American Institute of Fishery Research Biologists

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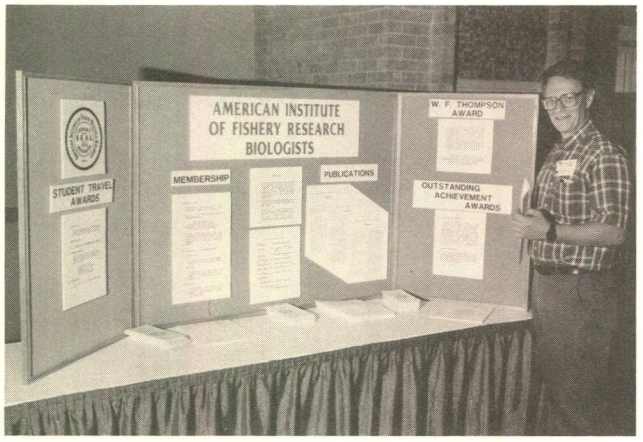

John Merriner prepared a new AIFRB exhibit for the AFS meeting in San Antonio in September 1991. Here, President Jack Helle admires the display, which is portable and can be shipped to any AIFRB member who wishes to show it at a fishery meeting.

Logo Contest

The Board of Control of AIFRB has approved a competition for a logo that has an eye-catching, dynamic design and symbolizes the AIFRB, professional accomplishment, and research. Individuals in all membership categories of AIFRB are eligible to submit multiple entries. So, for the fee of $0.29 for first-class postage you can be a winner in the AIFRB logo design contest. The winning design will be used on official AIFRB documents, letterhead, and possibly on other items such as coffee mugs, t-shirts, etc.

The winning entry will receive a cash award of $200 and a free sample of any products issued with the logo affixed. After the holiday season, conjure up the winning logo image. Concept designs or rough art work are acceptable for this submission.

A committee of the Board of Control will review all entries and select up to 5 finalist designs. The full Board of Control will review the finalist designs, select the winner, and arrange for final art work on the design.

Mail your entry to John V. Merriner, NOAA-NMFS Laboratory, 101 Pivers Island Road, Beaufort, North Carolina 28516.

Entries will be accepted through March 15, 1992. We want to see those cards and letters rolling in.

A Window on Preference

Joseph W. Rachlin, *AIFRB Treasurer*

One of the more fascinating aspects of fish ecology is the attempt to understand how communities of fish manage to distribute the available food resources of their habitat in such a way as to avoid the predicted consequences of the competitionist paradigm. This model of the world essentially predicts that species competing for limited resources, in a given place and at a given time, will interact in a competitive fashion such that the weaker competitors will be forced out of the contested niche, driven from the habitat, or, if they can not alter their niche or leave, will be driven to extinction. Basic to this model is, first, that the resources are in fact limited, and second, that competition is a real and observable interaction among the members of the community under study. Yet one is always impressed with the variety of fish found in our rivers and streams, and even more so in the waters of our coastal zone, all seemingly feeding on a sparse variety of food items. This diversity of fish appears paradoxical in terms of the competitionist paradigm.

To address this apparent ecological paradox, my students, colleagues, and I have over the past decade subjected ourselves to sampling rivers and streams while fighting off the onslaughts of blackfly and mosquito attacks in summer, to tramping through thin ice in winter, in order to validate a model designed to aid in resource partitioning studies. Once validated, we enlarged the scope of our work to include the coastal oceanic province of the western arm of the New York Bight. This had us out on a 90-foot research vessel in weather so cold, in winter, that rime ice incrusted the entire ship, and the collecting nets brought samples on board which froze on contact with the air; to collecting, late summer, on storm-tossed seas with 8- to 10-foot waves crashing over the deck with such force as to threaten to wash overboard all, including personnel, that was not lashed securely to the anchored safety lines. All this in order to be able to sample the fish community and its dietary resource base during supposed seasons of both food abundance and sparsity.

The basic concept behind our studies involved evaluating the niche breadths of the fish in a given community. This deals with the notion of feeding repertoire, and concerns itself with the variety, rather than quantity, of food items taken. The concept of niche breadth is the simplest to determine,

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A Window on Preference cont.

since it requires only a stomach content evaluation of a fish species, summed over the entire feeding season, and in no way attempts to evaluate this in relation to diet availability. However, to look at species interactions, a second concept must be addressed; that is the notion of dietary preference. This second concept relates the dietary intake of a fish to the proportional representation of all available food items within the fish's habitat. It is this second notion that is fraught with difficulty and bias. How is one to evaluate the availability of food items in the fish's environment? The idea of food availability is in fact two separate notions. The first is, which of all the possible living organisms in the environment constitutes actual items of dietary interest to the fish species in question, and second, how best to estimate the proportional representation of those determined food items of interest? Niche breadth adequately addresses the first problem, but the second is more difficult to extract. Tradition, simply stated that all one needed to do was adequately sample, using appropriate gear, the environment, and from these samples one could determine environmental availability from the proportional representation of each collected item, sampled by the gear. The problem is that each type of sampling gear has its own bias regarding what it collects. For example, plankton nets often miss key members of the planktonic community because they swim faster than the net, or are swept aside by the wave front produced as the net is drawn through the water column. Bottom grabs are relatively efficient in sampling benthic infauna, such as clams, worms, and snails, which are relatively slow moving or are buried in the bottom sediments and can not avoid the gear. But epibenthic fauna, such as shrimp, mysids, amphipods, and crabs—all-important dietary items for fish—sense the pressure waves which are generated as the grab is lowered to the bottom, and simply move out of "harm's way." The result of this gear bias is that proportional representation and availability are woefully underestimated, and further, skewed in the direction of only those items sampled by the gear, eliminating from inclusion those often more important items which escape or avoid capture.

The basic thrust of our research has been to develop an alternative approach to this problem of gear-generated bias in resource estimation. Our simple idea was based on the proposition that if you wish to know what a fish prefers to eat, simply ask the fish. Unfortunately there was no "Dr. Doolittle" among us. To get around this problem we relied on the fact that each fish species in a community feeds in a manner dictated by its genetic load as expressed through interaction with the environment within which it finds itself. Further, each species feeds differently from any other species. These feeding patterns may be slightly or manifestly different, depending on the fish's genetics, as exhibited through its morphology, physiology, and behavior, and its interactions with other fish in the community and the environment at large. Thus if we treat each species as an independent sampler of the environment, and pool the stomach contents of all sampled members of the community, we will have a fair representation of the food which was available to, and which was actually being taken by that community. Then, the only bias introduced is that of the fish, which is precisely the bias we are interested in. One criticism of this procedure is that the methods used to collect members of the fish community introduce an unavoidable and special bias of its own. While this is true and can not be eliminated, it can be minimized by limiting the fish community, under study, to those fish which are fairly sampled by the gear of choice, i.e., electrofishing equipment in fresh waters, or seine nets and trawls in the marine environment. With this methodological approach the pooled stomach contents of all sampled fish becomes the estimate of environmental availability against which the stomach contents of individual species of the sampled community can be evaluated for preference using appropriate mathematical models.

Using this approach we have successfully investigated dietary preference in freshwater environments of the Waccabuc River in Westchester County of New York, the Hudson River, and in the marine environments of the Lower Hudson Estuary, and the New York Bight from Breezy Point, New York, south to Absecon Inlet, New Jersey. In all cases we have never found an instance of competitive interaction. What we found instead was that fish, while often having shared preferences for common food items, still exhibit enough variety in their individual preferences to permit them to shift among several dietary choices. What this means is that the members of a community accommodate each other, rather than compete, and it is this accommodation which permits the great community diversity observed in these environments. This accommodation even extends to resident species in the coastal zone when their feeding grounds are invaded by successive waves of migrating species. For example, the windowpane flatfish seems unperturbed in its feeding on mysids and sand shrimps even though its habitat is sequentially invaded by continuous waves of migrating winter, summer, four spot, and smallmouth flounders which also enjoy foraging on these same dietary delights. That these species have been feeding in essentially the same manner for at least the last forty years can be deduced from the literature on the diets of individual fish species, indicating little change in the nature of the resource base over this period of time and arguing for its not being limiting.

This apparent long-term stability in the resource base allows for the possibility of determining if a particular region has recently been impacted or changed, perhaps by human intervention. What is needed is an appropriate window into the past. We have shown, using the ichthyological holdings of the American Museum of Natural History, that fish routinely maintained in its collections have their stomach contents well enough preserved to determine, often to the species level, the nature of their diets at the time of their original capture. This information can be obtained without damaging the specimens so that they are still available for other scientific study. Using this technique we were able to determine that the feeding repertoires of three species of hake (white, red, and spotted) in the region of Brigantine Shoals, off

Little Egg Harbor, New Jersey, have not significantly altered their feeding patterns from 1973 to the present, and that the feeding patterns of these species in this particular area are representative of their dietary patterns throughout the New York Bight.

Our future plans, funding permitting, will allow us to test these methods of evaluating dietary preference in tropical fish communities in the high montane forest river systems of the Eastern Highlands Province of Papua New Guinea, and at the same time increase the Museum's collection of New Guinea's ichthyofauna for future studies.

(Reprinted from *Friends of Fishes*)

On AIFRB and Professionalism in Fisheries Science

William F. Royce

(This article was included as part of the Oct.-Dec. 1991 report of the Northwest Washington District. It appears here as a separate item because of its size and importance.)

This is a preliminary response to my assignment during the San Antonio meeting of Chapter presidents: to review the early history of AIFRB and the rationale for its formation.

I propose to go a step beyond professionalism in the development of scientific information to professionalism in aquatic environmental management in which scientific information is never as certain as one would like.

It will not be an unbiased report because I will draw extensively on my own experience and relationships with AIFRB, Atlantic Fisheries Biologists, Pacific Fisheries Biologists, and the American Fisheries Society, as well as the many people who have shaped my impressions.

My source material is from the files on AIFRB that have been stored at the Montlake Library of NMFS, and my own files on it and the other organizations. A major source is the AFS publication *A Century of Fisheries in North America*, published in 1970.

First, a brief review of our organizations with some comments on pertinent aspects.

AMERICAN FISHERIES SOCIETY

AFS evolved from a meeting of practical fish culturists on December 20, 1870 in New York City who named their organization The American Fish Culturist's Association. It quickly became politically involved with the formation and functions of the U.S. Commission on Fish and Fisheries authorized by Congress in 1871. Spencer F. Baird, Assistant Secretary of the Smithsonian Institution, was appointed Commissioner and directed to investigate the conservation of food species on the coasts and lakes of the nation. He began his work in that year in Woods Hole. The Association asked Congress in 1872 to introduce or multiply valuable fish throughut the country. Congress appropriated $15,000.

The AFCA was concerned especially with depletion of the fish stocks and fish culture as a means of alleviating it. Numerous Atlantic salmon runs had already been decimated. The name American Fisheries Society was adopted in 1884, and its objectives, included promotion of fish culture, encouraging the interests in fish culture and the fisheries, and treatment of all scientific and economic questions regarding fish.

From its beginning AFS strongly identified with science and with good public relations with state fish commissions and fish culturists. A central theme was to keep ahead of environmental changes on all waters that were detrimental to fish and fishing.

By the year 1900, the Society had 204 members. By 1911, it had 638 and had been organized into five subject-matter divisions; Fish Culture, Aquatic Biology and Physics, Commercial Fishing, Angling, and Protection and Legislation. By 1920, at the age of 50, interest had waned, and membership was 598. It had, however, produced an impressive body of literature, become internationally known, and stimulated university instruction in the fisheries profession. A committee headed by Professor G. C. Embody at Cornell had suggested a university curriculum to prepare fish culturists.

Total membership was about the same for the next 20 years. The list of active members in 1940 totalled only 630 but in addition the Society had awarded Honorary Membership to the Presidents of the United States and Mexico, the Governor General of Canada, and State and Provincial governors, among others. It also had 43 patrons—companies with a financial interest in the fisheries. Its *Transactions* were devoted almost entirely to salmonid culture and fisheries.

The decade of the 1940s appears to have been a period of relative stagnation for the Society. Membership in 1950 included 939 active members in good standing, 43 life members, 19 sustaining members, 55 library members, 35 official members, 42 patrons, and 14 honorary members. Annual publication of the *Transactions* was up-to-date for the first time in many years. The report of the Secretary-Treasurer for that year pointed out that Presidents had warned that the future of the Society depended on its appeal to every branch of fisheries.

The next decade was little better. Total membership had increased to 2,073 in August 1960 but 680 had failed to pay their dues. Nevertheless, reform was under way. Publication of the quarterly *Transactions* began. A Committee on Professional Standards was established. It reported in 1961 with a recommendation that its work be closely coordinated with that of the American Institute of Fishery Research Biologists, but that a majority of AFS members did not wish to have professional standards required for membership in AFS. But it recommended further that AFS should set up general criteria for professional standards that could be used to guide training institutions and to assist hiring agencies. 607 Professional Certificates had been mailed to invividuals before the meeting in 1962.

AFS has developed exemplary publication series. Its *Transactions* are now in Volume 120. They were augmented by the bulletin *Fisheries* in early 1976, and by the *North American Journal of Fisheries Management* in 1981.

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AIFRB and Professionalism cont.

AFS has also evolved into Eastern, Southern, and Western Divisions, which hold annual meetings, and about 25 chapters many of which hold several meetings annually. In addition, it collaborates with many other organizations in holding fisheries-related meetings. Membership is now about 8,500, including about 400 from outside North America, making it a truly international organization.

North American Fisheries Policy: The American Fisheries Society promotes the scientific management of aquatic resources for the optimum use and enjoyment by the people of this continent. Included here are sport and commercial fisheries in both fresh and marine waters for aquatic plants and animals. Included also is the promotion of the best possible quality of the aquatic environment consistent with its use for fish production. Scientific management of these resources is best achieved by promoting the theory and application of all appropriate branches of science including the social as well as the natural sciences and the applied as well as the basic. (Adopted by AFS in 1938; and revised in 1954, 1964, 1970, and 1973.)

PACIFIC FISHERY BIOLOGISTS

Interest in more strongly professional fishery organizations developed at the meeting of the Ichthyologists and Herpetologists Section of AAAS on the University of Washington campus in June 1936. Harry Dunlop was temporary Chairman and George Kelez kept the minutes. The others present included T. Barnaby, F.H. Bell, V. Brock, W.M. Chapman, L.R. Donaldson, E. Forester, J. Hart, J.L. Kask, A.L. Pritchard, G. Rounsefell, R. Smith, A. Suomela, W.F. Thompson, and R. Van Cleve. Although W.F. Thompson apparently was present at the organizational meeting, he never served as President, Secretary-Treasurer, or on the Executive Committee.

The first regular meeting was held on March 20, 1937 in Vancouver BC with Dr. R.E. Forester as the elected President. Membership was only a few dozen until after 1945 when it grew to several hundred. Attendance at annual meetings was from about 200 to more than 300 at meetings between early 1950s and 1967. The organization has continued with annual meetings, and has a current membership of about 500.

ATLANTIC FISHERIES BIOLOGISTS

United States and Canadian fishery scientists more or less copied the concept of the Pacific Fishery Biologists and organized an Atlantic counterpart in April 1940. The organizers included several with West Coast experience and its stated purpose was "to promote the interchange of ideas on fisheries research through informal discussion." Annual meetings were held at least until the mid 1950s when about 100 members were listed. The membership was concerned almost entirely with marine fisheries.

UNIVERSITY OF WASHINGTON COLLEGE OF FISHERIES

The University of Washington College of Fisheries was established in 1919 with John Cobb as Director. He brought Dr. Embody from Cornell to teach aquatic biology and fish culture for a few years. Professors Carl Fellows and Trevor Kincaid completed the staff.

After Dean Cobb's death in 1929, Dr. W.F. Thompson headed the College. He shifted the curriculum toward biology and conservation, and dropped instruction in fishing and canning techniques. He organized the Fisheries Research Institute in 1947 after he was succeeded by Dr. W.M. Chapman. Dr. Chapman left for the U.S. State Department in 1948 and was succeeded by Dr. Richard Van Cleve. Fishery technology was brought back to the curriculum in 1948. The Fisheries Research Institute continued under Dr. Thompson's direction until he retired in 1958. He was succeeded by Dr. William F. Royce and by Dr. R.L. Burgner in 1967. (Major changes in the College (School) of Fisheries have been made since 1989 but are not germane to this review.)

AMERICAN INSTITUTE OF FISHERY RESEARCH BIOLOGISTS

During the 1950's and after he retired, Dr. Thompson devoted much attention to organizing the AIFRB. His report to the membership in 1958 is exemplary. His arguments are as pertinent today as they were then.

But our challenges today are immensely greater because the condition of the fish in our waters is an index of the quality of our environment, and our challenges go far beyond the best available scientific information. For example:

"Nonetheless, exclusive reliance on scientific procedure creates several important problems for ethical discourse about environmental problems of which environmental professionals are not aware. Such exclusive reliance on scientific procedures and methods also may lead to a devaluation of environmental resources. As we face the 1990s, it is critically important that environmental professionals strive to integrate environmental ethical discourse in their more commonly used technical and legal discourses, because most environmental problems should be understood as ethical problems—and should be particularly sensitive to the environmental ethical questions created in matters where scientific uncertainty prevents prediction of environmental consequences." Brown, D.A. 1990. Integrating environmental ethics with science and law. *The Environmental Professional*, Vol. 12 (344-350) 1990.

Dr. Thompson was prescient in forming AIFRB but we face ever greater challenges. I suggest that we in AIFRB give much more attention to fisheries as human activities (and not be just an American Institute of Fish Research Biologists).

Pete Cole of our group at Ohio State University had elaborated an approach in a paper "New Dimensions to the Education of Fish and Wildlife Professionals" which has been submitted to the journal, *The Environmental Professional*. He argues that fish and wildlife professionals have strong ties with professionals in engineering and other natural resource areas. He and his graduate students suggest inclusion of the following dimensions at the graduate level:

Policy-ethical-legal
Communication-education
Human interactions, sociological and psychological

Research-statistical
Biological-ecological
Management
Professional

Is it not time to think of our organization as the *American Institute of Professional Fishery Scientists* if we are really going to be leaders in our profession? Dr. Thompson responded to challenges of 25 years ago which have been changing at an accelerated pace.

AIFRB Research Assistance Award Program

This announces the beginning of the 1992 AIFRB Research Assistance Award Program, which provides travel assistance for qualified graduate fishery students and other associate members of the Institute so that they may present a paper at a fishery-related meeting of their choice.

For Associate Members to apply for an award, they should submit a written request and a letter of support from their research mentor or supervisor, specifying the meeting. Also, they should send a copy of an abstract of the paper and notification of the paper's acceptance to Dr. Joseph W. Rachlin, Department of Biological Sciences, Lehman College of C.U.N.Y., Bedford Park Boulevard West, Bronx, NY 10468-1589.

The deadline for receipt of applications for this year is April 1, 1992.

Recipients of Research Assistance Awards will have their names and abstracts published in BRIEFS.

Gifts from Emeriti

AIFRB Treasurer Rachlin reminds us of the generosity of Emeritus members who have paid dues for the 1992 fiscal year. Although people in this category have no obligation to pay dues, several have done so. AIFRB is grateful for these gifts, which will enrich the treasury and help us pay for Institute expenses.

District News

Great Lakes, South Central

Missing: Great Lakes District of the AIFRB. Has not been seen or heard from for a long time. Anyone wanting to take a leadership role and set up a meeting, please contact the members. Some of us wonder why we are paying $20 per year when there are no meetings to attend.

Northwest Washington **William F. Royce,** *Director*

The first meeting for 1991-1992 was held on December 12, 1991 at Sand Point. The guest speakers were Bill Royce and John Roos.

Bill's presentation drew upon his extensive fisheries experience, which includes employment in USFWS, NMFS, former Directior of FRI, Associate Director of UW's College of Fisheries, Director of the Woods Hole Laboratory of USFWS, and Assistant Regional Director in charge of research in Alaska. Professionalism in fisheries was a topic of interest at a recent AFS meeting on Watershed Management in Newport, Rhode Island. Bill discussed the fact that fishery scientists are frequently confronted by questions that involve not only fish biology but ethics. It may be time to review and update the AIFRB policy statement on professionalism. Readers are encouraged to submit their comments and opinions.

John Roos presented a fascinating first-hand comparison of the International Pacific Salmon Fisheries Commission (IPSFC) and the North Pacific Fishery Management Council (NPFMC). John's discussion drew upon his experience as former Director of IPSFC and his current membership on the advisory panel of the NPFMC.

The IPSFC was established in 1937 to regulate harvests of sockeye and pink salmon returning to Fraser River. The commission consisted of three Canadian and three U.S. appointees, which were apolitical. The commission based its management decisions on data and advice presented by biologists and engineers. These decisions were made during brief, non-public meetings between senior staff and Commissioners. John noted a key success of the Commission, i.e. effective salmon management, was the close link between scientists and the management process.

The NPFMC was created by the Magnuson Fishery Conservation Act of 1976 to develop management regulations for North Pacific and Bering Sea fisheries. It has a much different structure than the IPSFC and other Commissions. The NPFMC consists of 15 council members of which many are directly involved in the harvest process. A large advisory panel consists of a variety of special interest groups. Meetings are long (e.g. 10 days rather than a few hours) and typically include extensive testimony from the public. The involvement of many individuals and interest groups can lead to long, heated discussions before formulating management decisions.

Southern California **M. James Allen,** *Director*

The Southern California District held its fourth meeting of the year on September 26, 1991 at El Adobe Restaurant in San Juan Capistrano. The meeting included a business session and a presentation by Dr. Dale Squires (Southwest Fisheries Science Center, National Marine Fisheries Service, La Jolla, CA), who spoke on "Individual Transferable Quotas (ITQ) in Fisheries Management: Panacea or Pandora's Box?" Dr. Squire's presentation reviewed the fundamental concepts of ITQs, including a discussion of their strengths and weaknesses. It also reviewed the application of ITQs throughout the world.

Jim Allen reported on matters discussed at the AIFRB Board of Control Meeting at San Antonio, TX on September 7 and 8, 1991, and on the Harvest Refugia Symposium

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District News cont.

held at the American Fisheries Society meeting on September 12. Pete Haaker was designated to head a committee to set up a one-day symposium on harvest refugia issues applicable to California.

An executive meeting was held on September 10, 1991, to discuss the outcome of the national meeting and to plan the September 26, 1991 meeting. In addition, a Harvest Symposium Committee meeting was held on October 27, 1991, at Pete Haaker's house to discuss preparation for the Sympsoium. The meeting was attened by Dr. Gary Davis, Pete Haaker, and Jim Allen. A tentative date was set up for the Symposium—March 23, 1992. The Symposium will be titled "Harvest Refugia: An Alternative for Coastal Fisheries Management." Eleven speakers were identified and the format of the meeting was planned (talks plus a panel discussion). Registration fees were defined but the location of the symposium remains to be determined. In addition, we still need to contact the potential speakers.

The Southern California District will also sponsor a half-day symposium on the "Biology of California Fishes" at the Southern California Academy of Sciences meeting on May 1 or 2, 1992 at Occidental College.

Meetings and New Publications

Coral Reef Conference

The Coral Reef Coalition, an alliance of over 100 environmental groups as well as scientists, divers, fishermen, and government officials, will be holding its First Annual Conference on March 19-22, 1992 in Key West, Florida. First created to mobilize public support during the Florida Keys sanctuary designation process, the Coalition is now bringing together interested and knowledgeable people around the world to discuss management of the Keys' resources. Experts from New Zealand, Thailand, Belize, Curacao, Australia and the United States have been invited to attend and discuss resource management issues and alternatives for the keys' ecosystem. Some of the most pressing issues to be discussed include coral bleaching, water quality degradation and loss of species.

For more information, contact: Maureen Eldredge, Atlantic Habitat Specialist, Center for Marine Conservation, 1725 DeSales Street, N.W., Suite 500, Washington, D.C. 20036; (202) 429-5609.

World Fishes Important to North Americans

American Fisheries Society Special Publication 21, *World Fishes Important to North Americans (Exclusive of Species from the Continental Waters of the United States and Canada),* is a 1991 book authored by C.R. Robins (AIFRB Fellow 1975), R.M. Bailey (AIFRB Fellow 1972), C.E. Bond (AIFRB Fellow 1973), J.R. Brooker, E.A. Lachner, R.N. Lea (AIFRB Member 1974), and W.B. Scott (AIFRB Fellow 1961); these authors represent the AFS Committee on Names of Fishes. The volume has 243 pages and bears a price of $38 (cloth) and $30 (paper); AFS members pay $30 and $24, respectively.

This is a comprehensive reference for those within the United States and Canada who deal with non-North American fishes and the products that are manufactured from them. Each listing gives a species' scientific name, its recommended common name, and other names by which it is known; its native range; and the nature of its importance. Species are included because of their value as food, sport, bait, or aquarium fishes in North America; their use in industry, aquaculture, or research; their status as endangered or threatened; or their treatment in textbooks and popular media. Others are included because they are poisonous or venomous, carry parasites or diseases, or occur close to this continent. Administrators, aquarists, biologists, businessmen and women, editors, lawyers, legislators, and writers will value this book, which complements but does not overlap the 1991 edition of *Common and Scientific Names of Fishes from the United States and Canada*, AFS Special Publication 20.

This book can be ordered from the American Fisheries Society, 5410 Grosvenor Lane, Bethesda, MD 20814-2199.

Fisheries Bioengineering Symposium Proceedings

The Bioengineering Section of the American Fisheries Society has published *Fisheries Bioengineering Symposium*, the proceedings of a symposium of the same title. Issued as Symposium 10 of the American Fisheries Society, this volume was edited by John Colt and Ray J. White (AIFRB Fellow 1979). It has 566 pages and costs $80 (only $64 to AFS members).

The goals of fisheries bioengineering are mitigation of fishery losses and restoration of fish populations. Whether bioengineers reconstruct a stream habitat, build a fish ladder past a dam, or design a hatchery, they must meld physical principles with biological sophistication. Bioengineering is a young but rapidly maturing discipline, as the proceedings of the Fisheries Bioengineering Symposium attests. *Fisheries Bioengineering* contains 65 papers that provide general perspectives (4 papers) and detail the latest innovations in the design and function of habitats (20), fish passage facilities (13), and hatcheries (28). Bioengineering is becoming one of fishery management's most effective tools, and any professional seeking to improve fishery resources will want to study this volume.

The book can be ordered from the American Fisheries Society, 5410 Grosvenor Lane, Suite 110, Bethesda, MD 20814-2199.

Mysids in Fisheries

T.P. Nesler and E.F. Bergersen have edited *Mysids in Fisheries; Hard Lessons from Headlong Introductions,* which has been issued as American Fisheries Society Symposium 9. This volume of 199 pages in paper sells for $33 ($27 to AFS members).

Twenty papers from two 1988 symposia document the ecological importance of opossum shrimp in North

American, Scandinavian, and New Zealand lakes, and the culture and toxicology of marine mysids. Eye-opening case histories trace the widespread damage that introduced *Mysis relicta* have brought to the sport fisheries they were intended to enhance. Mysids may take 8-10 years before they fully reshape the food chain. Thus the consequences of introductions are not immediate, and past mistakes may be repeated if the complex life histories of opossum shrimp are not fully considered in relation to different ecosystems. Fishery managers contemplating the use of mysids to alter food web dynamics should read this book first.

Order the book from the American Fisheries Society, 5410 Grosvenor Lane, Suite 110, Bethesda, MD 20814-2199.

Pacific Coast Nudibranchs

Sea Challengers has published another beautifully illustrated book, *Pacific Coast Nudibranchs*. This is the second edition of David Behrens' pioneering volume; the author was assisted in this edition by Terry Gosliner as technical editor. The 1991 book, paperbound, has 112 pages and 217 color plates.

