed Chapter sponsored legislation. Chairman: (proposed) Chapter President, K. Wich, C. Parker
- D. Proposed Appointments of Standing Committees:
  1. Program Committee: Co-chairman-Harry Everhart; R. Engstrom-Heg. Others to be selected by Co-chairman.
  2. Professional Standards - Chairman-Steve Simpkins - select his own members.
  3. Pollution Abatement - Howard Dean - select his own member(s).
  4. Awards Committee - M. Pfeiffer (accepted). He will work through the Executive Committee.
  5. Publicity Committee - R. Harding - he will select his own members.
  6. Resolutions Committee - Paul Neth - he will select his own member.
  7. Auditing Committee - Russ Fieldhouse - he will select his own Committee.
  8. Nominating Committee - M. Pfeiffer (accepted) - he will select his other members.
  9. Executive Secretary Committee - R. Griffiths - he will select his other members.

#### II. Meetings

- A. Proposed "Field Meeting(s)"



NEW YORK CHAPTER — AMERICAN FISHERIES SOCIETY

- 2 -

1. Summer (Possible locations)
  - a. Cape Vincent Area
  - b. Adirondack League Club
  - c. Paul Smiths
  - d. Shackelton Point
2. Fall proposed site for a late September-early October meeting
  - a. Salmon River (Pulaski area)
  - b. Dunkirk (Lake Erie area)
  - c. Shackelton Point (Salmon River-Oneida Lake)
3. Annual Meeting - We do not expect a joint meeting with the Wildlife Chapter, they have alternate plans.
  - a. Cornell-January-workshop types of meeting
  - b. Shackelton - Workshop type
  - c. Other suggestions from membership

III. Membership and Dues

- A. Dues. Petty will dun members for arrears.
- B. New Members:
  1. Canvass for membership from all NYS Resident Parent Society Members.
  2. Request each active member sign up one co-worker!
  3. Solicit Wildlife Chapter Members for Fisheries Chapter Membership also. (Some of us fish men also belong to the Wildlife Chapter).

IV. Membership Participation in Chapter Affairs and Promotion of Chapter Image and Objectives

- A. Executive Committee
  1. Personal contact with members (and potential members).
  2. Send out more news letters and communication to other Committees and members.
- B. Publicity Committees
  1. Provide 12 monthly PR releases for news media.
- C. Film: Each member sell a copy! A separate film report will be out soon. Pearce contacted Werner and we will have a progress report soon on film sales.

V. Resolutions

1. Adirondack Fish Management in Wilderness Areas - A motion was passed at the annual meeting to propose to State authorities changes in restriction on allowable fish management activities in wilderness



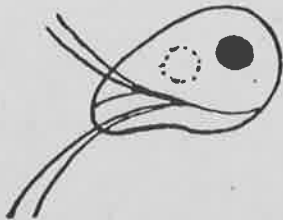


areas of the Adirondacks: Attached is a resolution prepared by Otis and Pfeiffer - please let Petty know if you approve or disapprove the resolution as written!

2. Chapter consultants - was discussed, no decision was made as to further action on this topic.

Members - please send comments to Petty as to whether or not the Chapter should get involved with (1) Doing consultant work via of a select committee - proceeds to go to the Chapter (2) Chapter should develop a list of members who would do consultant work for their own gain (3) Chapter sub-contract consultant jobs and keep a percent of the fee (4) Chapter stay out of consultant programming in any role.

Executive Committee  
William Pearce, President  
Martin Pfeiffer, Past President  
Arch Petty, Secretary-Treasurer  
Robert Werner, Vice-President  
(absent)



American Fisheries Society

## *Fish Health Section*



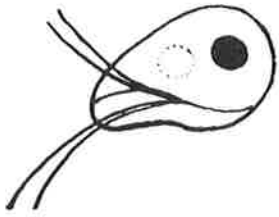
### SUGGESTED PROCEDURES FOR THE DETECTION AND IDENTIFICATION OF CERTAIN INFECTIOUS DISEASES OF FISHES



United States Department of the Interior  
Fish and Wildlife Service

1974??





American Fisheries Society

***Fish Health Section***



SUGGESTED PROCEDURES FOR THE DETECTION AND IDENTIFICATION OF  
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# SUGGESTED PROCEDURES FOR THE DETECTION AND IDENTIFICATION OF CERTAIN INFECTIOUS DISEASES OF FISHES

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## Introduction

During the past twenty years intensive culture of freshwater and marine fish for sport or food has grown rapidly and continues to grow. The number, types, and severity of disease outbreaks caused by bacterial, parasitic, and viral agents among these propagated fishes have also increased. Rapid and accurate diagnosis and detection of these diseases is essential not only for control but also to better understand the epizootiology of the various diseases. Development of standard methods has been one of the major goals of the Fish Health Section of the American Fisheries Society since the establishment of the Section. After years of preliminary work by the Technical Procedures Committee to identify diseases for which standard methods were needed, a meeting was held in Denver, Colorado, in August 1974. The meeting was attended by fish health specialists from the United States and several other countries with the main objective being the selection of standard methods for diagnosis and detection of certain of the infectious diseases of fishes and the adoption of these methods by the Fish Health Section. The material in this report is the result of that meeting, and we believe that the procedures adopted are the most reliable and sensitive presently available. An attempt has been made not only to describe the suggested methods but also to provide information on numbers of fish to be examined and procedures for aseptic removal of tissues.

The diseases listed in this report require application of standardized methods to insure accurate diagnosis or detection. Many of the parasite diseases such as Ichthyophthirius and bacterial gill disease have not been described in detail. Although such diseases may cause substantial loss of fish, their diagnosis is easily accomplished using previously published information. References have been included in each section to direct the reader to methods of identification of these disease agents.

Finally, the Executive Committee of the Fish Health Section wishes to express its appreciation for the time and effort of all contributors, and to the Technical Procedures Committee for assembling and editing the report. Special thanks is also given to Dr. S. F. Snieszko of the Eastern Fish Disease Laboratory for his review.

Graham L. Bullock  
President  
Fish Health Section

## Section 1

### GENERAL EXAMINATION PROCEDURES

B-1.1

opposite the posterior edge of the stump of the removed fin. Insert the blade of another pair of scissors in the incision and cut dorsad until resistance indicates that the upper extremity of the cavity has been reached. Then, taking care not to puncture the intestine, cut along the mid-ventral line until just short of the vent. Lift the flap thus obtained and loosen any adhesion between it and the underlying viscera with a blunt probe. Finally, starting near the vent, cut in a semi-circular route to complete excision of the body wall.

- G. Internal Examination. To reduce the risk of contamination, take bacterial inocules from the kidney and from any tissues that appear grossly abnormal immediately after opening the body cavity. Prepare and stain smears of these various materials. Record the appearance of the organs with respect to such features as: color and consistency; hemorrhage, inflammation, pustules, nodules or growths; and the presence or absence of food or mucus in the stomach and intestine. Following this, remove tissues for other purposes, such as virological, myxosporidian, and histological examinations.
- H. Disposal of Samples. The receiving laboratory should handle and dispose of samples and other items liable to be infectious in a manner that precludes the dissemination of disease agents. All material such as fish carcasses or tissues, transport containers and water, microbial cultures, and contaminated equipment should therefore be autoclaved, incinerated, or otherwise disinfected before being discarded.

