

American Institute of Fishery Research Biologists

... BRIEFS ...

VOL. 23, NO. 1

FEBRUARY 1994

1992 Group Achievement Award

The Cooperative Fish and Wildlife Research Units of the Fish and Wildlife Service won the AIFRB Outstanding Group Achievement Award for 1992. Jack Helle, AIFRB Past-President, presented awards at ceremonies at several Units in the West. The figures below picture award rites at Oregon State University and the University of Washington.



At Oregon State University the Outstanding Group Achievement Award is given to the Cooperative Fisheries Unit. Present were Dr. Richard Tubb, Head, Department of Fisheries and Wildlife; Dr. Carl Bond, Professor of Fisheries, Emeritus; Ms. Melani Bonnicksen, Unit Secretary; Jack Helle, AIFRB Past-President; Dr. Carl Schreck, Unit Leader; Dr. Kenneth Currens, Unit Geneticist; Grant Feist, graduate student; and Dr. Marty Fitzpatrick, Assistant Professor of Fisheries.



The Cooperative Unit at the University of Washington receives the Outstanding Group Achievement Award. On hand were Dr. Glenn VanBlaricom, Assistant Unit Leader--Wildlife; Dr. Christian Grue, Unit Leader; Dr. Ellen Pikitch, Associate Director for Research, School of Fisheries; Jack Helle, AIFRB Past-President; Dr. Gilbert Pauley, Assistant Unit Leader--Fisheries; and Dr. Marsha Landoit, Director, School of Fisheries.

Research Assistance Awards

The time is ripe to take action on nominations for AIFRB's Research Assistance Awards. These awards, which amount to \$100 to \$350, are made to AIFRB Associate Members in good standing to help provide travel assistance to present papers at scientific meetings.

To apply, submit a written request for an award, a letter of support from your research mentor or supervisor, the name of the meeting, an abstract of the paper to be presented, and a notification of the paper's acceptance for presentation.

If you are not a member of AIFRB, request a membership application.

The deadline for award applications is April 1 preceding the meeting. Submit applications to Thomas R. Lambert, PG&E, 3400 Crow Canyon Road, San Ramon, CA 94583.

W.F. Thompson Best Paper Award

AIFRB seeks to recognize excellence by encouraging student research in fisheries and publication of research results. To this end, the Institute gives the W.F. Thompson Best Paper Award for the best publication of the year arising from student research. The winner receives \$750 and a certificate.

For eligibility, papers must be based on research conducted while the senior author was a student, be concerned with fish or some aspect of aquatic science, and be accepted for publication in a recognized scholarly journal or as part of a book within three years of the senior author's termination of student status.

To apply, for papers published in 1992 or 1993, send a resumé with details of the senior author's student and employment history to Dr. John B. Pearce, Northeast Fisheries Science Center, 166 Water Street, Woods Hole, MA 02543-1097.

The deadline for 1993 papers is August 1, 1994.

Our People

William W. Fox (AIFRB Fellow 1984) has received the Executive Excellence Award for Executive Achievement for outstanding contributions to the conservation and management of the Nation's living marine resources as Assistant Administrator for Fisheries (in NOAA) from 1990 to 1993. Bill is now Director, Office of Protected Resources in NOAA.

Peter Perschbacher (AIFRB Associate 1985) has joined the staff at the University of Arkansas as Assistant Professor of Aquaculture. His research experience has been in intensive recirculated channel catfish production.

Rolland A. Schmitten (AIFRB Member 1987) has been appointed as Assistant Administrator for the National Marine Fisheries Service in Washington, D.C. He has served as Regional Director of NMFS's Northwest Regional Office in Seattle.

MICRA

The Mississippi River and its tributaries comprise one of the largest and most valuable ecosystems in the world. Fish stocks in these waters are increasingly important to recreational fishing. Yet habitat degradation and the multiplicity of aquatic management authorities complicate and threaten the supply and utilization of these stocks. Fish species that move between management jurisdictions create complex resource management problems related to regulation development, licensing enforcement, and establishment of management objectives. Fishery management must be able to respond to increasing demand. This demand will be met only if fishery management agencies work together to perpetuate and enhance these important interstate aquatic resources and habitat.

