



Fish Health Section Newsletter

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Volume 3

October-December 1975

Number 4

1976 OFFICERS ELECTED CERTIFICATION APPROVED

The 1976 election results of the Fish Health Section of the American Fisheries Society have been reported by Dr. John Plumb, Chairman of the Section's Membership and Balloting Committee. Dr. Donald Amend was elected President for 1976, replacing Mr. Courtney Gustafson. Dr. Amend is a Research Microbiologist with the U.S. Fish and Wildlife Service, Western Fish Disease Laboratory, Seattle Washington.

Mr. David McDaniel will be taking over from Mr. Jim Warren as Vice-President for the coming year. Mr. McDaniel is a Staff Specialist on Inland Fisheries with the U.S. Fish and Wildlife Service, Washington, D.C. Mr. Ivan McElwain will serve as Secretary-Treasurer, a position he has filled for the past year. Mr. McElwain is Director of the U.S. Fish and Wildlife Service Fish Disease Control Laboratory, Fort Morgan, Colorado. Mr. Harold Wolf was elected Chairman of the Nominating Committee, replacing Mr. Ron Goede. Mr. Wolf is Director of the Fish Pathology Laboratory, California Department of Fish and Game, Rancho Cordova, California.

Congratulations are extended to each of the newly elected Section officers along with the hope that the coming year might prove to be as successful and rewarding for the Fish Health Section as those gone by. The membership is reminded that excellent leadership along with active participation from the wide diversity of individual members has been the key to the present success and momentum of the Section. Any individuals wishing to actively share in the growth and direction of the Section should make their thoughts known to the newly elected officers so that they may be included in future planning.

A sincere and well earned thank you is also extended to the outgoing officers and committee members for a job well done. It has been another year of significant growth and development for the Fish Health Section and the profession as a whole.

The coming year also holds an air of expectation for the Section in terms of the strong mandate given by the membership in the recent election to establish a meaningful program of Professional Certification. The proposed amendment to the By-Laws, Article VII, Section 1, Paragraph F (as published in the FHS/AFS NEWSLETTER, 3(3), 1975) concerning establishment of a Board of Certification under the Professional Standards Committee of the Section was approved by eighty eight (88%) percent of the voting membership. The Professional Standards Committee for 1975, under the chairmanship of Dr. Fred Meyer, should be congratulated for their successful efforts at providing a meaningful and yet workable Professional Certification amendment that so many could agree with.

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1976 FHS MEMBERSHIP FEES NOW DUE

To Kill
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FHS/AFS
WDA group p. 8

Aquatic Animal Health An Editorial Comment

DISEASE CONTROL AND ERADICATION
-TO KILL OR NOT TO KILL-

As an active professional in the field of Fish Health and in my capacity as Editor of the FHS/AFS NEWSLETTER, I have sensed an urgent and rapidly growing concern and controversy over the problem of infectious disease control and eradication. The basic question involved seems to be if, when, and how a stock of fish and/or a culture facility might be condemned, sacrificed, and/or closed in an attempt to control or possibly eradicate a particular infectious disease.

To further an understanding of the problems inherent to the question, I have asked three professionals experienced in and closely allied to different aspects of the subject to comment from their representative points of view. Mr. J. David Erickson is an active, well spoken, and highly respected commercial trout hatchery biologist, culturist, and manager from the Hagerman Valley of Southern Idaho. Dave has many years of practical experience concerning the application and economics of infectious disease control in a commercial production hatchery. Representing the question from the standpoint of a state agency is Mr. Doug Mitchum, a Fish Pathologist with the Wyoming Game and Fish Department Research Laboratory in Laramie. Doug is well experienced with the problems of disease control and eradication within a state and has established a most successful program for the state of Wyoming. Mr. David W. McDaniel is a Staff Specialist on Inland Fisheries with the U.S. Fish and Wildlife Service in Washington, D.C. Dave has been closely associated with federal programs of fish disease control and eradication and got his practical experience on the subject as a U.S.F.W.S. Hatchery Biologist out of Springville, Utah. -EDITOR-



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The NEWSLETTER of the Fish Health Section of the American Fisheries Society is published four times annually in accordance with Section objectives. The use of company or registered trade names does not constitute an endorsement but serves only to keep members informed. Contributions to the NEWSLETTER are encouraged and should be sent to one of the following committee members no later than the 15th of the month preceding the date of publication to be included into the next quarterly issue.