## II. Sample Size Table

The minimum sample size for each lot will be in accordance with a plan which provides 95% confidence of detecting a disease with an assumed incidence of infection at or greater than 2% or 5%. The minimum sample size for populations varying from 50 to infinity, for each inspection, is as follows:

<u>Population or Lot Size</u>	<u>Incidence 2% Size of Sample</u>	<u>Incidence 5% Size of Sample</u>
50	48	34
100	77	44
250	112	52
500	128	55
1,000	138	57
1,500	142	57
2,000	143	58
4,000	146	58
10,000	147	58
100,000 and larger	148	58



Section 2

METHODS FOR THE DIAGNOSIS OF CERTAIN  
VIRAL FISH DISEASES

C-1.1

## I. General Procedures for Cell Culture and Virology

### A. Quality Control

1. Susceptible, normal appearing and rapidly dividing cells shall be used for all virus assays. Cells less than 72 hours old and 80 to 90% confluent are preferred for sample inoculation.
2. All cell culture stocks must be tested for and found free from Mycoplasma sp. at three month intervals (suggested procedure in supplement). Only those stocks found free of Mycoplasma sp. shall be used in virus assays.
3. All non-autoclavable constituents of media must be tested and found free from Mycoplasma sp. (see procedure in supplement) and inhibition to cell growth and/or virus replication. Certified Mycoplasma free sera and other certified reagents need not be tested.
4. Only penicillin-streptomycin (100 units/ml) or gentamicin (100 µg/ml) and mycostatin (25 mg/ml) are allowed for routine cell culture work. Gentamicin is especially recommended for control of Mycoplasma.

### B. Virus Assay Controls

1. The cells used in each virus assay must demonstrate sensitivity to at least one fish virus. It is preferred that cells demonstrate a sensitivity to all fish viruses being checked for by the assay. If this is not possible cells should periodically be sent to a laboratory which will check their sensitivity to the viruses of concern. Sensitivity shall be defined as the ability of the cells to show typical cytopathic effects (CPE) when exposed to  $10^{-2}$  -  $10^{-3}$  TCID<sub>50</sub> of virus.
2. Uninoculated or negative (inoculated with sterile saline or known uninfected fish tissue) controls must be incubated with each virus assay. These controls must remain free from CPE throughout the entire incubation period of the assay.

### C. Sampling and Handling of Samples

1. During epizootics, a minimum of 10 fish in 2 pools shall be sampled.
2. When testing for virus in asymptomatic fish, sampling shall be according to the table of attribute sampling based upon a 95% level of confidence. (See table in Methods for Examination of Fish for Infectious Diseases.) When killed fish are used

9. If samples must be transported or stored, and this time period exceeds 12 hours, the transport medium shall be buffered saline (pH 7.0-7.8). At the discretion of the investigator, antibiotics may be used in the transport medium to control growth of microbial contaminants in the samples.
10. Tissue samples must be triturated by grinding in a mortar with pestle or homogenized by blender, homogenizer, or tissue grinder.
11. To control bacterial growth in inoculated cell cultures, samples will be processed as follows:
  - a. Centrifuge samples at 2,000 X g for about 10 minutes.
  - b. Add antibiotic mixture to the supernatant only to obtain a final concentration of 100-2,000 µg. Gentamicin and 400 units Mycostatin per milliliter of supernatant (penicillin-streptomycin at 800 units of penicillin and 800 µg streptomycin may be substituted for the gentamicin).
  - c. Allow mixture to stand for at least 2 hours at 15-20°C. (Samples with antibiotics may be stored overnight at 5°C if inoculation cannot be made at the end of the 2 hour period.)
  - d. Inoculate onto appropriate cell cultures according to other methods listed in this text. (As an alternate contamination control procedure, filtration of samples through a 0.45 µ filter can be used.)
12. Final organ sample dilution prior to primary inoculation onto cell culture shall not exceed 1:200 (1 gram of tissue in 199 cc diluent). Final ovarian fluid sample dilution shall not exceed 1:10.
13. All tests for virus detection will be incubated for a minimum of 14 days at 15-30°C (depending on virus being assayed for). A temperature of 15°C is recommended for IHN, IPNV and VHSV. For CCV detection, 30°C is suggested. During this incubation period, the pH of cell cultures shall be maintained between 7.4 and 7.8, except in the case of the pH of cell cultures for IHN and IPNV which shall be maintained between 7.0 and 7.8.
14. When assaying for virus in asymptomatic fish, and where circumstances indicate a likelihood that primary inoculation of cell cultures might not result in detection of virus, a blind passage should be considered by the investigator.

3. Wolf, K. 1970. Guidelines for virological examination of fishes. In A symposium on diseases of fish and shellfish. American Fisheries Society Special Publication No. 5, p. 327-340.
4. Wolf, K., and M. C. Quimby. 1969. Fish cell and tissue culture. In Fish Physiology, vol. 3, W. S. Hoar and D. J. Randall, editors. Academic Press, New York, p. 253-305.
5. Wolf, K., and M. C. Quimby. 1973. Towards a practical fail-safe system of managing poikilothermic vertebrate cell lines in culture. In Vitro, vol. 8, p. 316-321.
6. Wolf, K., and M. C. Quimby. 1973. Fish Viruses: buffers and methods for plaquing eight agents under normal atmosphere. Applied Microbiology, vol. 25, p. 659-664.

## II. Infectious Pancreatic Necrosis

- A. Name of the Disease and Etiologic Agent. Infectious pancreatic necrosis (IPN), infectious pancreatic necrosis virus (IPNV).
- B. Known Geographic and Host Range of the Disease
  1. Geographic range. Northern Hemisphere.
  2. Host range. Brook trout (Salvelinus fontinalis), brown trout (Salmo trutta), rainbow trout (Salmo gairdneri), cutthroat trout (Salmo clarki), lake trout (Salvelinus namaycush), Atlantic salmon (Salmo salar), coho salmon (Onchorynchus kisutch), and chinook salmon (Onchorynchus tshawytscha).
- C. Clinical Signs of Diagnostic Significance
  1. IPN is an acute disease causing mortality of fry and fingerlings, and occasionally of yearling trout and salmon. The largest and healthiest appearing fry or fingerlings usually are affected first. Whirling may occur when the mortality rate is high; swimming victims rotate about their long axis. When not otherwise obvious, alarming the fish by a sharp rap on the trough or other scare will often elicit the whirling response. Agonal behavior may alternate with quiescence during which victims lie on the trough bottom and respire weakly. Whirling is a terminal sign and death usually occurs within an hour or two.
  2. Signs include overall darkening, exophthalmia, abdominal distention, and at times hemorrhages in ventral areas including bases of fins. Internally, multiple petechiae occur in the pyloric caecal area, and the liver and spleen are pale. The digestive tract is almost universally without food; accordingly, the stomach appears whitish. A clear to milky mucous occurs in the stomach and anterior intestine.
- D. Diagnostic Procedures for Disease Situations
  1. Presumptive diagnosis
    - a. Presence of typical CPE in cell culture.
    - b. Histological examination revealing pronounced pancreatic necrosis with both acinar and islet tissues affected. Adjacent adipose tissue necrotic. Cytoplasmic inclusions in pancreatic cells near the edges of affected tissues.
    - c. Presence of signs as described in C above.
    - d. History of the hatchery or natural environment indicates a likelihood of IPN infection.

4. Wolf, K., and M. C. Quimby. 1971. Salmonid viruses: infectious pancreatic necrosis virus. Morphology, pathology, and serology of first European isolations. Archiv fur Gesamte Virusforschung, vol. 34, p. 144-156.
5. Wolf, K., S. F. Snieszko, C. E. Dunbar, and E. Pyle. 1960. Virus nature of infectious pancreatic necrosis in trout. Proceedings of the Society for Experimental Biology and Medicine, vol. 104, p. 105-108.
6. Yasutake, W. T. 1970. Comparative histopathology of epizootic salmonid virus diseases. American Fisheries Society Special Publication No. 5, p. 341-350.

### III. Viral Hemorrhagic Septicemia

A. Name of the Disease and Etiologic Agent. Viral hemorrhagic septicemia (VHS), Egtved virus.

B. Known Geographic and Host Range of the Disease

1. Geographic range. VHS has been reported from a number of but not all European countries. There have been no reports of VHS outside of Europe.

2. Host range. Although several species of salmonids are experimentally susceptible to VHS by injection, epizootics have been reported only in rainbow trout.

C. Clinical Signs of Diagnostic Significance

1. Historically the clinical signs of fish infected with VHS have been categorized into the acute, chronic, and nervous forms. However, from a descriptive standpoint there is much overlap in the clinical signs observed with each form, and although the signs are associated with the disease, the signs in individual cases may not be observed. Therefore, the following clinical signs are not separated into three categories.