In response to this critical situation, the 29 State conservation departments having fisheries management jurisdiction in the Mississippi River Drainage system (MRDS) have recently agreed to band together under the unique and precedent setting Mississippi Interstate Cooperative Resource Agreement (MICRA) and share their resources, facilities and funding for the preparation and implementation of Long-Range Strategic Plans for management of the Basin's interjurisdictional fisheries.

The mandate set by the States for MICRA is "To assess the Mississippi River drainage fishery resources and habitat requirements to protect, maintain, and enhance interstate fisheries in the basin." The American Fisheries Society and the U.S. Fish & Wildlife Service have agreed to assist the States in this endeavor.

MICRA defines interjurisdictional resources as "those fishery resources that cross or are common to two or more state boundaries and come under the shared jurisdiction of two or more governmental entities." The States have already identified more than 90 major rivers and more than 80 fish species of great concern.

Waters of the MRDS are host to many recreational fish species that move among different habitats in the 29 states. These fish habitats have been increasingly altered by development projects such as construction of navigation facilities, dredging, hydroelectric plants, and flood control dams, and the resultant changed water and sediment transport regimes, and by man's shoreline development activities. At present, information is insufficient to assess how much these alterations have affected the health of fish population.

Consequently, MICRA has invited other federal, non-federal and private entities, including the U.S. Army Corps of Engineers (COE), U.S. Forest Service (USFS), National Marine Fisheries Service (NMFS), Tennessee Valley Authority (TVA), utility companies, resource user groups, and several Indian tribes having resource management jurisdiction within the basin to join in the effort. MICRA will also recognize and embrace the existence of numerous MRDS compacts, committees, commissions, and councils, and honor their long-standing status and missions, attempting to join all entities

having management jurisdiction and responsibility for MRDS fisheries resources into the cooperative program.

MICRA's MISSION STATEMENT reads as follows: "Improve the conservation, development, management and utilization of interjurisdictional fishery resources in the Mississippi River Basin through improved coordination and communication among the responsible management entities."

GOAL A: Develop a formal framework and secure funding for basin-wide networking and coordinating mechanisms that complement existing and emerging administrative entities.

GOAL B: Develop public information and education programs to disseminate information that supports fishery resource management in the Mississippi River Basin.

GOAL C: Develop an information management program based on standardized methods for collecting and reporting fishery resource data, basin-wide.

GOAL D: Determine and document the socio-economic value of fishery resources and related recreation.

GOAL E: Improve communication and coordination among entities responsible for fisheries resource management in the Mississippi River basin.

GOAL F: Periodically identify and prioritize issues of concern in the Mississippi River Basin for coordinated research that supports cooperative resource management.

GOAL G: Identify and coordinate fishery management programs to address species and habitat concerns from an ecosystem perspective.

GOAL H: Develop compatible regulations and policies for fishery management to achieve interstate consensus on allocation of fishery resources.

GOAL I: Develop protocols, policies and regulations for disease control, introduction of exotics, maintenance of genetic integrity, and maintenance and enhancement of indigenous species.

GOAL J: Preserve, protect and restore fishery habitats basin-wide.

MICRA will be managed by an interagency Steering Committee, composed of personnel employed by member States and entities. The Steering Committee will be chaired, on a rotating basis, by one of the members. MICRA staffing will be developed, as needed, to fit the on-going mission. At a minimum, a Coordinator/Executive Secretary position and a small number of clerical and support staff will be needed. Most technical work will be conducted by participating States and entities. MICRA funding will likely come from many sources, including:

- State and Entity contributions,
- Federal and State appropriations,
- Multi-State and Entity funding mechanisms,
- Private Grants,
- Contributions, and
- Other Sources as yet undefined.

The MICRA Strategic Plan will be developed in a step-down fashion. The Comprehensive Plan being developed first will lay out basin-wide goals, objectives, and tasks. This document, developed by consensus of partner States and entities, will guide overall development, implementation, and management of MICRA.