This is a guide to the Opisthobranchs from Alaska to Baja California. It is the only all-color monograph and field guide for this geographic region and this unique group of molluscs. The volume contains a pictorial glossary and pictorial key to the orders and suborders. Each of the 217 fully described species is shown in rich color, and each description includes identifying characters, description of radula, natural history notes, size, and geographical range.

Pacific Coast Nudibranchs can be ordered from Sea Challengers, 4 Somerset Rise, Monterey, CA 93940 for $29.95 + $3.00 shipping.

Fishes and Invertebrates in Southeast Estuaries

Distribution and Abundance of Fishes and Invertebrates in Southeast Estuaries by David M. Nelson, Mark E. Monaco, Elizabeth A. Iriandi, Lawrence R. Settle, and Linda Coston-Clements is a 1991 report from NOAA's Estuarine Living Marine Resources (ELMR) program. The 177-page volume presents information on the spatial/temporal distribution and relative abundance of 40 fish and invertebrate species in 20 estuaries along the Atlantic Coast of North Carolina, South Carolina, Georgia, and Florida. Its purpose is to disseminate data developed in the ELMR program. The presence, distribution, and relative abundance of each species' life stage, and the time period it uses each estuary are the primary data compiled.

The data and framework presented are illustrative of the nationwide ELMR program. Similar reports have been published for nine estuaries in Texas, thirteen estuaries along the Gulf coast of Florida and Alabama, nine estuaries in Louisiana and Mississippi, and 32 estuaries on the west coast of California, Oregon, and Washington.

Free copies are available from David M. Nelson, NOAA N/ORCA 1, 6001 Executive Blvd., Room 220, Rockville, MD 20852.

In Memoriam

Stewart Springer

AIFRB Fellow 1974

August 23, 1991

Stewart Springer, world-renowned shark researcher and natural historian, passed away on August 23 in Gainesville, Florida at the age of 85. Springer, a research associate with the Florida Museum of Natural History since 1980, was recognized as the patriarch of the field of shark research and was widely quoted and sought out by international workers.

Springer was largely self-taught. After graduating from high school in Indianapolis, Indiana in 1924, he attended Butler College for two years while simultaneously supporting himself as a union musician and serving as the first curator of the Children's Museum of Indianapolis. During this period Springer published his first scientific papers, including one describing a new species of lizard. Economics forced his withdrawal from school and, after working as a chemistry technician at Indianapolis' sewage treatment facility, he moved to Biloxi, Mississippi in 1929. Springer spent seven years working there as a commercial collector of biological specimens and as a commercial fisherman, but still had time to publish a series of scientific papers.

From 1936-1940 he served as manager of the Bass Biological Laboratory in Englewood, Florida and began to develop his interest in sharks. Closure of the laboratory then sent Springer to the Florida Keys, where he managed Florida Marine Products, a commercial shark fishing operation. Shortly thereafter he was called to Washington to work with the government's war-time efforts to formulate a shark repellent. Large numbers of aviators were being lost over ocean waters and morale was low among pilots. Springer explained recently that "it was okay to give one's life for your country, but to get eaten for it was another matter!" Although a truly effective repellent was never formulated, the developed product, "Shark Chaser", saved at least some lives and provided a psychological lift to many servicemen.

Following the war Springer returned to commercial shark fishing and served as manager of Shark Industries in Salerno, Florida. It was here that he fully developed his understanding of shark population dynamics. The shark fishing industry collapsed in 1950 due to the development of a cheaper, synthetic source of vitamin A. Springer was hired by the U.S. Fish and Wildlife Serivce to direct formation of a fishery laboratory in Pascagoula, MS and to develop the commercial fisheries of the Gulf of Mexico.

In 1955 Springer was promoted to director of the Exploratory Fishing Branch of the Fish and Wildlife Service, and moved to Washington, D.C. In 1964, at the age of 58, he completed his undergraduate education and graduated from George Washington University. Shortly thereafter he transferred to Stanford University where he spent three years working on shark fisheries and systematic research projects. Springer returned to Washington in 1968 and served as Deputy Assistant Director for the Fish and Wildlife

cont. on page 8

In Memoriam cont.

Service and in the Service's Systematics Laboratory at the Smithsonian Institution until his retirement in 1971.

After spending eight retirement years in Placida, Florida, where he served as an affiliated researcher at Mote Marine Laboratory, Springer moved to Gainesville in 1980. He remained an active shark researcher at the Florida Museum of Natural History almost until his death, and was awarded the American Elasmobranch Society's Distinguished Service Award in 1988 in honor of his lifetime of research on sharks. Earlier this year a volume honoring the work of Springer, *Discovering Sharks*, was published by the American Littoral Society.

Steward Springer is survived by his wife Vergie; his children Diana, Philip, Michael, John and Christopher; and sixteen grandchildren and ten great-grandchildren.

J.A. Aplin
AIFRB Member 1970
October 26, 1991

Stanley G. Jewett, Jr.
AIFRB Fellow 1961; Emeritus 1974
September 1, 1991

William L. Peck
AIFRB Member 1971
November 25, 1990

Membership Report

PROMOTION TO FELLOW		NEW MEMBERS	
Dr. K V. Koski	AK	George J. Guillen	TX
		Dr. Chang Ik Zhang	MD

Sammy M. Ray, *Membership Chairman*
Texas A & M University at Galveston
Building 3311, Fort Crockett
Galveston, TX 77551

Direct membership inquiries to the Membership Chairman

BRIEFS, the newsletter of the American Institute of Fishery Research Biologists, is published six times a year. It is intended to communicate the professional activities and accomplishments of the Institute, its Districts, and Members; the results of research; the effects of management; unusual biological events; matters affecting the profession; political problems; and other matters of importance to the fishery community. Comments and contributions should be sent to the Editor, Dr. Oliver B. Cope, 15 Adamswood Road, Asheville, NC 28803. Subscription $20 a year to Institutions and Non-Members.

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American Institute of Fishery Research Biologists

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VOL. 21, NO. 2 APRIL 1992

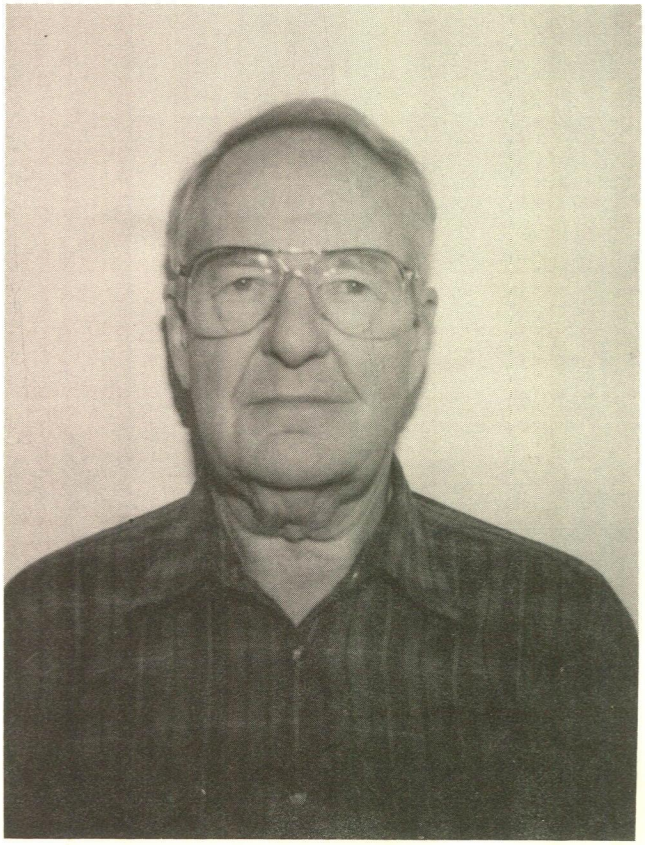
Bud Burgner Given Outstanding Achievement Award

Dr. Robert L. (Bud) Burgner (AIFRB Fellow 1968) was the recipient on February 12, 1992 of AIFRB's 1991 Outstanding Achievement Award for Individuals. For those who don't know Dr. Burgner, or "Bud," as his friends and colleagues like to call him, he has, during his lifelong career in fisheries, rendered exceptional service to our profession. Bud, a native Washingtonian, was born in Yakima in 1919, and graduated from Selah High School, Selah, Washington, in 1937. He attended Yakima Valley Junior College, and received B.S. (1942) and Ph.D. Degrees (1958) in Fisheries from the University of Washington. His Ph.D. dissertation work on abundance, growth, and survival in juvenile sockeye in the Wood River Lakes, Bristol Bay, Alaska, was an integral part of the exemplary Alaska Salmon research program at the Fisheries Research Institute (FRI), which was organized and developed in 1946 by W.F. Thompson at the request of the salmon industry.

After military service, Bud started his career as a biologist at FRI in 1946, and in 1948 was made Assistant to the Director of the Institute, and then Assistant Director in 1955.

Bud was appointed to the University of Washington fisheries faculty in 1955, and made significant contributions to fisheries research and education throughout his academic career. In 1968, he was appointed Professor and Director of FRI. As a Fisheries Professor, Bud demonstrated outstanding teaching and training of students. He was supervisory chairman for numerous graduate students completing M.S. and Ph.D. theses on field fisheries, environmental studies, and North Pacific fisheries research and management. During his distinguished career, Bud was principal investigator of many major research programs: for example, various ecological studies of sockeye salmon lakes in Alaska and Washington (1955-83), marine ecology studies at Amchitka (1967-74), the IBP Coniferous Biome Study and continuing NSF-supported Analysis of Ecosystems Study in the Lake Washington watershed (1969-74), Ross Reservoir Aquatic Environment Studies (1971-1978), and the internationally recognized High Seas Salmon Program (1967-present).

Over the years, Bud has given up much of his free time to serve on advisory bodies and committees. He was a member of the Scientific and Statistical Committee of the



North Pacific Fishery Management Council (1979-88), and he still serves as scientist member of the Committee on Biology and Research, International North Pacific Fisheries Commission (1967-present). When Bud retired in 1984, the University of Washington bestowed upon him the title of Professor Emeritus. Although tennis and other leisure-time activities may now occupy more of his time than previously, Bud remains very active professionally. In addition to consulting work, serving on various advisory committees, and direction of the High Seas Salmon Program at FRI, he has recently authored two significant publications:

Burgner, R.L. 1991. Life history of sockeye salmon (*Oncorhynchus nerka*). Pages 3-117 *in* C. Groot and L. Margolis (eds.) Pacific Salmon Life Histories. UBC Press, Vancouver.

Burgner, R.L., J.T. Light, L. Margolis, T. Okazaki, A. Tauts, and S. Ito. 1992. Distribution and origins of steelhead

cont. on page 2

Bud Burgner cont.

trout (*Oncorhynchus mykiss*) in offshore waters of the North Pacific Ocean. Int. N. Pac. Fish. Comm. Bull. 51. 92 p.

Bud's contributions to our profession represent a lifetime of outstanding achievements, and we hope that you will join us in congratulating him on his award.

AIFRB's Logo

The BRIEFS February announcement of the competition for a design for an AIFRB logo brought very encouraging response from the membership. As of the March 15 deadline, John Merriner had received 68 entries. The offerings came from all parts of the U.S., and some were received from Canada. The collection of entries shows great variety in terms of quality of art, originality, and formality, and John says he sees many that he thinks would be appropriate.

The next step is President Helle's appointment of a judging committee to select the five best designs for finalist status. The full Board of Control will review the finalist designs, choose the winner, and arrange for the final art work on the winning design.

The winner receives $200 and free samples of any product bearing the logo.

New District Officers

Barbara E. Warkentine (AIFRB Member 1989) of SUNY Maritime College, Bronx, NY has been elected as Director of the New York/New Jersey District.

Dick Heimann (AIFRB Member 1967) has been elected Vice Director and **Dan Howard** the Secretary/Treasurer of the Northern California District.

Our People

Ira R. Adelman (AIFRB Fellow), professor and head of the Department of Fisheries and Wildlife at the University of Minnesota, has been elected the first president of the newly formed National Association of University Fisheries and Wildlife Programs.

Thomas Busiahn (AIFRB Associate 1983) has become the project leader of the Fish and Wildlife Service Fisheries Assistance Office in Ashland, Wisconsin, after eight years as chief biologist of the Great Lakes Indian Fish and Wildlife Commission.

Carlos M. Fetterolf (AIFRB Fellow 1973) has retired from his position as Executive Director of the Great Lakes Fishery Commission after 40 years of work on the aquatic resources of North America. Friends and colleagues honored Carlos at a retirement celebration in Ann Arbor, Michigan on January 30, 1992.

Donald Gunderson (AIFRB Member 1979) is the recipient (with co-author C.I. Zhang) of the *North American Journal of Fisheries Management* Most Significant Paper Award.

John Halver (AIFRB Fellow 1971) received the *Makhila d'Honneur* from the International Union of Nutritional Scientists, for distinguished leadership and research in fish nutrition.

George R. Spangler (AIFRB Member 1972), professor of fisheries at the University of Minnesota, has been named interim director of Minnesota Sea Grant. George is well known for his expertise in Indian treaty rights and in management issues facing the Great Lakes fishery.

Frieda Taub (AIFRB Member 1968) was elected chair of the applied section of the Ecological Society of America.

District News

Northwest Washington **William F. Royce,** *Director*

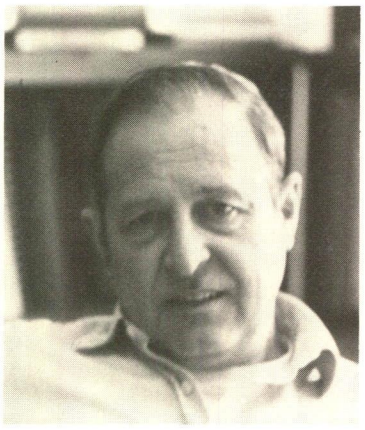
The January 1992 meeting of the District was held on January 30 at the Montlake NMFS Auditorium. The program was a panel presentation on *Fishery-Marine Mammal Interactions in the North Pacific: The Conflict and Potential Solutions*; the participants were Bert Larkins of the American Factory Trawlers Association; Dr. Rich Marasco of Resource Ecology and Fisheries Management, NMFS; and Dick Merrick of the National Mammal Laboratory.

Successful Scallop Introduction

Bay scallops provided by the Northeast Fisheries Science Center's (NEFSC's) Milford (Conn.) Laboratory to the People's Republic of China (PRC)—at the PRC's request—have resulted in a huge new fishery in that nation within the past 10 years. During 1981 and 1982, the NEFSC provided three shipments of scallops to the PRC's Institute of Oceanology, Academia Sinica, in Qingdao. All animals in the first two shipments (45 and 200, respectively) either died during shipping or failed to spawn. Twenty-six of the 128 animals in the third shipment survived and spawned. Subsequent hatchery production and field transplanting along much of the PRC's coast have resulted in an estimated 220-million-pound (live weight) yield in 1991.

The PRC sought to introduce the bay scallop into its waters for economic reasons—it grows faster and is better suited to hatchery production than the PRC's native scallop, *Chlamys farreri*. However, the successful introduction of a new species into an existing biological community causes ecological alteration, sometimes enough to damage existing economic, recreational, or aesthetic uses by humans. Accordingly, intentional species introductions are not routine, are usually controlled by protective treaties/laws/regulations, and are often backed up by careful scientific studies. In this instance, the PRC assumed responsibility for the effects of introducing bay scallops into its waters. For its part, the United States—through the NEFSC—sought to ship disease-free, parasite-free animals.

Candidates for AIFRB President-Elect

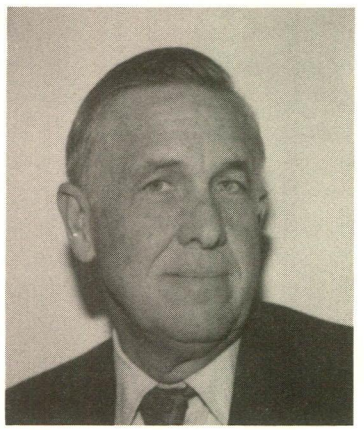


Vaughn C. Anthony

Dr. Vaughn C. Anthony (AIFRB Fellow 1980) is Chief of the Conservation and Utilization Division of the Northeast Fisheries Center, National Marine Fisheries Service, at Woods Hole, Massachusetts, being responsible for the research programs for stock assessments, fisheries economics, collection of fisheries statistics (both port sampling and at-sea observer programs), resources surveys for fish and shellfish, and biological studies on age, growth, maturity, etc. He is also responsible for research on product quality and safety for fish and shellfish and for special projects on large pelagics, marine mammals, and Atlantic salmon. He manages and administers a 14 million dollar budget and 200 employees.

Vaughn was born in West Franklin, Maine in 1937. He earned a B.S. degree in Wildlife Conservation at the University of Maine in 1959, a M.S. degree in Fisheries at the University of Michigan in 1960, and a Ph.D. degree in Fisheries at the University of Washington in 1972. From 1962 to 1976, Anthony held several Fisheries Assessment research positions with the National Marine Fisheries Service at Woods Hole and Boothbay Harbor. For the next two years he was Director of Marine Research for the Maine Department of Marine Resources, and in 1980 returned to the National Marine Fisheries Service at the Northeast Fisheries Center as Chief, Senior Assessment Scientist. From 1985 to the present, Vaughn has been Chief of his Division at the Northeast Fisheries Center.

Among his general activities, Vaughn Anthony has served as advisor, expert, Chief Scientist, Rapporteur, or Chairman to international fisheries organizations such as ICNAF, NAFO, ICES, and NASCO for many years; member of the Advisory Committee for Fisheries Management of ICES from 1980 to 1990 and was recently Chairman of Demersal Finfish Committee of ICES: member of honor societies Xi Sigma Pi (Forestry) since 1958, Phi Sigma (Biology), and Sigma Xi (Research) since 1960 and has been an AIFRB Fellow since 1980; past member of the American Fisheries Society Publication Policy Committee and Associate Editor of the *North American Journal of Fisheries Management*; and in 1984 received the Department of Commerce Silver Medal for improving assessments of North American fish stocks, aiding their conservation, and benefiting U.S. fisheries.



Edwin A. Joyce, Jr.

Edwin A. Joyce, Jr. (AIFRB Fellow 1981) is the Director of the Division of Marine Resources in the Florida Department of Natural Resources. In this capacity, Ed administers the activities of the Division, which embraces three Bureaus, more than 175 employees, and a $9 million annual budget. He gives expert testimony in court, before legislative committees, the Florida Marine Fisheries Commission, and the Governor and Cabinet on marine resource issues, research, and budget; represents Florida and the Department on a wide variety of commissions, councils, etc. concerned with marine resource responsibilities; and handles a variety of correspondence on marine-related issues for the Governor, Executive Director, and others.

Edwin Joyce was born in Hampton, Virginia in 1937. He received a B.A. degree in Botany-Zoology from Butler University in 1959 and a M.S. degree in Marine Biology from the University of Florida in 1961, and did graduate work at Duke University, the University of South Florida, and Florida State University. Ed worked as a Marine Biologist with the Florida Board of Conservation in 1961-62, established a new field laboratory and conducted research on shrimp in St. Augustine from 1962 to 1965, took charge of invertebrate studies in St. Petersburg from 1965 to 1967, became a Senior Fisheries Biologist in 1967, was promoted to Supervisor of the Marine Research Laboratory in 1968, became Chief of the Bureau of Marine Science and Technology in 1972, and was elevated to the post of Division Director in 1975.

Joyce has many professional society memberships and appointments to his credit. Among them are the National Shellfisheries Association, Sigma Xi, American Fisheries Society, Board of Directors and Executive Board of the Gulf and Caribbean Fisheries Institute, Board of Directors of the Coastal Plains Center for Marine Development Services, Scientific Advisory Committee of the Atlantic States Marine Fisheries Commission, Vice Chairman of the Technical Coordinating Committee of the Gulf States Marine Fisheries Commission, Scientific and Statistical Committee of the Gulf of Mexico Fishery Management Council, and several other committees.

Edwin Joyce is listed in several Who's Who lists and similar designations, and is active in civic organizations. He has authored or co-authored 32 publications.

ZM Marches On

In December, the Alliance for the Chesapeake Bay's *Bay Journal* reported that the zebra mussel was found at a power plant on the upper Susquehanna river in New York. The Susquehanna flows from New York through Pennsylvania and into Maryland where it empties into Chesapeake Bay. No mussels have yet been found in Pennsylvania, but they are expected to eventually spread downstream. Zebra mussels are native to the Caspian Sea; they spread across Europe via shipping canals and were introduced into the U.S. around 1985 or 1986. They were transported to the U.S. by ocean-going ships and then released into the lower Great Lakes with the release of ballast water.

The Chesapeake Bay Program's Living Resources Subcommittee has formed an Exotic Species Workgroup to focus on the zebra mussel and the potential problems of other exotics that may enter the Bay area. The Bay is no stranger to problems with exotics. In 1982, *Hydrilla*, a submerged aquatic plant native to Southeast Asia, invaded the Potomac River and now covers several thousand acres.

Chemicals in Aquaculture

Any use of a substance to alter the physiological status of an animal for purposes of disease control or prevention can be considered as use subject to control under the Food, Drug and Cosmetic Act. Any use of such substance subject to this definition is illegal unless specifically authorized on the label of the substance.

This statement was reenforced at a two-day meeting of the Quality Assurance Work Group established by the Joint Subcommittee on Aquaculture. The meeting was congenial, but very frank, and very disappointing for fish culturists and fish farmers who feel they were left with empty medicine chests. "A stone wall is a stone wall, even if it is foam padded," said John Nickum, President of the AFS Fish Culture Section, regarding the friendly attitude but firm stance of FDA representatives. FDA is aware and concerned over the plight of public and private aquaculture, but their overriding concern is the safety of human food supplies, environmental safety, and worker safety. FDA is willing to work with fish culturists, but will not compromise on the requirements that are mandated by both law and consumer concerns. A campaign for research funding on the use of drugs in aquaculture is underway. For more information contact John Nickum at (703) 358-1878.

Meetings and New Publications

Residential Course—Estuarine and Coastal Wetland Management

University Extension, University of California will conduct a residential course on June 9-13, 1992 entitled *Physical Processes in Estuarine and Coastal Wetland Management*. The sessions will be cosponsored by seven agencies and associations concerned with wetland conservation, and will be held on the Clark Kerr Campus in Berkeley.

This course provides an overview of key physical processes and their management implications. Topics to be covered include:

Physical evolution of estuaries and coastal wetlands
Estuarine hydrodynamics
Mixing processes in the coastal environment
Sediment transport processes
Analytic tools, such as modeling

Examples of comprehensive management policies will be discussed, and case studies will be used to illustrate many aspects of the course content.

For information on fees, schedules, housing, or other details, write Continuing Education in Engineering, University Extension, University of California, 2223 Fulton St., Berkeley, CA 94720.

Atlantic Salmon Symposium

The *Fourth International Atlantic Salmon Symposium* will take place on June 14-17, 1992 in St. Andrews, N.B., Canada. This year's meeting will feature international speakers covering Salmon in the Sea (what happens to smolt after they reach the sea, with sessions on ecology, exploitation, and political issues) and New Enhancement Strategies for the freshwater production of salmon juveniles, with papers on such topics as quota purchases, kelt reconditioning, and public involvement.

For information on this symposium, write Bonnie Mockbee, Symposium Coordinator, Box 489, St. Andrews, N.B., Canada E0G 2X0.

Larval Fish Conference

The 16th Annual Larval Fish Conference and Annual Meeting of the Early Life History Section of the American Fisheries Society will be held on June 16-20, 1992 at the University of Rhode Island, Kingston. Papers are now being accepted. The meeting theme, *Environmental Quality and the Early Life Stages of Fish*, will be explored in invited talks and contributed papers. Papers that address current research in fish early life history not relating to the theme will be presented in concurrent sessions. There will also be a poster session, and students are encouraged to contribute either papers or posters.

Contact Grace Klein MacPhee, the University of Rhode Island Graduate School of Oceanography, Narragansett Bay Campus, Narragansett, RI 02882-1197.

Tidal Marsh Plants

Lionel H. Eleuterius is the author of *Tidal Marsh Plants*, a 168-page book with 98 color photos and many technical line drawings.

Written specifically for use in the field, *Tidal Marsh Plants*, is an indispensable guide to the vascular plants found in the salt marshes along the Atlantic and Gulf coasts of the United States. This comprehensive and easy-to-use guidebook is the definitive guide for researchers who wish to make quick and accurate identifications of plant species while in the field.

Tidal Marsh Plants is the product of years of extensive and detailed study of the coastal wetlands. Included are sections on plant taxonomy, phenology, identification of monocotyledons and dicotyledons, comparisons of grasses (Poaceae), sedges (Cyperaceae), and rushes (Juncaceae), and detailed descriptions and illustrations of over 200 plants. To assist the user in plant recognition, both the Latin and common names of all plants are included, along with a convenient glossary of botanical terms. The beautiful plants of the tidal marsh zones come to life in full-color photographs of 98 selected species.

Tidal Marsh Plants will be of interest to scientists and teachers, as well as students, hunters, fishermen, trappers, and ecologists. For those whose jobs or hobbies take them into the estuaries, bays, bayous, or sounds of the Atlantic or Gulf coasts, this guidebook will allow for clear and easy identification of area plants.

This volume, selling for $24.95 plus $1.50 postage, can be ordered from Pelican Publishing Company, Box 189, Dept. TID3, Gretna, LA 70054.

Delaware's Fishes

Maynard S. Raasch and Vaughn L. Altemus, Sr. have authored *Delaware's Freshwater and Brackish Water Fishes*, a 166-page book with 100 full-color photographs. The volume covers all freshwater fishes known to occur in Delaware and those that travel from salt water to spawn. Also treated are selected marine fishes with special family relationships or which enter fresh water as juveniles. The book also contains a taxonomic list and bibliographic references.

The price is $10 for Delaware Society of Natural History members and $12 for non-members. Order from Claude E. Phillips Herbarium, Delaware State College, Dover, Delaware 19901.

Hudson River Fisheries Research

C. Lavett Smith has edited *Fisheries Research in the Hudson River*, a publication of the State University of New York Press.

This book addresses specific water quality and pollution problems and documents the changes that occurred during the critical transition period when PCB dumping was discontinued and water treatment plants came into increased use. It will appeal to fishery biologists working with Atlantic coast species, people involved with estuaries worldwide, and to all environmentalists interested in the history of the landmark Hudson River Settlement Agreement.

Fisheries Research in the Hudson River includes a summary of existing fisheries data bases, with comments on their strengths and weaknesses and a guide to their availability, as well as discussions of the natural history of striped bass, white perch, river herrings, tomcod, sturgeon, and a very important food source, the amphipod *Gammarus tigrinus*. It also proposes a management plan for sturgeon, a plan based on an age-structured population model that demonstrates the practical application of basic scientific data.

This book can be ordered for $24.50 paperback (plus $3.00 postage) from the State University of New York Press, c/o CUP Services, P.O. Box 6525, Ithaca, NY 14851.

New Wiley Books

The following new books can be ordered from John Wiley & Sons, Box 6793, Dept. 063, Somerset, NJ 08875-9977.

Captive Seawater Fishes, by Stephen Spotte. This book describes water chemistry, technology, and the biological and physical processes of the aquarium ecosystem. Additionally, it presents fish physiology, nutrition, disease, and health maintenance. It is a practical book providing usable methods and specific protocols for keeping marine fish with the emphasis on professional approaches for public aquariums. Includes 400 illustrations with 42 in full color, 976 pp. (1991) $95.00

Biology of Freshwater Pollution, by C.F. Mason. This extensively revised edition of the popular text includes results of the latest research on the causes of pollution and methods for its control. Describes the sources of various types of pollutants, their effects on aquatic organisms, ecosystems, and man, using case histories where appropriate. It introduces techniques for assessing the effects of pollution, both in the field and in the laboratory.