2. Typical external signs of the disease include exophthalmia, abdominal swelling with ascities, anemia, and perhaps some evidence of hemorrhaging at the base of fins. Internally visceral adipose tissue and peritoneal mesenteries show numerous diffuse petechial hemorrhages, the kidney is hyperemic and swollen, hemorrhages in the periocular connective tissues, multiple hemorrhages in the lateral skeletal muscles, and the liver is pale. Microscopically extensive necrosis of the hematopoietic tissue of the kidneys and spleen is typical. Also, focal necrosis in pancreatic and liver tissues are common, and hemorrhages in the skeletal muscles can be observed.

D. Diagnostic Procedures for Disease Situations

1. Presumptive diagnosis

a. The isolation of the virus in cell culture with the development of typical cytopathology can be used to presumptively identify VHS. Typical cytopathology includes rounding of cells and pyknosis of nuclei. Plaque morphology is very helpful in distinguishing VHS from IPN or IHN.

- b. Less acceptable procedures. In the absence of demonstrated histopathological changes, virus neutralization with specific antiserum and a high titer ( $10^5$  infectious units or above ) of virus in the tissue can be used to positively identify the disease.
- E. Procedures for Detecting Asymptomatic Infections. The procedures for detecting VHS carriers can be followed as described for IPNV. Sample each lot at the assumed 5% incidence level. Collect only kidney and spleen and do not process samples of tissue with more than 5 fish per pool. Follow cell culture and virological procedures as described above in D 1 a. Any isolated virus must be confirmed according to Section D 2 a above, except no histological examination is needed.
- F. Procedures for Determining Prior Exposure to the Etiologic Agent. No serological tests are available at the present time.
- G. Procedures for Transportation and Storage of Samples to Ensure Maximum Viability and Survival of the Etiologic Agent. These are described under General Procedures for Cell Culture and Virology.
- H. References
1. Campbell, J. B., and K. Wolf. 1969. Plaque assay and some characteristics of Egtved virus (virus of viral hemorrhagic septicemia of rainbow trout). Canadian Journal of Microbiology, vol. 15, p. 635-637.
  2. Hoffman, G. L., S. F. Snieszko, and K. Wolf. 1970. Approved procedure for determining absence of viral hemorrhagic septicemia and whirling disease in certain fish and fish products. U.S. Bureau of Sport Fisheries and Wildlife Fish Disease Leaflet 9, p. 7.
  3. Jorgensen, P. E. V. 1973. Inactivation of IPN and Egtved virus. Rivista Italiana. Piscicoltura Ittiopatologia, vol. 8, p. 107-108.
  4. Wolf, K. 1972. Advances in fish virology: a review 1966-1971. Symposia of the Zoological Society of London, no. 30, p. 305-331.
  5. Wolf, K. and P. E. V. Jorgensen. 1970. Salmonid viruses: double infection of RTG-2 cells with Egtved and infectious pancreatic necrosis viruses. Archiv fur Gesamte Virusforschung, vol. 29, p. 337-342.



#### IV. Infectious Hematopoietic Necrosis

A. Name of the Disease and Etiologic Agent. Infectious hematopoietic necrosis (IHN). (Synonyms: The disease has also been referred to as Oregon sockeye disease or Sacramento River chinook disease. The virus isolated from the various species is now more commonly referred to as the chinook salmon, sockeye salmon, or rainbow trout strain.)

#### B. Known Geographic and Host Range of the Disease

1. Geographic range. The initial geographic range of IHN was the Pacific Coast of North America from California to Alaska; however, incidental outbreaks have been reported from South Dakota, Minnesota, Idaho, West Virginia, Colorado, Montana, and Hokkaido, Japan.

2. Host range. The natural host range includes rainbow trout (Salmo gairdneri) (including Steelhead), chinook salmon (Oncorhynchus tshawytscha), and sockeye salmon (Oncorhynchus nerka). So far as is known, the coho salmon (Oncorhynchus kisutch) appears to be resistant to IHN.

C. Clinical Signs of Diagnostic Significance. Typical external signs of the disease may include exophthalmia, anemia, hemorrhaging at the base of fins, fecal casts, abdominal swelling with ascites, and scoliosis or lordosis in survivors of epizootics. Internally petechial hemorrhages in adipose tissues of the visceral cavity and mesenteries are often seen, the kidney and liver are edematous and pale, and subdermal hemorrhaging posterior to the cranium is common. Microscopically there is extensive necrosis of the hematopoietic tissue of the spleen and anterior kidney, and focal necrosis in pancreatic and liver tissue is often observed. The necrosis of the granular cells of the intestinal lamina propria is of diagnostic value. The above clinical signs are often associated with the disease but may not be observed in individual cases, and are totally absent in carrier fish.

#### D. Diagnostic Procedures for Disease Situations

##### 1. Presumptive diagnosis

a. The isolation of the virus on cell culture with the development of typical cytopathology can be used to presumptively identify the virus. Typical cytopathology includes nuclear chromatin margination and rounding of cells. This is best demonstrated by studying the plaque morphology.

- E. Procedures for Detecting Asymptomatic Infections. The only acceptable procedure for detecting IHN carriers is to test ovarian fluid for the presence of virus; however, in the case of rainbow trout either sex can be used. In all cases fish should be sampled according to section on General Procedures for Cell Culture and Virology. Samples may be collected and processed into 5 fish pools. Cell culture and virological procedures are to be followed as described above under D 1 a, and confirmation of the identity of any isolated agent must be followed as described above in D 2 a except no histopathological examination is needed.
- F. Procedures for Determining Prior Exposure to the Etiologic Agent. No serological tests are available at the present time.
- G. Procedures for Transportation and Storage of Samples to Ensure Maximum Viability and Survival of the Etiologic Agent. These are described under General Procedures for Cell Culture and Virology.
- H. References
1. Amend, D. F. 1970. Approved procedure for determining the absence of infectious hematopoietic necrosis (IHN) in salmonid fishes. U.S. Bureau of Sport Fisheries and Wildlife, Fish Disease Leaflet 31, 4 p.
  2. Amend, D. F., and V. C. Chambers. 1970. Morphology of certain viruses of salmonid fish I. "In vitro" studies of some viruses causing hematopoietic necrosis. Journal of the Fisheries Research Board of Canada, vol. 27, p. 1285-1293.
  3. Amend, D. F., W. T. Yasutake, and R. F. Mead. 1969. A hematopoietic virus disease of rainbow trout and sockeye salmon. Transactions of the American Fisheries Society, vol. 98, p. 796-804.
  4. McAllister, P. E., J. L. Fryer, and K. S. Pilcher. 1974. Further characterization of infectious hematopoietic necrosis virus of salmonid fish (Oregon strain). Archiv fur Gesamte Virusforschung, vol. 44, p. 270-279.
  5. McCain, B. B., J. L. Fryer, and K. S. Pilcher. 1971. Antigenic relationships in a group of three viruses of salmonid fish by cross neutralization. Proceedings of the Society for Experimental Biology and Medicine, vol. 137, p. 1042-1046.

## V. Channel Catfish Virus Disease

A. Name of the Disease and Etiologic Agent. Channel catfish virus disease (CCVD), channel catfish virus (CCV).

B. Known Geographic and Host Range of the Disease

1. Geographic range. Alabama, Arkansas, California, Georgia, Iowa, Kansas, Kentucky, Mississippi, Nebraska, Oklahoma, Texas, West Virginia, and Honduras, Central America.
2. Host range. Channel catfish (*Ictalurus punctatus*) is the primary host and blue catfish (*I. furcatus*) may be naturally infected and definitely experimentally infected.