- Dr. Robert A. Busch (Editor), Fish Pathology Laboratory, Bldg.#48, Humboldt State University, Arcata, California 95521
- Mr. Charles R. Berry, Jr., (eastern U.S.), Department of Fisheries and Wildlife Science, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24060
- Mr. Gary W. Camenisch (central U.S.), 666 Primrose Lane, Springfield, Missouri 65804
- Dr. Trevor P. T. Evelyn (Canada and international), Pacific Biological Station, P.O. Box 100, Nanaimo, British Columbia, V9R 5K6, CANADA
- Dr. Richard A. Heckman (western U.S.), Zoology Department, 143 Wid B, Brigham Young University, Provo, Utah 84601

A POINT OF VIEW FROM PRIVATE INDUSTRY An attempt to summarize an opinion representing the various interests of private fish farming would be difficult if not misleading. Fish farming interests vary widely among trout growers, recreational dealers, food fish growers, tropical fish people, catfish farmers, etc. There is also a great diversity among the interests of various agency programs.

However, it seems there is one factor common to all who propagate and grow fish. This is the need to seek some control over serious fish diseases which are not present in existing stocks. I believe condemnation and destruction could be an effective tool of fish disease control. Obviously, if the first trout infected with whirling disease in Pennsylvania had been destroyed, a number of private trout operations and many agency programs would be more viable today.

Though condemnation and destruction could be effective, such a controversial program would be difficult to adopt. Support for initiating such a program must build from the private sector as well as government. I believe the livestock industry's effectiveness in the area of disease control stems from widespread industry support.

Besides industry support, I would list the following characteristics as essential to a fish destruction policy:

1. Indemnification - Unless the owners of the fish imported them with full knowledge of the disease, full indemnification at fair market value is necessary.
2. Local Control - A national board or federal agency judging on fish destruction would be unwieldy and probably too inflexible to meet local needs. A state boundary is preferable.
3. Fair Representation - Administration of regional control groups needs equal representation from private fish growers and agencies.
4. A "Demonstrated Threat" Clause - This means that diseases requiring fish destruction would be limited to those few diseases known to cause serious economic and resource damage. Diseases now present in the region would not be listed.

Destruction of fish in many situations had occurred too late to prevent dissemination of the disease to adjacent fish populations. In other cases, hatchery mortality has been used as a measure of the disease's severity in wild populations. Thus, misuse of fish destruction has occurred.

In summary, the tool of fish destruction in disease control cannot be as effective as other means and must be used only sparingly. Nationwide information of disease histories and prevention of fish movement by fishery managers are far more important.

Mr. J. David Erickson
P.O. Box 548
Buhl, Idaho 83316

A STATE AGENCY'S POINT OF VIEW Should a stock of hatchery fish be destroyed or should a hatchery facility be closed in an attempt to control or possibly eradicate an infectious disease problem? The question presents a problem of increasing concern and controversy to professional fisheries people - be they fish culturists, managers, researchers, pathologists, or administrators.

In my capacity as a state fish pathologist, I was invited to answer the question from the State Game and Fish point of view. My response is necessarily based upon experience gained within the state of Wyoming. This is an important point. Wyoming is very fortunate to be relatively free of the serious infectious diseases of salmonids. We have had bacterial kidney disease, furunculosis, and enteric redmouth. These diseases, we believe, have been eradicated from our hatchery system. We have not had a known case of IPN, IHN, or *Myxosoma cerebralis*. Yes, we have been looking!

Wyoming's relatively disease-free history is due partly to luck, but also, our situation is due to an effective fish disease control program which was initiated during the early 1950's. This program includes continuous surveillance of hatcheries for specific diseases. We have a policy which prohibits importation of fish infected with certain diseases. And, perhaps most important, we are self sufficient in trout egg production and do not import trout eggs or fish into our hatchery system. We are not smugly looking down on less fortunate states. Personally, I am humbled and apprehensive! Will it only be a matter of time before a case of IPN appears?