The book also examines the role of the biologist in pollution assessment and control and in the wider sphere of management of aquatic resources. New to this edition are chapters on acidification, organochlorines, heavy metal radioactivity, and oil—reflecting an increased concern about these pollutants during the last decade. 348 pp. (1991) *paper* $44.95

Aquatic Microbiology, by G. Rheinheimer. Denoting the progress in our understanding of microorganisms in lakes, rivers and the sea, this new edition will continue to serve as a standard reference for researchers of aquatic environments.

It explores new approaches in the study of aquatic microorganisms such as the new work in the area of thermal vents in the deep sea; interactions between microbes and other organisms; and the many exciting contributions of molecular biology to the field. 363 pp. (1992) $79.50

Fishes and Invertebrates in West Coast Estuaries

NOAA's Estuarine Living Marine Resources program has published two more items in its series on distribution and abundance of estuarine biota. *Distribution and Abundance of Fishes and Invertebrates in West Coast Estuaries, Volume I: Date Summaries* and *Volume II: Species Life Histories* are the new papers. Volume I has 240 pages and Volume II has 330, packed with data on 47 fish and invertebrate species from 32 estuaries along the contiguous West Coast of the U.S.

Copies are available from Strategic Environmental Assessment Division, Office of Ocean Resources Conservation and Assessment, National Ocean Service, Rockville, MD 20852.

Salmon Symposium Proceedings

Proceedings of the 1990 Northeast Pacific Chinook and Coho Salmon Symposium are now available. This AFS Western Division biennial symposium was held in September 1990 and was hosted by the Humboldt and California-Nevada Chapters. Topics include threatened and endangered salmon, genetics and hatchery practices, chinook and coho management in large river systems, smolt quality and immigration cues, harvest management techniques, and management of fall chinook of the Klamath River system.

Copies of the Proceedings are available for $15 (U.S.) each, and only a limited number have been printed. Contact Dr. Thomas Hassler, U.S. Fish and Wildlife Service, California Cooperative Fisheries Research Unit, Humboldt State University, Arcata, CA 95521, 707/826-3268.

Lewis Publishers Books

Lewis Publishers, Inc. of 2000 Corporate Blvd., N.W., Boca Raton, Florida 33431 is offering some new books dealing with fisheries and fishery-related topics.

Practical Guide to Managing Acidic Surface Waters and Their Fisheries, by Robert W. Brocksen, Michael D. Marcus, and Harvey Olem, explains how to manage acidic surface waters to preserve or restore fisheries. The work gives readers the basic tools to carry out a variety of surface water management activities. Topics include biological productivity and recovery, costs of liming, fish stocking, lake liming techniques, nutrients, regulations and permits, sampling, stream liming techniques, water quality analysis, and watershed liming techniques.

The book will be a useful reference for fishing club managers, state and local government personnel, lake association managers, and others responsible for maintaining lakes and streams that may be affected by acidity from any source.

The contents include the establishment of needs and feasibilities in surface water liming, setting reasonable fishery and water quality management goals, obtaining legal permits and obtaining and applying limestone, extra help for the habitat and the fisheries, evaluating the success of liming, and physical, chemical, and biological responses to surface water liming. A chapter presents case studies for four lakes, ponds, watersheds, and streams.

This 206-page volume can be ordered from the publisher for $59.95 US or $72.00 outside US.

Ecological Risk Estimation, by Steven M. Bartell, Robert H. Gardner, and Robert V. O'Neill, describes the development and analysis of a methodology for forecasting probable effects of toxic chemicals on the production dynamics of a generalized aquatic ecosystem. It explains, in detail, how methods are derived for extrapolating the results of toxicity tests performed with laboratory populations, and it estimates the effects of toxins on corresponding populations in natural lakes and rivers.

The methodology represents an innovative approach for using the vast amount of routinely collected toxicology data to forecast toxic effects. Furthermore, this book considers the implications of uncertainities associated with these extrapolations and attempts to directly consider them when making the forecasts. The results of the forecasts are then evaluated in the context of experiments performed in laboratory microcosms and larger outdoor ponds, where the effects of phenolic compounds were examined. Finally, the results are discussed in relation to modifying the aquatic system simulation mode, refining model parameter estimates, and modifying toxicity assays for collecting more ecologically relevant data. This book is unique in that it provides a working methodology to use when forecasting risk in probabilistic terms based on current toxicity test results. As a result, it will be an essential reference source for environmental scientists, aquatic ecologists, toxicologists, ecosystem modelers, and policy makers.

Chapters cover background and motivation for ecological risk analysis, toxicological and ecological data for risk analysis, modeling sub-lethal toxic effects, forecasting risk in aquatic ecosystems, evaluation of the risk forecasting methodology, comparisons of predicted and measured effects, and conclusions and future directions.

This book has 425 pages and costs $69.96 US and $89.00 outside US.

Chemical Dynamics in Freshwater Ecosystems, edited by Frank A.P.C. Gobas and John A. McCorquodale, reviews the processes that control the

cont. on page 6

New Publications cont.

distribution and impacts of chemical substances discharged into freshwater aquatic environments. The book focuses on the relationships between chemical emissions and the resulting ambient concentration in water, sediments, fish, benthos, plants, and other components of real aquatic ecosystems. Hydrodynamics, sediment dynamics, chemical fate processes, bioaccumulation, and food-chain transfer are major topics discussed in the book. Case studies and models are used to illustrate how quantitative predictions of chemical dynamics and behavior in the aquatic environment can be made.

Chemical Dynamics in Freshwater Ecosystems is an excellent reference for aquatic toxicologists, wildlife toxicologists, wildlife biologists, environmental chemists, governmental regulators, environmental modelers, consultants, and students studying the effects of chemicals on aquatic environments.

This book deals with hydrodynamics of connecting channels, hydrodynamic modeling in the Great Lakes from 1950-1990 and prospects for the 1990's, sediment exchange process perameterization, exchange of chemicals between lakes and the atmosphere, modeling the accumulation of polycyclic aromatic hydrocarbons by the amphipod *Diporeia*, modeling the accumulation and toxicity of organic chemicals in aquatic food chains, modeling accumulation of organic chemicals in aquatic food webs, derivation of bioaccumulation parameters and application of food chain models for chlorinated dioxins and furans, and temporal trends and distribution of PCB congeners in a small contaminated lake in Ontario, Canada.

This 300-page volume, due in June 1992, sells for $69.96 US and $84.00 outside US.

Zebra Mussels: Biology, Impacts, and Control, by Thomas F. Nalepa and Donald W. Schloesser, discusses the recent introduction of the zebra mussel in North American waters that has caused great concern among industrial and recreational users of these waters. This bivalve mollusc is a biofouler that attaches to any firm substrate (e.g., rocks, piers, water intake pipes, boat hulls) and has already created significant problems for raw water users such as water treatment plants and power plants.

Zebra Mussels: Biology, Impacts, and Control provides needed information regarding the biology of the zebra mussel in North America and Europe, presents case studies of environmental and industrial impacts, and outlines control strategies. Summary articles detail its life history, origins, and morphology. The book also examines techniques used to culture and maintain this organism in the laboratory. Thirty-two color plates are included to illustrate some of the dramatic problems created by the explosive population growth of this species. *Zebra Mussels: Biology, Impacts, and Control* is an important book for ecologists, conservationists, environmental consultants, water quality engineers, regulatory officials, power utilities, and libraries.

This volume treats the growth and development of the zebra mussel, its distribution in the Old and New Worlds, colonization, relation to contaminants, predation on the mussel, morphology and physiology, effects of the mussel on water works and water quality, control by chemicals and acoustics, parasites, and other ecological factors.

This book is due in July 1992 and will have 450 pages. The price will be $69.95 US and $85.00 outside the US.

Thesis and Dissertation Abstracts

The Life and Times of the Santee-Cooper Population of Larval Striped Bass (*Morone saxatilis*)

David H. Secor, Ph.D. 1990

University of South Carolina

The Santee-Cooper population of striped bass has adjusted to major changes in its riverine habitat to produce a world-renowned fishery. Since 1975, there has been a decline in juvenile recruitment indices and there is concern whether the capacity for reproduction can sustain the fishery. Larval growth and survival patterns were investigated in tank, pond, hatchery, and natural environments to determine the effect of biotic factors on striped bass recruitment. The effect of maternal contribution (egg size) was studied in tank and pen-rearing (pond) experiments. Larvae were fed at three different ration levels, starved for 4 and 10 days, and then fed. Embryo and larval sizes converged with age due to a positive relationship between offspring size and yolk and oil utilization rates. Survival of larvae starved for 4 and 10 days was inversely related to initial egg size.

In hatchery production, offspring survival rates were highly variable and unrelated to maternal size. Maternal size did contribute significantly to production of larvae through increased fecundity. Relative rates of broodstock contribution (calculated as Effective Population Number) varied among years as a function of family variance and assumptions on the number of males contributing to fertilization. Otolith back-calculation methods were tested to quantify larval growth rates from field-collected juveniles. Age significantly influenced the relationship between larval length and otolith diameter. A quadratic regression method which included otolith diameter and age was more senstitive to negative growth and growth inflections than other methods tested in laboratory studies.

Validation of the method on pond-reared larvae indicated significant temperature effects on otolith scaling patterns. Under assumptions of temperature histories of field-collected juveniles, larval growth rates were back-calculated for the 1987 year-class. Relative juvenile survivorship was positively related to growth rate between two cohorts. Somatic growth rates ranged from 0.35 to 0.68 mm*d^{-1}. These rates were 1.5 to 20 times greater than those reported for the Hudson, Potomac, and Sacramento populations over the same ages. High growth rates could be due to favorable growth conditions inherent to the freshwater nursery. Alternatively, growth rates of southern populations of striped bass could be high throughout their life histories due to a temperature/latitude effect.

Comparative Ecology, Morphology, and Population Genetics of Black Triggerfish, *Melichthys niger*

Kathryn Diane Kavanagh, M.A. 1991

College of William and Mary in Virginia

Field measurements of distribution and aggressive behavior were taken from groups of black triggerfish *Melichthys niger* that exhibited strikingly different densities in two coral reef locations. Triggerfish were found in large swarms of >500 individuals around Johnston Atoll (central Pacific Ocean), while triggerfish around Ambergris Caye, Belize were found in lower abundance and were more dispersed. Intraspecific aggressive behavior was greater in the low-density group, suggesting density-dependent behavior. In the laboratory, analysis of morphology, genetics, diet, condition, and growth factors was performed on specimens collected from Belize, Johnston Atoll, Puerto Rico, Hawaii, and Curacao to look for correlates with the density difference.

Differing population densities and gregarious behavior of widely separated populations of *Melichthys niger* were apparently not determined by genetic influence. Genetic and morphological results both indicated no within-ocean isolation of populations, but interpretations of between-ocean isolation were contradictory. Morphological analysis indicated similarity in body shape among all groups, but distinct modal differences between Atlantic and Pacific Ocean groups in numbers of pectoral-, anal-, and dorsal-fin rays, with Atlantic specimens tending to have an additional ray. Modes of fin ray counts were consistent between populations within oceans. Vertebral counts were shown to be variable, but they did not show a trend between oceans. Collected specimens from Johnston were generally much smaller than specimens from Belize or the other Caribbean sites. Estimates of growth from annuli deposited on first dorsal spines were estimated to be faster in the Belize group than in the Johnston group, and Belize fish reached a greater maximum size.

Electrophoretic analysis of 36 presumptive gene loci showed no fixed allelic differences between ocean populations, and a very low genetic distance of 0.01 was calculated between ocean groups. While the meristic evidence strongly indicated some evolutionary divergence between ocean groups, the genetic results suggested worldwide gene flow may have occurred relatively recently.

Measurements of diet and condition factors showed variability, but neither was correlated with density of the population. No differences were detectable in the general taxonomic composition and organic content of

diets of Johnston and Belize groups, or in condition as measured by relative liver size. However, the high-density Puerto Rico group differed in condition and organic ratio of diet from both low-density Belize and high-density Johnston groups.

Life History of the Bay Anchovy, *Anchoa mitchelli*, in Chesapeake Bay

Jiangang Luo, Ph.D. 1991

College of William and Mary in Virginia

Eggs from plankton samples in lower Chesapeake Bay indicated that the spawning season of the bay anchovy *Anchoa mitchilli* in 1988 was from early May to mid-September. Oocyte stages in adults were used to determine daily spawning time and frequency, as well as batch fecundity. Spawning was temporally synchronized and lasted for about 1.5 h each night. Spawning time became later each month (2000 h on 6 June to 2330 h on 31 August). Spawning frequency per individual was every 4 d in early June and 1.3-1.9 d in other months. Batch fecundity was a linear function of fork length and body weight; regression slopes on 6 July and 4 August were significantly higher than those on 6 June and 31 August. Estimated mean total spawnings per female in 1988 was 54. Total egg production for a fish of average size was 45,110, which is equivalent to 346% of body biomass energy. Age determination based on lagenar otoliths showed that some fish spawned when as young as 2.5-3 months.

Transport of the adult bay anchovy in darkness was studied in laboratory and field experiments. In a hydraulic flume, 99% of all fish were transported to the end of the flume in darkness at a current speed of 30 cm s^{-1}. In field experiments, fish marked with neutral red dye and released in a creek at flood tide were recaptured 5.1 km upstream 4 h after release at night, and were recaptured within 200 m of the release site 3 h after release in daylight. This nocturnal transport phenomenon may also exist in other marine and estuarine pelagic fishes, and may help in understanding behavior and distribution of pelagic estuarine fishes.

Historical trawl survey data indicate that bay anchovy is the most abundant species in lower Chesapeake Bay. The standardized CPUE data show long-term population fluctuations on the order of ten-fold. The bay anchovy population also has extensive seasonal variations which appeared attributable to winter migration or mortality, high spring and summer predation, and peak recruitment in fall. A Fourier analysis removed the seasonal (short-term) variation from the long-term data series. An autoregressive analysis of the residual series indicated that it contained a significant first-order autoregressive process component $r^2 = 0.26$, $P \leqslant 0.0066$), which was interpreted as a spawner-recruit relationship. Cross-correlation analysis indicated that bay anchovy population abundance was positively correlated with winter water temperature ($r = 0.663$, $P \leqslant 0.0001$) and river flow ($r = 0.376$, $P \leqslant 0.027$), but negatively correlated with white perch abundance ($r = 0.437$, $P \leqslant 0.011$) and the squared function of residual wind speed ($r = -0.377$, $P \leqslant 0.026$). A multiple regression model indicated that temperature, white perch abundance and wind made significant contributions (accounting for 78% of the variation) to the model, with no significant contributions from other factors.

Aspects of the Life History of the Tarpon (*Megalops atlanticus*) from South Florida

Edward C. Cyr, Ph.D. 1991

University of South Carolina

Tarpon are highly esteemed as sportfish, and form the basis of major fisheries in Florida and the Caribbean. However, the life-history data required to properly manage these fisheries are lacking. This study was initiated to determine some seminal aspects of the life history of tarpon.

Leptocephalus larvae were collected on ichthyoplankton cruises in the eastern Gulf of Mexico. Growth of Phase-I leptocephali was linear. Phase-I lasted approximately 30-40 days, followed by an approximately 14-day metamorphosis. Back-calculated hatch dates were from late May to mid July, which fell in the spawning season estimated from seasonal gonad development. Collection of young leptocephali far offshore suggests that tarpon spawn in the open ocean, not in inland areas as previously thought.

Juveniles were captured in cast nets in the brackish wetlands which they use as nursery areas. Young-of-the-year (YOY) tarpon recruited into nursery areas during the fall. YOY growth was extremely seasonal; approximately 85% of first-year growth occurs from April through September. One-year-old fish were approximately 400-430mm SL.

Adults were collected primarily through taxidermists and fishing tournaments in south Florida. Adult tarpon displayed a strong sexual dimorphism of size which was age-dependent at larger sizes. Males grew relatively rapidly until approximately 1300mm and 15-20 years of age when growth became asymptotic. Females grew rapidly until 1600mm and 15-20 years of age when growth became more asymptotic, but did not cease as in males. Growth rates were variable for both sexes. Mean estimated age for males (21.1 years) was significantly less than that for females (25.8 years).

Reproduction was seasonal and appeared to occur from April through July or August. Fecundity was high, averaging 1,504,300 eggs/female and was linearly related to weight and age. Female tarpon mature at a large size and late age; the smallest sexually mature female tarpon examined was 29.1 kg with an estimated age of 13.8 years.

The Effect of Low Salinity on Established Infections of *Perkinsus marinus* (Apicomplexa: Perkinsasida) in the Eastern Oyster, *Crassostrea virginica*

Lisa Maria Ragone, M.A. 1991

College of William and Mary in Virginia

Environmental parameters are particularly important regulators of host parasite interactions. Understanding the influence of environmental factors can aid resource managers in preventing or terminating disease epizootics of commercially important species. The effect of salinity on *Perkinsus marinus*, a protozoan pathogen of the eastern oyster, *Crassostrea virginica*, was investigated. Oysters parasitized by *P. marinus* were exposed under laboratory conditions to 6, 9, 12 and 20 ppt salinity regimes at temperatures exceeding 20 degrees Celsius, for a period of 8 weeks. Infection prevalence and intensity was assessed in samples (n=25) drawn from each treatment group following 2, 4, 6 and 8 weeks of exposure; oyster mortality was determined daily. The pathogen persisted throughout the course of the experiment at all salinities tested; however, development of *P. marinus* infections to lethal levels was delayed in oysters maintained at 12, 9, and 6 ppt. Cummulative mortalities at the termination of the experiment were 31.1, 32.1, 14.1, and 13.9 percent of 20, 12, 9, and 6 ppt. respectively. Oyster survival at 6 ppt was significantly higher than at 20 ppt. A critical range for parasite pathogenicity apparently exists between 9 and 12 ppt. Although *P. marinus* is able to tolerate salinities as low as 6 ppt, it is less virulent at salinities less than 9 ppt.

In Memoriam

Frank P. Maher
AIFRB Member 1966

January 28, 1992

Frank P. Maher passed away on January 28 after a long career as a fishery biologist.

Frank worked as a fishery biologist for the Province of British Columbia for 12 years, and in 1964 accepted a position in fisheries with the Ministry of Natural Resources in Ontario. Twenty-three years later, in 1987, he retired.

Frank Maher always had a keen interest in AIFRB. His wife, Jane, writes, "Frank always enjoyed reading the newsletters. He frequently talked about any new ideas that had been presented, and about people he knew that were mentioned".

The fisheries community will miss Frank Maher.

Membership Report

Inquiries regarding membership should be directed to Dr. Sammy Ray, Membership Chairperson, Texas A&M University at Galveston, 5007 Avenue U, Galveston, Texas 77550.

BRIEFS, the newsletter of the American Institute of Fishery Research Biologists, is published six times a year. It is intended to communicate the professional activities and accomplishments of the Institute, its Districts, and Members; the results of research; the effects of management; unusual biological events; matters affecting the profession; political problems; and other matters of importance to the fishery community. Comments and contributions should be sent to the Editor, Dr. Oliver B. Cope, 15 Adamswood Road, Asheville, NC 28803. Subscription $20 a year to Institutions and Non-Members.

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VOL. 21, NO. 3 JUNE 1992

1992 Board of Control Meeting

The annual Board of Control meeting for 1992 will be called to order at 8 a.m. on September 12 and adjourn at 5 p.m. on September 13. The sessions will take place at the Rushmore Plaza Hotel and Conference Center in Rapid City, South Dakota, the location of the 122nd Annual Meeting of the American Fisheries Society.

President Jack Helle invites the AIFRB membership to submit agenda items to him prior to the meeting. All members of AIFRB are urged to attend the Board of Control meetings.

Board of Control Basic Agenda

1. Call to Order
2. Adoption of Agenda
3. Introductions
4. Treasurer's Report (Rachlin)
5. Secretary's Report (Myers) (including minutes from 1991 meeting in San Antonio)
6. Report of Membership Committee (Ray)
7. Report of BRIEFS Editor (Cope)
8. Report of Production Editor (Merriner)
9. Reports from District Directors
10. Summary Comments by President (Helle)
11. Other Business
12. Status and Discussion of Awards
    - A. Travel Assistance Awards
    - B. W. F. Thompson Awards
    - C. Outstanding Achievement Award - individual
    - D. Outstanding Achievement Award - group
13. New Business
14. Transfer of chair to incoming President (Helle)
15. Arrangements for 1992 meeting
16. Adjournment

Ray Address Change

Dr. Sammy Ray, AIFRB Membership Chairman, has a new mailing address. Mail should now be sent to Dr. Sammy Ray, Membership Chairman, Texas A & M University at Galveston, 5007 Avenue U, Galveston, Texas 77550.

New AIFRB Brochure

American Institute of Fishery Research Biologists

AMERICAN INSTITUTE OF FISHERY RESEARCH BIOLOGISTS CORPORATE SEAL 1956 WASHINGTON

1992

AIFRB has a new brochure describing the Institute and its operations. This revised version will be very useful for our people as they recruit new members and for refreshing the memories of those already part of the organization.

The 6-page 1992 brochure tells of the history and purposes of AIFRB, the makeup of the Board of Control, the boundaries of the Regions and of the Districts, the awards program, the classes of membership and the requirements for qualification, how to join the Institute, and names and dates of Past Presidents. The brochure also contains an application for membership.

The 1992 brochure is available from the Membership Chairperson and the District Directors.

Kendall Warner Honored

Kendall Warner (AIFRB Fellow 1971) has been presented the "Silver Trout" award by the Sunkhaze Chapter of Trout Unlimited. The Silver Trout is awarded annually to a fisheries professional who has made a significant contribution to fishery science in Maine.

Warner began his career with the then Maine Inland Fish and Game Department in 1948 as a fishery aide. After working with the U.S. Fish and Wildlife Service in 1950 and as a research assistant at Cornell University in 1951-52, he returned to Maine to work in the department's Fishery Division, where he has remained to the present.

In 1952-53 he was director of a statewide lake survey program; 1953-68 he was regional fishery biologist in the Ashland District; 1968-71 he was fishery resource planner; 1971-84, fishery research supervisor; 1984-present, fishery research and management supervisor, based at the Bangor headquarters.

A member of the American Fisheries Society since 1950, Warner served as president of the Northeastern Division in 1972-73, and has served it in other official capacities. In 1987, he was presented with the society's "Professional Award of Merit." Membership in the organization is made up of fishery professionals from the northeastern United States and Canadian provinces. Warner is co-author, with the late Keith A. Havey, of "The Landlocked Salmon—Its Life History and Management in Maine." He has also authored numerous scientific papers for technical journals, and popular articles on fisheries subjects in MAINE FISH AND WILDLIFE magazine.

A native of Westfield, Mass., Warner has a Bachelor of Science degree in wildlife management from the University of Maine, and a Master of Science degree in fishery biology from Cornell University.

He and his wife, Sandra, live in Orono. They have two daughters, Kendra and Leanne.

Our People

Dr. Phyllis Cahn (AIFRB Fellow 1981) will share editorial duties with Dr. Esteban Miranda in the production of the *North American Journal of Fisheries Management*.

Eric Hallerman (AIFRB Associate 1981) will conduct a course in Fish Genetics as part of the American Fisheries Society's Continuing Education Day on September 13, 1992 during the AFS annual meeting in Rapid City, South Dakota.

Two AIFRB people are 1992 candidates for Second Vice-president of the American Fisheries Society. **Dr. Gene Huntsman** (AIFRB Fellow 1984) and **Paul J. Wingate** (AIFRB Member 1980) are competing for this high honor.

District News

NORTHERN ALASKA **Stephen M. Fried,** *Director*

Since I put out the first, and to this point only, newsletter last November, I've managed to get a monthly seminar series started. You should be aware of this since I've been sending out announcements for these to all district members as well as the general professional fisheries community in the district. Attendance has been good—about 20-30 people in the audience each time. It appears that these informal seminars have helped fill a need in the fisheries community. The next seminar in the series concerns an increasingly important topic: fish genetics and fishery management. This has become an interesting and very controversial issue in Alaska, so I hope you will attend.

I have almost given up on trying to initiate regular district meetings, but I still feel strongly that it would be valuable, and fun, to hold an annual meeting. I know that the wide dispersal of our members makes meetings a problem, but it seems that an annual meeting should be possible. It may help to hold an annual meeting in conjunction with other professional activities that would involve members (e.g. Sea Grant symposia, oil spill meetings, even an AFS chapter meeting). If any of you have some ideas as to the best time and place, please let me know.

I'm trying to complete a short outline of the history of our district to send to Bill Royce next month. He will be compiling a history of AIFRB for the organization's 40th anniversary. I've been working with the files I've got from past district director Bill Wilson to do this. If anyone else has some pertinent information please send it to me or give me a call.

Membership Drive

Instead of 27 members, our district actually has 23 members. But, I know that each of you has taken the time to nominate one new member since I sent out my first newsletter in November 1991. I'm trying to do my part and have already recruited two members, who have sent their requests to Sammy. Again, remind potential members that there are worthwhile benefits to belonging to AIFRB, such as our travel award program, the recent logo contest, the professional membership certificate, acceptance into a select group of professionals, and the national newsletter BRIEFS. The initial membership fee of $25 ($5 for membership certification, $20 annual dues) is small compared to membership benefits. Please send membership nominations, or have interested potential members send detailed resumes, to Sammy Ray, Membership Chairman, Texas A & M University at Galveston, 5007 Avenue U, Galveston, TX 77550.

District Issues

AIFRB is a respected professional organization which has served a useful purpose both for its members and fishery resources. I recently met with John Strand, of National Marine Fisheries Service in Juneau, who is the district director-elect for Southeast Alaska. John was very interested in working with our district on an issue of importance. Results of this venture could be an issue paper, symposium sponsorship, etc. I would like to hear from the membership concerning issues they feel we could successfully address (e.g. preservation of wild fish stocks, fisheries enhancement, Exxon Valdez oil spill fisheries restoration, continuing education for fishery professionals, etc.).

Submissions to BRIEFS

Oliver Cope, editor of AIFRB's national newsletter, is always looking for more items to include within BRIEFS. If you have relevant articles, opinions, meeting announcements, new publication announcements, awards, activities, relevant pictures, Masters thesis abstracts, etc. that you would like to place in BRIEFS, please either send it to me or send it directly to Oliver at 15 Adamswood Road, Asheville, NC 28803.

Chevron Conservation Award Winners

Of 25 individuals and organizations given 1992 Chevron Conservation Awards for pioneering conservation accomplishments, 12 were honored for their efforts on behalf of aquatic and semi-aquatic environments. This emphasis on water-related activities is a refreshing change from the perspectives seen in the past, when awards for aquatic conservation were relatively scarce.

Honorees for 1992 are:

Stan Blum of Fort Pierce, Florida led a 6-year effort to eliminate the use of East Coast drift nets. He also spearheaded a project to build artifical reefs to create inshore fisheries, reduce inlet dredging, and relocate sewage plants discharging into the Indian River.

Mary Patricia Pazara of Fort Pierce, Florida is known as the "Turtle Mother" for her efforts to save sea turtle eggs and hatchlings threatened by development in southeastern Florida. For the past 2 years, she has guided nature walks through the 4,000-acre Savannas State Preserve and compiled data on avian fauna and wildlife nesting.