C. Clinical Signs of Diagnostic Significance

1. Epizootics are characterized by a high rate of mortality in catfish that are less than 6 months old and less than 10 g in weight and when water temperatures exceed 25°C.
2. Infected fish swim erratically, sometimes rotating about the longitudinal axis and at times hanging head up in the water.
3. Externally, diseased fish have abdominal distension, exophthalmia, pale or hemorrhagic gills, petechiae at the base of fins and throughout the skin, particularly on the ventral surface.
4. Internally, the body cavity is filled with a clear, yellowish fluid, (ascites), hemorrhage throughout the musculature, liver, kidney and spleen. The liver, kidney, stomach and intestine may be pale in advanced states of disease. The gastrointestinal tract is filled with a mucoid secretion and it is void of food.
5. Histopathology is characterized by an increase in lymphoid cells in the kidney. Renal tubules are necrotic and edematous. Necrosis and edema are present in hematopoietic tissue surrounding renal tubules. The liver has diffuse necrosis, edema and hemorrhage. Hemorrhage, edema, and possibly mucosal sloughing is present in the intestine. The spleen becomes congested, edematous and macrophages are laden with degenerate erythrocytes. Cardiac tissue may be necrotic and focal hemorrhage may also occur in the musculature.

3. Plumb, J. A. 1971. Tissue distribution of channel catfish virus. *Journal of Wildlife Diseases*, vol. 7, p. 213-216.
4. Plumb, J. A. 1973. Effects of temperature change on mortality of fish infected with channel catfish virus. *Journal of the Fisheries Research Board of Canada*, vol. 30, p. 568-570.
5. Plumb, J. A. 1973. Neutralization of channel catfish virus by serum of channel catfish. *Journal of Wildlife Diseases*, vol. 9, p. 324-330.
6. Plumb, J. A., L. D. Wright, and V. L. Jones. 1973. Survival of channel catfish virus in chilled, frozen and decomposing channel catfish. *The Progressive Fish Culturist*, vol. 35, no. 3, p. 170-172.
7. Wolf K., and R. W. Darlington. 1971. Channel catfish virus: a new herpesvirus of ictalurid fish. *Journal of Virology*, vol. 8, p. 525-533.
8. Wolf, K., R. L. Herman, and C. Carlson. 1972. Fish Viruses: histopathologic changes associated with experimental channel catfish virus disease. *Journal of the Fisheries Research Board of Canada*, vol. 29, p. 149-150.

## VI. Suggested Procedure for PPLO Detection - Modified Fabricant's Medium

- A. Cells and sera and medium components should be checked for PPLO at least once every three months.
- B. To accomplish this check, one ml aliquots of cell suspensions are planted in 16 x 125 mm screw cap tubes. After 24 hours, the cells are scraped off and 0.5 ml of cells and TCF are planted in each of 2 PPLO tubes containing modified Fabricant's medium. One is incubated anaerobically at room temperature. The other is placed in a candle jar (10% CO<sub>2</sub> at 37°C). The tests are observed for 21 days.
- C. Whenever growth is apparent subcultures are made on plates to obtain the typical fried egg colonies.
- D. For best results, Fabricant's medium should be prepared in quantities to last about 1 month (store at 4°C).

### E. Modified Fabricant's Medium Formulation

- 1. PPLO broth without crystal violet (Difco) 70%  
(To make plates, substitute Difco PPLO agar for the PPLO broth without crystal violet.)
- 2. Horse serum 20%
- 3. Yeast extract (Hayflick and Chanock type). 5%  
To prepare add 250 grams dried yeast (Fleishmann's active dry yeast or comparable product) to 1000 ml distilled water. Boil for 15 minutes (simmer), cool, centrifuge off yeast at 10,000 RPM for 10 minutes. Filter through Seitz EK - distribute in screw top tubes or bottles, sterilize by autoclaving. Store in freezer at -20°C.
- 4. The following solutions should be sterilized by autoclaving 20 min at 121°C.
  - a. 0.2% solution of DNA (Na salt from thymus) 1%
  - b. 10% Na citrate 1%
  - c. Sterile molar potassium phosphate (K<sub>2</sub>HPO<sub>4</sub>) solution 2%

### Section 3

## METHODS FOR THE DIAGNOSIS OF CERTAIN BACTERIAL FISH DISEASES

D-1.1

## Foreword

In the following pages, methods are outlined for the diagnosis of 10 bacterial fish diseases. Other bacterial diseases of concern have not been considered--some because of their sporadic occurrence and others because of their uncertain etiology. Certain of these diseases are mentioned in Section XIII and readers desiring more complete information on these and other unmentioned bacterial diseases are referred to the literature in Section XIV.

Several of the diseases have been renamed. It is hoped that the new names describe more effectively, both the nature of the condition and its etiology.

Finally, and most important, the methods described are best suited for diagnosing clinically diseased fish. Satisfactory procedures for the detection of covert bacterial fish infections are still lacking. Two approaches for detecting covert infections are being studied but both are still very much research topics. The first is an indirect method and is based on demonstrating pathogen-specific agglutinins in suspect fish; the second is direct and is based on demonstrating antigens of the pathogen in the fish tissues. The immunodiffusion and fluorescent antibody techniques that may be of value in the latter approach are briefly described in Section XII.

## I. Furunculosis

- A. Name of the Disease and Etiologic Agent. Furunculosis, Aeromonas salmonicida.
- B. Known Geographic and Host Range of the Disease
1. Geographic range. Worldwide except possibly for Australia and New Zealand; reported predominantly in fresh water.
  2. Host range. All fresh-water and marine fish are considered susceptible.
- C. Clinical Signs of Diagnostic Significance. Furunculosis has been studied in salmonids in which it may take one of four clinical forms. The forms range from peracute (mortalities without gross lesions) and acute (gills hemorrhage readily), to subacute (the bodies darken) and chronic (bodies are dark and might show vesicles that contain blood-tinged fluid or that have broken to form ragged-edged ulcers). The acute forms of the disease are not specifically diagnostic for furunculosis but the signs associated with the chronic form of the disease, taken together with the source and history of the fish, may be of some diagnostic value.
- D. Diagnostic Procedures for Disease Situations. Diagnosis is based on isolation and identification of the causative organism. Primary isolation should be made from kidney on tryptic (trypticase) soy or furunculosis agar at 20-25°C for 24-48 hours.
1. Presumptive diagnosis. The organism, when cultured as above, should be a Gram-negative, non-motile, coccoid rod (in tissues it is more distinctly rod-like); it should be cytochrome oxidase-positive and should produce a brown pigment that diffuses into the medium (an occasional strain may be incapable of producing the pigment).
  2. Confirmatory diagnosis
    - a. The procedure of choice is the slide agglutination test using anti-A. salmonicida serum (see Section XII Serological Procedures). Note: Certain strains of A. salmonicida agglutinate spontaneously in saline; the slide agglutination test can only be carried out with such strains if the cell suspensions are first briefly sonicated to prevent autoagglutination.



## II. Motile Aeromonas Septicemia

- A. Name of the Disease and Etiologic Agent. Motile *Aeromonas* septicemia (MAS), *Aeromonas hydrophila* complex. (Synonyms-- bacterial hemorrhagic septicemia, hemorrhagic septicemia, and many others.)
- B. Known Geographic and Host Range of the Disease
1. Geographic range. Worldwide in fresh water.
  2. Host range. Probably all fresh-water fish.
- C. Clinical Signs of Diagnostic Significance. The disease occurs most frequently in warm waters of high organic matter content following some stress or injury such as might result from handling, external parasites, low oxygen, or poor overwintering conditions; it is normally a generalized septicemia with clinical signs virtually indistinguishable from those of other septicemias. The disease may range in form from peracute (mortalities without gross lesions) and acute (hemorrhaging of gills, vent, and internal organs; blood-tinged fluid in the body cavity) to subacute and chronic. With the latter forms, abscesses and ulcers are evident externally.
- D. Diagnostic Procedures for Disease Situations. Diagnosis is based on isolation and identification of the etiologic agent. Primary isolation should be made from kidney on tryptic (trypticase) soy agar (TSA) incubated at 20-25°C for 24-48 hours. Note: If for some reason MAS is strongly suspected, kidney may, in addition, be inoculated onto the Rimler-Shotts (RS) medium which should then be incubated at 35°C. The RS medium provides for the very rapid detection (only 20-24 hours are required) of organisms in the *A. hydrophila* complex; it would, however, allow vibrios to go undetected (see Section on Media and Reagents).
1. Presumptive diagnosis. Criteria for a presumptive diagnosis are satisfied if the TSA isolate proves to be a short, motile, cytochrome oxidase-positive, Gram-negative, usually straight rod that is fermentative in glucose O/F medium.
  2. Confirmatory diagnosis
    - a. A confirmed diagnosis is obtained if the TSA isolate produces gas during the fermentation of glucose in addition to having the characteristics already listed. If the isolate proves to be an anaerogenic glucose fermenter, a confirmed MAS diagnosis then requires