It is precisely because of our situation in Wyoming, that I have some definite opinions on disease control. It is obvious that no ponderous decision is necessary if the diagnosed disease is treatable. However, if a hatchery stock was infected with a persistent untreatable infectious disease (e.g., IPN of *M. cerebralis*) my recommendations would be: (1) quarantine the hatchery, (2) antiseptically destroy obviously diseased stock, (3) plant "carrier" and uninfected lots into no-outlet ponds where there is little or no risk of spreading the disease, (4) disinfect the facility, (5) restock with certified disease-free eggs or fish, and monitor.

Destruction of fish is a drastic control measure which is likely to meet understandable resistance. No one enjoys burying fish. I believe, however, that this control method is justified in certain cases. There is abundant scientific evidence that infectious diseases often cause high mortalities in hatchery stocks, and that survivors are often carriers. Stocking such fish might be condoned only if they are placed into no-risk waters. However, this practice must also provide a fishery. It is uneconomical, unethical, and impractical to stock diseased fish which have little chance of survival.

The last point presents a problem and challenge for all of us. We need good research on what happens to stocked infected fish and what affect the diseases have on the indigenous fishes. Such data are needed to enable us to make scientific, practical recommendations to administrators who must make the final decisions.

I do not agree with the philosophy "yes, we have a serious disease problem but let's live with it". A hatchery manager should not have to take twice as many eggs or fish as needed in order to compensate for losses expected from disease.

Finally, I offer a quotation from a 1968 paper by Ken Wolf, et al. "Inefficient business does not survive in today's competitive world. The propagation of diseased fish is a form of inefficient production which will not endure in the commercial field and it should not be tolerated in conservation agencies."

Mr. Douglas L. Mitchum
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University of Wyoming
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Laramie, Wyoming 82071

A POINT OF VIEW FROM THE FEDERAL GOVERNMENT

I believe that it is safe to conclude that most people in the fishery profession see the need for fish disease control. While this conclusion is certainly not earth-shattering, it has more meaning that one

utilize carriers

might think. It is important because disease control, any disease control, is based on certain principles which have been complied with if, in fact, control is to be achieved.

As I see it, our big hangup is not that we don't believe in the need for control programs but rather that we have not been able to agree on what degree of control is needed. In other words, we have little direction and no real overall goal. This has resulted because we haven't been able to reach a consensus on how far we collectively are willing to go to control certain so-called serious fish diseases. Unfortunately, unilateral control programs are self defeating. The best disease control program can be ineffective if it does not harmonize with surrounding programs.

I am a strong believer in the need to destroy fish populations that are infected with diseases that pose a threat to the Nation's fisheries. I have my opinions as to what diseases pose such a threat and realize that there are many people who would disagree with my list. It is no wonder that there is great controversy associated with killing fish in the name of disease control when we can't agree on what diseases need controlling. The controversy doesn't stem from killing the fish but from how we go about it. What could be more confusing than one group killing fish with a specific disease while an equally competent group doesn't even consider the infection a problem?

In my opinion, there is a rational way of reducing the trauma of conducting disease control programs, especially when depopulation and disinfection are involved. First there has to be a policy, be it for one hatchery, a state, a region, or the entire Nation. This policy must contain the goal of the program based on a compromise of all the ethical, economical, practical, scientific, and legal opinions of the people that have to make the thing work. Naturally, a policy of this type would be most effective if established on a national basis, but there is serious doubt that this can be accomplished in the foreseeable future. Regional policies, such as the one established by the Colorado River Wildlife Council, probably are the most realistic for accomplishing coordinated disease control programs. In such a policy the different participants establish the diseases that cannot be stocked in the drainage. This, of course, is reflected to the hatcheries. This provides a logical system for determining the need for hatchery disinfections or closures. It provides for a oneness of purpose for managers, biologists and administrators.

With the present state of knowledge these policies cannot be perfect. It is very difficult to determine and agree on what diseases should not be stocked. We need to direct much more of our research effort to determine what happens when we introduce diseases into natural waters. We need to determine what diseases are hatchery problems and which are environmental problems. As this information is available, control plans can be modified to be more or less restrictive. In concert with these policies, the Federal Government should continue to protect the Nation's fisheries through regulations which prevent importation of serious exotic diseases.