Paul Shafland (AIFRB Member 1982) of Boca Raton, Florida is a biologist who pioneered research in the introduction and management of non-native fishes into inland waters. He incorporated his findings into a resource management plan that has been recognized as a national model for managing exotic species.

Ed Chaney of Eagle, Idaho has worked for 2 decades to protect salmon and steelhead trout in Northeast region rivers. He organized a coalition to protect fish migration runs, and he heads a nonprofit organization dedicated to habitat enhancement, research of environmental issues, and analysis of public policy.

Gaylord Donnelley of Libertyville, Illinois launched the Illinois and Michigan Canal Heritage Corridor, the nation's first 450 square mile "partnership" park. Having played a key role in numerous conservation organizations since the 1930s, Mr. Donnelley led efforts to protect a 350,000-acre estuary in South Carolina.

Edgar W. Garbisch of St. Michaels, Maryland was one of the earliest proponents of using natural landscaping, rather than man-made construction, to prevent shoreline erosion. As founder of Environmental Concern, Inc., a nonprofit organization dedicated to wetlands science and restoration, he established what is now considered one of the nation's premier wetland plant nurseries.

Robert Petrosky of Riverdale, Maryland and his dog Brandy rescue box turtles in Maryland, Virginia, and suburban Washington, D.C., from sites slated for construction. Throughout the past 4 years, Mr. Petrosky has carried more than 200 turtles to safety, either relocating them to a natural habitat or temporarily caring for them at home.

Ben Rizzo of Waltham, Massachusetts is an international authority on the design and construction of fish passages at hydroelectric dams and other waterworks. He is credited with designing fish passage facilities throughout the Northeast, including one on Maine's Penobscot River, which is the largest Atlantic salmon run in the U.S.

James E. Corbin of St. Louis, Missouri is known as the "Green Colonel" for his efforts as director of the St. Louis District for the U.S. Army Corps of Engineers. He established a 1,200-acre wetland adjacent to a major lock and dam project, and directed the design and construction of nursery ponds, as well as the enhancement of wildlife habitats.

George Grant of Butte, Montana has fought streamside erosion and other threats to the Big Hole River for more than 60 years. He founded the Big Hole River Foundation to maintain a high-quality, wild trout river for present and future generations.

Robert M. Saunders of La Grange, Texas has been instrumental in forging some of the most comprehensive and significant environmental legislation in Texas history. A member of the state's House of Representatives, he sponsored major recycling legislation, established the Texas Conservation Passport, and developed a management plan to protect the state's shores and coastal waters.

Ilene Marckx of Federal Way, Washington opened her family's property to the public as "Wetlands of the West Hylebos," which is home to more than 200 different species of wildlife in southern King County near Seattle. Working with various organizations, she negotiated to have the urban wetlands designated a state park and natural area, with the entrance beginning at the approach to her home.

Grass Carp and Bay Grasses

To some, the grass carp is a cost-effective way to control aquatic weeds without using chemical herbicides. To others, they are biological lawn mowers with the potential of wreaking havoc if unleashed.

Whichever is the case, the fish has been introduced into the Chesapeake Bay watershed and is in increasing demand by the owners of private lakes and ponds.

Concern is focused on the possibility that grass carp could consume huge amounts of submerged aquatic grasses if they escape those private water bodies and reach the tidal tributaries of the Bay. The submerged grasses are considered to be a critical part of the Bay ecosystem, helping to improve water quality and providing habitat for many species.

Restoring submerged grasses—now thought to occupy only about 10 percent of their historic range in the Chesapeake—is one of the top priorities of the Bay Program. The fish can consume some wetland grasses as well.

cont. on page 4

Grass Carp and Bay Grasses cont.

The grass carp, *Ctenopharyngodon idella*, is a native of eastern China and Siberia. They are one of the largest members of the minnow family, and can grow to be more than 100 pounds, though in this region 20 to 30 pounds is more typical. The U.S. Fish and Wildlife Service imported the fish in the early 1960s to study its use as a biological control for aquatic grasses.

"They are basically weed eating machines—big ones," said Bob Bachman, director of freshwater fisheries with the Maryland Department of Natural Resources. "Our policy has been that they should not be brought into Maryland."

A grass carp can consume one-and-a-half times its weight daily and can grow by about 10 pounds a year. That has made them a desired commodity for people wishing to control excess plants in such places as fishing ponds, golf course ponds, irrigation canals, and farm ponds.

A grass carp costs about $8, and will consume large amounts of grass until it reaches about five years old, when its food intake slows down. John Kauffman, a regional fisheries manager with the Virginia Commission of Game and Inland Fisheries, said eight grass carp could control about an acre of aquatic vegetation—as long as it was a type of vegetation the fish like to eat. By contrast, he said, chemical or mechanical controls would cost at least $100 per acre every year.

"Overall, when people have the choice of the three methods, we would generally recommend the carp," Kauffman said.

While grass carp in some cases have been shown to provide effective control, in other instances the results have been disastrous. They are such voracious eaters, they often result in total eradication—rather than control—of grasses. Introduction of grass carp in 22,000-acre Lake Conroe in Texas in 1981 resulted in the eradication of all aquatic vegetation within 18 months, resulting in a crash in the largemouth bass fishery. In Virginia, Kauffman said stocking recommendations had to be revised downward two years ago because the fish too often eradicated grasses in ponds.

After their introduction in the United States, many states were reluctant to allow the use of grass carp because of their ability to migrate and spawn. In the 1980s, however, it was found that by heat-shocking grass carp eggs the fish would develop three sets of chromosomes rather than the normal two. These fish, called triploids, could not reproduce.

With that change, more states began allowing the use of triploid grass carp to control vegetation. Today, more than 30 states allow their use.

Virginia has allowed the use of sterile grass carp since the mid-1980s to control weeds in private ponds and lakes.

"If you've got to go with a triploid grass carp or some of the chemicals they're using, I would definitely go with the triploids," said David Whitehurst, chief of the Fishery Division of the Virginia Commission of Game and Inland Fisheries.

The Pennsylvania Fish and Boat Commission is considering whether to allow the use of sterile grass carp to control weeds, and is expected to take up the issue at its April meeting.

"We feel that biological control, as long as it's done prudently, is better than chemical control," said Vince Mudrak, chief of the division of research in the Pennsylvania Fish Commission. The commission "is looking at all sides of the issue of grass carp," Mudrak said, but had not yet made a decision whether to permit their use.

Grass carp are a migratory fish and prefer moving water to ponds. Critics of grass carp introduction say that over time, numbers of the fish will reach public waterways—whether through intentional release or by escaping ponds during floods or water releases. Because the fish can live 10 to 15 years or more, the possibility exists for sizeable populations to build up near the mouths of rivers where they could damage grass beds.

"The thing with triploids is we really don't know what the heck they're going to do out there," said Alan Heft, a fisheries biologist with the Maryland DNR who has been researching the issue.

Heft said he had not seen research indicating that escaped triploid populations would become a problem.

But, he added, triploid fish have not been used long enough to be sure of their ultimate impacts.

"It may be all right," Bachman said, "but we don't have the evidence that it is."

Proponents say allowing the use of triploids allow states to regulate the fish being imported. Otherwise, people who want grass carp may illegally bring fish from other states—and they may bring varieties that can reproduce. In fact, despite prohibitions, grass carp have been found in both Maryland and Pennsylvania.

Virginia has allowed the use of triploid grass carp since the mid-1980s, and today about 10,000 fish a year are imported. The state allows only fish from producers which have been certified by the U.S. Fish and Wildlife Service as producing triploids. Also, the state tracks incoming shipments and performs spot inspections.

Kauffman said years of spot checks found only one fish capable of reproduction.

And only once, when an impoundment washed out near the Mattaponi River, were numbers of grass carp found in a waterway, Kauffman said.

If escaped fish did become a problem, both Kauffman and Whitehurst said, the state could enact a prohibition on new fish. Those in the wild, unable to reproduce, would eventually die off.

Heft and Bachman, though, urged caution on importing the species, saying that by the time a problem was discovered, there would be no option but to wait for the fish to die off while the damage occurred.

Others approach the issue with caution, too.

The Exotic Species Workgroup of the Bay Program's Living Resources Subcommittee may take up the issue.

And Linda Hurley, a biologist with the U.S. Fish and Wildlife Service who has worked extensively with the Bay's submerged grasses, agreed that grass carp could pose a problem if they reached grass beds in the Chesapeake and its tributaries.

Hurley said the grass carp only control the symptom of another problem—the excessive plant growth in ponds located at farms and golf courses is often the result of

excessive fertilizer use. "You should be looking at why the plants are there," she said.

Karl Blankenship in *Bay Journal*, March 1992

Meeting Announcements and New Publications

Symposium—Fish Otolith Research

An international symposium on *Fish Otolith Research and Application* will take place on January 24-27, 1993 at Hilton Head, S.C. The convenors are S.E. Campana of Canada and J.M. Dean (AIFRB Fellow 1983).

The objectives of this symposium are to bring together those who study otoliths and those who use them as tools, in order to assess knowledge, clarify issues, develop options, and explore opportunities in this rapidly evolving field. Emphasis will be placed on innovative approaches to otolith research and their application in fish biology and population dynamics studies. Themes to be developed are *Otolith Growth, Morphology, and the Estimation of Fish Growth, Otoliths in Studies of Population Biology*, and *Otolith Composition as an Index of Environmental History*. The symposium will also offer workshops on otolith techniques, as well as hands-on clinics dealing with image analysis systems, *in vitro* otolith studies, and detection of marked otoliths.

For further information, contact Dr. S.E. Campana, Bedford Institute of Oceanography, Box 1006, Dartmouth, N.S., Canada B2Y 4A2 or Dr. J.M. Dean, Belle W. Baruch Institute, University of South Carolina, Columbia, SC 29208.

Biology of Estuaries

Michael J. Kennish has authored *Biology of Estuaries: Anthropogenic Effects*, a book of 376 pages, 71 tables, and 38 illustrations. The volume provides a comprehensive treatment of pollution in estuaries, presents data on estuarine pollution that will be useful to researchers in a wide variety of disciplines, and features timely subject matter since so many of today's current environmental concerns are focused on pollution in estuaries and coastal marine waters.

Ecology of Estuaries: Anthropogenic Effects represents the most definitive and comprehensive source of reference information available on the human impact on estuarine ecosystems. The volume discusses both acute and insidious pollution problems plaguing these coastal ecotones. It also provides a detailed examination of the deleterious and pervasive effects of human activities on biotic communities and sensitive habitat areas in estuaries. Specific areas covered include organic loading, oil pollution, polynuclear aromatic hydrocarbons, chlorinated hydrocarbons, heavy metals, dredging and dredged-spoil disposal, radionuclides, as well as other contaminants and processes. The diverse components of these anthropogenic influences are assembled in an organized framework and presented in a clear and concise style that will facilitate their understanding. The book will serve as an excellent reference source for scientists conducting research on estuarine systems and will be valuable for administrators, decision-makers, and other professionals managing the natural resources of these important waters. Students and instructors will discover that it can be used as a text for upper level undergraduate and graduate level courses.

This book is available for $139.95 in the U.S. and $168 elsewhere from CRC Press, Inc., 2000 Corporate Blvd., N.W., Boca Raton, FL 33431.

Artificial Fisheries Habitats

Academic Press has published a 285-page book, *Artificial Habitats for Marine and Freshwater Fisheries*, edited by William Seaman, Jr. (AIFRB Member 1975) and Lucian M. Sprague, both of the University of Florida.

Artificial habitats have been used for centuries to successfully modify environments for the benefit of Man. In the aquatic environment, the use of artificial habitat technologies is of growing interest worldwide. Opportunities exist to apply these technologies in many areas, including classical scientific investigations of ecosystems structure and function, engineering advances in underwater technology, and fisheries and environmental management.

The applications of artificial habitat technologies are taking on ever greater economic, social, and environmental importance globally, not only in developed countries such as Japan, where highly sophisticated technologies are used, but also in developing nations, where lower cost practices are in use. There is growing pressure to increase production while, at the same time, preserve or enhance the environments and ecosystems surrounding fisheries.

This book provides a comprehensive review of the facts, issues, and global trends emerging regarding the use of artificial habitats in aquatic ecosystems. It presents the most recent scientific advances in ecology and engineering technologies related to the building of artificial habitats, and it also presents many of the fisheries management and socioeconomic and environmental issues.

Artificial Habitats for Marine and Freshwater Fisheries will be of interest to a broad audience, including natural resource scientists, planners, and managers, particularly those interested in aquatic and fisheries science management; organizations and individuals interested in commercial and recreational fishing; ecologists; environmental economists, engineers, lawyers, and social scientists; and geographers.

Buy the book for $39.95 from Academic Press, Book Marketing Dept., 1250 Sixth Ave., San Diego, CA 92101-4311.

Creel and Angler Surveys

The American Fisheries Society has published its Symposium 12, *Creel and Angler Surveys in Fisheries Management*, a book of 528 pages. The authors are D. Guthrie, J.M. Hoenig (AIFRB Associate 1982), M. Holliday, C.M. Jones, M.J. Mills, S.A. Moberly (AIFRB Fellow 1984), K.H. Pollock, and D.R. Talhelm.

Surveys of anglers and their catches are among the most important professional tools available to managers of recreational fisheries. Surveys provide information about who and how many are fishing, about what is caught in what numbers by which methods, about the status of exploited stocks, and about angler needs, values, and demographics.

Like any sampling schemes, surveys can produce misinformation if they are not planned, executed, and analyzed carefully according to sound statistical designs. Because of their importance, fisheries surveys have received increasing attention in recent years. The latest developments in survey theory and practice were presented at an international symposium in 1990. *Creel and Angler Surveys in Fisheries Management*, the proceedings of that conference, contains 59 papers that address roving creel, access point, telephone, mail, and other types of surveys. A recurrent theme of this volume is the proper application of surveys to estimate biological and economic attributes of fisheries and to obtain social profiles of anglers. Anyone who designs and implements surveys or who administers survey programs will gain many insights from the contributions in this book.

The book can be ordered from the American Fisheries Society, 5410 Grosvenor Lane, Suite 110, Bethesda, MD 20814-2129. The cost is $84, but AFS members pay only $67.

Fishes of the Sea

John and Gillian Lythgoe have authored *Fishes of the Sea—The North Atlantic and Mediterranean*, a 256-page volume covering 887 species with 200 color photographs and 530 line drawings.

This photographic and descriptive guide to the fish species that inhabit the North Atlantic and Mediterranean is unique in its emphasis on the

cont. on page 6

New Publications cont.

appearance of marine fishes in their natural habitats. It expands and recasts the Lythgoes' highly regarded first edition published two decades ago. In particular, all of the more than 200 color photographs are new, and most are accompanied by line drawings that emphasize distinctive traits. The fish are arranged by class, family, and species, and succinct descriptions give detailed information about anatomy, distribution, food, and breeding habits.

This book sells for $35.00 and is available from MIT Press, 55 Hayward Street, Cambridge, MA 02142.

Dissertation and Thesis Abstracts

Behavioral Responses of Postlarval Penaeid Shrimp to Galveston Bay Olfactants

Mark Christopher Benfield, Ph.D. 1991

Texas A & M University

A laminar-flow choice chamber was developed to measure the orientative responses of postlarval penaeid shrimp to olfactants. Animals were provided with a free choice between two water types separated by a steep concentration gradient. In preliminary experiments, both postlarval brown shrimp *Penaeus aztecus* and white shrimp *P. setiferus* were significantly attracted to water from a West Galveston Bay saltmarsh. Subsequent experiments with brown shrimp indicated that this estuarine water lost its attractiveness over winter, which suggests that the attractant(s) is biogenic in origin.

Experiments were unable to identify conclusively the attractants associated with the primary saltmarsh nursery habitats. Postlarval brown shrimp did not demonstrate significant attraction to the odor of smooth cordgrass *Spartina alterniflora* or *Spartina* detritus. Responses to epiphytic algae from *S. alterniflora* were equivocal but suggested that these epiphytes may produce an attractant. Significant avoidance of the odor of amphipods *Gammarus mucronatus* was observed in two of three experiments. A rinse from conspecific postlarvae was significantly avoided in a single experiment.

Postlarvae turned upstream more frequently in the olfactant-treated stream and downstream more frequently in the control. These turning patterns were consistently observed in tests involving non-repellent odors; however, the generally low incidence of turning (<25%) rendered most comparisons of turning frequencies non-significant. Observed patterns of turning behavior may indicate that attractive odors function as a sign stimulus, releasing a positive rheotaxis which might assist postlarvae in locating odor sources.

Responses of postlarval brown shrimp to 0-450 $\mu g \cdot L^{-1}$ pentachlorophenol were evaluated in synthetic seawater and estuarine water. Brown shrimp avoided pentachlorophenol above 91 $\mu g \cdot L^{-1}$. Pentachlorophenol was more repellent in estuarine water than synthetic seawater. The mean 96 H LC_{50} was 317 $\mu g \cdot L^{-1}$, which suggests that postlarvae are capable of avoiding acutely toxic concentrations of pentachlorophenol.

The results suggest that natural estuarine olfactants are attractive to postlarvae. The source(s) of these materials remain poorly understood. Olfactants would provide a consistent signal regardless of the prevailing salinity regime within the estuary and may assist postlarvae in locating estuaries and/or nursery habitats within estuarine systems.

Food and Feeding of Northern Bluefin Tuna (*Thunnus thynnus*) and Yellowfin Tuna (*Thunnus albacares*)

Charles G. Barr, M.A. 1991

College of William and Mary in Virginia

A two-year study was conducted examining the food and feeding strategies of bluefin tuna (*Thunnus thynnus*) and yellowfin tuna (*Thunnus albacares*) as they occur off the coast of Virginia. Stomach samples from 220 bluefin and 259 yellowfin were collected from the recreatonal fishery from June through September 1988 and 1989. Data were collected on tuna catch locations, sea surface temperatures at time of capture, and tuna length/weight. Stomach contents were measured volumetrically using water displacement and food items were counted and identified to the lowest possible taxon.

Results of the length/weight data indicated the average bluefin and yellowfin tuna were 2 to 3-year-old fish. Bluefin averaged 10.8 kgs. in weight with an average fork length of 84 cm. Yellowfin averaged 14.8 kgs. in weight with an average fork length of 94 cm.

The diets of the bluefin and yellowfin were grouped into three categories: fish, squid, and crustaceans. Fish comprised the largest portion of both tuna diets by number, volume, and frequency of occurrence. The data show the importance of the sand lance, *Ammodytes dubius* as a primary food source for both bluefin and yellowfin tuna. The yellowfin diet exhibited greater diversity of prey fish, with 21 families represented. The bluefin diet consisted almost exclusively of *A. dubius*; however, eight fish families were represented. Squid were represented in both bluefin and yellowfin tuna by a single species, *Illex illecebrosus* (short-finned squid). Crustaceans (mainly amphipods, isopods, megalopae, and mysids) were common in both bluefin and yellowfin stomachs.

Differences in feeding strategies between the bluefin and yellowfin tuna were evident based on dietary differences and feeding in distinctly different marine habitats. Yellowfin were found in areas with warmer sea-surface temperatures and strong thermocline which restricts them to high frequency of floating plant material found in their stomachs. The high prey diversity found in yellowfin stomachs was also indicative of feeding in areas of upwelling found along thermal fronts. Bluefin were found in areas characterized by cooler temperatures, shallower thermoclines, and lack of thermal fronts. Bluefin feeding most frequently occurred in the lower water column. This was evident by a low occurrence of floating plant material, the occurrence of gravel and small shells found in some stomachs, low prey diversity, and the presence of benthic and demersal prey.

Factors Affecting Survival of Early Life Stages of Striped Bass

John Clarke McGovern, Ph.D. 1991

College of William and Mary in Virginia

Field surveys in the Pamunkey River, Virginia indicated that numerous fish and invertebrate predators varied in their spatiotemporal coincidence with eggs and larvae of striped bass, *Morone saxatilis*, on spawning grounds. In 1986 laboratory experiments, the cyclopoid copepod *Acanthocyclops vernalis* was observed to attack and kill striped bass larvae. In addition, juveniles or adults of satinfin shiner, spottail shiner, tessellated darter, white perch, striped bass, bluegill, pumpkinseed, channel catfish, and white catfish ate yolk-sac larvae under laboratory conditions. Consumption of larvae by spottail shiners and satinfin shiners increased with increasing prey density to a maximum observed ingestion of 150 and 81 larvae per predator per hour, respectively. In contrast to these laboratory results, neither eggs nor larvae of striped bass were positively identified in the guts of field-collected fishes, although various fish species consumed many eggs of the white perch.

In 1988 laboratory presentations, bay anchovy and Atlantic menhaden tested positive as potential predators. Consumption of striped bass larvae by bay anchovy increased at higher prey densities to a maximum of 42 larvae/h at prey densities of 1,650/m^3. Examination of 229 stomachs of bay anchovy collected during peak spawning in 1988 and 1989 provided direct evidence of predation on striped bass eggs and larvae.

The relationship between patterns of survival inferred from the back-calculation of juvenile birthdates were compared with data sets describing predator and prey fields, egg production, food abundance, and changing environmental conditions during the 1988 and 1989 spawning seasons. The physical factors pH, rainfall, dissolved oxygen, and water temperature were measured at 30-minute intervals and observations of predator, prey, egg, and larval densities were recorded weekly or semi-weekly.

In 1988, a year of average recruitment, only 11% of the juveniles aged (n=78) were born during the week of peak spawning when over 48% of the eggs were produced. In 1989, a year of high recruitment, the temporal distribution of juvenile hatchdates more closely followed the distribution of eggs with 30% of the juveniles (n=96) born during the week of peak spawning when 40% of the eggs were spawned. Potential fish predators were collected in greater numbers during peak spawning in 1988 (61/100m^3)

than during the same period of time in 1989 (12/100m³). Water temperatures were lower during peak spawning in 1988 (16 °C) than during 1989 (19 °C). Also, prey items for first-feeding larvae decreased the week following peak spawning in 1988 from an average number of 194 to 74 individuals/1. Lower water temperatures and reduced food densities in 1988 may have produced a combined effect of prolonging developmental stages of striped bass eggs and larvae, thereby making them more susceptible to elevated predator densities.

A Comparison of Meristics and Morphometrics Between Two Strains of Pond Cultured Striped Bass (*Morone saxatilis*)

Steven Gornak, M.A. 1991

College of William and Mary in Virginia

The analysis of both morphometric and meristic characters of 619 juvenile pond-cultured striped bass (*Morone saxatilis*) demonstrated the existence of two separate stocks in the Northern Chesapeake Bay (Chesapeake and Delaware Canal and Patuxent River). The two measurements of depth, CPD, and PC3, produced the best discrimination of stocks, while the length variables AI, PTO, PTI, and PC2 were also able to contribute to the delineation process. The principal components also proved to be better discriminators of stocks than the log-transformed variables. The analysis of meristic characters indicated that counts of the second dorsal fin rays produced the best separation of stocks. The anal fin rays appeared to be very sensitive to changes in temperature and, therefore, this variable is less stable and not considered to be a good discriminator.

Stock Enchancement of Caribbean Spiny Lobster, *Panulirus argus* Latrielle, Using Artificial Shelters; Patterns of Survival and Dynamics of Shelter Selection

David B. Eggleston, Ph.D. 1991

College of William and Mary in Virginia

Marine habitats with limited refugia from predation but adequate food may support increases in prey abundance if artificial shelters placed in these habitats reduce predation-induced mortality. Moreover, the protective capacity of shelters may vary according to the scaling between shelter size and prey size, and the proximity of unprotected prey to those shelters. These hypotheses were tested with field tethering experiments in seagrass beds of Bahia de la Ascension, Mexico by examining the impact of different-sized artificial shelters upon survival of three juvenile size-classes of the Caribbean spiny lobster, *Panulirus argus*. Lobsters were tethered at two sites (inner-bay, sand-seagrass flat and outer-bay, seagrass bed adjacent to coral reefs), with and without access to artificial lobster shelters, and at different distances from the shelters. The artificial shelters were concrete structures (casitas) that simulate lobster dens. The size frequency, species composition, and foraging range of potential predators was quantified, and the physical features of casitas that influence den choice by juvenile spiny lobsters was estimated. In the tethering experiments, spiny lobster survival was generally higher in smaller than larger casitas, though the effect depended upon the relationship between lobster and shelter size; site effects were non-significant. Small juveniles (46-55 mm carapace length (CL)) survived better at casitas or 30 m away from casitas than 15 m or 60-70 m away. Large juveniles (56-65 mm CL) survived better 60-70 m away from casitas than at casitas. Thus, spiny lobster survival depends not only upon the availability of shelter, but also on the scaling between shelter size and lobster size. Moreover, there is a nonlinear relationship between predation risk and distance from an artificial shelter.

Predator observations indicated that the size range, maximum size, and species diversity of predators increased with casita size, thereby imposing higher predation intensity in larger casitas. Predator observations also indicated that the daytime predator guild, composed primarily of snappers (family Lutjanidae), seldom strayed more than 30 m from casitas and were typically within 10 m of casitas. Thus, tethering lobsters 60-70 m away from casitas appeared adequate to examine survival of lobsters in an environment uninfluenced by daytime predators aggregating to casitas. These results strongly suggest that placement of appropriately-scaled artificial shelters (e.g. casitas), in nursery areas where natural shelter is scarce, like Bahia de la Ascension, Mexico, is likely to augment habitat carrying capacity and therefore lobster production by increasing protection from predators.

Shelter use patterns of den-dwelling *Panulirus argus* appear to be regulated by (1) social structure, which alters the effectiveness of communal defense, and (2) the scaling between shelter size and lobster size, which enhances the protective capacity of the den. These hypotheses were tested with field enclosure experiments examining the effects of spiny lobster size, social condition (i.e. presence or absence of conspecifics), shelter size, and predation risk (i.e. presence or absence of a major predator, the nurse shark *Ginglyostoma cirratum*), upon den choice by juvenile and adult *P. argus*. To corroborate the findings of the enclosure experiments, seasonal, size-specific abundance patterns of *P. argus* were quantified in the field by deploying artificial lobster shelters (casitas) of different sizes in two habitats that differed primarily in the potential for gregarious interactions: an inner-bay, sand seagrass flat with high lobster densities, and an outer-bay, seagrass bed adjacent to coral reefs with sparsely distributed lobsters. The experimental and observational field results were strikingly similar.

Social condition and the scaling of lobster size to shelter size jointly regulated den choice patterns of adult and juvenile *Panulirus argus* in the field experiments and observations; lobsters also displayed marked size-specific behavorial flexibility in den choice according to social condition and predation risk. When conspecific densities and predation risk were low, lobsters resided primarily in smaller shelters; when conspecific densities were high and predation risk was low, lobsters resided predominantly in large shelters offering the highest potential for gregariousness; and, when predation risk was high, irrespective of conspecific densities, lobsters shifted to gregarious habitation in smaller, safer shelters. In the field, large shelters, which offer the highest potential for gregarious occupation with conspecifics, attracted significantly higher numbers and a broader size range of lobsters than medium or small shelters, particularly at the inner-bay site where lobster densities were high. Medium shelters were only effective at concentrating medium-sized juvenile lobsters at the outer-bay site, while small shelters were only occasionally inhabited by small juvenile lobsters. The frequency of gregariousness in the field was much higher at the inner-bay site, where lobsters were dense, than at the outer-bay site, where lobsters were sparse, even accounting for the difference in lobster density between sites.

This study indicates that the density of conspecifics in a given habitat can enchance gregariousness in spiny lobsters, which in turn influences the relative impact of lobster size, shelter size, and predation risk upon den choice. In defining the critical determinants of den choice for *P. argus* , this study provides an empirical and conceptual framework for identifying how variations in the availability of resources, such as conspecifics and appropriately scaled refuges, influence the distribution and abundance of social, shelter-dwelling species.