### III. Pseudomonas Septicemia

- A. Name of the Disease and Etiologic Agent. Pseudomonas septicemia, Pseudomonas sp, particularly P. fluorescens, some outbreaks have been caused by a nonmotile capsulated Pseudomonas. (Synonyms--bacterial hemorrhagic septicemia, hemorrhagic septicemia.)
- B. Known Geographic and Host Range of the Disease
1. Geographic range. Worldwide in fresh and sea water.
  2. Host range. All species of fish are probably affected at one time or another.
- C. Clinical Signs of Diagnostic Significance. The disease appears to be stress-mediated and occurs most frequently under warm-water conditions; it usually occurs as a generalized septicemia with clinical signs that vary according to the acuteness of the infection and which are very similar to those of other septicemias (see, for instance, motile Aeromonas septicemia).
- D. Diagnostic Procedures for Disease Situations. Diagnosis is based on isolation and identification of the etiologic agent. Primary isolation should be made from kidney on tryptic (trypticase) soy agar at 20-25°C for 24-48 hours.
1. Presumptive diagnosis. Criteria for a presumptive diagnosis are satisfied if the isolate is a short, motile, cytochrome oxidase-positive, Gram-negative rod that is oxidative or inactive with glucose (in glucose O/F medium) and frequently produces a fluorescent pigment.
  2. Confirmatory diagnosis
    - a. The criteria are the same as those described above for the presumptive diagnosis.
    - b. For making a diagnosis, a sample of five moribund fish from each affected holding unit (e.g. tank, raceway, pond) is recommended. For amplification, see item D2c in the section on furunculosis.
- E. Procedures for Detecting Asymptomatic Infections. The remarks in item E of the furunculosis section apply here. Because Pseudomonas is considered to be ubiquitous in water, a search for a suitably sensitive detection procedure has not been actively pursued and may not be warranted.

#### IV. Vibriosis

- A. Name of the Disease and Etiologic Agent. Vibriosis, Vibrio sp., V. anguillarum or other species or varieties which also may be pathogenic to fish. (Synonyms--boil disease, ulcer disease, salt water furunculosis, red pest or red boil of eels, and others.)
- B. Known Geographic and Host Range of the Disease
1. Geographic range. Worldwide, principally in marine situations, but some outbreaks have occurred in fresh water.
  2. Host range. All marine and fresh water fish are considered susceptible.
- C. Clinical Signs of Diagnostic Significance. The disease is normally a generalized septicemia with clinical signs virtually indistinguishable from those of other septicemias. In salmonids in which the disease is frequently seen it ranges in form from peracute (mortalities without gross lesions) and acute (hemorrhaging of the eyes, gills, vent, skin and internal organs, blood-tinged fluid in the body cavity) to subacute and chronic (hemorrhagic ulcerations of the skin and underlying muscle). Marine fish may exhibit one or more of the foregoing signs; fresh water Ictalurids apparently suffer from a non-systemic form of the disease in which there is superficial erosion of the caudal peduncle.
- D. Diagnostic Procedures for Disease Situations. Diagnosis is based on isolation and identification of the etiologic agent. Primary isolation should be made from kidney (and lesion material, where necessary ) on tryptic (trypticase) soy agar incubated at 20-25°C for 24-48 hours.
1. Presumptive diagnosis. Criteria for a presumptive diagnosis are satisfied if the TSA isolate is a short, motile, cytochrome oxidase-positive, Gram-negative, usually curved rod that is fermentative in glucose O/F medium.
  2. Confirmatory diagnosis
    - a. Criteria for a confirmed diagnosis are satisfied if the TSA isolate ferments glucose anaerogenically and is sensitive to the vibriostatic agent O/129 and novobiocin.
    - b. For making a diagnosis, a sample of five moribund fish from each affected holding unit (e.g. tank, raceway,

## V. Enteric Redmouth

- A. Name of the Disease and Etiologic Agent. Enteric redmouth (ERM), RM bacterium. (Synonyms--Hagerman redmouth disease, redmouth disease.)
- B. Known Geographic and Host Range of the Disease
1. Geographic range. Limited to North America thus far. Confirmed isolations have been made in Alaska, Arizona, California, Colorado, Idaho, Montana, Nevada, Ohio, Oregon, Saskatchewan, Tennessee, Utah, and Washington.
  2. Host range. Potentially all salmonids. (Isolations from non-salmonids not yet reported.) Confirmed isolations have been made from Atlantic salmon (Salmo salar), brook trout (Salvelinus fontinalis), brown trout (Salmo trutta), chinook salmon (Oncorhynchus tshawytscha), coho salmon (Oncorhynchus kisutch), cutthroat trout (Salmo clarki), rainbow trout (Salmo gairdneri), and sockeye salmon (Oncorhynchus nerka).
- C. Clinical Signs of Diagnostic Significance. The disease may occur as a peracute, acute, or subacute to chronic condition. The clinical signs of the acute forms of the disease are very similar to those seen in other bacterial septicemias. In the more chronic infections, the clinical signs are somewhat more diagnostic for ERM and, when considered in conjunction with the origin and history of the fish (the disease has a rather restricted distribution), can provide valuable clues as to the identity of the disease. In chronic infections the fish are dark, lethargic, and commonly show bilateral exophthalmia which may have progressed to rupture of the eye. There may be cutaneous petechiation but the skin is intact. Petechial hemorrhages occur diffusely on (and in) the viscera and musculature.
- D. Diagnostic Procedures for Disease Situations. Diagnosis is based on isolation and identification of the causative organism. Primary isolation should be made from the kidney on tryptic (trypticase) soy agar incubated at 20-25°C for 24-48 hours.
1. Presumptive diagnosis. For presumptive identification, the organism should at least be shown to be a Gram-negative, cytochrome oxidase-negative rod that fails to produce indole in tryptone broth and produces an acid (only) reaction on the slant and in the butt of slanted triple sugar iron agar (see Fig. 1). Additional characteristics that might also be verified for the organism in presumptive

## VI: Edwardsiella Septicemia

- A. Name of the Disease and Etiologic Agent. *Edwardsiella septicemia*, *Edwardsiella tarda*. (Synonym--emphysematous putrefactive disease of catfish.)
- B. Known Geographic and Host Range of the Disease
1. Geographic range. Southeastern and southwestern United States; Southeast Asia.
  2. Host range. Channel catfish (*Ictalurus punctatus*), goldfish (*Carasius auratus*), and fresh water eels (*Anguilla japonicus*). The organism has also been found in a variety of other animals including seals, sea lions, turtles, alligators, and snakes, and has been implicated as a pathogen in certain diseases of humans, cattle, pigs, and birds.
- C. Clinical Signs of Diagnostic Significance. The disease is favored by high water temperatures (30°C and above) and, in channel catfish in which it has been well documented, it initially manifests itself as small, cutaneous lesions located posteriolaterally on the fish. Later, abscesses may develop within the muscles of the flank and caudal peduncle. Large cavities filled with a malodorous gas and necrotic tissue may be produced. The lesions may be visible externally as swellings (if enough gas has been produced in the underlying lesions) or as bleached areas.
- D. Diagnostic Procedures for Disease Situations. Diagnosis is based on isolation and identification of the etiologic agent. Primary isolation should be made from kidney (and from other lesion material, if necessary) on to tryptic (trypticase) soy agar incubated at 20-25°C (preferably at 25°C) for 2-4 days.
1. Presumptive diagnosis. For presumptive identification, the etiologic agent should at least be shown to be a short, Gram-negative, cytochrome oxidase-negative rod that produces indole in tryptone broth and produces the following reactions on slanted triple sugar iron agar: an alkaline slant, and a butt showing acid and gas as well as hydrogen sulfide production (see Fig. 1). Additional characteristics that might also be verified for the organism in presumptive testing are its motility and its ability to ferment glucose (both acid and gas are produced in glucose O/F medium).