The Comprehensive Plan will be supplemented by Species SubPlans and Watershed SubPlans, which will address spe-

cific fishery and aquatic habitat management problems throughout the Basin. These subplans will be developed by resource managers and planners of participating States and Entities at the field level. MICRA's operational network and shared data management mechanisms will provide coordination to ensure that the Subplans meet MICRA's overall objectives, and do not duplicate other efforts. MICRA's coordination network and shared ownership will help to ensure broad funding support for all resource management plans throughout the Basin.

For more information contact:

MICRA Coordinator
U.S. Fish & Wildlife Service
608 East Cherry St.
Columbia, MO 65201
(314) 876-1911

Meeting Announcements and New Publications

Conference--Marine and Estuarine Science and Management

A conference, *Marine and Estuarine Shallow Water Science and Management in the Mid-Atlantic Region*, will take place on March 8-11, 1994 at the Holiday Inn on the Boardwalk, Atlantic City, New Jersey. The sponsoring organizations are the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, the National Marine Fisheries Service, the Mid-Atlantic Fishery Management Council, the Delaware Department of Natural Resources, the Maryland Department of Natural Resources, the Estuarine Research Federation, the Atlantic Estuarine Research Society, and the Sport Fishing Institute.

This conference will address issues related to the management of shallow water habitats in the mid-Atlantic region (defined for the purposes of this conference as Connecticut through North Carolina), and will include both research and management considerations. In the mid-Atlantic region, as in most coastal areas of the U.S., shallow water systems are currently being managed by an array of Federal and State agencies, with consequent inconsistencies. For example, there are 17 Federal and State entities currently regulating shallow water habitats in the mid-Atlantic region, with no consistency in the definition of those habitats. Add to this the large number of counties and municipalities with regulatory jurisdiction, and the problem becomes compounded.

The purpose of the conference is to assemble managers and researchers to assess the current state of understanding concerning the functions and values of shallow water habitats, and to identify additional critical information required to support science-based management decisions.

Participation is open to federal, state, and local government regulatory and resource managers, research scientists, non-governmental advocacy groups, and any other persons involved with issues relating to the management of shallow water marine and estuarine habitats.

Program topics will include indirect impacts to shallow waters from use and management practices, methodologies for assessing shallow water ecosystems, defining and characterizing shallow waters, linking shallow waters with near ecosystems, shallow waters as valuable habitats, sediment dynamics in shallow waters, direct impacts to shallow waters from use and management practices, assessing shallow waters using GIS and remote sensing techniques, methods for evaluating change and potential for change in shallow waters, competing uses in shallow waters, management case studies in shallow waters, and AERS scientific and technical presentations.

Registration and hotel information are available from Mr. Ralph Spagnole, EPA, 84 Chestnut St. (3ES42) Philadelphia, PA 19107.

Klamath River Fisheries Symposium

This symposium will take place at the Red Lion Inn in Eureka, California on March 23-24, 1994.

The symposium will identify and evaluate the challenges to anadromous fish restoration in the Klamath River Basin and recommend solutions. The Klamath-Trinity Basin has been the focus of concerted restoration efforts carried out by federal, state, and tribal agencies. After more than a decade of cooperative efforts, these agencies are organizing the Klamath River Basin Symposium to present results of investigations, identify information needs, and discuss future objectives for restoration programs.

Topics to be discussed include biological challenges, physical challenges, fisheries management, and political challenges (ecosystem management).

Symposium participants and attendees will primarily consist of investigators and managers from within the basin. Authorities from outside the basin are also invited to present new perspectives and to critique current efforts. Representatives of local watershed restoration groups and other individuals with an interest in the Klamath-Trinity Basin anadromous fisheries are also welcome.

For more information, call George Kautsky at (916) 625-4267.

Wild Trout and Planted Trout

Wild Trout and Planted Trout: Balancing the Scale is the title of a workshop to be held on May 19-20, 1994 in Denver, Colorado. The objectives are to define the current concerns about use of cutthroat trout and stocks of wild trout in the management of sport fisheries, and to identify management alternatives that will address such concerns.