In Memoriam

Eugene M. Maltzeff

AIFRB Member 1963

October 22, 1991

Membership Report

NEW FELLOW

Vincent P. Williams	GE

PROMOTION TO MEMBER

Peter J. Auster	CT

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J. Dale Shively	WI
Dr. Theodore H. Kerstetter	CA

ASSOCIATES

Jonathan Gary Kennen	NY
Pradeep Hirethota	NY
Mirella Martinez	TX

EMERITUS

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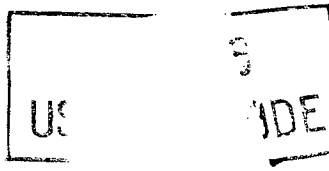
Dr. Donald E. Wohlschlag	TX
Wayne A. Burck	OR
S. Hamar Midgley	Australia

Direct membership inquiries to: **Dr. Sammy M. Ray**
Membership Chairman
Texas A & M University-Galveston
5007 Avenue U, Galveston, TX 77551

American Institute of Fishery Research Biologists
NMFS Laboratory • Beaufort, NC 28516



Address Correction Requested

FIRST CLASS

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La Jolla, CA
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BRIEFS, the newsletter of the American Institute of Fishery Research Biologists, is published six times a year. It is intended to communicate the professional activities and accomplishments of the Institute, its Districts, and Members; the results of research; the effects of management; unusual biological events; matters affecting the profession; political problems; and other matters of importance to the fishery community. Comments and contributions should be sent to the Editor, Dr. Oliver B. Cope, 15 Adamswood Road, Asheville, NC 28803. Subscription $20 a year to Institutions and Non-Members.

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American Institute of Fishery Research Biologists

. . . BRIEFS . . .

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Anthony Is Our President-Elect

Dr. Vaughn Anthony garnered the big votes in AIFRB's mail ballot election for the presidency of the Institute. By winning over Edwin A. Joyce, Vaughn becomes our President-Elect, to serve as President for 2 years. He will take office and relieve Jack Helle at the 1992 Board of Control meeting in Rapid City, South Dakota in September.

AIFRB was fortunate in having two highly qualified candidates for this office. We thank all who participated in the election, especially the candidates.

The membership congratulates Dr. Anthony, and we will anticipate strong leadership on his part, leadership that will carry AIFRB to new heights.

Board of Control Meeting

A basic agenda for the Board of Control meeting in Rapid City was published in the June issue of BRIEFS. Some of the important items to be considered under the "old and new business" categories are: (1) selection of a logo for AIFRB, (2) merits of having an executive secretary, (3) discussion of "advocacy" controversy within professional societies, (4) relationship between AIFRB and the American Fisheries Society (AFS), and (5) a half-hour slide talk by Malin Babcock (Alaska Southeast District Director) on the impacts of the Exxon Valdez oil spill on aquatic resources in Prince William Sound, Alaska.

A notice about the AIFRB logo contest with instructions on how to enter was inserted in the December 1991 issue of BRIEFS. The response to the contest was surprising. Sixty-four entries were submitted! President Helle appointed a selection committee to narrow the choices so the Board of Control could make a final decision at the annual meeting. Past Presidents John Hunter (California) and Gene Nakamura (Florida) headed the committee. Hunter was assisted by J. Mosher and I. Barrett. Nakamura was assisted by L. Barger and A. Collins. The entries were narrowed down to two—one for the formal logo and another that could be used on tee-shirts, mugs, et al.

The idea of AIFRB having an executive secretary was discussed briefly at last year's Board of Control meeting. During the 1960's and 1970's, when Heward Bell was Secretary, the position was somewhat like having an executive secretary. The thought of having a recently retired member take on an expanded secretary's job again has some merits. Presently, when the President and/or Past President are out of the country or on extended trips AIFRB matters go on hold.

Several members have suggested that the advocacy positions taken by several related professional societies recently, need to be discussed. Apparently, this is a very controversial subject. And, the annual discussion of the relationship between AIFRB and AFS will take place. President Helle has received several letters during the past year commenting on the articles in BRIEFS and discussions by the Board of Control last year on this subject.

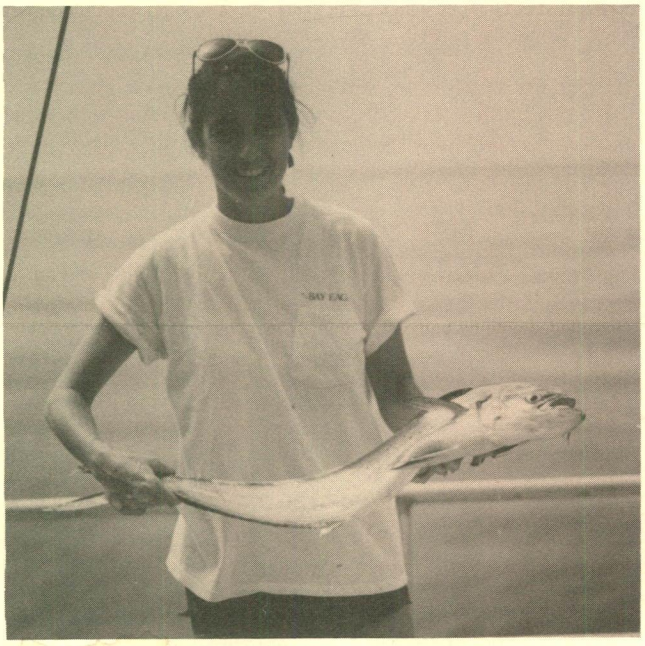
Malin Babcock will be prepared to present a half-hour slide talk on the results of research on the impacts of the Exxon Valdez oil spill in Prince William Sound, Alaska. There have been many inquiries about the status of research that has not been made public because of the legal problems associated with the spill. Malin has prepared an informative slide talk about recently released results.

New Membership Directory

AIFRB has a new directory, the May 1992 Directory of Members that lists all Institute Associates, Members, Fellows, and Emeritus Members in good standing as of February 1992. This volume replaces the September 1987 issue. With the guidance of John Merriner and the good work of Treasurer Joseph Rachlin, the 61-page book is the biggest and best directory we have ever had. One useful innovation is the inclusion of telephone numbers (when they are known), greatly enhancing the utility of the book.

A copy of the new directory has been mailed to each of our people.

W.F. Thompson 1990 Award Winner



Carole C. Baldwin

Carole C. Baldwin has been judged the winner of AIFRB's W.F. Thompson Award for 1990. The award, $750 and a certificate, is for the published student paper deemed to be the best contribution to knowledge among annual submissions. Carole's winning paper, *Morphology of the larvae of American Anthiinae (Teleostei: Serranidae), with comments on relationships within the subfamily*, was published in Copeia (No. 4, 1990).

Her research led to a Master of Science degree through the Charleston Higher Education Consortium Graduate Program in Marine Biology at the College of Charleston, Charleston, South Carolina. Dr. G. David Johnson, Curator of Fishes at the National Museum of Natural History, Washington, D.C. and Carole's advisor, submitted Carole's paper to AIFRB for consideration by the committee.

Jack Helle, AIFRB President, presented the award and offered contratulations from AIFRB.

1992 AIFRB Associates' Research Awards

Dr. Joseph Rachlin, Chairman of the Associates' Research Award Program, announces that selections have been made for awards to nine associate members of AIFRB to help the recipients present papers at national and international meetings. $2,100 will be distributed among the winners. The selectees, their affiliations, and abstracts of their papers are presented here:

Dr. Mark C. Benfield, a former graduate student of Dr. Sammy Ray of Texas A&M University at Galveston, will present a paper which summarizes the results of his doctoral research at the 1992 Joint Estuarine and Coastal Sciences Association (ECSA)/Estuarine Research Federation (ERF) Conference in Plymouth, UK in September.

ESTUARINE OLFACTANTS—POTENTIAL ORIENTATIVE CLUES FOR POSTLARVAL PENAEID SHRIMP

Postlarval brown shrimp *Penaeus aztecus* and white shrimp *P. setiferus* are estuarine-dependent species supporting a substantial commercial fishery. The mechanisms by which postlarvae orient towards estuaries and their nursery habitats within these systems are poorly understood. While salinity has frequently been proposed as an orientative clue, anecdotal evidence suggests postlarvae may also respond to olfactants.

A dichotomous laminar-flow choice chamber was developed to measure the responses of postlarvae to olfactants. Individual animals were provided with a free choice between two water types separated by a steep concentration gradient. In replicate experiments, both *P. aztecus* and *P. setiferus* were significantly attracted to water from a West Galveston Bay, Texas saltmarsh over a carbon-filtered synthetic seawater control. Preliminary experiments conducted with *P. aztecus* indicated that estuarine water lost its attractiveness over winter, suggesting biogenic production of the olfactory agent.

Experiments were unable to conclusively identify the origins of the attractive agents. Postlarval brown shrimp did not demonstrate significant attraction to the odor of smooth cordgrass *Spartina alterniflora* or *Spartina* detritus. Responses to epiphytic material from *S. alterniflora* were equivocal but suggested a potential attractant source. Significant avoidance of the odor of amphipods *Gammarus mucronatus* was observed in two of three experiments.

In the presence of a non-repellent odor, postlarvae turned upstream more frequently than downstream in the olfactant-treated stream with the reverse pattern in the control. The generally low incidence of turning rendered most comparisons of turning frequency non-significant. Turning patterns may indicate that attractive odors function as a sign stimulus, releasing a positive rheotaxis which assists postlarvae in locating odor sources. Olfactants should provide a consistent signal regardless of the prevailing salinity regime within an estuary and may assist postlarvae in locating Galveston Bay and/or nursery habitats within this system.

Ms. Nancy Bower, a graduate student working under the direction of Dr. Jay Stauffer at the Pennsylvania State University, presented two papers on aspects of her thesis research at the American Society of Ichthyologists and Herpetologists Annual Meeting in Illinois in June 1992.

A NEW SPECIES OF ROCK-DWELLING CICHLID (PISCES: CICHLIDAE) FROM LAKE MALAWI, AFRICA, WITH COMMENTS ON *Melanochromis vermivorus* TREWEVAS

Morphometric and meristic measures were obtained from six populations of Lake Malawi fishes purported to belong to the species *Melanochromis vermivorus* Trewevas and compared with measures from the type material of *M. vermivorus* . Multivariate statistical analysis of the data revealed differences between the type material and the sampled populations with respect to both shape and meristic measures. In addition, an undescribed species, *M.* sp. 'chinyamwezi' (endemic to Chinyamwezi Island), was shown to be conspecific with the six putative populations of *M. vermivorus*. Within the seven populations, slight differences in coloration and color pattern were observed, but there was substantial overlap in morphometric and meristic measures. Based on our results, we describe a new species of *Melanochromis* that includes the six populations previously identified and *M. vermivorus* and the previously undescribed *Melanochromis* species from Chinyamwezi Island.

INTRA- AND INTERSPECIFIC MITOCHONDRIAL DNA SEQUENCE VARIATION WITHIN THE GENUS MELANOCHROMIS (PISCES: CICHLIDAE) FROM LAKE MALAWI, AFRICA

Evolutionary biologists have long speculated on the mechanisms responsible for the explosive speciation of fishes in the African Great Lakes. In Lake Malawi, there are approximately 350 described species with an additional 500 to 700 undescribed species. Ninety-nine percent of these species are endemic and have evolved within the lake over the last 1-2 million years. Lack of suitable morphological characters has made reconstruction of intralake phylogenies difficult. We analyzed mtDNA sequence variation in a 448 bp segment of the control region in two populations each of two species of *Melanochromis* from Lake Malawi. We found essentially no sequence variation within populations and the amount of variation between populations depended upon the species. The two populations of *Melanochromis vermivorus* Trewevas differed by only two base pairs (0.4%), whereas the two populations of *Melanochromis auratus* (Boulenger) differed by seven base pairs (1.6%). Comparison of these sequences with those of other species of rock-dwelling cichlids suggested that with respect to the region of mtDNA analyzed, *M. vermivorus* appeared to be monophyletic, but *M. auratus* appeared polyphyletic. Our results indicate that mtDNA sequence variation should be useful in examining relationships among geographically sympatric species and allopatric conspecific populations.

Mr. David Bushek, a graduate student working under the direction of Dr. Standish K. Allen, Jr. at Rutgers University's Shellfish Research Laboratory, presented a paper on aspects of his thesis research at the May 1992 Aquaculture meeting in Orlando, Florida.

PERKINSUS RACES: MANAGEMENT IMPLICATIONS AND INITIAL OBSERVATIONS OF GEOGRAPHICALLY DISTINCT ISOLATES

Pathogenic organisms often develop races with different levels of virulence or environmental tolerance. *Perkinsus marinus*, a major pathogen of the American oyster *Crassostrea virginica*, has been studied for more than 40 years yet there is virtually no information concerning the existence of races. Such information is critical for development of control strategies and resistant oyster stocks, and screening non-native species for resistance. Observations on the distribution and virulence of *P. marinus* in the field suggest races may exist that vary in salinity tolerance, temperature tolerance, and possibly virulence. This study represents an initial comparison of geographic isolates of *P. marinus*. Oysters infected with *P. marinus* were collected from several sites in the Gulf of Mexico and along the Atlantic Coast of the United States. Growth and development of isolates were compared under standard thioglycolate culture at various temperatures and salinity. Production of zoospores was also compared. Results are discussed in the context of disease management and directions for future research.

Dr. Jon S. Chen, a former graduate student of Dr. Cheng-i Wei of the University of Florida, presented two papers on the results of his dissertation research at the 1992 Institute of Food Technologists Annual Meeting, in New Orleans, Louisiana in June.

STRUCTURAL COMPARISON OF CRUSTACEAN, PLANT, AND MUSHROOM POLYPHENOL OXIDASES

The unfavorable enzymatic browning caused by polyphenol oxidase (E.C. 1.14.18.1: PPO) on the surface of many plants and seafood products has been of great concern to food processors and scientists. Although melanin formation does not affect the nutrient content of food products, it is perceived as spoilage by consumers. Economic loss resulting from PPO has always been significant and presents a practical problem to the food industry. Enzymatic browning of fruits, vegetables, and crustaceans due to PPO activity has been extensively studied.

Differences in the secondary structure between trypsin and endogenously activated forms of Florida spiny lobster PPO was recently demonstrated using spectropolarimetry. In addition it has been reported that PPO from plant and crustacean sources not only varied with respect to catalytic activity in the oxidation of DL-bets-3,4-dihydroxyphenylalanine (DL-DOPA) but showed different sensitivity to inhibition by kojic acid (5-hydroxy-2-hydroxymethyl-gamma-pyrone), a fungal metabolite.

In this study, PPO from crustaceans (lobster, white and brown shrimp), potato, and mushroom were compared with respect to native molecular weight, subunit size, secondary structure, and immunochemical properties. Results showed varied subunits with different molecular weights existed among these enzymes. Although these PPOs were shown to share similar antigenic determinants, they however varied in their secondary structures.

INACTIVATION OF POLYPHENOL OXIDASE BY HIGH PRESSURE CARBON DIOXIDE

Undesirable enzymatic browning caused by polyphenol oxidase (E.C. 1.14.18.1; PPO) on the surface of fruits, vegetables, and seafood products has been of great concern to food processors because the formation of melanin reduces consumer acceptability of these products.

Supercritical (SC) fluid using carbon dioxide (CO_2) as solvent has been reported to inactivate peroxidase, apple PPO, and pectinesterase. Although SC-CO_2 has been studied for its inactivation effect on PPO, alpha-amylase, glucose oxidase, lipase, and catalase activity, information regarding the inactivation effect and kinetics of SC-CO_2 on purified PPO has not been elucidated. This study was thus undertaken to investigate the effect of SC-CO_2 on the inactivation of purified Florida spiny lobster, brown shrimp, and potato PPO.

Results showed lobster, brown shrimp, and potato PPO exhibited a time-related decline in activity following treatment at 43 °C with high-pressure CO_2 at 58 atm. The kinetics showed these three PPOs were more susceptible to the combined treatment of high-pressure CO_2 and heat than to heat alone. The study also showed crustacean PPOs were more vulnerable than potato PPO to high-pressure CO_2 treatment. The high-pressure CO_2-treated and non-treated PPO varied with respect to electrophoretic protein patterns and isoelectric profiles as well as secondary structures.

Mr. Gregory A. DeBrosse, working with Dr. Standish K. Allen, Jr. at Rutgers University's Shellfish Research Laboratory, presented a paper on aspects of their research at the May 1992 Aquaculture meeting in Orlando, Florida.

CONTROL OF OVERSET ON CULTURED OYSTERS USING BRINE SOLUTIONS

HSRL has a long standing program in oyster genetics and breeding. One of the worst scenarios for maintenance of broodstocks is overset by native oysters. Preliminary experiments in 1990 indicated that overset might be controlled simply by immersing animals in a concentrated brine solution; such treatments in 1990 resulted in 89-100% mortality of < 1mm spat. In 1990 field tests, overset on broodstocks was reduced to 3 spat/oyster using 200 ppt immersions compared to 22 spat/oyster in controls. In 1991 we refined the parameters for effective brine dips. First, we tested survival of oysters (potential substrate for overset) immersed for 2, 5, or 10 minutes in 200 ppt brine followed by either 3 or 6 hours aerial exposure. For juveniles, cumulative mortalities ranged from 3-6% compared to 5% in controls, for adults, 2-4% died after brine immersion and 2-3% died in controls. Second, we tested survival of hatchery-set oyster spat immersed in 200 ppt brine. For spat with shell lengths < 5.0 mm and immersed in 200 ppt brine for 2, 5, or 10 minutes, 57%, 70% and 83% died after 3 hr aerial exposure and 64%, 85% and 86% died after 6 hr aerial expsoure. Control mortality averaged about 23% in both 3 and 6 hr aerial exposures. For larger spat immersed in 200 ppt brine for 10 minutes, cumulative mortality was 47% and 88% for 3 and 6 hr aerial exposure, respectively, and 22% and 32% for controls. Results of 1990 field tests and 1991 experiments demonstrate that brine solutions will be effective and save considerable labor.

Mr. Jonathan G. Kennen, a graduate student working under the direction of Dr. Neil H. Ringler at the State University of New York, College of Environmental Science and Forestry at Syracuse, NY, presented a paper on aspects of his thesis research at the 48th Annual Northeast Fish and Wildlife Conference in Norfolk, Virginia in May 1992.

QUANTIFYING MIGRATION OF NATURALLY PRODUCED *Oncorhynchus* SMOLTS IN THREE EASTERN LAKE ONTARIO TRIBUTARIES

Tributaries of eastern Lake Ontario support a diverse fish fauna, including naturalized populations of brown trout (*Salmo trutta*), four species of *Oncorhynchus* and an additional 35 fish species. Decisions regarding fishing regulations and salmonid stocking in Lake Ontario are currently made with insufficient information on stream dynamics. Our objectives were to 1) determine the number of adult Pacific salmon based on carcass counts, 2) estimate naturally produced salmonid smolts using auger traps, and 3) develop a stock-recruitment model for chinook salmon.

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Associates' Research Awards cont.

Carcass biomass in a fished stream averaged 57% lower than in an unfished system during 1987-91. More jacks, a higher male:female ratio, and smaller size at maturity characterized the fished population, suggesting that an intense gauntlet fishery removes disproportionate numbers of large salmon. Capture efficiencies ranged from 1.3-18%, 3.7-16%, 3.5-14% for chinook, coho, and steelhead smolt, respectively. Mean trapping efficiency for all species recaptured was 9.5%. Annual estimates of chinook smolts in an unfished stream ranged from 1,440 to 57,592; and in two fished streams from 56 to 3,904 smolts. The percentage of chinook smolts emigrating during storm events ranged from 31-79%. Steelhead (*O. mykiss*) and coho (*O. kisutch*) smolts showed protracted migration patterns; however, chinook (*O. tshawytscha*) smolts tended to migrate in large pulses in June and July. An overall decline in adult chinook salmon was apparent from 1987 to 1991. A stock recruitment relationship between chinook smolt and adult numbers was evident. Recent changes in fishing regulations, however, may dramatically alter the number of smolts produced. Estimates suggest that natural reproduction from these highly productive eastern Lake Ontario streams may account for a greater proportion of the salmonids recruited to eastern Lake Ontario than originally perceived.

Mr. David Love, a graduate student working under the direction of Dr. William Eaton at the University of Alaska Fairbanks, at Fairbanks, Alaska, presented a paper on aspects of his thesis research at the American Fisheries Society-Western Fish Health Section Meeting in Nanaimo, British Columbia in June 1992.

BITTER CRAB DISEASE IN AUKE BAY TANNER CRABS

Incidence and average intensity of Bitter Crab Disease (BCD) in Auke Bay Tanner crabs (*Chionoecetes bairdi*) were significantly greater during June through September of both 1989 and 1990 than during October through May. BCD is a chronic but fatal disease; crabs did not develop immunity and often died from secondary bacterial and ciliate infections. Total mortality exceeded incidence and was not significantly different between summer and winter seasons or between years. BCD appears to be host-specific: red king crabs (*Paralithodes camtschaticus*) and Dungeness crabs (*Cancer magister*) did not contract BCD post-injection. BCD amoeboid stages consistenly caused disease in Tanner crabs when injected into the hemocoel, while dinospore stages did not. Waterborne challenges did not cause disease. BCD parasites did not occur intracellularly, remaining within the hemal and vascular systems. Parasites exited the host via gills and possibly esophagus. The life cycle of BCD dinoflagellates outside their hosts remains incompletely described.

Ms. Mirella C. Martinez, working under the direction of Dr. Sammy M. Ray at Texas A&M University at Galveston, Texas, presented a paper on aspects of her research at the 1992 World Aquaculture Society Meeting in Orlando, Florida in May.

POSSIBLE GENETIC INFLUENCES ON THE GROWTH RATE AND SURVIVAL OF TWO POPULATIONS OF *Crassostrea virginica*

Laguna Madre (LM), Texas, has unique populations of oysters, *Crassostrea virginica*, that are genetically distinct from all other Atlantic populations. The LM is also a unique environment, characterized by extreme hypersalinities and high summer temperatures. We examined growth of LM oysters relative to Galveston Bay (GB) oysters to determine if this genetic differentiation is correlated with oyster physiology. Oysters were acclimated to a common environment and mass-spawned to produce two pure populations (GB×GB=GG, LM×LM=LL) and the reciprocal crosses (GB×LM=GL, LM×GB=LG). Larvae were grown in 20 ppt and 40 ppt. The paternal GB crosses grown in 40 ppt died at the larval stage. Spat from surviving groups were grown in LM and GB. At both locations, LL_{40ppt} and LL_{20ppt} spat grew significantly faster than GG_{20ppt} spat. Growth of all reciprocal crosses were intermediate and showed significant parental effects. LL_{20ppt} growth was similar in both locations. GG_{20ppt} spat in LM grew faster than siblings in GB, but significantly slower than any LL cross. Some authors have speculated that LM populations have genetically adapted to their environment, while others have suggested that drift and isolation are responsible for the observed differentiation. These preliminary results are consistent with the isolation hypothesis but indicate that some physiological differentiation may have occurred as well.

AIFRB Awards

The Board of Control meeting at Rapid City, South Dakota on September 12 and 13 will make final selections on two of our prestigious awards—Outstanding Achievement Award for Individuals and Group Award of Excellence. These awards recognize outstanding accomplishments by individuals and groups that reflect the high standards we expect for these honors.

AIFRB Outstanding Achievement Award for Individuals

This award is reserved for persons who have authored significant publications in fisheries, have rendered exceptional service to the profession, have demonstrated outstanding teaching or training of students, have been responsible for important discoveries or inventions, or have made major contributions to the advancement of fishery science. Recipients have been:

Elbert H. Ahlstrom	1979
James E. Sykes	1980
F. Heward Bell	1981
Richard H. Stroud	1982
Kenneth D. Carlander	1983
David W. Schindler	1984
Peter Larkin	1985
William G. Gordon	1986
William F. Royce	1987
Reuben Lasker	1988
————	1989
————	1990
Robert L. Burgner	1991

AIFRB Group Award of Excellence

This award is given to an organization which has established an outstanding record of contributions to fisheries. The criteria for judging are similar to those for the award for individuals—significant publications, exceptional service, outstanding teaching or training, important discoveries or inventions, and major contributions to the advancement of fishery science. In the past, awards have gone to:

Canadian Journal of Fisheries and Aquatic Sciences	1982
Great Lakes Sea Lamprey Control Program	1983
Harvesting Technology Division, NMFS	1984
Sport Fishing Institute	1985
————	1987
Southwest Fisheries Center, La Jolla	1988
————	1989
————	1990
————	1991

W.F. Thompson Awards

Award for 1989

The nominating process for the W.F. Thompson Award for the best student paper of 1989 has been reopened, as only two papers have been submitted. All readers of BRIEFS are urged to try hard to think of papers based on student research published in 1989 and to send copies of these to the chairman of the committee. Former students may nominate their own papers.

This award recognizes outstanding student research in fisheries. The criteria for nomination and selection are:

the research was done while the nominee was a student; the publication of the research may be multi-authored, but the student must be the senior author; the paper was published in 1989; the paper pertains to fish or fisheries; only the student who performed the research is eligible for the award.

The winner of this award will receive $750 and a certificate. Any co-authors will receive certificates, but no cash.

The chairman of the committee to review the nominations for this award is Dr. William H. Bayliff, an AIFRB Fellow.

Nominations, including six reprints of each paper, should be sent to:

Dr. William H. Bayliff
Inter-American Tropical Tuna Commission
Scripps Institution of Oceanography
8604 La Jolla Shores Drive, La Jolla, CA 92037-1508

Award for 1990

The W.F. Thompson Award for the best student paper of 1990 has been won by Carole C. Baldwin, now with the Institute of Marine Science, College of William and Mary in Virginia, Gloucester, Virginia. An article in this issue of BRIEFS treats Ms. Baldwin's victory.

Award of 1991

Nominations for the 1991 award are being reviewed, and it is hoped that Dr. Bayliff will have an announcement for the Board of Control meeting in September.

District News

Northern Alaska **Stephen M. Fried,** *Director*

The Northern Alaska District was formed because fishery biologists in the central and northern part of Alaska felt that their interests in AIFRB forums would be better represented. This idea for a new district took shape in the early 1980s and spawned a fledgling *ad hoc* northern Alaska group which convened monthly meetings in Anchorage for brown bag lunch seminars. That group continued to move for the formation of a new northern district since most of Alaska District activities were held in the Juneau/Auke Bay area, where most AIFRB members lived. The northern Alaska group was successful in convincing the AIFRB Board of Control to split the Alaska District into two districts—Northern and Southeast. William J. Wilson was appointed the first Director of the Northern Alaska District in mid-1988. He held this office until the fall of 1991, when he stepped down and Stephen M. Fried accepted the directorship for the district. Since its inception, the Northern Alaska District has been quite active in national AIFRB activities and meetings. The Northern Alaska District has been represented at every annual Board of Control meeting since the district was formed in 1988.

In 1992, the District has sponsored the following seminars: February—*Effective presentation graphics*; March—*Reestablishing lake trout in the Great Lakes: Application of research to management problems*; April—*Genetics and fisheries management.*

Southeast Alaska **Malin Babcock,** *Director*

This District held a potluck dinner for officers and guests of honor at the Gastineau Hatchery on June 6. Jim and Mary Lou King, who won a Chevron Conservation Award in 1989, gave an excellent program based on their activities and the Award. The Kings were nominated by the District for the Chevron Award in 1989 for their varied and extensive work in Alaska in the area of wetlands habitat conservation and education. The Mendenhall Wetlands Refuge in the Juneau, Alaska area is a direct result of their combined efforts. Jim King has had a noteworthy career with the U.S. Fish and Wildlife Service, working primarily with waterfowl, and Mary Lou King was instrumental in the establishment of a highly successful Alaska statewide program which includes marine and wetlands educational curricula for elementary and middle school children.