Mr. David W. McDaniel
7313 Castle Road
Manassas, Virginia 22110

It is most evident that decisions concerning the design and application of practical programs of fish disease control and eradication must be made with the common consensus of all parties involved. These decisions must also be based upon scientific, economic, legal, ethical, and practical considerations. It is the expressed sincere hope of each of the authors and this Editor that this Editorial Comment will serve to stimulate a candid interest and dialogue on the subject between all parties involved, possibly setting the stage for a workshop session on the subject during the proposed National Meeting of the Fish Health Section this summer. Such a course would eventually result in a better communication and understanding of the problems involved and the identification of those areas requiring further study and elucidation for a more effective solution to the problem. -EDITOR-



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The membership is reminded that the outcome of this election should be immediately followed by the nomination and special election of a five (5) member Board of Certification as provided for in the approved amendment. It will then be the job of these elected Board members to design and implement a Program of Professional Certification based upon the recommendations of the Professional Standards Committee and the membership. Nominations for the Board of Certification should be sent directly to the newly elected Chairman of the Nominating Committee:

Mr. Harold Wolf, Director
 Fish Disease Laboratory
 2111 Nimbus Road
 Rancho Cordova, Calif. 95670

PROFESSIONAL NEWS & VIEWS

NEW VACCINE DELIVERY SYSTEM DEVELOPED

In a paper presented to the recent Fish Health Section Module of the National Meeting of the American Fisheries Society, we indicated that vacuum infiltration and membrane accelerants were used to effectively immunize fish. Tests since that time have shown that the vacuum step was not helpful and that

In a paper presented to the recent Fish Health Section Module of the

the effect of the membrane accelerants was primarily due to an osmotic force. Consequently, our immunization procedure is now quite different from that previously described.

The new procedure is best described as the Immersion Method. This procedure can be used to immunize large populations of fish in a safe, expeditious, effective, and economical manner. It was found that fish would take up large quantities of a vaccine by first placing them in a hyperosmotic solution for about two minutes, then placing the fish in the vaccine for about one and a half minutes. Variables found to be important are: 1) antigenic mass; 2) type and concentration of the hyperosmotic solution; 3) pH; 4) duration of exposure; and 5) temperature. For example, a minimum antigenic mass is needed using a 1650 mOsm alkaline (pH 8.0) urea or NaCl solution for a minimum of two minutes. Although there is an increased infusion of vaccine at higher temperatures, the effect of temperature is not as important as the above variables. The above results are not effected by fish size from one to eight grams. Excessively stressed fish (i.e. held in a net for several minutes) showed markedly reduced uptake of vaccine.

The vaccine solution does not enter the fish via the oral route. Some vaccine enters via the gills, but the major portal of entry is the lateral line. The lymphatic system is associated with the lateral line and may explain the effectiveness of the vaccination method. We have successfully immunized salmonids to Enteric Redmouth (ERM), *Vibrio anguillarum*, and infectious hematopoietic necrosis virus using this procedure both in the laboratory and in field tests under natural conditions. Although the method was developed primarily for the delivery of vaccines to fish, it perhaps could be used for the administration of chemotherapeutics, markers, essential nutrients, or other substances difficult to administer to large numbers of fish, especially when the oral route cannot be used. For comment or further information, contact Dr. Donald F. Amend, Western Fish Disease Laboratory, Bldg. #204, Naval Support Activity, Seattle, Washington 98115

IPN VIRUS CARRYING WILD TROUT CHARACTERIZED

A sampling program conducted by both the Nevada Department of Fish and Game and the U. S. Fish and Wildlife Service, has recently begun to characterize asymptotically infected IPN virus carrying wild stocks of rainbow trout. As of September 10, 1975, 78 individual kidney/spleen homogenate samples collected from fish in Lake Mohave on the lower Colorado River have yielded 21 positive samples. These results indicate a natural 26.9% carrier incidence in this stock of fish. The carrier rate was also shown to be the highest among females weighing 2.5 pounds or less. Scale samples demonstrate that the majority of the IPN virus positive carriers were 2.5 years old or less. For comment or further information contact Mr. Bruce D. Rosenlund, P.O. Box 365, Leadville, Colorado 80461