The workshop will focus on issues regarding the management of inland or resident salmonids in the Rocky Mountains of the United States and Canada.

For information, call Bill Bradshaw at (307) 777-4559.

45th Tuna Conference

A first announcement and call for papers has been issued for the 45th Tuna Conference, to be held May 23-26, 1994 at the University of California's Lake Arrowhead Conference Center. The Tuna Conference, sponsored annually by the Inter-American Tropical Tuna Commission and the U.S. National Marine Fisheries Service, is an international meeting of

persons with scientific or commercial interest in tunas and tuna fisheries. It is a forum for discussing progress in research on all aspects of tunas and other large denizens of the pelagic habitat. The informal setting provides a unique opportunity to present ongoing results and developing theories, and it allows for stimulating interchange of views and opinions.

Presentation topics have ranged from taxonomy to fishery economics, but, in keeping with tradition, a theme has been chosen to provide some focus to the deliberations. The theme is "Movement and Migration", a rather broad field of inquiry. Some possible topics are: evaluation of exchange rates, diffusion rates and other movement parameters; determination of migration patterns in space and time; environmental determinates of movement; behavioral and physiological adaptations for movement. The geographic scale of interest can range from the small, as in schooling behavior, to the large, as in trans-oceanic migrations.

Speakers are encouraged to present a paper that relates to the theme; however, papers on other topics 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 April 1, 1994. Facilities for overheads, slides, and video tapes will be provided.

The Conference provides scholarships in support of students presenting papers. There are a limited number of scholarships available, and students must be enrolled in an accredited university to qualify.

Registration forms, abstract guidelines, and information on scholarships are available from Randall Rasmussen, Southwest Fisheries Science Center, P.O. Box 271, La Jolla, CA 92038.

Symposium--Global Trends in Fishery Management

The University of Washington and the National Marine Fisheries Service will be co-conveners of an international symposium, *Fisheries Management Global Trends*, at the University of Washington in Seattle, Washington on June 14-16, 1994. This meeting will bring together scientists, managers, and industry participants to review and discuss trends and current problems in fisheries management. Recent experiences and innovations in the science and art of fisheries management around the world will be examined through individual presentations and panel discussions, with particular emphasis on lessons applicable to fisheries in the United States.

The main topics on the program are the status and trends in world fisheries, new approaches to management decision-making, allocating fishing rights, multiple species and ecosystem considerations, and trends in world aquaculture.

Further information is available from Dr. Ellen K. Pikitch, School of Fisheries, WH-10, University of Washington, Seattle, WA 98195.

Inland Fisheries of Europe

William A. Dill (AIFRB Fellow 1980) has authored a two-volume work, *Inland Fisheries of Europe*, published by the Food and Agriculture Organization of the United Nations as EIFAC Technical Paper 52.

Bill Dill, after a full and rewarding career in fishery biology with the California Department of Fish and Game, was

employed by the FAO in Rome, Italy and became Chief of their Inland Fishery Branch.

The first volume of *Inland Fisheries of Europe* (EIFAC Technical Paper No. 52) appeared in 1990 and contains information from 22 European countries, dealing with physical geography, climate, hydrography and limnology, land and water use, fish and fisheries, ownership, administration, management, investigation, and agreements, and references specific to the country.

The second volume (EIFAC Technical Paper No. 52. Suppl.) appeared in 1993 and covers nine additional European countries in its 281 pages. This volume discusses some of the attributes and trends relating to the fisheries in some of the countries.

This is the only publication covering the inland fisheries of all of the countries of Europe, and thus has considerable importance.

For information on cost and availability, write William A. Dill, 730 North Campus Way, Davis, CA 95616.

Zebra Mussel Monitoring and Control

Lewis Publishers has published *Practical Manual for Zebra Mussel Monitoring and Control*, by Renata Claudi and Gerald L. Mackie. This 1993 book has 256 pages and costs \$59.95 in the U.S. and \$72 outside.