Tamra Faris, District Secretary-Treasurer; Joyce Landingham, Chair, District Nominating Committee; Jim King; Mary Lou King; Malin Babcock, District Director; and John Strand, District Director-Elect.

Northern California **Tom Lambert,** *Director*

The kickoff for the District's 1991-92 activities was the annual September planning meeting which was held at outgoing Director Ed Ueber's San Francisco office of the Gulf of the Farallones National Marine Sanctuary. We enjoyed a great view of the fog rolling through the Golden Gate at sunset. The main topic of the business portion of the meeting was selecting subjects and speakers for the year's three dinner meetings. More people than ever turned out for this meeting, in part to see AIFRB member Chris Dewees demonstrate the art of gyotaku, Japanese fish printing. Chris, whose gyotaku art work has been exhibited at the Smithsonian and California Academy of Sciences, started by producing a beautiful rendering of a surf perch. We then all tried printing fish on paper and T-shirts, with varying degrees of success and howls of laughter over some very bizarre-looking fish impressions.

The first dinner meeting was held at an Oakland restaurant on November 6, 1991. Josh Collins of the Department of Geography, University of California, Berkeley gave a fascinating talk on *What is a Tidal Marsh? Landscape, Ecology, and Policy*. Josh described how tidal marshes

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District News cont.

form and their ecological and hydraulic dynamics. With a remarkable series of aerial photos he showed how the network of channels and pools in a marsh undergo dramatic natural redistribution over the course of a few decades. He also explained how the intricate hydraulics of marshes makes it very difficult to engineer the creation of new tidal marsh or to restore former marshlands.

Thirty-seven members and guests attended our annual banquet at a San Francisco Chinese restaurant selected by the District's epicure, Tom Jow. Our January banquet is strictly a social event to share interesting conversation over a great feast.

At our March dinner meeting held in San Rafael, University of California, Davis professor Peter Moyle, spoke on *Salmon, Steelhead, Sturgeon and Smelt: California's Threatened Anadromous Fishes*. Professor Moyle presented a disturbing status report showing that virtually all California anadromous fish species are declining. Some of the species may soon be deserving of protection under the Endangered Species Act (ESA). But protection measures taken under the ESA can create dilemmas. For example, a flow schedule designed to protect the spawning and incubation of the federally protected Sacramento River winter-run king salmon from lethal water temperatures may also increase spawning and incubating mortality in spring and fall-run salmon. The Sacramento spring-run salmon is a likely candidate for listing as threatened under the ESA, while the Sacramento fall-run is California's principal sport and commercial salmon fishery.

The final speaker of the series was Bruce Herbold who discussed *The Clean Water Act and its role in the protection of San Francisco Bay-Delta fish habitats*. Speaking at our May 7, 1992 dinner meeting in Sunnyvale, Dr. Herbold outlined the complex legal issues in the myriad clashing demands for California's water. He noted that the Federal EPA will closely follow the State Water Resources Central Board's (SWRCB) development of new water quality standards for the Bay-Delta. In consideration of the dwindling fish populations, the EPA may again challenge any standards set by the SWRCB that they feel are inadequate. The EPA also seeks to speed along the process of setting standards in light of rapid downward spiral of some of the Bay-Delta fish populations.

Southern California

M. James Allen, *Director*

The Southern California District held two business meetings during the first half of 1992 and conducted two symposia. The first business meeting of the year was held on January 30, 1992, at El Adobe Restaurant in San Juan Capistrano. The meeting included a business session and a presentation by Dr. Paul Smith (Southwest Fisheries Science Center, National Marine Fisheries Service, La Jolla, CA), who spoke on *Interactions of populations of pelagic fishes within their communities*. Dr. Smith's presentation described large scale temporal cycles of pelagic fish species of the California Current system and noted how little is known about most species in the pelagic community. Natural cycles in abundance of the many relatively unstudied species of the pelagic community may be the driving force behind intermediate-range population cycles of commercially important pelagic fishes.

The District held a symposium entitled *Harvest Refugia, an Alternative Tool for Fisheries Management* on March 23, 1992, at Cabrillo Marine Museum, Los Angeles. The Symposium Committee consisted of Pete Haaker, Gary Davis, Jim Allen, Marty Golden, and Ann Brierton. About 80 persons attended the symposium which featured nine speakers and a panel discussion. Speakers included Dr. Gary Davis and Dr. Jennifer Dugan (Channel Islands National Park); Dr. Scoresby Shepherd (South Australia Department of Fisheries); Dave Parker, Jim Hardwick, and Gordan Cribbs (California Department of Fish and Game); Dr. Harry Helling (Orange County Marine Institute); Dr. Dan Reed (University of California, Santa Barbara); and Dr. Michael Crosby (NOAA's Sanctuary and Reserves Division). Talks included an introduction, review of literature, role of refugia in South Australia, Marine Resources Protection Act reserves in California, effects of refugia on rockfishes, the role of public education, design and enforcement considerations, and the role of NOAA's National Marine Sanctuaries in refugia research. A panel including the symposium speakers and Locky Brown (Greater Los Angeles Council of Divers), Bob Fletcher (Sportfishing Association of California), and Steve Rebuck (California Abalone Association) discussed constraints, concerns, and difficulties of harvest refugia design.

The second business meeting of the year was held on April 23, 1992, at the same location. Jim Allen reported on the success of the Harvest Refugia Symposium and announced that Ann Brierton (Occidental College, Redondo Marine Laboratory) had been appointed Vice-Director; Ann had also served as Vice-Director from 1987 to 1990. The presentation at this meeting was given by Dr. Robert J. Lavenberg (Natural History Museum of Los Angeles County), who spoke on *Life history research on California halibut (*Paralichthys californicus*)*. The presentation described life history research being conducted by the Natural History Museum at Southern California Edison Company's Redondo Marine Laboratory. Laboratory-kept halibut spawned almost daily during the peak spawning period, resulting in a higher-than-expected fecundity. The rearing program at the lab has proven sufficiently successful to provide a source of juvenile halibut for early life history research needs.

The District held a symposium entitled *Biology of marine and freshwater fishes of California* at the Southern California Academy of Sciences meeting on May 2, 1992, at Occidental College. Ten speakers braved riot-torn Los Angeles to present results of recent research on southern California fishes. Speakers included Dr. Camm Swift (Natural History Museum of Los Angeles County), Dr. John Stephens (Occidental College), Dr. Jonathan Baskin (California Polytechnic University, Pomona), Dr. Michael Horn and Dr. Kathryn Dickson (California State University, Fullerton), Manny Ezcurra and Dr. Richard Bray (California State University, Long Beach), Dr. Don Buth and M.A. Chotkowski

(University of California, Los Angeles), and Dr. James Malcolm (University of Redlands). Freshwater fish topics included an age and growth study on arroyo chub (*Gila orcutti*), population genetics of suckers (Catostomidae), and intraspecific variation in threespine stickleback (*Gasterosteus aculeatus*). Marine fish topics included phylogenetics of Northeast Pacific gobies, diversity of intertidal fishes, urban impacts to the King Harbor fish assemblage, microbial digestion of the herbivorous halfmoon (*Medialuna californiensis*), movements and behavior of Pacific electric ray (*Torpedo californiensis*), and aerobic and anaerobic capacities of endothermic fishes. Dr. Jim Allen served as moderator for the symposium.

The District also presented an award of $100 for Best Student Paper in Fishery Biology at the Southern California Academy of Science Meeting to M. Refik Orhun (San Diego State University/Hubbs-Sea World Research Institute, San Diego). Refik's paper was entitled *Early life history research of white seabass* (Atractoscion nobilis).

Dissertation Abstract

A Bioenergetics Analysis of Yellowfin Tuna (*Thunnus albacares*) Predation in the Eastern Pacific Ocean

Robert J. Olson, Ph.D. 1990

University of Wisconsin-Madison

A bioenergetics model was constructed to evaluate the trophic dynamics underlying production of yellowfin tuna, an important apex predator in the eastern Pacific Ocean. Predation dynamics were studied using physiological parameters from previous studies, diet data from yellowfin caught in association with dolphins by the purse-seine fishery, and environmental data. The model provided a tool to examine a hypothesis that sexually dimorphic growth is due to higher spawning costs in females than males. Estimates of the energy differential required to balance female and male growth rates and of average daily spawning costs in males were produced, based on the assumption that the average individual yellowfin, upon reaching sexual maturity, spawns over a 2-month period each year. The bioenergetics model was configured to simulate the condition that the accrual of energy for reproduction takes place by increased food consumption, rather than by gradual increases in gonad mass or body reserves under a regime of constant consumption rates. Model simulations showed that consumption by the average individual must increase substantially during the hypothesized spawning seasons, but the diet data did not show markedly increased rations during those months.

New information on food selectivity and resource limitation was provided. Diet breadth calculated using model predation estimates correlated significantly with the depth of the upper mixed layer of the ocean at the stomach sampling locations ($0.05 > P > 0.02$). An interpretation based on optimal foraging theory suggests that preferred prey became limiting in availability when the volume of the epipelagic habitat increased. Frigate and bullet tunas (*Auxis* spp.), the dominant prey when diet breadth was low, appear to be preferred. Smaller, less-profitable prey were added to the diet during the quarters when diet breadth was greater. Thus, contrary to the long-held view of an opportunistic forager, yellowfin appear to forage optimally and select prey by particle size.

Diet data for 1970-1972 provided a natural experiment due to the reduced productivity associated with El Niño Southern Oscillation (ENSO) warming in 1972. The index of diet breadth was lower than expected during the fourth quarter of 1972, when ENSO warming was most pronounced and widespread in the major fishing areas. Reduced food supply, however, was indicated by a high percentage of empty stomachs in the yellowfin taken during that quarter.

In Memoriam

Arnie J. Suomela

AIFRB Emeritus 1971

June 17, 1992

Arnie J. Suomela of Seattle, Washington, died on June 17th at the age of 89.

Arnie graduated from Ilwaco High School in 1920 and enrolled in the newly established College of Fisheries of the University of Washington in Seattle that fall. He was in the third graduating class of the College when he received his B.S. degree in 1924. Upon graduation, Arnie received an appointment as "Fish Warden" in the "Alaska Service". One of his first assignments was to assist in salmon tagging experiments in Southest Alaska. Upon completion of tagging and the collection of tag returns in 1924, he was sent to Cordova to take charge of that office while the regular agent was on annual leave.

While in Cordova, he also coached the high school basketball team, which became the city league's champion.

He returned to the University of Washington and received his Master's Degree in 1931. He was then sent to the Fishery Laboratory in Palo Alto to continue his studies of the Bristol Bay red salmon, and then he received a call from the Commissioner of the U.S. Bureau of Fisheries, asking that he come to Washington, D.C. to take charge of the Pribilof Fur Seal Management Program.

In January 1936, he married Rhea Withers of Spokane, Washington and they recently celebrated their 56th anniversary.

Arnie came to the Seattle Montlake Fisheries Laboratory in 1934, and in 1939 he faced his greatest challenge. Grand Coulee dam, which was then under construction, would be a complete barrier to the upstream migration of adult salmon, and steps had to be taken to try to salvage the salmon runs that spawned in tributaries of the Upper Columbia River. Arnie was responsible for the successful transfer by truck of adult chinook, blueback, steelhead, and silver salmon from traps at Rock Island dam to existing salmon streams below Grand Coulee. This was the largest and most extensive salvage and relocation program for salmon ever completed in the United States and probably the world.

In 1942, he left the federal service to join the Washington State Department of Fisheries as the State's Biologist for Management.

In 1945, the Oregon Fish Commission appointed Arnie as their "Master Fish Warden" and in 1947, the legislature passed a Bill prepared by Arnie that changed the title to Director of Fisheries for the Fish Commission of Oregon.

In 1953, Secretary of the Interior Douglas McKay requested permission from the Oregon Fish Commission that Arnie be released for the summer to investigate the administration and management of the U.S. Fish and Wildlife Service in Alaska. Probably the most important recommendation Arnie made was that the U.S. Fish and Wildlife Service be divided into two Bureaus: first, the Bureau of Commercial Fisheries and second, the Bureau of Sports Fisheries and Wildlife, with Area Directors in charge of both Bureaus.

In 1954, Arnie was appointed Assistant Director of the U.S. Fish and Wildlife Service in Washington, D.C. and later, Associate Director. In 1956, President Eisenhower nominated him as the new Commissioner of the reorganized Fish and Wildlife Service, a position he held until the administration changed in 1960. In addition to his responsibilities for fish and wildlife in the United States, he also served as U.S. Commissioner on a number of International Commissions.

In 1961, Arnie was appointed by the U.S. State Department to be the Fishery Attache in the American Embassy, Tokyo, Japan. In this highly political and extremely sensitive position, Arnie maintained incredibly good relations with the Japanese industry and the Foreign Office while retaining the trust and support of fishing interests in the United States.

Arnie was a charter member of the Pacific Fisheries Biologists, a Fellow Emeritus of the American Institute of Fishery Research Biologists, and a member of the National Association of Retired Federal Employees. Academic Honors included an Associate Member of Sigma Xi, Phi Sigma Biology

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In Memoriam cont.

Honorary Society, and a member of Lambda Chi Fraternity. He was a 50-year member of Royal Arch Masons, Knights Templar, and the Al Kadar Shrine for Crippled Children. He was a Senior Consultant on the auxiliary faculty of the College of Fisheries, University of Washington.

The family suggests remembrances be made to the University of Washington School of Fisheries Scholarship Fund, WH-10, University of Washington, Seattle, WA 98195.

Eugene M. Maltzeff

AIFRB Member 1963

October 22, 1991

Gene was born in Khabarovsk, Siberia, where his father was an officer in the Russian Imperial Army. The family, including Gene, his mother and father and his sister Lydia, emigrated to the United States in 1922.

He received an A.A. degree from San Mateo Junior College in 1932. Later he transferred to the University of Washington (B.S. in Fisheries, 1939). Graduate work was there and at the University of California at Berkeley in 1940.

In 1946 Gene married Ann Hok of Vancouver, B.C. This event occured in the St. Nicholas Russian Orthodox Cathedral in Seattle, and was attended by many of Gene's fishery friends. They had a son, Eugene E. and a daughter, Natasha.

Gene's fishery career started in the 1940's with the Fish and Wildlife Service. During World War II he worked in a variety of administrative and engineering jobs outside of fisheries. After the war Gene returned to fisheries, primarily in the Columbia River Basin. In 1968 he was classified as a Foreign Fisheries Analyst. In that capacity he made several trips to study foreign fisheries, particularly those of the Soviet Union.

Honors included a Meritorious Service Award for managing the evaluation of the Columbia River Indian Fishery. Gene was a member of AIFRB, and was listed in the 1974 edition of American Men and Women of Science.

After retirement from the government in 1975, he became a Licensed Consultant in Marine Affairs. Hobbies included playing the piano, tennis, volleyball, and fishing.

Gene's pleasant demeanor made him many friends. In a letter to Mark Morton he showed his sense of humor by listing his nicknames: "The Russian", "Curly", and "Mad Russian".

Membership Report

Inquiries regarding membership should be directed to Dr. Sammy Ray, Membership Chairman, Texas A&M University at Galveston, 5007 Avenue U, Galveston, Texas 77550.

BRIEFS, the newsletter of the American Institute of Fishery Research Biologists, is published six times a year. It is intended to communicate the professional activities and accomplishments of the Institute, its Districts, and Members; the results of research; the effects of management; unusual biological events; matters affecting the profession; political problems; and other matters of importance to the fishery community. Comments and contributions should be sent to the Editor, Dr. Oliver B. Cope, 15 Adamswood Road, Asheville, NC 28803. Subscription $20 a year to Institutions and Non-Members.

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FIRST CLASS

Address Correction Requested

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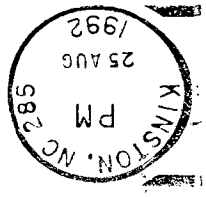

American Institute of Fishery Research Biologists

. . . BRIEFS . . .

VOL. 21, NO. 5 OCTOBER 1992

Board of Control Meeting—1992

The 1992 annual meeting of the AIFRB Board of Control was called to order by President Jack Helle at 8:30 a.m. on September 12 at the Holiday Inn Rushmore Plaza Hotel in Rapid City, South Dakota. At the 2-day meeting were: Jack Helle, President; Vaughn Anthony, President-Elect; Charles Cole, Past-President; Katherine Myers, Secretary; Joseph Rachlin, Treasurer; Sammy Ray, Membership Chairman and Texas District Director; Oliver Cope, BRIEFS Editor; John Merriner, Production Editor; Steve Fried, Northern Alaska District Director; Malin Babcock, Southeast Alaska District Director; John Strand, Southeast Alaska District Director-Elect; Tom Lambert, Northern California District Director; Jim Allen, Southern California District Director; Barbara Warkentine, New York-New Jersey District Director; William Royce, Northwest Washington District Director; and Kirk Beiningen, member from the Oregon-Southwest Washington District.

After the determination that a quorum was present, the agenda was approved.

The minutes of the 1991 Board of Control meeting were approved. There was some discussion of the value of briefing books for the use of meeting participants in the future, and there was agreement that some form of briefing information would be useful.

Treasurer's Report

Treasurer Joseph Rachlin delivered his report for fiscal year 1992, as of August 15, 1992, and commented on various

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Players in the Board of Control meeting at Rapid City, South Dakota in September 1992. Front row: **Steve Fried**, *Director*, Northern Alaska District; **Katherine Myers**, *Secretary;* **John Merriner**, *BRIEFS Production Editor;* **Sammy Ray**, *Membership Chairman;* **Oliver Cope**, *BRIEFS Editor*. Back row: **Jim Allen**, *Director*, Southern California District; **John Strand**, incoming *Director*, Southeast Alaska District; **Pete Cole**, *Past-president;* **Barbara Warkentine**, *Director*, New York-New Jersey District; **Jack Helle**, outgoing *President;* **Vaughn Anthony**, incoming *President;* **Bill Royce**, *Director*, Northwest Washington District; **Malin Babcock**, outgoing *Director*, Southeast Alaska District; **Tom Lambert**, *Director*, Northern California District; and **Joseph Rachlin**, *Treasurer*.

Board of Control Meeting cont.

features of AIFRB's fiscal operations. The Board, acting as auditors, examined the checkbooks, declared them to be accurate, and approved the report.

A list of 20 delinquent members was presented. These, having failed to pay dues for 3 years, are eligible for removal from AFIRB rolls. Some have agreed to pay back dues immediately; the rest will be removed.

A summary of the financial report follows:

CREDITS:		
Dues Receipts		$15,480.61
Balance Carryover From Fiscal 1991		16,712.41
Rental of Mailing List		422.80
	Total Credits	**$32,615.82**
DEBITS:		
Treasurer's Expenses:		
Assistant		$ 435.00
Insurance Bond		100.00
Computer Supplies, Mailing Labels		000.00
Treasurer's Stationery Stock		284.86
Dues Notice Postage		000.00
Bank Charges-Canadian Exchange Costs		6.33
	Subtotal	**$ 826.19**
BRIEFS:		
Production and Postage		$ 1,974.94
Coastal Press, Printing		4,155.61
Editor's Costs		35.88
	Subtotal	**$ 6,166.43**
Awards:		
Associate Member Research Award Program		$ 1,750.00
W.F. Thompson Award:-		
Carole C. Baldwin (1991-1992)		750.00
	Subtotal	**$ 2,500.00**
Other:		
AFS 1991 Meeting Contribution		$ 300.00
Travel to 1991 AIFRB Board Meeting		3,762.80
Membership Directory		2,662.87
President's Postage		000.00
Membership Brochures		519.72
Membership Committee Costs		588.75
Assistant to Membership Chair		2,000.00
Travel to 1992 AIFRB Board Meeting		135.00
	Subtotal	**$ 9,969.14**
	Total Debits	**$19,461.76**
ASSETS:		
I-Liquid:		
Prudential-Bache Money Market		$ 2,070.00
Prudential-Bache Cash Account		31.97
Checkbook Balance		13,154.06
II-Asset Funds:		
Blackstone Income Trust Inc. Sold 21 Jan. '92		
AIM Equity Funds, Const. Fnd. 705 sh.		$ 8,791.35
P-B. Municipal Ser. Fnd. NJ 1,372.441 sh.		15,662.00
P-B. Equity Fund: Class B 772.024 sh.		9,580.82
Franklin Tax Free Trust NJ 539.329 sh.		5,267.68
Van Kampen Merritt. Sold 10 Jan. '92		
Putnam Invest. Grade Muni. Trust 425 sh.		5,790.63
	Total All Assets	**$60,348.51**

Report on Publications

BRIEFS Editor Cope gave the following report:

This report marks an anniversary for the editor of BRIEFS—it is the tenth annual report he has submitted to the Board of Control. This activity has been a stimulating and rewarding experience, and has brought a feeling that the moderate success of BRIEFS has played a vital role in the life of AIFRB. It has been fascinating to note the different styles of the many AIFRB leaders with whom the Editor has served, and to realize that the Institute has moved forward and done great things in the face of the various degrees of participation and management methods that have prevailed. Through it all, the Editor has had thoroughgoing cooperation and encouragement from our directors; for this, the Editor is grateful.

BRIEFS had six issues in the past year, each carrying eight pages. Each issue had at least one figure, and the total for the year was 15 (much of it from Jack Helle's good photography). The format and content this year followed those of recent years, with the accent on AIFRB affairs and research on fishery and aquatic science topics. Some management items have appeared when they had research implications or had widespread interest within the fishery community.

Contributions from all sources for consideration for publication in BRIEFS this year numbered 270, compared to 285 last year. BRIEFS ran 74 of these, for a use rate of 27.4%, compared to 35.8% last year. Most offerings, by area, came from the Mid-Atlantic (61), followed by the South (33), New England (21), the West (20), the Midwest (9), Canada (3), and other parts of the world (5).

Six District Directors submitted reports of their activities. Northern Alaska and Northwest Washington sent three each; Southern California, two; and Southeast Alaska, Northern California, and Great Lakes, one each. Seven Districts sent none.

A large number of submissions were received from individual AIFRB people, mostly officers and committee chairmen. Notable in this effort were John Merriner, who, in addition to all his good work as Production Editor, management of the logo program, and his important part in publication of a new AIFRB membership directory, sent 44 items for consideration; Joseph Rachlin; Jack Helle; Sammy Ray; and Katherine Myers.

Four universities furnished dissertation or theses abstracts to BRIEFS—College of William and Mary in Virginia, Texas A&M University, University of Washington, and University of Wisconsin-Madison. This small number is much lower than we expected, in view of the strong interest expressed at recent Board of Control meetings.

John Merriner, Production Editor, reviewed his experience this year in distributing BRIEFS. He also reported that a new Directory of Members, dated May 1992, was mailed to the membership, and that a new brochure describing AIFRB's structure, objectives, and operations was prepared and distributed. John stated that the AIFRB exhibit he prepared last year will be in place again this year at the American

Fisheries Society meeting. Three District Directors requested that the exhibit be shipped to them for display at meetings in their Districts.

John Merriner, with help from others, is working on a revision of the by-laws.

Membership Report

The Membership Chairman, Sammy Ray, furnished a detailed summary in his report of the operations of his Membership Committee during the year. New applications for membership numbered 18—9 for Associate membership, 7 for Member status, and 2 for Fellow. All were approved. Of these, 2 were nominated by the membership, 12 were sent with curriculua vitae, 2 were sent with initial correspondence, and 1 former member rejoined.

The new members are employed as follows: 5.6% with the U.S. government, 5.6% with state government, 5.6% with private enterprises, 33.3% with universities, and 50% are graduate students.

Promotions were granted, 1 to Member status and 2 to Fellow rank. Six of our people became Emeritus this year.

AIFRB's total membership, which changes from day to day, is approximately 1,100.

Awards

Associates' Research Awards. Joseph Rachlin reported that the Institute disbursed $1,750 for these awards this year. As noted in BRIEFS (August 1992), nine winners received stipends to assist them in travel costs as they deliver papers at meetings of professional societies.

W.F. Thompson Best Student Paper Award. This year, this award for 1990 went to Carole C. Baldwin for her paper on larval morphology of Anthiinae, as reported in BRIEFS (August 1992). No selection has yet been made for this honor for 1989 or 1991, but the committee hopes to make selections soon.

Outstanding Achievement Award for Individuals. The Board of Control voted to give this prestigious award to a fishery scientist well known in the fishery community. The name will be revealed in a future announcement.

Group Award of Excellence. The Board decided upon a winner, but will make the announcement at a later date.

The Board discussed a report submitted by William Bayliff, Chairman of the AIFRB Awards Committee. The report dealt with the W.F. Thompson Award, it's history, the requirements concerning the award, the numbers of papers nominated, and ways of generating action in the university community. In its review of the report, the Board of Control felt the requirements for the award should be revised, with the deletion of several criteria that have applied in the past. This issue will be studied, and BRIEFS will carry an item in the future to clarify the criteria for submission and judging of nominations.

District Reports

Northern Alaska District

District Director Stephen Fried presented the following report:

No district meetings were held this year, but some modest accomplishments were made in other areas. Three issues of a district newsletter were written and distributed in November 1991, April 1992, and July 1992. Three seminars were sponsored and held at the regional Alaska Department of Fish and Game office in Anchorage. The first, in February 1992, was on effective presentation graphics. The speaker was Elmer Webster of Digital Graphics, Inc., a firm in Anchorage specializing in graphic arts. The second, in March 1992, was on reestablishment of lake trout in the Great Lakes. The speaker was Dr. Charles Kreuger of Cornell University, who was spending his sabbatical leave with the U.S. Fish and Wildlife Service in Anchorage. The third, in April 1992, was on genetics and fisheries management. The speaker was Dr. James Seeb of the Alaska Department of Fish and Game. Finally, Past-Director William Wilson and I wrote a brief history of the Northern District and submitted it to William Royce, who is compiling a history of AIFRB.

The Northern Alaska District covers a large geographic area but has only 23 members. I've attempted to recruit new members, and have handed out several applications. At least two people I contacted indicated they would be applying for membership.

I began my first year as District Director with $120.00, which was turned over to me by the departing director. Realizing that this sum of money would not allow me to begin a new life in the South Pacific, I decided to spend $43.27 on postage for District newsletters and refreshments at the seminars. This leaves a total of $76.73 remaining in petty cash for the District.

The logo submitted by Arthur Thompson, showing two fish and the North American continent, won unanimous approval from all Northern District members I contacted. One common comment was that the appropriate use of colors would serve to greatly enhance the logo.

I plan to set up another series of seminars beginning October 1992, and have already contacted a few people to get some preliminary commitments. I will be putting out another newsletter after I return from the Board of Control meeting. I have made plans to hold a District luncheon meeting in Valdez, Alaska in conjunction with the annual meeting of the Alaska Chapter of the American Fisheries Society. Costs should be modest (room rental is about $25-50; box lunches about $10), but I will probably have to ask for a new infusion of money from Treasurer Joseph Rachlin. I will be extending invitations to Southeast Alaska District members to attend, as well as any interested non-members (who I will try to recruit). Since Past-Director William Wilson will be chairing a session for the AFS Alaska Chapter meeting, I will probably not be eating lunch alone.

I have greatly enjoyed my first year as District Director and hope to make my next year more productive. I plan to hold a vote for a new District Director this winter, since a two-year term of office seems reasonable in a District with such a modest number of members. While the Alaska Chapter of AFS has become very active in northern Alaska, I also hope to find a comfortable niche for AIFRB as well. There are many important issues concerning continuing education, ethics, and professionalism in fisheries that both organizations can effectively address together.