IPN VIRUS ISOLATED FROM WILD APACHE TROUT

The Fish Disease Control Center In Fort Morgan, Colorado has recently isolated IPN virus from ovarian fluid of a "wild" Apache trout (*Salmo apache*, an endangered species known as Apache or Arizona trout found in the White Mountains of Arizona). The specimen, a 2.25 pound female, was live captured from and returned to Christmas Tree Lake on the White Mountain Apache Indian Reservation. Testing for the virus was done in support of a developing propagation program of Apache trout to provide a low yield, quality fishery in lakes on the Reservation. For comment or further information, contact Mr. Ivan B. McElwain, Fish Disease Control Center, P.O. Box 917, Fort Morgan, Colorado 80701

ANTIBODY PRODUCTION IN CHANNEL CATFISH

Studies recently completed at the Southeastern Cooperative Fish Disease Project at Auburn University have measured the presence and levels of circulating and secretory antibody produced by channel catfish in response to antigen administration by different routes. Fingerling channel catfish were administered a polyvalent bacterin against *Aeromonas hydrophila* and *Flexibacter columnaris* by oral immersion, fed and injection routes. Following a suitable period for response to the antigen, blood, surface mucus and gut mucus samples were taken from identical fish. Serum was titered by standard microtiter techniques and surface and gut mucus samples titered by capillary precipitin tests against antigen sonicates. Circulating antibody titers were three to four times as high in injected fish as fed or immersed fish. However, secretory precipitating antibody in fish immersed in the bacterin was found to be greater than 20X that of fish fed or injected. These high levels of precipitating antibody in the gut seem to indicate that further studies with immersion type vaccines might result in protective immunization against infectious diseases of fish. For comment or further information, contact Mr. John H. Schachte, Southeastern Cooperative Fish Disease Project, Department of Fisheries and Applied Aquacultures, Auburn University, Auburn, Alabama 36830

FLUORESCENT ANTIBODY TECHNIQUE USED TO DIAGNOSE
ASYMPTOMATIC BACTERIAL KIDNEY DISEASE

Using the fluorescent antibody technique (FAT), personnel of the Fish Disease Control Center and the Eastern Fish Disease Laboratory were able to detect extremely low numbers of the kidney disease bacterium in a few rainbow and brown trout reared at a federal hatchery in Arizona. With one exception, a minimum of five KD cells were seen in each of the kidney smears collected from the five fish found to be positive. None of the fish were showing clinical signs of the disease. Obviously, the KD bacterium was present in minimal numbers and could have been easily missed, even with FAT, without the intensive examination given each sample. The fluorescent antibody technique continues to demonstrate its potential as a powerful diagnostic tool, particularly when applied to the detection of asymptotically infected carrier fish. For comment or further information, contact Mr. Paul W. Janeke, Fish Disease Control Center, Fort Morgan, Colorado 80701

MEETINGS & MISCELLANY

FISH DISEASE SYMPOSIUM INCLUDED IN THE THIRD
INTERNATIONAL WILDLIFE DISEASE CONFERENCE

A symposium entitled "Infectious Diseases of Fishes" was held August 27, 1975 as part of the Third International Wildlife Disease Conference at Munich, West Germany with Dr. G. L. Hoffman convening. The following papers were given: Introduction, G. L. Hoffman of the United States; Viruses, N. Fijan of Yugoslavia and W. Ahne of West Germany; Bacteria, E. Shotts of the United States; Protozoa, G. L. Hoffman; Monogenoideans, G. Malmberg of Sweden; Helminths, W. Rogers of the United States; Helminth transfer, O. Bauer of Russia and G. L. Hoffman; Parasitic Copepods, Z. Kabata of Canada. There were also some contributed papers on fish diseases. The proceedings will be published by Plenum Press, New York, U.S.A. For comment or further information, contact Dr. G. L. Hoffman, Fish Farming Experiment Station, P.O. Box 860, Stuttgart, Arkansas 72160

MID-WEST FISH AND WILDLIFE CONFERENCE
FEATURES FISH HEALTH MODULE

A separate module devoted to fish health topics was included in the program of the 37th Midwest Fish and Wildlife

Conference held at Toronto, Canada December 8-10, 1975. This session was the first of its kind to deal specifically with fish health problems in the history of the Conference. Awareness and concern about fish diseases and their control has apparently reached those who plan major meetings.