Since its introduction to the Great Lakes system in 1985, the zebra mussel has spread so rapidly that it is now considered the most serious biofouling pest of any exotic species. *Practical Manual for Zebra Mussel Monitoring and Control* will help you counter this threat by leading you through the events you will be faced with when dealing with this biofouler. This book is a crucial source of detection, monitoring, and control methods. It also provides thorough discussions regarding the mussel's biology and potential for harm.

The book covers the biology of the zebra mussel, monitoring for infestation, zebra mussel infestation--structures of concern, mitigation by chemical treatment, chlorination, non-chemical control, case histories, a glossary, references, and an index.

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

The Fishes of Tennessee

David A. Etnier and Wayne C. Starnes are the authors of a new book, *The Fishes of Tennessee*.

The waters of Tennessee are home to about 300 species of fishes. This readable and authoritative book, the first comprehensive study of its kind, examines that diversity within the state's complex natural history. It not only synthesizes a wealth of scientific knowledge but presents a tremendous amount of original research.

This volume has 696 pages, 414 color photos, and 49 illustrations. The price is \$60 + \$3 postage.

Order from The University of Tennessee Press, Knoxville, TN 37006-0325.

Freshwater Fishes of Virginia

This 1,096-page hardbound volume, by R.E. Jenkins and N.M. Burkhead, *Freshwater Fishes of Virginia*, is a 1994 issue. It covers 210 species, has 192 distribution maps, contains 466 species photographs (144 in color), has detailed keys, and is abundantly illustrated. The price is \$85.

Order from the American Fisheries Society, Fulfillment Dept., Box 1056, Evans City, PA 16033.

Thesis Abstracts

An Assessment of the Transferability of Habitat Suitability Criteria for Smallmouth Bass, *Micropterus dolomieu*

Thomas P. Groshens, M.S. 1992
Virginia Polytechnic Institute

The purpose of this study was to determine if habitat suitability criteria developed in the summer months for smallmouth bass were transferable among streams representing different ecoregions.

Habitat suitability criteria were developed for depth, mean column velocity, cover, and substrate for two size-classes of smallmouth bass, 100-199mm and ≥ 200 mm, in the North Anna River and Craig Creek, Virginia. Criteria that accurately describe habitat selection by a species or guild in a system different from where the criteria were developed are said to be transferable to that system. The transferability of suitability criteria between the North Anna River and Craig Creek, as well as depth and velocity criteria from Minnesota, the Huron River in Michigan, and the Upper James River, Virginia, to the North Anna River and Craig Creek were tested using a 2x2 contingency table analysis.

Depth criteria for the smaller sizes of smallmouth bass did not transfer well between regions; 4 of the 8 transferability tests (50%) failed. Depth criteria for larger smallmouth bass transferred to the North Anna River and Craig Creek in all cases.

Velocity criteria developed for the smaller size-classes did not transfer well among regions; only 3 of the 8 transferability tests were positive. Likewise, velocity criteria for larger sizes of smallmouth bass did not transfer well; only 1 of 8 tests were positive.

General criteria were developed for depth and mean column velocity by averaging the suitability values reported from this and 3 other studies. General depth and velocity criteria transferred well to the North Anna River and Craig Creek for both the larger and smaller size-classes of smallmouth bass; all depth tests were positive and 3 of 4 velocity tests were positive. The improved success of transferability warrants investigation of developing general criteria for smallmouth bass.

Cover criteria for both size-classes of smallmouth bass were transferable from the North Anna River to Craig Creek but not vice-versa. Substrate heterogeneity criteria were not transferable between the North Anna River and Craig Creek for either size-class of smallmouth bass. Criteria developed for the percentage of substrate particles ≥ 15 cm (smallmouth bass ≥ 200 mm only) were transferable from Craig Creek to the North Anna River but not vice versa.

The transferability of habitat suitability criteria among regions was inconsistent and it is recommended that site-specific criteria be developed for each stream to which habitat assessments are applied. Additionally, nose velocities used were more consistent between the North Anna River and Craig Creek than were mean column velocities used. Hence, it is recommended that information on nose (focal point) velocities be incorporated into habitat studies to more accurately describe smallmouth bass velocity requirements.