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Board of Control Meeting cont.

Southeast Alaska District

District Director Malin Babcock presented the following report:

This District has had a fairly successful year. Evening program meetings included October, Dr. Stanley Rice and Mike Murphy presenting a talk on 0-Age Sockeye; February (Jan. meeting cancelled—weather), David Carlile gave a presentation on rockfish habitat which provided interesting video footage taken from a submersible; April, Ladd Macaulay, Manager of Juneau's Gastineau Hatchery, gave a briefing and tour of the hatchery's new facilities.

Winding up the year were two social events. In June, we had a potluck dinner with Jim and Mary Lou King as the featured speakers. Jim and Mary Lou King won the Chevron Conservation Award in 1989 after being nominated by the District for their varied and extensive work in Alaska in the area of wetlands habitat conservation and education. In July, the District, with assistance from the Auke Bay Lab and the University of Alaska Southeast's Fisheries School, hosted a well attended softball game and barbecue for the visiting crew, cadets, officers, and scientists from the *R/V Oshoro Maru*. The *R/V Oshoro Maru* has a long history of oceanographic and fisheries research in the North Pacific Ocean, and many District members have participated in cooperative programs with the vessel.

The District again provided support for a Juneau Natural Resources Laboratory on the University of Alaska Southeast campus with letters to key Congressional members. Likewise, the District wrote letters supporting basic fisheries research (U.S. Forest Service) in the Copper River Delta, the largest wetlands ecosystem on the West Coast. Another issue which we supported was the protection of the Indian Creek watershed (located on the Prince of Wales Island). This watershed is scheduled for logging but has a history of fairly extensive habitat and salmonid field studies conducted in cooperative studies by the National Marine Fisheries Service (Bureau of Commercial Fisheries), the U.S. Forest Service, the Fisheries Research Institute of the University of Washington, and the Alaska Department of Fish and Game. Because of the timing of our written concern, we probably will not be successful in this issue.

One of our Associate members, Dave Love, won an AIFRB Travel Assistance grant. Dave presented results of his work on bitter crab disease at the Western Fish Disease meeting in Nanaimo, B.C., June 1992.

Our treasury has remained at $250-$300. We assessed a small dues ($5.00) on each member; and our main costs are mailing meeting notices.

I have enjoyed my brief stint as District Director and wish John Strand success as the upcoming Director. I challenge him to increase involvement in District activities and issues by members who work for agencies other than National Marine Fisheries Service.

Northern California District

District Director Tom Lambert related the activities of the District during the past year.

A planning meeting in September 1991 was well-attended and featured a program on Japanese fish printing, with participation by all those present. A dinner meeting in November included a lecture on tidal marshes and their ecology, with visual renditions of the redistribution of channels and pools. In January, the District held its annual social meeting, a banquet at a San Francisco Chinese restaurant.

Another dinner meeting took place in March, with Peter Moyle speaking on California's threatened anadromous fishes, all of whose populations are declining. The last dinner meeting, in Sunnyvale in May, had as the main attraction a lecture by Bruce Herbold, who spoke on the Clean Water Act and the protection of fish habitats in the San Francisco Bay and Delta.

A history of the District was written for use by Dr. William Royce in his preparation of a history of AIFRB.

This District now has 76 members.

Southern California District

District Director Jim Allen told of the achievements of this District in 1991-1992.

AIFRB has a strong following in this area, while the American Fisheries Society is not as active as elsewhere. The District normally has three to five meetings per year, with an attendance of 10-30 people per meeting. The membership stands at 75.

In the first half of 1992, the District held two meetings and sponsored two symposia. At the first meeting, Dr. Paul Smith spoke on interactions of populations of pelagic fishes within their communities in the California Current system, while the second meeting featured Dr. Robert Lavenberg, whose presentation covered life history research on California halibut.

The first symposium dealt with harvest refugia as a tool in fisheries management, and brought together nine speakers who spoke from several different perspectives. A panel of the speakers and three others discussed harvest refugium design. The second symposium, in May, addressed the biology of marine and freshwater fishes of California. This symposium had ten speakers, who lectured on a variety of species.

The District awarded $100 to M.R. Orhun for the best student paper delivered at the meeting of the Southern California Academy of Science.

James Allen, William Bayliff, and Martin Golden wrote a history of this District from 1960 to 1992 for use in the AIFRB history being compiled by William Royce.

New York-New Jersey District

District Director Barbara Warkentine presented the following report:

In November 1991 Joseph W. Rachlin stepped down as the NY-NJ District Director and I, Dr. Barbara E. Warkentine, was appointed by AIFRB President Jack Helle as the new Director of this District.

As of August 1992 the current membership for the NY-NJ District is 39 members. This represents a net increase of two new members over last year.

During the past year the District had conducted a recruiting drive. Membership applications were sent to all District

members, encouraging them to have their students and colleagues join AIFRB. This effort resulted in the recruitment of four new associate members. The District was pleased to welcome:

Mr. Jonathan Gary Kennen (NY-SUNY Syracuse)
Mr. Robert J. Danehy (NY-SUNY Syracuse)
Mr. Pradeep Hirethota (NY-SUNY Syracuse)
Mr. Oris Sanjur (NJ-Rutgers)

One of our District members had a status change to emeritus. Congratulations are extended Dr. Hugh A. Poston (NY).

Three of our District Associate members were selected to receive research awards from AIFRB's 1992 Research Assistance Award Program. Our congratulations go to Mr. David Bushek of Rutgers University, NJ; Mr. Gregory A. DeBrosse of Rutgers University, NJ; and Mr. Jonathan G. Kennen of SUNY Syracuse.

Dr. Joseph W. Rachlin represented the NY-NJ District and the parent Society at the 48th Annual Northeast Fish and Wildlife Conference in Norfolk, Virginia. At this meeting he was invited, by the Northeast Division President Robert Carline, to attend the Executive Committee's Breakfast to discuss the function of AIFRB and how we as a District might work more closely with the Northeast Division of AFS to increase membership and support students wishing to attend and present papers at the Northeast meetings. In conjunction with the establishment by the Northeast Division of AFS of a student support program for attendance and presentation at the Northeast Fish and Wildlife Conference, the District agreed to contribute up to $100 of its operating budget in support of this program, the rationale being that this represents the major meeting which the majority of the District membership attends on a regular basis.

After this report was delivered, there was discussion about the possibility of enlarging the geographic area covered by the District because of interest on the part of fishery biologists in Pennsylvania, Connecticut and other adjacent states. The Board voted to give permission to the New York-New Jersey District to provide AIFRB services in the Northeastern Region of AIFRB for 1 year.

Texas District

District Director Sammy Ray reported on activities in this District during the past year. Efforts to recruit a new District Director have not been successful. It was planned that the District would organize and sponsor a symposium covering bycatch problems, but this project did not come to fruition.

Northwest Washington District

Dr. William Royce, District Director, reported on activities for the past year.

The District has 270 names on the roster, but meeting attendance seems low. At the two meetings held this year, 10 people were on hand in December, and 30 attended the Spring meeting.

The District newsletter was not issued in 1991-1992.

Logo Contest

AIFRB's 1992 program for the design of a logo was very successful—68 logo designs were received from members. The selection process was not as successful, for the final designs selected by the judging committee were not accepted by the Board of Control. After much discussion, the Board decided to start again, reopening the contest and seeking new entries. An article will appear in BRIEFS to notify the membership of the Board's desires and the method of submitting logo designs.

AIFRB History

William Royce reported on his progress in the preparation of a written history of AIFRB. His examination of the Institute archives in Seattle has resulted in the recovery of early documents that have helped him identify the concepts W.F. Thompson and the other founding fathers had in mind when they formed AIFRB almost 40 years ago.

Four Districts have responded to the call by writing histories of the individual Districts, and these have been transmitted to Dr. Royce. The Alaska District history tells of its beginning in 1964 and the progress and problems that prevailed in the 28 years of activity, including the division in 1987 into Northern and Southeast Districts. A chronology lists officers and major accomplishments, including an impressive list of symposia, forums, white papers, and awards.

The Northern California District submission told of its formation as the Central California District in 1978, the name change to *Northern California District* in 1987, meeting schedules, major activities, and a list of officers, year by year. The Southern California District history told of its birth in 1960, its normal meeting schedule, and the many symposia and workshops it has sponsored. Highlights of important events in each decade, lists of officers, participation in the national organization, awards given and received, symposia sponsored, special projects, local meetings and presentations, and articles in BRIEFS concerning the District were presented in detail.

The New York-New Jersery District prepared a historical profile that traced District activities from its establishment in 1977 to the present. The efforts of the District Directors in soliciting new members, the meetings and a sponsored symposium, representation at fishery meetings, and a plan to help fund students to attend and present papers at meetings were described.

Other Districts are expected to submit written histories for use in the Institute history.

Attempts will be made to induce another person to work with Dr. Royce on the AIFRB history, and it is hoped that the completed history will help celebrate AIFRB's 40-year anniversary in 1994.

Advocacy

The Board had discussions as to whether it is proper for AIFRB to engage in lobbying or in advocacy of political positions on an official basis. The general feeling at the meeting was that it is not improper for an individual to state his opinions, but AIFRB should not adopt a position as an organization.

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Board of Control Meeting cont.

AIFRB and AFS

The question as to whether AIFRB should remain an organization separate from the American Fisheries Society was introduced again at this year's meeting. Letters from two AIFRB members were received during the year; both advanced reasons for maintaining the reltionship as it is. In discussions at the meeting, one minority position was stated, but the majority of those present agreed that AIFRB should not become a Section of AFS.

Executive Secretary

The need for AIFRB to hire an Executive Secretary was brought up and briefly discussed, but no motion was taken, for or against.

New Business

District Meeting Announcements

The announcing in BRIEFS of upcoming District meetings was suggested, for the benefit of AIFRB people who anticipate being in the area during their travels. It was agreed that BRIEFS can carry such announcements, as long as the Editor can receive notification sufficiently in advance of printing schedules.

New Computer and Printer

It was revealed that the AIFRB Treasurer is using antiquated computer equipment for the Institute's financial and membership records, and that replacement by newer, more appropriate equipment would greatly enhance the Treasurer's ability to do the job. The cost of such an acquisition would be reasonable. A motion to authorize the expenditure of not more than $2,500 for upgrading the system was seconded and carried.

President's Comments

President Helle began his comments by describing his experiences at the World Fisheries Congress in Greece last May with 500 people from 50 countries. The various symposia and workshops were well-attended, and the theme summaries at the end of the Congress stressed global collaboration on fish research and management, broadened monitoring of current situations and evaluation of management practices, a longer horizon for decision-making, and more attention to human dimensions in fisheries.

Jack especially enjoyed the exchanges on biodiversity and fish genetics, but came away sobered by fishery and people problems, pollution issues, and the loss of species.

President Helle spoke on the need for stimulation of AIFRB Districts into more activity and the desirability of better defining the requirements for the Fellow category. He also saw the possible need for holding Board of Control meetings over 2½ days instead of 2, as in the past; the many items on the agenda could be better addressed by meeting on Friday, Saturday, and Sunday.

Jack concluded his remarks by thanking all officers and members for their contributions to a successful year for AIFRB.

Passing the Gavel

At 6 p.m. on September 19, President Helle passed the gavel to Vaughn Anthony, the incoming President of AIFRB. After expressing thanks to the Board for their participation at the meeting, Vaughn told of the times he had spent with W.F. Thompson, and stated his hopes for the future of AIFRB.

Adjournment

President Vaughn Anthony adjourned the meeting at 6:16 p.m.

More Missing Members

Even with a brand new membership directory, AIFRB must continue its struggle to maintain up-to-date addresses for its membership. When the postal people return mail marked "return to sender", we must try to ferret out the missing member.

Here is a new list of AIFRB members whose addresses we seek:

Dr. Gilbert W. Bane	Terry J. Foreman
Jerry L. Rasmussen	William S. Perret

Jeus-Eric Eliassen (once of Norway)

Anyone knowing the current address of any of these should notify our Treasurer, Dr. Joseph Rachlin, Lehman College Bio., Bedford Park Blvd. West, Bronx, NY 10468-1589.

Our People

AIFRB people attending the World Fisheries Congress in Athens, Greece in May were **Buck Bryant** (Member 1984), **Eugene Buck** (Member 1977), **Carlos Fetterolf** (Fellow 1973), **Bill Fox** (Fellow 1984), **Dave Gibbons** (Member 1981), **Jack Helle** (Fellow 1985), **Stan Moberly** (Fellow 1984), **Larry Nielsen** (Fellow 1989), **Jim Reynolds** (Member 1970), **Bill Wilson** (Member 1983), and **Gary Sakagawa** (Fellow 1987).

American Fisheries Society officers inducted at the 1992 AFS meeting in Rapid City, SD included **Carlos Fetterolf** (AIFRB Fellow 1973), President, and **Paul Wingate** (AIFRB Member 1980), 2nd Vice-president.

Dr. Gregory T. Ruggerone (AIFRB Associate 1988), has been extended a rare invitation by Dr. M. Selifonov, Director of the Kamchatka Branch of TINRO, to visit Russian salmon scientists and salmon facilities of the Kamchatka Peninsula in August 1992. This will be the first time that American scientists will be allowed to visit the Russian facilities and observe their operations first-hand. This joint venture is part of a cooperative salmon research program that is developing between Russian and American scientists. It is the hope that this interaction will continue to develop and lead to further cooperative salmon research between Russian and American scientists.

Daniel Hayes (AIFRB Associate Member 1984) has been elected Secretary-Treasurer of the Southern New England Chapter of the American Fisheries Society.

Meeting Announcements and New Publications

Symposium—Conservation Genetics and Evolutionary Ecology

This international symposium, which is a case study of the cichlid fauna of Lake Victoria, will take place on October 30-November 2, 1992 at Stouffer's Dublin Hotel and the Columbus Zoo in Columbus, Ohio.

The conference will bring together geneticists, ecologists, fisheries scientists, aquarium and zoo curators, and other interested persons to discuss the conservation genetics and evolutionary ecology of endangered fish communities. The meeting will emphasize the haplochromine cichlid fauna of Lake Victoria as the primary case study. Problems in maintaining natural populations of these fish, and in preserving populations of endangered species through captive breeding programs, will be discussed. Other model systems, including the North American desert fishes and the fishes of the Appalachian basin will also be discussed and contrasted. There will be seven scientific sessions, including a session of concurrent lectures on husbandry techniques and computer approaches to species management to be held at the Columbus Zoo aquarium, and associated poster sessions.

For information on fees and registration, write Conservation Genetics Symposium, Box 188, Powell, OH 43065-0188.

Anadromous Alosa Symposium

The Tidewater Chapter of the Southern Division of the American Fisheries Society will sponsor this symposium on January 14-15, 1993 at the Clarion Resort and Conference Center in Virginia Beach, Virginia.

Topics will include biology, stock assessment and management, fish passage, culture and stocking, and ecological roles in freshwater systems, all in relation to anadromous *Alosa* species.

For information, write Richard Eades, VDGIF/Tidewater Chapter AFS, 6530 Indian River Road, Virginia Beach, VA 23464.

AFS Southern Division Meeting

The Southern Division of the American Fisheries Society will hold its 1993 Mid-Year Meeting at the Comfort Hotel River Plaza in Chattanooga, Tennessee on February 24-28, 1993.

Highlights of the expanded mid-year meeting will include technical sessions, continuing education workshops, and a reception at the new Tennessee Aquarium.

For information on participation and accommodations, write Nick Parker, Texas Cooperative Fish and Wildlife Research Unit, Texas Tech University, Lubbock, Texas 79409-2125.

Dolphins and Tuna Fishing

Dolphins and the Tuna Industry is written by Robert C. Francis, Frank T. Awbrey, Clifford A. Goudey, Martin A. Hall, Dennis M. King, Harold Medina, Kenneth S. Norris, Michael K. Orbach, Roger Payne, and Ellen Pikitch. This 176-page book was written by the members of the Committee on Reducing Porpoise Mortality from Tuna Fishing (CRPMTF) of the National Research Council. Yellowfin tuna occur at the surface in the eastern Pacific Ocean (EPO) in three types of schools—those associated only with other fish, those associated with floating objects, and those associated with dolphins. The yellowfin in schools associated with dolphins are, on the average, larger than those in other types of schools, so greater total catches of yellowfin are obtainable when most of the fishing is directed toward dolphin-associated fish. Unfortunately, however, dolphins are killed when making sets on dolphin-associated fish. The U.S. Marine Mammal Protection Act of 1972 mandated that measures be taken to reduce the mortality of dolphins caused by U.S. vessels to levels approaching zero. At that time the U.S. National Marine Fisheries Service increased its research on the tuna-dolphin problem. During the 1970s and 1980s many U.S. vessels transferred their operations to the western Pacific Ocean, or dropped out of the fishery entirely, and the proportion of the yellowfin tuna catch in the EPO taken by U.S. vessels decreased from 79 percent in 1972 to 9 percent in 1991. Dolphin mortalities thus became an international problem, and the Inter-American Tropical Tuna Commission became involved in research to evaluate the effects of the fishery on the various stocks of dolphins and in gear research and education.

The annual mortalities of dolphins caused by vessels of all nations fishing in the EPO have decreased from more than 100,000 animals during the 1970s to about 28,000 animals in 1991. Despite the reduction in mortalities, public objection to the fishery continued, and in 1990 all the major canneries in the United States announced that they would no longer accept tunas caught in association with dolphins. The CRPMTF noted that "a complete ban on dolphin fishing or the purchase of tuna caught on dolphins is not required to ensure the survival and even the increase of dolphin populations." It recommended continuation and expansion of: (1) research and education directed toward reduction of mortalities of dolphins; and (2) research directed toward development of methods of catching large yellowfin without encircling dolphins. Additional funding for such work has recently become available.

This book can be obtained for $22.95 from the National Academy Press, 2101 Constitution Avenue NW, P.O. Box 285, Washington, D.C. 20055.

Membership Report

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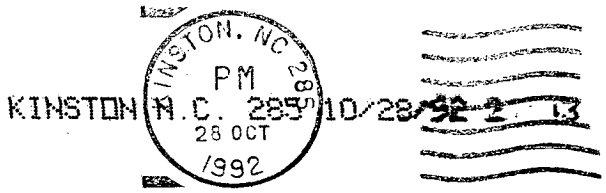

FIRST CLASS

BRIEFS, the newsletter of the American Institute of Fishery Research Biologists, is published six times a year. It is intended to communicate the professional activities and accomplishments of the Institute, its Districts, and Members; the results of research; the effects of management; unusual biological events; matters affecting the profession; political problems; and other matters of importance to the fishery community. Comments and contributions should be sent to the Editor, Dr. Oliver B. Cope, 15 Adamswood Road, Asheville, NC 28803. Subscription $20 a year to Institutions and Non-Members. Officers—Vaughn Anthony, President, Katherine Myers, Secretary, Joseph Rachlin, Treasurer.

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American Institute of Fishery Research Biologists

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VOL. 21, NO. 6 DECEMBER 1992

Outstanding Achievement Award

The 1991 AIFRB Outstanding Achievement Award for individuals was presented to Dr. Robert L. (Bud) Burgner in Seattle, Washington in October 1992. At the ceremony were **Roy Nakatani,** *Past Secretary,* **Bud Burgner, Bill Royce,** *former NW Washington District Director,* **Greg Ruggerone,** *NW Washington District Acting Director, and* **Kate Myers,** *AIFRB Secretary.*

Second Nuisance Mussel in Lake Erie

A second species of exotic mussel, the quagga mussel, has been found unexpectedly in two separate locations in Lake Erie by investigators for both the U.S. Fish and Wildlife Service (USFWS) and the New York State Department of Environmental Conservation (NYSDEC) office in Dunkirk.

The quagga is a relative of the notorious zebra mussel and samples were collected by USFWS two miles south of Buffalo, New York, while a second collection was made by NYSDEC from about 90 feet of water, off Barcelona, New York.

Natural resource agencies, including USFWS, are finding that these mussels and other nuisance exotic species are adding very significant stresses to already declining populations of native fish and wildlife resources. According to Dieter Busch, Chief of the USFWS' Lower Great Lakes Fishery Resources Office at Buffalo, ''The known impacts of nuisance mussels have included reductions in the availability and abundance of desired species. These reductions are occurring at a time when society is demanding more from its natural resources.''

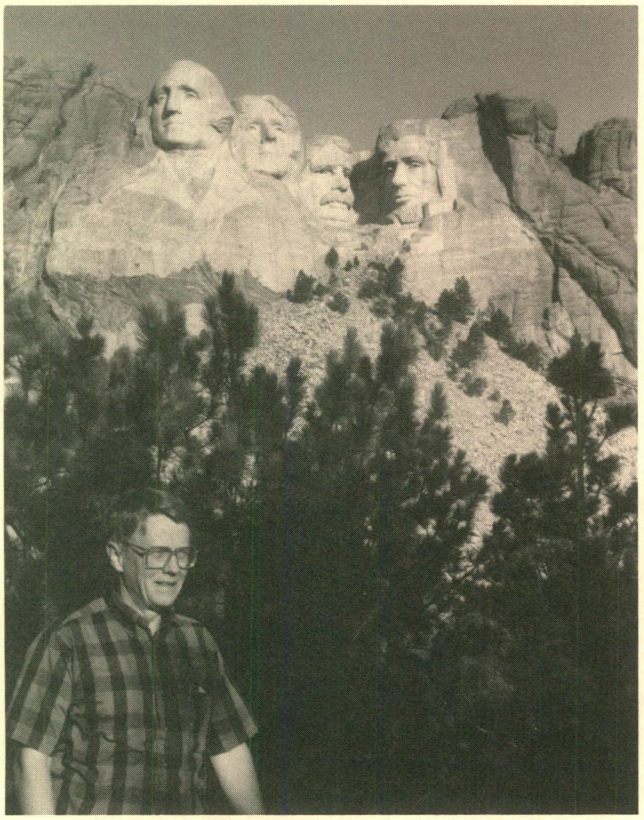
Busch added that this new invader, in much the same manner as the zebra mussel, was most likely brought into the Great Lakes in ballast water discharged from freighters originating from European ports.

The quagga mussel is about the same size as the zebra mussel with adults in the 1 to 1½ inch size range. Individual mussels from both species show large variations in patterns and colors. They usually have striped patterns of various types from concentric bands to jagged lines but may also be in solid colors. The usual color combinations are black, brown, and cream. The major notable difference between the zebra and quagga mussel is in the shape of the shell. When looking at a side of these mussels, the zebra mussel shell has a ''flat'' side while the quagga mussel is rounded similar to small oyster shells.

Preliminary information on the quagga mussel indicates that its habits and life requirements are very similar to those of the zebra mussel. Habitats include most hard substances, especially those found in moving waters. Their impacts on ecological processes and functions, such as covering fish spawning areas and other substrate and filtering microscopic food out of the water, are expected to be the same as that from the zebra mussels. In addition, the economic impacts caused by the mussel's adhesion to water-intake pipes appears to be very similar to that of the zebra mussel.

Investigators believe that, based on information from Lake Ontario, the quagga mussel can be expected to share equally with zebra mussels the available habitats. Busch cautioned, however, that ''this does not mean that the total numbers will double but that the community can be expected to be one-half zebra mussels and one-half quagga mussels.''

From SFI Bulletin, Sept. 1992



AIFRB President Jack Helle joins four other Presidents at Mt. Rushmore during the Board of Control meeting in September.

Fish Therapeutants

Before a therapeutant can be registered for use in aquaculture, it must be studied under an investigational new animal drug (INAD) permit and a registration application or new animal drug application (NADA) can be filed only when the required data package is completed. The FDA now identifies seven "new animal drugs" of low regulatory priority. It had previously listed five compounds of low regulatory priority, which means that they can continue to be used by aquaculturists provided proper procedures are followed.

The following compounds may be used with certain provisions: sodium sulfite, sodium chloride, sodium bicarbonate, acetic acid, carbon dioxide gas, povidone iodine, and calcium chloride.

FDA said it is "unlikely to object" to the use of these compounds if the following conditions are met: the drugs are used for their prescribed indications and doses; their usage follows good management practices; the product is of appropriate grade for use in food animals; and there is not likely to be an adverse environmental effect.

"The agency's enforcement position of the use of these compounds should not be considered an approval nor an affirmation of their safety and effectiveness. At some time in the future the agency may take a different position on the use of any or all of these compounds," the FDA said.

Currently, the following compounds may not be used in aquaculture: chloramphenicol, nitrofurans, certain steriod hormones, certain antibiotics, malachite green, central nervous system stimulants and depressants, fluoroquinolones, and quinolones. Fluoroquinolones and quinolones are on this list because not enough is known about them.

Source: *The Catfish Journal*, July 1992.

Early Life History Research on Tunas

The Inter-American Tropical Tuna Commission (IATTC) is conducting research on the early life history of tropical scombrids in the Panama Bight. Laboratory and field studies are centered at the IATTC's Achotines Laboratory, located on the southern coast of the Azuero Peninsula, Panama.

Efforts continue at the laboratory to develop methods for the culture and spawning of scombrids in captivity. In September 1991, a small group of captive black skipjack tuna, *Euthynnus lineatus*, (290-366 mm) which had been held in the Achotines Laboratory for 10 months, were found to be sexually mature. The fish had been captured in November 1990 at lengths of 16-22 mm. Attempts at fertilization using one female and two males were unsuccessful, although the eggs appeared to be fully developed and hydrated. This is believed to be the first time that *Euthynnus* has been held in captivity from the larval stage to sexual maturity. After the existing seawater aquarium system is upgraded, young black skipjack will again be captured and maintained in an attempt to repeat the maturation process.

A system is now in place at the laboratory to control seawater temperature in large tanks. The system will be used in a study of the effects of varying temperature and food concentration on the growth and survival of larval and early-juvenile black skipjack.

Research is underway on the age and growth of late-larval and early-juvenile scombrids captured at sea near the Achotines Laboratory. The studies include experiments designed to examine somatic and otolith growth and the effectiveness of two fluorochromes for marking otoliths, and to determine the periodicity of increment formation in the otoliths of black skipjack and frigate and/or bullet tuna (*Auxis* spp.). In addition, growth rates of field-caught larval and juvenile black skipjack have been estimated from otolith increment analysis and compared by season.

A study of the rates of starvation of larval and juvenile black skipjack, frigate and/or bullet tuna, and sierra (*Scomberomorus sierra*) has recently been completed. The study involved the development of nutritional criteria for first-feeding larvae and metamorphosing juveniles, as well as *in situ* estimates of starvation of wild-caught fish.

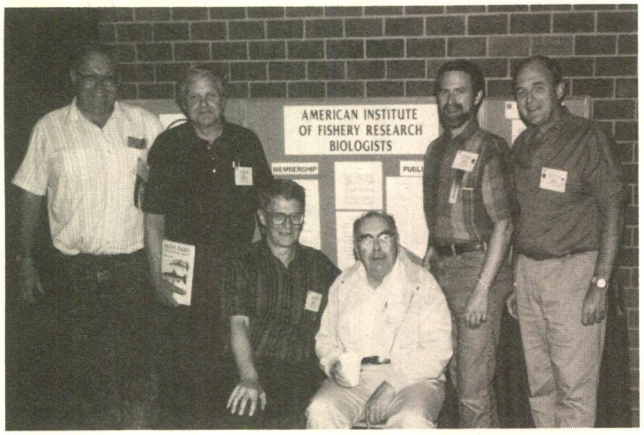
An ichthyoplankton and oceanographic sampling program is also being conducted at the Achotines Laboratory. Sampling for the first phase of the program was conducted from a 25-foot Boston Whaler during August 1989-September 1990 off the Azuero Peninsula. Standardized oblique tows

using a 70-cm bongo net with 333-*u*m mesh, CTDO casts to 100 m, and hydrocasts were made at 14 stations to define the seasonality of spawning by scombrids in the region, to examine relationships between the occurrence of scombrid larvae, local physical processes, and secondary production, and to describe the cross- and long-shelf distribution patterns of scombrid larvae. The offshore sampling program was changed in 1991 to examine day-night differences in vertical stratification of scombrid larvae and physical parameters. Vertically-stratified sampling with a Tucker trawl and CTDO casts, including light-intensity measurements, are being conducted at one station during both day and night. The plankton from each Tucker trawl sample is divided into two equal samples using a codend splitter; one-half of each sample is preserved in Bouin's fixative for studies of nutritional condition and the other half in ethanol for age and growth determination and food-habits studies.