## VII. Columnaris Disease

- A. Name of the Disease and Etiologic Agent. Columnaris disease, Flexibacter columnaris. (Synonyms--Chondrococcus columnaris, cotton wool disease, mouth fungus.)
- B. Known Geographic and Host Range of the Disease
1. Geographic range. Probably worldwide.
  2. Host range. All fresh-water fishes are considered susceptible.
- C. Clinical Signs of Diagnostic Significance. The disease affects fish of all ages and is favored by warm-water conditions (14°C and over). When highly virulent strains of the pathogen are involved, the fish may die without any gross signs of pathology but the pathogen is recoverable from the gills; with strains of lower virulence, external lesions of some diagnostic value are produced. (Internally, gross lesions are usually absent or unremarkable even though the pathogen may be present.) External lesions may occur on the body surface, on the gills, or on both. On the fins, head and trunk, they occur initially as greyish-white cutaneous foci. The foci may enlarge to be several centimeters in diameter and the skin in the affected area may be eroded so that shallow ulcers are produced. On the gills, the lesions appear to radiate from a focal point; the affected tissues become bleached and necrotic but fusion of the lamellae does not occur. Often, the pathogen's yellow-pigmented cells may be present in large enough numbers to color the lesions yellow or orange.
- D. Diagnostic Procedures in Disease Situations
1. Presumptive diagnosis. Presumptive diagnosis is based on showing that the lesions contain long, thin (5 to 12 microns by 0.75 micron), Gram-negative rods; it should produce a dry, rhizoid, yellowish colony on cytophaga agar within 3 days at 20°C, and should be motile by a gliding or flexing motion on solid surfaces; it should seldom cause disease at temperatures below 14°C.
  2. Confirmatory diagnosis
    - a. The procedure of choice is the slide agglutination test using anti-F. columnaris serum. Because certain strains of F. columnaris agglutinate spontaneously in saline, the slide agglutination test can only be

# VIII. Coldwater Disease

- A. Name of the Disease and Etiologic Agent. Coldwater disease, Cytophaga psychrophila. C. psychrophila is not recognized as a species in the current edition of Burgey's Manual. (Synonyms-- peduncle disease, low temperature disease.)
- B. Known Geographic and Host Range of the Disease
1. Geographic range. To date the disease has been reported only from the continental United States, predominantly from the northwestern United States.
  2. Host range. All salmonids are probably affected but juvenile coho (Oncorhynchus kisutch) and fall chinook (O. tshawytscha) salmon are particularly susceptible.
- C. Clinical Signs of Diagnostic Significance. The disease is a fresh-water condition that normally occurs when the water temperatures are 12°C or below; juvenile fish are primarily affected, the causative organism being recoverable from both the external lesions and the internal organs. In alevins, the ventral surface of the yolk sac becomes eroded and the sac may rupture releasing its contents. In fingerlings with the acute form of the disease, the fish may darken in the peduncle region and die without any surface lesions appearing. More commonly, however, superficial lesions occur; these are frequently first observed in the peduncle area but may also occur on other areas of the trunk and head. The lesions may enlarge and the underlying tissues may be extensively eroded; if the fish survives long enough, it may suffer a loss of its caudal fin, and the vertebral column in the caudal peduncle may eventually be exposed. In the chronic form of the disease, the fish may exhibit lordosis and scoliosis.
- D. Diagnostic Procedures for Disease Situations
1. Presumptive diagnosis. The disease may be considered presumptively diagnosed if it occurs at water temperatures of 12°C or below; if the lesions contain a long, thin (3.5 to 7.5 microns by 0.75 micron), Gram-negative rod; it should produce a moist, yellow, spreading colony on cytophaga agar within 3 days at 20°C and should exhibit a gliding motility on solid surfaces.

## IX. Saltwater Myxobacteriosis

- A. Name of the Disease and Etiologic Agent. Saltwater myxobacteriosis, Sporocytophaga. (The taxonomic significance of Sporocytophaga is problematic at this time.)
- B. Known Geographic and Host Range of the Disease
1. Geographic range. Reports to date have been from the northwestern United States and Scotland.
  2. Host range. Immature salmonids in sea water.
- C. Clinical Signs of Diagnostic Significance. The disease appears to be a cutaneous (non-systemic) condition with lesions occurring most frequently on the flanks and ventral surface of the fish; lesions on the gills have not been reported. The lesions, which can be very extensive, appear like surface abrasions. Mortalities are usually quite low and are likely due to loss of body fluids.
- D. Diagnostic Procedures for Disease Situations
1. Presumptive diagnosis. The affected fish should show shallow external lesions that contain large numbers of a long relatively thick Gram-negative rod; in smears the rods are often bent into curious configurations (walking sticks and horseshoes); no growth occurs on cytophaga agar but on cytophaga agar supplemented with a 1.5-2.0% sea salts, yellow colonies are produced in several days at 20-22°C; microcysts are often present among the vegetative cells of older colonies.
  2. Confirmatory diagnosis
    - a. No confirmatory serological techniques are available.
    - b. For making a diagnosis, a sample of five moribund fish from each affected holding unit (e.g. tank, raceway, pond, enclosure) is recommended. For amplification, see item D2c in the section on furunculosis.
- E. Procedures for Detecting Asymptomatic Infections. Asymptomatic carriers are not likely to be of great significance because the organism is likely to be carried on the surface of the fish in which position it may be washed off or effectively treated; in addition, the organism is thought to be far more widespread in sea water than is indicated above. A suitably sensitive detection procedure may therefore be unnecessary.



## X. Bacterial Kidney Disease

- A. Name of the Disease and Etiologic Agent. Bacterial kidney disease, Corynebacterium sp. (Synonyms--kidney disease, corynebacterial kidney disease, Dee disease.)
- B. Known Geographic and Host Range of the Disease
1. Geographic range. North America, Scotland, and Japan.
  2. Host range. Confirmed isolations have been from salmonids to date; all salmonids are considered susceptible.
- C. Clinical Signs of Diagnostic Significance. Acute and subacute forms of the disease occur only sporadically. More typically, the disease is a chronic one that seldom occurs in fish less than 6 months old. The chronic disease is characterized internally by an enlarged, edematous kidney that may appear grey and corrugated. The kidney usually exhibits off-white lesions that vary in size and number. These lesions sometimes occur in other organs, chiefly the liver and spleen. A turbid fluid is often present in the abdominal and pericardial cavities, especially in older fish. Externally, the clinical signs are of less diagnostic value: fish may appear normal, or they may show one or more of the following: exophthalmia, skin petechiation, vesicles in the skin.
- D. Diagnostic Procedures for Disease Situations
1. Presumptive diagnosis. Smears of infected tissue should contain numerous small, Gram-positive, non-acidfast diplobacilli that occur both intra- and extra-cellularly; the organism should fail to grow on tryptic (trypticase) soy agar at 20°C, even when extended incubation periods (e.g. 2 weeks) are used.
  2. Confirmatory diagnosis
    - a. The procedure of choice is the immunodiffusion test using antiserum prepared against the causative bacterium and homogenates of infected fish tissue (see section XII on Serological Procedures). A positive immunodiffusion test without demonstration of the bacteria in a smear should be considered a presumptive diagnosis only.
    - b. A more time-consuming and laborious procedure is to isolate the causative bacterium and show that it is identical (or essentially identical) with the kidney disease bacterium. (Descriptions of the kidney disease