Haul Out Patterns and Behavior of Harbor Seals, *Phoca vitulina*, During the Breeding Season at Protection Island, Washington

Adeline M. Kroll, M.S. 1993
University of Washington

Haul out patterns, site use, and behavior were studied in harbor seals (*Phoca vitulina*) during the 1991 breeding season on Protection Island, Washington. The two major haul out sites at Protection Island were Violet and Kanem Spits. Seals were surveyed several times a day by boat and by land. During each survey, the total number of seals, including the number of

mother-pup pairs and of other seals, was reported for seven haul out sites (six at Violet Spit and one at Kanem Spit). Boat and land surveys were combined to document the trends in harbor seal population for the whole island. Maximum number of seals occurred at Protection Island in August. The pupping season ranged from mid-July to late August at Kanem Spit.

The use of haul out sites at Protection Island has changed over time. Previously, a small number of seals used Protection Island and Violet Spit was the only pupping site. Currently, a greater number of seals (40% increase) now use the island and have extended their pupping activities to Kanem Spit.

Maximum counts of seals peaked at both sites in the early afternoon, and was lowest in the late afternoon at Violet Spit and in the morning at Kanem Spit. Maximum counts of seals were observed most frequently one hour before low tide at both Violet and Kanem Spits. This is consistent with previous observations on haul out patterns of harbor seals in sites where space is not limited. The change in ratio of daily maximum number of pups to total seals indicated that pups, and, indirectly, mother-pup pairs, segregated during the early part of the breeding season.

Behavior patterns common to mother-pup pairs and to other seals were recognized on shore and in the water. Activity patterns were grouped into seven main categories including sleeping, alarm, locomotion, comfort (nursing for mother-pup pairs), exploratory, play, and agonistic behaviors. Mother-pup pairs differed from behaviors of other seals in exploratory and play behaviors, and were characterized by typical behaviors such as nursing and birth. No successful "milk stealing" was observed.

The most frequent activity pattern of harbor seals during the breeding season was sleeping, followed in decreasing importance by locomotion, comfort, exploratory, play, and agonistic behaviors. Mother-pup pairs slept significantly less than adults, immatures, and pups considered as a group. Overall, mother-pup pairs distinguished themselves from the adults, immatures, and pups in terms of their circadian (for sleeping) and tidal (for alarm and agonistic behaviors), activity patterns.

The majority of disturbances recorded on Protection Island resulted from human activities. However, a significant percentage of disturbances had no attributable cause. This study hypothesizes that reactions of seals toward disturbance with no attributable cause might be deliberate so that the seals enter the water as a unified group. These deliberate synchronous movements of seals in the direction of the water, and the segregation of mother-pup pairs during the early breeding season, support the hypothesis that harbor seals have stable social units on land.

Effects of Temperature and Food Concentration on Growth and Survival of Late-Larval and Early-Juvenile Black Skipjack, *Euthynnus lineatus*

Vernon Paul Scholey, M.S. 1993
University of Washington

Laboratory growth and survival studies at different temperatures and food concentrations were conducted on late-larval and early-juvenile black skipjack, *Euthynnus lineatus*, captured by nightlighting 8 to 11 km off the Pacific coast of the Republic of Panama. Fish with an initial standard length of about 15mm were stocked at nine per 330-liter tank and raised for 8 d at 23° and 28°C and at low ($10 \cdot 1^{-1}$), medium ($40 \cdot 1^{-1}$), and high ($80 \cdot 1^{-1}$) food (wild-caught zooplankton) concentrations. Survival ranged from 44 to 100% and was not affected by temperature. Survival was significantly lower at low food concentrations than at medium and high food concentrations. Growth in standard length ranged from 0.71 to $2.44 \text{ mm} \cdot \text{d}^{-1}$. Growth in length and weight was greater with increased food levels and temperatures. Optimal growth, survival, and tank productivity in the lab occurred at 28°C and high food-concentration levels.