Staff, Inter-American Tropical Tuna Commission

Old China Hands

In 1987, a People-to-People delegation led by Bernie Skud toured fishery facilities in China, Korea, and Japan. In the group were several AIFRB members, some of whom gathered for a reunion at the Rapid City, South Dakota meetings in September.



Fred Copes (Wisconsin), John Karinen (Alaska), Jack Helle (Alaska), John Owen (North Dakota), Bill Wilson (Alaska), Bob Gray (Washington).

Our People

Donald Bevan (AIFRB Fellow 1968), a past Director of the University of Washington School of Fisheries, has been selected to chair the National Marine Fisheries Service Salmon Recovery Team. This group is charged with the recovery of endangered Snake River sockeye salmon and threatened spring, summer, and fall chinook salmon.

John Halver (AIFRB Fellow 1971) has retired from the faculty of the School of Fisheries of the University of Washington after serving as a faculty member for 32 years.

Bruce Miller (AIFRB Fellow 1989) was presented with an Award of Merit at the 1992 Annual Meeting of the North Pacific International Chapter of the American Fisheries Society. The award was given for "many years of doing an outstanding job of organizing the student presentations at the annual meetings."

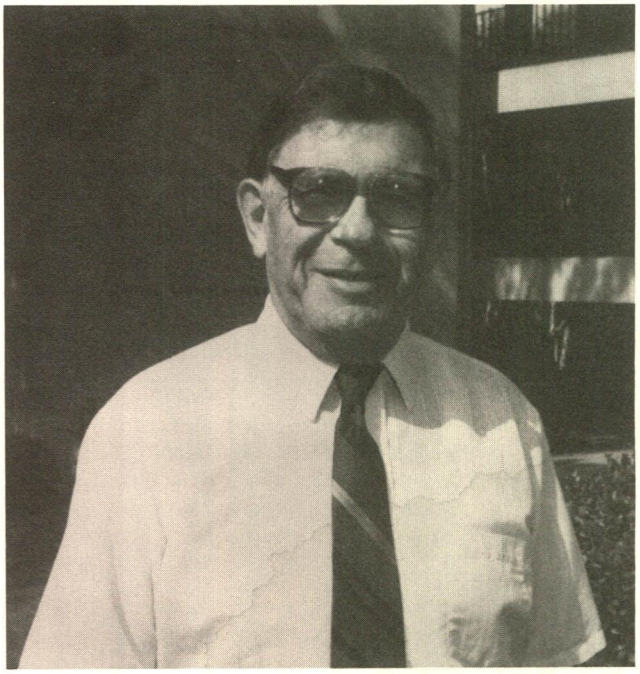
Robert Stickney (AIFRB Fellow 1983) has just completed the 1991-1992 term as president of the World Aquaculture Society.

Izadore Barrett Retires

On October 2, 1992, Dr. Izadore Barrett (AIFRB Fellow 1971) retired as Director of the National Marine Fisheries Service's (NMFS) Southwest Fisheries Science Center (SWFSC) in La Jolla, California, ending a fisheries career that spanned four decades.

Recognized nationally and internationally for his leadership in the field of marine research and protected species management, Barrett had been with the Center and NMFS since 1970. He had served as Science and Research Director of the Center and NMFS' Southwest Region since 1977.

During his tenure, Barrett successfully pressed for new and better technologies to solve fisheries and marine mammal problems, for more economics research in fisheries, for more reliable fisheries data bases, and for more efficient and dependable sea survey designs.



Internationally, Barrett has fostered important dialogues with other fishing nations, including extensive cooperative research with Mexico and Japan. He has been co-Chair of the MEXUS-Pacifico Committee, a cooperative fisheries research agreement between Mexico and the United States, since its establishment in 1987. He had redirected NMFS'

cont. on page 4

Izadore Barrett Retires cont.

Antarctic program in support of U.S. policy to protect Antarctic living marine resources.

Listed in *Who's Who in America,* Barrett is also registered in *Who's Who in the West, Who's Who in Frontiers of Science and Technology,* and in *American Men and Women of Science*. Besides being a Research Associate at Scripps Institution of Oceanography, Barrett is a Fellow of the American Institute of Fishery Research Biologists, a charter member of the Society for Marine Mammals, and a member of the American Society of Ichthyologists and Herpetologists, the Western Society of Naturalists, and the American Association for the Advancement of Science.

Born in Vancouver, British Columbia, Canada, Barrett received a M.A. degree in zoology and marine fisheries in 1949 from the University of British Columbia in Vancouver and a Ph.D. degree in public administration of fisheries from the University of Washington at Seattle in 1980. He served as chief of the Inter-American Tropical Tuna Commission's (IATTC) Panama Laboratory in Panama from 1956-1959 and as their senior scientist at La Jolla, California, from 1959-1967. From 1967-1969, he served as chief biologist of the United Nations Development Program's Fisheries Development Project at Santiago, Chile. From 1969-1970, he was Fisheries Advisor to the government of Chile.

Meetings and New Publications

44th Tuna Conference

A first announcement and call for papers has been issued for the *44th Tuna Conference*, to be held Monday through Thursday, 17-20 May, 1993, at the University of California's Lake Arrowhead Conference Center. The Tuna Conference is sponsored annually by the Inter-American Tropical Tuna Commission and the U.S. National Marine Fisheries Service. It provides a unique opportunity for scientists to present ongoing research results on tunas, billfishes, dolphins, and sharks. The casual and informal retreat setting allows for stimulating interchange of views and opinions among scientists and other interested participants.

This year's Conference theme is "How good are our data and assumptions?". This means any tuna-related research may be presented; however, emphasis on how your data were collected, what additional data would be helpful, how you handle measurement errors in the data, how you validate and verify your data (i.e., quality control), and emphasis on your assumptions and the sensitivity of your methods to them will be appreciated. You are encouraged to present a paper that relates to the theme; however, papers on other themes are also welcome. Twenty minutes will be allocated for each presentation with an additional five minutes for questions. There will be an author-attended poster session. A one-page (single-spaced) abstract will be required for papers and posters. The abstracts must be received by 1 April, 1993 (guidelines will be sent in another notice). Facilities for overheads, slides, and video tapes will be provided. Titles of papers or posters to be presented should be submitted on the registration form.

The Conference provides scholarships that cover the cost of registration, room, and board for students presenting papers. Round-trip transportation is provided from San Diego to Lake Arrowhead at no cost. There are a limited number of scholarships available, and students must be enrolled in an accredited university to qualify. If you are interested, contact us for further information.

Registration forms are available from the Inter-American Tropical Tuna Commission at the Scripps Institution of Oceanography, 8604 La Jolla Shores Drive, La Jolla, CA 92037-1508. Forms must be received by December 15, 1992.

Yellowfin Year Program

Report of the Yellowfin Year Program is a 1991 publication of the International Commission for the Conservation of Atlantic Tunas.

Due to apparent overexploitation of yellowfin tuna in the eastern Atlantic Ocean during the late 1970s and early 1980s, the International Commission for the Conservation of Atlantic Tunas directed additional funds and research effort "to deepen our knowledge of yellowfin population dynamics and thereby improve our ability to make wise recommendations for management of this important resource." The field work was carried out during 1986 and 1987, and the results are summarized in this 586-page book, Collective Volume of Scientific Papers of the International Commission for the Conservation of Atlantic Tunas, Volume 36. The first 103 pages of the book consist of a report of the program in three languages, English, French, and Spanish. This report is followed by 19 peer-reviewed scientific papers, 4 in English, 12 in French, and 3 in Spanish. Copies of this book are available from the International Commission for the Conservation of Atlantic Tunas, Principe de Vergara, 17-7, 28001, Madrid, Spain. No information on the price is available.

Native Trout of Western North America

Robert J. Behnke has authored *Native Trout of Western North America*, published by the American Fisheries Society as Monograph 6. The 1992 volume has 275 pages, with 8 color plates.

The trout native to western North America have evolved a great variety of adaptations to often extreme environments. All this diversity and more has been compiled in *Native Trout of Western North America*. Few groups of fish are more venerated, yet few groups have been more abused. The natural ranges of western trout have been sharply reduced by dams, land-use practices, and introductions of exotic species, and some subspecies and populations have been lost forever. By demonstrating the scope and importance of trout diversity for enhancing fishery resources, Behnke has made a major contribution to resource management in North America.

Behnke had drawn not only on published literature and agency reports but on his own vast experience with these fishes as well. He has integrated the biology and ecology of these fish with their taxonomy, classification, and evolutionary history to provide the most comprehensive survey of indigenous western trout available in one document.

Books can be ordered from the American Fisheries Society at the following prices: Hard cover: $41.00; AFS members $33.00. Soft cover: $33.00; AFS members $26.00. (Prices include postage and handling). Inquire about the limited edition series.

Water Quality in River Systems

Edited by C.D. Becker and D.A. Neitzel, *Water Quality in North American River Systems* is a 328-page book selling for $44.95+3.50 shipping.

The core of this new book—twelve chapters, each addressing a separate river system—analyzes the water quality and ecological features of North American rivers and provides guidelines as to how these resources can be utilized without being destroyed.

Water Quality in North American River Systems provides a diverse yet representative analysis of North American rivers. The hydrologic, morphologic, and biological features of each ecosystem are analyzed, with particular attention given to the impact of both natural processes (such as storms, floods, weather, fires, and biotic reproduction) and exploitative processes (such as harvesting renewable resources, adding physical and chemical substances, restructuring physical features related to the river bed, and introducing exotic organisms).

This information, while specific to each ecosystem, provides a reasonable portrayal of other rivers in the same area, and together the twelve river systems portrayed in *Water Quality* provide an indication of water quality and river integrity throughout North America.

River systems covered in this book are the Chena, Bow, Columbia, Santa Domingo, Missouri, Upper Mississippi, La Grande, Ohio, Cumberland, Blackwater Rivers of the southeastern U.S. Coastal Plain, and Mobile.

Order from the Battelle Press, 505 King Ave., Columbia, OH 43201-2693.

Fishes of Alberta

This book of 464 pages with color and black-and-white photographs, tables, maps, figures, appendices, glossary, bibliography, and index is by Joseph S. Nelson and Martin J. Paetz.

Alberta has a wide range of fish species due to its unique geography—ranging from low plains to high alpine mountains and the province's lakes, streams and numerous bodies of water offer excellent fishing opportunities. Of the 51 native species and eight introduced ones in Alberta, about 17 species are sought after by anglers. There are representatives of 13 families native to the province, ranging from the primitive jawless lampreys to advanced spiny-rayed members of the perch family and from the coldwater trout and char to the coolwater sturgeon and goldeye. Species of two other families have been introduced and have reproducing populations in a hotspring.

This completely revised edition of *Fishes of Alberta*, originally published in 1970, includes up-to-date information on distribution, new species, and biology of Alberta's fishes. Topics include background on the province's fishes and their environment, fishing in Alberta, fish management in Alberta, post-glacial origins of fish fauna, and the classification of fishes. For the 59 species of fish found in Alberta, information on identification, distribution, biology, taxonomic history, and, where appropriate, angling is included. There is also a discussion of all species of fish introduced, collected or thought to have been collected but not now established in Alberta and of other species occurring in adjacent areas.

To aid identification, a key to the 15 families of fishes of Alberta helps the reader to identify a specimen to its family. Keys to the species are found in the introductory section of each family when more than one species occurs in Alberta. Distribution maps show where in the province individual species are commonly found.

The volume can be ordered from The University of Alberta, 141 Athabasca Hall, Edmonton, Alberta, Canada T6G 2E8. The cost is $34.95 for cloth and $24.95 for paper+$2.00 for shipping.

Fish Medicine

Fish Medicine, edited and with major contributions by Michael K. Stoskopf, is a 1992 book of over 910 pages and over 500 illustrations. It provides today's most comprehensive information of the clinical management of diseases and disorders in all major fish groups, with the best advice from 47 experts on how to diagnose and treat diseases of food, game, and pet fish, both marine and freshwater.

Chapters cover general medicine; freshwater temperate fishes; salmonids; goldfish, koi, and carp; catfishes; marine tropical fishes; marine cold-water fishes; sharks, skates, and rays; and appendices.

Order for $95 from W.B. Saunders Company, The Curtis Center, Independence Square West, Philadelphia, PA 19106-3309.

Aquaculture Sourcebook

Edwin S. Iversen (AIFRB Fellow 1971) and Kay K. Hale of the University of Miami have authored *Aquaculture Sourcebook*, a 320-page volume with 110 illustrations.

Aquaculture Sourcebook is an introductory text and ready reference for information on the fresh-, brackish-, and saltwater farming of both fish and shellfish, as well as of several important algae. Until now, such material has been available only in scattered publications; but *Aquaculture Sourcebook* incorporates all the feasibility data pertinent to farming aquacultural species in North America into one easy-to-use text.

Aquaculture Sourcebook has been designed to satisfy the needs of fisheries scientists and commercial aquaculturists by

cont. on page 6

Meetings and New Publications cont.

providing, in a handy and well-organized format, information vital for successful North American aquacultural ventures. Concise details are given for over 130 individual species, including not only those raised for human consumption, but also organisms reared for feed, bait, or other purposes.

Each entry in this valuable volume covers such relevant material as: the scientific and common names of the organism, its visual appearance and distinctive characteristics, habitat range specifications, species reproduction and development, age- and growth-related factors, specific parasites and diseases, potential predators and/or competitive species, and its prospects for future aquacultural success.

Key groups of closely related species are discussed in a geographic context, highlighting areas where each will find the habitat best for its survival. Great care has been taken to specify ranges of tolerable salinity and optimum temperature for candidate species, and emphasis has been placed on creating aquacultural environments that replicate those normally habitated in nature.

Comprehensive, informative, and accessible, *Aquaculture Sourcebook* is both the perfect desktop reference for anyone establishing an aquacultural facility, and a ready reference to help maintain one.

CONTENTS: INTRODUCTION. U.S., CANADIAN, AND MEXICAN AQUACULTURE, U.S. Aquaculture. Canadian Aquaculture. Mexican Aquaculture. SPECIES FOR HUMAN FOOD. Plants. Invertebrates. Vertebrates. NON FOOD SPECIES. Foods for Aquaculture Species. Sportfish Bait. Experimental Animals. Ornamental Species. Selected References. Appendixes. Subject Indes. Taxonomic Index.

The price is $49.95 from AVI/Van Nostrand Reinhold, 115 Fifth Avenue, New York, NY 10003.

Mercury Warning

Mercury Warning: The Fish You Catch May Be Unsafe To Eat is a study of mercury contamination in the United States. This report from the Clean Water Fund shows that millions of Americans may unknowingly be exposed to dangerous levels of mercury in freshwater fish they catch in lakes and streams. Mercury, a toxic metal, interferes with the development of the brain and nervous system, lowering intelligence and impairing hearing, speech, and coordination.

Twenty-six states have now issued mercury health advisories covering tens of thousands of lakes, urging only limited consumption of fish from their waters or, for some lakes, warning against eating the fish at all. Thousands of pounds of mercury are pumped into the air each year, primarily by coal-fired power plants and municipal garbage incinerators only to be washed out of the atmosphere by rain and snow and dumped into lakes and streams, sometimes hundreds of miles away.

Order for $20 from Clean Water Fund, 1320 18th St., NW, Washington, DC 20036.

Creating Freshwater Wetlands

Donald A. Hammer has written *Creating Freshwater Wetlands*, a 312-page volume selling for $58. It is a practical reference book that covers the subject of creating and restoring freshwater wetlands. Chapters treat marshes, bogs, swamps, sloughs, fens, tules, and bayous; components of wetlands; natural methods for creating and maintaining wetlands; wetlands functions, values, and benefits; defining objectives; advice and assistance; site selection and evaluation; planning; construction; planting; attracting/stocking wildlife; and operation and maintenance.

Order from Lewis Publishers, 2000 Corporate Blvd., N.W., Boca Raton, Florida 33431.

Marine Debris Survey Manual

The National Oceanic and Atmospheric Administration has issued NOAA Technical Report NMFS 108, *Marine Debris Survey Manual*, written by Christine A. Ribic, Trevor R. Dixon, and Ivan Vining. This 1992 volume has 92 pages, 15 figures, a glossary, a list of acronyms, and citations.

Over the last several years, concern has increased about the amount of man-made materials lost or discarded at sea and the potential impacts to the environment. The scope of the problem depends on the amounts and types of debris. One problem in making a regional comparison of debris is the lack of a standard methodology. The objective of this manual is to discuss designs and methodologies for assessment studies of marine debris.

Chapters cover methodology, shipboard surveys for large debris items, shipboard trawling surveys for small debris items, beach surveys for small to large debris items, benthic surveys for large submerged debris items, and aerial surveys.

For information on availability, write to U.S. Department of Commerce, National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.

District News

NORTHERN ALASKA **Stephen M. Fried,** *Director*

The following is exerpted from the Northern Alaska District Newsletter of September 25, 1992:

The Northern Alaska District will be hosting a lunchtime meeting for members and non-members during the Alaska Chapter meeting of the American Fisheries Society (AFS) in Valdez during 17-19 November. I have already placed an announcement in Oncorhynchus, the Alaska Chapter's newsletter, to alert people to this meeting. If enough AIFRB members attend, I would like to conduct a short business meeting. I would also like to make members and nonmembers aware of the perks that go along with AIFRB membership and, hopefully, will be able to recruit some new members. I would particularly like to get some ideas of how AIFRB can help meet the needs of continuing education for fishery professionals.

I would again like to host a series of seminars this year. If any member would like to present a talk, please let me know. I've briefly talked with Carl Burger at U.S. Fish and Wildlife Service, and we tentatively agreed to rotate seminar sites between the State Fish and Game office on Raspberry Road and the U.S. Fish and Wildlife Service office on Tudor Road. I will send out announcements as soon as I line up speakers and set times and places.

The District, in conjunction with the Alaska Department of Fish and Game, sponsored two seminar/workshops in November. On the 19th, the topic was *Genetic Considerations in Salmon Recovery Efforts*, with Robin Waples of the National Marine Fisheries Service in Seattle as the guest speaker. On November 20 the subject was *Appropriate Use of Artificial Propagation in the Restoration of Fish Populations*, the guest speaker being Fred W. Allendorf of the Division of Biological Sciences in Seattle and the University of Montana at Missoula.

NORTHWEST WASHINGTON **Greg Ruggerone,** *Acting Director*

District members met for the annual Chinese banquet at the House of Hong on October 27, 1992, again arranged by Ken Chew. After the usual sumptuous meal, members, spouses, and interested non-members were treated to a program involving a slide presentation on *Fisheries and People of Kamchatka, Russia* offered by Greg Ruggerone, Trey Walker, Kate Myers, and Don Rogers, all of the Fisheries Research Institute, School of Fisheries of the University of Washington.

Dissertation and Thesis Abstracts

Distribution, Abundance, and Behavior of the Cownose Ray, *Rhinoptera bonasus* (Mitchill 1815), in Lower Chesapeake Bay

Robert A. Blaylock, Ph.D. 1992

College of William and Mary in Virginia

Aspects of the ecology of the cownose ray, *Rhinoptera bonasus*, in the lower Chesapeake Bay and its tributaries were studied using aerial surveys, biotelemetry, and examination of stomach contents.

The Chesapeake Bay was surveyed by airplane during 1986-1989 to examine the distribution of cownose rays and estimate their abundance using line transect methods. Cownose rays resided in Chesapeake Bay throughout the summer months, entering in early June and emigrating in late September. They were usually absent, or nearly so, by late October. Mean monthly abundance ranged from none present in May and November, to a September average of $9.3 \cdot 10^6$ rays. Maximum estimated abundance was $3.8 \cdot 10^7$ cownose rays in September 1988, a year when cownose rays formed an exceptionally large pre-migratory school.

Sonic and radio-frequency transmitters were attached to free-swimming cownose rays which were followed for periods ranging from 6-13 h to examine swimming behavior. Six adult cownose rays were tracked and all except one showed directed movement which differed significantly from random circular movement. All but one of those swam in the direction of the tidal current. These results were in concurrence with theory suggesting that negatively buoyant fishes should benefit by using tidal stream transport to minimize energy expenditure.

Analysis of stomach contents to determine prey species was not possible because the bivalve prey could not be identified to species from the small shell fragments present. For this reason, an index of relative importance could not be calculated. The molluscan families Mytelidae (mussels) and Solenidae or Psammobiidae (razor clams) predominated in the stomachs and spiral valves of trawl-caught specimens from the Chesapeake Bay eastern shore. Gastrointestinal tracts from pound net-caught specimens were generally empty, and the one specimen harpooned in the York River contained a few shell fragments from hard clam. Assuming a daily ration of 3% of its body weight, an average weight of 7.13 kg, and using the mean September abundance estimate, it was estimated that in Chesapeake Bay cownose rays could consume an average of $1.95 \cdot 10^3$ metric tons of biomass daily.

Foraging Ecology of the Blue Crab, *Callinectes sapidus* Rathbun, in Lower Chesapeake Bay

Randa A. Mansour, Ph.D. 1992

College of William and Mary in Virginia

This two-year investigation jointly examined the key features of predator-prey dynamics—predator abundance and distribution, predator feeding habits, including cannibalism, and prey abundance and distribution—in a model marine benthic system. Specifically, this study concurrently quantified blue crab feeding habits and preference, and examined the inter-relationships between diet, predator preference, and predator and prey abundance and distribtuion in three subestuaries of lower Chesapeake Bay—the James, York, and Rappahannock Rivers, Virginia. Blue crab diets were separable on the basis of proportional consumption of three dominant dietary components: bivalves, crabs, and polychaetes. Crab abundance, prey abundance, and crab diet were correlated such that blue crabs aggregated in areas of highest preferred (i.e., bivalve) prey abundance, as determined through electivity analyses. Spatial (i.e., upriver/downriver) and size-related differences in diet selection occurred. At least two trophic groups were distinguished, based on their relative consumption of bivalves and crabs, including conspecifics (i.e., older juveniles and adults) or polychaetes and small crustaceans (i.e., younger juveniles and new recruits). Spatial differences were reflected by proportional bivalve consumption: crabs always preferred bivalves, but in areas of relatively lower bivalve abundance, opportunistically expanded their diets to include other prey taxa.

Cannibalism was common, but the frequency of occurrence varied with crab size, season, location, new juvenile recruit abundance, and the density of alternative preferred prey. Specifically, cannibalism frequency increased with crab size, was highest in areas of relatively lower bivalve densities, and predominated during the period of new juvenile recruitment in the Fall.

The results of this and other investigations indicate that blue crab predation may be the most important biotic determinant of community structure in this marine soft-bottom system. Furthermore, since a seasonal decline in prey abundance and availability did not occur, cannibalism, rather than intraspecific competion for limited resources, may be the most likely compensatory mechanism of blue crab population regulation in Chesapeake Bay.

Larvae and Relationships of Epinepheline Serranids (Teleostei: Percoidei)

Carole Christine Baldwin, Ph.D. 1992

College of William and Mary in Virginia

(Carole Baldwin was the winner of the 1990 W.F. Thompson Award)

Morphology is described for larvae of *Diploprion bifasciatus, Belonoperca chabanaudi, Jeboehlkia gladifer*, and *Grammistes sexlineatus* of the serranid subfamily Epinephelinae. Known larvae of all epinephelines are compared. Larval epinephelines differ in patterns of pigmentation, head spination, sequence of fin formation and morphology of elongate (often spectacularly so!) dorsal-fin spines. Relationships among epinepheline genera are investigated based on phylogenetic analysis of larval and adult morphology. Five monophyletic tribes are cladistically delineated, and relationships among tribes and among genera of the tribe Grammistini are hypothesized. Generic composition of tribes differs from Johnson's (1983) classification only in the allocation of *Jeboehlkia* to the tribe Grammistini rather than the Liopropomini. Despite the presence of the ichthyotoxin grammistin in the Diploprionini and Grammistini, the latter is proposed to be the sister group of the Liopropomini. This hypothesis is based, in part, on previously unrecognized larval features. Larval morphology also provides convincing evidence of monophyly of the subfamily Epinephelinae, the clade comprising all epinepheline tribes except Niphonini, and the tribe Grammistini. Larval features provide the only evidence of a monophyletic Epinephelini and a monophyletic clade comprising the Diploprionini, Liopropomini and Grammistini; identification of larvae of more epinephelines is needed to test those hypotheses.

Within the tribe Crammistini, *Jeboehlkia gladifer* is hypothesized to be the sister group of a natural assemblage comprising the former pseudogrammid genera (*Aporops, Pseudogramma* and *Suttonia*). The "soapfishes" (*Grammistes, Grammistops, Pogonoperca* and *Rypticus*) are not monophyletic, but form a series of sequential sister groups to *Jeboehlkia, Aporops, Pseudogramma* and *Suttonia* (the closest of these being *Grammistops*, followed by *Rypticus*, then *Grammistes* plus *Pogonoperca*). The absence in adult *Jeboehlkia* of several derived features shared by *Grammistops, Aporops, Pseudogramma* and *Suttonia* is incongruous with this hypothesis but may be attributable to paedomorphosis. The generic phylogeny of the Grammistini proposed herein emerges as the single most parsimonious hypothesis largely because of the method chosen for analyzing multistate characters. This study demonstrates that ontogeny is valuable in phylogenetic studies as a source of characters, means of assessing homology, and aid to identifying heterochrony.

Generic Identification and Patterns of External Pigment in Larval Gobies (Pisces: Gobiidae) from the Belize Barrier Reef

Elizabeth D. Maddox, M.A. 1992

College of William and Mary in Virginia

Late-stage goby larvae (Pisces: Gobiidae) collected in the Hol Chan Marine Reserve off Ambergris Cay, Belize, were identified to genus or several generic possibilities out of the over 30 nominal gobiid genera from the Caribbean Sea. Twelve morphological categories of gobies, defined by patterns of pigmentation and, presumably, representating species, were found

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in the survey material. Evaluation of osteological and other meristic characters placed three morphological categories in the *Gobionellus* group, three in the *Priolepis* group, one in the *Bathygobius* group, and five in the *Gobiosoma* group. (Generic groupings were proposed by systematists as working hypotheses of gobiid relationships.) Larvae from seven morphological categories were identified to a single genus, including larvae of *Coryphopterus*, *Gnatholepis*, and *Gobiosoma* which were described for the first time for species known from Belize. Larvae of *Gnatholepis thompsoni* were identified to species. Patterns of melanophores within morphological categories were remarkably consistent and supported their use as taxonomic tools in the identification of larval gobies to species. Consistency of pigment patterns at the genus level and within groupings of genera suggested that patterns of melanophores are important to systematic studies of the family.

Membership

Inquiries regarding membership should be directed to Dr. Sammy Ray, Membership Chairman, Texas A & M University at Galveston, 5007 Avenue U, Galveston, Texas 77550.

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