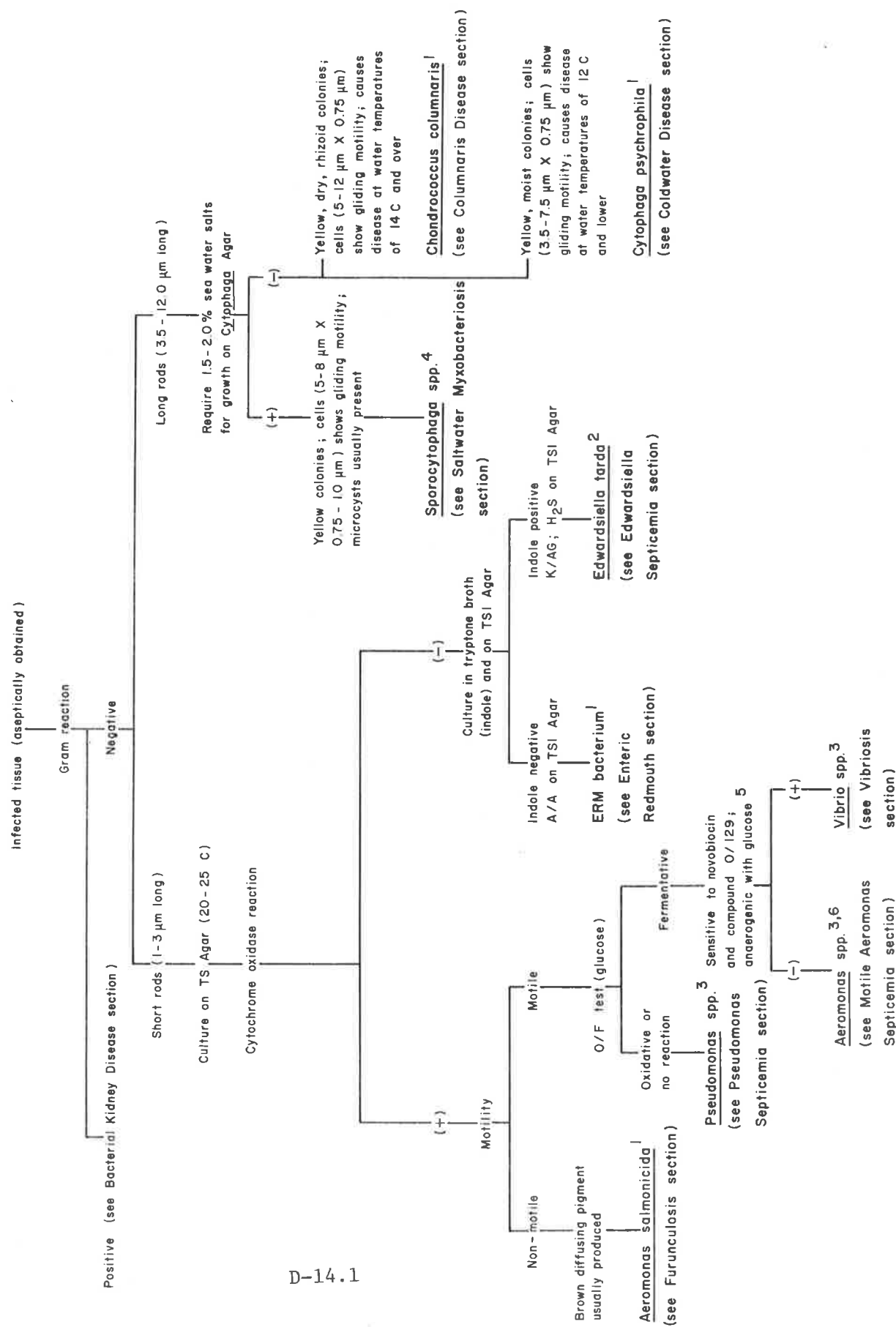
4. Smith, I. W. 1964. The occurrence and pathology of Dee disease. Scotland Department of Agriculture and Fisheries, Freshwater Salmon Fisheries Research Series No. 34. 12 p.

## XI. Media and Reagents

A. Media. Incubation temperatures appropriate for the bacterium under test should be used.

1. Trypticase Soy Agar (BBL)  
Tryptic Soy Agar (Difco)
2. Oxidation/Fermentation (O/F) Basal Medium (BBL, Difco)--  
This medium is used with 1% glucose as the test carbohydrate. Instructions on the use of the medium and the interpretation of results are given in the BBL Manual of Products and Laboratory Procedures (5th ed. 1968), p. 129-130 and in Difco Supplementary Literature (Oct. 1968) p. 255. Note: a marine version of this medium is also available from Difco.
3. Triple Sugar Iron Agar (BBL; Difco)--Instructions on the use of this medium and the interpretation of results are given in the BBL Manual of Products and Laboratory Procedures (5th ed. 1968), p. 148-149, and in the Difco Manual (9th ed. 1953), p. 166-168.
4. Tryptone Broth--Use for testing for indole production. The medium should contain 1% tryptone and 0.5% NaCl. Methods and reagents for testing for indole are given in the Difco Manual (9th ed. 1953), p. 53-54.
5. Urea Agar or Urea Agar Base (BBL, Difco)--Use for determining urease activity. Medium may be obtained ready-for-use in slanted tubes (as Urea Agar), or it may be compounded in the laboratory using Urea Agar Base plus Agar. Instructions for preparing the medium and reading the results are given in the BBL Manual of Products and Procedures and in Difco Supplementary Literature.
6. Rimler-Shotts (RS) Medium--Use for detecting Aeromonas liquefaciens complex organisms. Preparation of the medium and interpretation of results are given in the following paper: Shotts, E. B., Jr., and R. Rimler. 1973. Medium for the isolation of Aeromonas hydrophila. Appl. Microbiol. 26: 550-553.
7. Cytophaga Agar--For the composition of this medium, see: Anacker, R. L., and E. J. Ordal. 1959. Studies on the myxobacterium Chondrococcus columnaris. 1. Serological typing, J. Bacteriol. 78: 25-32. Note: Synthetic sea water salts are added to this medium to grow marine myxobacteria; these salts are commercially available.

Figure 1. Procedures for the Differentiation of Certain Gram-Negative Bacteria Associated with Fish Diseases\*



## XII. Serological Procedures

### A. Slide Agglutination Test

1. Definition. A procedure for rapid confirmation of a presumptively identified bacterial isolate. The test is based upon agglutination of the isolate in saline suspension when mixed with specific antiserum.
2. Materials
  - a. Glass slide. An alcohol-cleaned microscope slide or glass plate marked off into three 2.0 cm circular areas with a grease pencil.
  - b. Test antigen. Log phase culture of the presumptively identified bacterial isolate to be confirmed.
  - c. Diagnostic antiserum. A standardized specific and polyvalent antiserum prepared against a reference antigen. This reagent is available for many of the recognized bacterial fish pathogens from the Eastern Fish Disease Laboratory (EFDL\*) and should be stored at 4°C with the addition of aqueous thimerosal to 1:10,000.
  - d. Reference antigen. A standard control antigenic preparation capable of reacting specifically with the diagnostic antiserum. This reagent may be made from a confirmed positive isolate, or better still, should be obtained from EFDL\* and stored as specified.
  - e. Diluent. A physiological (0.90%) sodium chloride solution, autoclaved, and stored at room temperature.

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U. S. Fish and Wildlife Service  
Route 1, Box 17A  
Kearneysville, West Virginia, U.S.A.  
25430

- d. (--+). A true negative result (proving that the isolate is different from the known pathogen) is indicated by the lack of agglutination in areas 1 and 2 and agglutination in area 3.

## B. Double Immunodiffusion Test

1. Definition. This particular test is a rapid, specific, confirmatory procedure for visualizing the presence of diffusible antigens of fish pathogens while they are still in the host tissues. This test is specifically devised for application to bacterial kidney disease.