The module, moderated by FHS Vice-President Jim Warren, began with his introductory remarks on the current status of major diseases in the Great Lakes area and efforts to control them. Four presentations followed. Charlie Suppes, of the Missouri Department of Conservation, discussed the experiences his organization has had during the past several years in the development and operation of Missouri's fish health program. Harry Westers of the Michigan DNR described the details surrounding the recent outbreak of whirling disease in a talk colorfully illustrate with slides. Robin McKelvie, from the Halifax Laboratory of Canada's Fisheries and Marine Service, provided up to the minute information on the extensive fish disease problems facing fish culturists in Eastern Canada, especially the Maritime Provinces. Bob Strand, of the Minnesota DNR, concluded the program with a descriptive paper on the characteristics and impact of Ergasilid copepods on wild walleyes. For comment or further information, contact Mr. Jim Warren, Fish Hatchery Biologist Laboratory, P.O. Box 252, Genoa, Wisconsin 54632

SHORT COURSE TO BE OFFERED IN THE DIAGNOSIS
AND TREATMENT OF WARM WATER FISH DISEASES

Dr. Tom Wellborn, leader of the Wildlife and Fisheries Cooperative Extension Service at Mississippi

State University and Dr. Fred P. Meyer, director of the U.S. Fish and Wildlife Service Fish Control Laboratory in LaCrosse, Wisconsin have announced the offering of a short course in the "Diagnosis and Treatment of Warm Water Fish Diseases". The course will be taught at Mississippi State University for two weeks from May 17 thru May 28, 1976. The course carries four hours of graduate credit through the University. Interested applicants should write to Dr. Thomas L. Wellborn, Jr., P.O. Box 5405, Mississippi State University, Mississippi State, Mississippi 39762 for further information.

TEXT ON NORMAL CHANNEL CATFISH ANATOMY AND HISTOLOGY

A reference text dealing with the normal morph-

ology of channel catfish is in the final preparation by Mr. John Grizzle and Dr. W. A. Rogers of the Southeastern Cooperative Fish Disease Project at Auburn University. The research for this publication has been supported by 309 funds from Missouri and the Southeastern Cooperative Fish Disease Project. The book will integrate the existing information on channel catfish and related Ictalurids with the results of a 3-year study of channel catfish. A chapter will be devoted to each system, describing the gross anatomy and histology. The text will be illustrated by approximately 150 photographs by Mr. Grizzle and drawings by Mr. Peter Carrington. Ms. Belinda Torbert has assisted with specimen and slide preparation.

The book should be useful to a wide variety of students and scientists. In the past, the lack of information on fish histology has made assessment of lesions resulting from diseases, toxins, and nutritional deficiencies difficult. The study of fish histology by students and ichthyologists has been hampered by the lack of easily available information. It is hoped that this book will help with both of these problems. Publication of the text is expected within the next few months. For comment or further information, contact Dr. W. A. Rogers, Southeastern Cooperative Fish Disease Project, Department of Fisheries and Allied Aquacultures, Auburn University, Auburn, Alabama 36830

1976 Fish Health Section Fees Due

The coming year promises to be one of major significance for the Fish Health Section of the American Fisheries and the profession it represents. Major developments concerning professional certification, legislation, national workshops, and expanded service and representation are in the wind. Make sure that your voice is heard and that you have the opportunity to actively share in the direction and growth of the Section and the Profession. Renew your membership in the Fish Health Section today and actively recruit new members from your colleagues around you. **DON'T DELAY! DO IT TODAY!**

Membership in the Fish Health Section of the American Fisheries Society is available to and encouraged for all persons interested in aquatic animal health and furthering the stated objectives of the Section. Please fill out the attached blank for either new or renewal membership. Annual dues in the amount of \$2.00 are payable by check or money order made out to the Fish Health Section/AFS. Mail your payment together with the completed application form as soon as possible to:

*PD
2-11-76*

Mr. Ivan B. McElwain, Sec.-Tres.
Fish Health Section/AFS
P.O. Box 917
Fort Morgan, Colorado 80701

-----Detach and return with payment-----Detach and return with payment-----

() new member () renewal

Name: _____

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City: _____ State: _____ Zip: _____

By charter, Fish Health Section membership is open only to individuals who are members in good standing of the parent Society. AFS membership applications are available from the Secretary-Treasurer or Chairman of the Membership Committee.

Dr. Robert A. Busch, Editor
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