### 2. Materials

- a. Medium. Prepare 0.5-0.75% agarose in pH 7.2 to 7.4 0.1 M phosphate buffered 0.90% physiological saline containing 0.2% sodium azide. Boil and pour into culture plates to a depth of 3-4 mm. Refrigerate to solidify and cut a well pattern such as the one shown in Figure 2. The wells should be 5.0 mm in diameter and 5.0 mm apart when measured from closest edges. The well pattern is best obtained using a commercial well-cutter or a cork-borer and template. Commercial Ouchterlony double diffusion plates designed for the purpose are available from: ICN Diagnostic Products  
P. O. Box 3932  
Portland, Oregon, U. S. A.  
97708
- b. Diagnostic antiserum. A standardized specific and polyvalent antiserum prepared against a reference antigen and available from EFDL.
- c. Reference antigen. A standardized specific antigenic preparation available from EFDL.
- d. Test antigen. A portion of tissue (usually kidney) which is homogenized with an equal portion of sterile 0.9% physiological saline.
3. Test procedure. Diagnostic antiserum is pipetted into the central well of the diffusion plate, being careful not to overfill and flood the well. Reference and test antigens are pipetted into peripheral wells. Following 24 hours of incubation at room temperature in a humidified chamber the plate is examined under oblique lighting against a dark background.

4. Results and their interpretation. Positive confirmatory results are indicated by the presence of one or more precipitin bands in the agar space between the central well and the peripheral well containing test antigen and between the central well and the peripheral well containing the reference antigen. If a precipitin band forms only between the central well and the reference antigen, this constitutes a negative result (no, or insufficient, test antigen is present).

C. Indirect Fluorescent Antibody (IFA) Test

1. Definition. The IFA technique is designed to detect the presence of specific bacterial agents in suspect materials. The test involves two successive antigen-antibody reactions. The first reaction is between the bacterial agent and a diagnostic antiserum prepared against it. The second reaction is between the antiserum and fluorescing globulin prepared against the antiserum.
2. Materials
  - a. Fluorescent microscope. A special microscope and ultraviolet light source with a cardioid type darkfield condenser capable of dry field and oil immersion scanning. The appropriate filter combination for the specific fluorescent globulin conjugate should be used (i.e., fluorescein isothiocyanate works well with a BG-12 and OG-1 filter combination).
  - b. FA slides. Acid cleaned FA quality microscope slides and coverslips which are commercially available.
  - c. PBS. pH 7.6 0.1 M phosphate buffered 0.9% physiological saline. (Bicarbonate buffered saline with a pH of 10-12 may also be used in place of the PBS to enhance fluorescence as noted later.)
  - d. FA mounting medium. A special non-fluorescing mounting medium, available from commercial sources.
  - e. Diagnostic antiserum. A standardized, specific, and polyvalent antiserum prepared against a reference antigen. This reagent is available for many of the recognized bacterial fish pathogens from EFDL.

XIV. Selected Additional Reading on Bacterial Fish Diseases (1950-1974).

The books and manuals in this bibliography contain much detailed and valuable information on bacterial fish diseases and are listed here for those wishing additional information on this topic.

- A. Amlacher, Erwin. 1970. "Textbook of Fishes Diseases" Translated by Conroy and Herman TFH Publications.
- B. Anonymous. 1971. "Fish Disease Manual, Region 3" Bureau of Sport Fisheries and Wildlife.
- C. Davis, H. S. 1956. "Culture and Diseases of Game Fish" University of California Press.
- D. Klontz, G. W. 1973. "Syllabus of Fish Health Management" Texas A & M University.
- E. Leitritz, Earl. 1962. "Trout and Salmon Culture" Fish Bulletin No. 107, State of California Department of Fish and Game.
- F. Mawdesley-Thomas, L. (Ed.). 1972. "Diseases of Fish" Symposia of the Zoological Society of London, No. 30 Academic Press.
- G. Reichenbach-Klinke, H. and Elkan. 1965. "The Principal Diseases of Lower Vertebrates" Academic Press.
- H. Sindermann, Carl. 1969. "Principal Diseases of Marine Fish and Shellfish" Academic Press.
- I. Snieszko, S. (Ed.). 1970. "A Symposium on Diseases of Fishes and Shellfish" American Fisheries Society, Special Publication No. 5.
- J. Snieszko, S. F. and Axelrod, H. R. (Eds.). 1971-1974. "Diseases of Fishes--Vols. I-IV" TFH Publications.
- K. Wood, J. W. 1968. "Diseases of Pacific Salmon. Their Prevention and Treatment" Washington Department of Fisheries.



Section 4

METHODS FOR THE DIAGNOSIS OF CERTAIN  
PARASITIC FISH DISEASES

E-1.1

### Foreword

The following methods were established by the Fish Health Section of the American Fisheries Society at its meeting in Denver, Colorado, August 12-15, 1974. Due to the rapid increase in interest in the area of aquaculture, it has become imperative that nationally accepted procedures be established for the detection of the more serious fish parasites.

The authors realize that the parasite list is not all inclusive; therefore, additional lists of parasite diseases have been compiled.

## ing Disease

Name of the Disease and Etiologic Agent. Whirling disease,  
Myxosoma cerebralis. (Synonym: blacktail.)

### Known Geographic and Host Range of the Disease

1. Geographic range. California, Connecticut, Massachusetts, Michigan, Nevada, Ohio, Pennsylvania, Virginia, West Virginia. The agent has also been found in continental Europe, England, New Zealand, South Africa, USSR, and South America.
2. Host range. All species of salmon, trout, and grayling.

### C. Clinical Signs of Diagnostic Significance

1. Whirling. Mad, tail-chasing behavior, particularly at feeding time or when startled. This usually occurs at two to eight months of age.
2. Skeletal deformities. Signs include sunken heads and spinal curvatures.
3. Blacktail. The posterior of the fish may be dark and nearly black at two to eight months of age.
4. Mortality occurs, although not catastrophically.

### D. Diagnostic Procedures for Disease Situations. Remove the head, deflesh where feasible, and cut lengthwise. Grind the cranium and gill arches in a mortar, add about 20 ml of water, stir thoroughly and examine two or more drops thoroughly for spores at high-dry magnification (430X). Staining with fast green will increase ease of detecting spores. As an alternate method, remove the head and cut lengthwise, scrape the cut surface with a scalpel, add a little water, mix and examine two drops as above. Diagnosis of an epizootic is considered positive if all of the following criteria have been satisfied:

1. Determine the presence of typical spores which do not contain iodophilous vacuoles.
2. Determine that the size of fresh or preserved spores are 8-10 microns.
3. Use histological sections to verify the presence of spores in cartilagenous tissue.

- g. Prepare an alkaline (pH 8.0) trypsin solution by adding 5.0 grams of trypsin (Difco) to 1 liter of Rinaldini's saline which is composed of the following:

Sodium chloride	8.0 grams
Potassium chloride	0.2
Sodium citrate	1.0
Sodium hydrogen phosphate	0.05
Sodium bicarbonate	1.0
Glucose	1.0
Distilled deionized water	qs to: 1.0 liter

Grind trypsin in mortar, add 10 ml of Rinaldini's saline solution from above, mix and dilute to a liter. Add 1 ml of 1% phenol red, if desired. Filter through glass wool fiber (Corning 3950) and then through coarse filter paper or Millipore pre-filter.

- h. Add sufficient trypsin solution (pH 8.0) to double the volume of the tissue suspension from step f above. Digest further at 22°C with stirring for 30 minutes.
- i. Halt digestion by adding out-dated serum to make a final concentration of 1:4 (serum to digestive mixture). Filter suspension through glass wool fiber.
- j. Centrifuge suspension at 1,200 G for 10 minutes. Discard supernatant. Re-suspend pellet in 10 ml or half-strength Balanced Salts Solution with 20% fetal calf serum.
- k. Place 3 ml of 55% (w/v) aqueous dextrose solution in each of a pair of 12 ml conical centrifuge tubes. Carefully layer 5.0 ml of the re-suspended digest over the surface of the dextrose in each tube without mixing. Centrifuge at 1,200 G for 30 minutes.
- l. Collect the pelleted material with a Pasteur pipet. Place 2-3 drops from each tube on a clean slide, place coverslip and examine at 430X for the presence of M. cerebralis spores.
- m. Systematically search each slide for approximately 2½ minutes or until spores are found. Confirmation by another qualified fish disease specialist should be sought following a diagnosis of M. cerebralis.