In the capture area there are two seasons. The wet season is a period of reduced upwelling with sea-surface temperatures (SST's) of about 27 to 29°C and low zooplankton levels. The dry season is a period of wind-driven upwelling with SST's of about 22 to 25°C and abundant zooplankton. Wet season was laboratory-simulated by a temperature of 28°C. Growth in standard length for black skipjack in the simulated wet season was up to 60% greater than in the simulated dry season. Growth at times may be temperature-limited in dry season and food-limited in wet season.

In Memoriam

Leonard N. Allison
AIFRB Emeritus 1971
March 4, 1993

Leonard N. Allison, a member of AIFRB since 1960, died on March 4, 1993 in Grayling, Michigan at the age of 82. Len was born August 5, 1910 in Lowellville, Ohio. He received a B.S. degree in biology from Grove City College, Grove City, Pennsylvania, in 1932, an M.S. degree in zoology from University of Buffalo, Buffalo, New York in 1936, and a Ph.D. in zoology from The University of Michigan, Ann Arbor, Michigan, in 1942.

His professional career was entirely with the State of Michigan Department of Natural Resources (nee Conservation) as a fish pathologist for the Fisheries Division. His first employment with the Fisheries Division was in 1938 and it continued until his retirement in 1971. He was on military leave during World War II from 1944 through 1946 while he served as a Lieutenant, Junior Grade in the U.S. Navy. In the Fisheries Division his responsibilities were two-fold: first was the diagnosis and control of fish diseases for the Hatchery Section, and second was research on fish diseases as part of the Institute for Fisheries Research (a cooperative unit between the University of Michigan and Michigan Department of Natural Resources). In this second role he produced more than 100 research reports and papers.

He married Isabelle G. Raysor February 5, 1938 in Poland, Ohio and is survived by Isabelle and their three children: Newt, Caroline, and Belle. He was respectfully and affectionately known in the Hatchery Section as "Doc" Allison, the person who protected their fish stocks from a variety of ailments, and in the research world he was recognized as a competent scientist in the area of fish diseases and parasites. He made a significant contribution to freshwater fisheries development.

Membership Report

Promotion to Fellow

Wolf-Dieter N. Busch NY
 Martin F. Golden CA
 Dr. John A. Strand WA
 William J. Wilson AK
 Dr. Foster L. Mayer FL

New Fellow

Dr. Elaine K. Pikitch WA

Promotion to Member

Mark T. Hill ID
 Hector Cruz-Lopez FL
 Steven A. Fishcher MI
 Nancy D. Davis WA
 Steven K. Davis AK

New Members

Dr. Jeffrey J. Hard WA
 Marija Vojkovich CA
 Jeffrey L. Ross NC

Associate (Student)

Murdoch McAllister WA

Associates (Professional)

Michael B. Ward WA
 Stephen T. Grabachi AK
 Keith Wolf WA
 Virginia Hanebuth AK

Emeritus

S. Kato CA
 Dr. James D. Hall OR
 Dr. George C. Grant VA
 J.A.R. Hamilton OR
 Dr. Charles E. Woelke WA
 Dr. C. Dale Becker WA
 Don T. Weber CO
 Doyle E. Gates TX

Sammy M. Ray, Membership Chairman
Texas A&M University at Galveston
5007 Avenue U
Galveston, Texas 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 District, 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, Northeast Fisheries Center, 166 Water St., Woods Hole, Massachusetts 02543, President; Katherine Myers, Fisheries Research Inst., WH-10, University of Washington, Seattle, Washington 98195, Secretary; Joseph Rachlin, Lehman College Bio., Bedford Park Blvd. West, Bronx, New York 10468, Treasurer.

ISSN-8755-0075

SSV CLASS

Address Correction Requested

Bronx, NY 10468-1589
 Bedford Park Boulevard West
 Lehman College, Biology
 c/o Joseph Rachlin

Research Biologists
American Institute of Fishery



... BRIEFS ...

VOL. 23, NO. 2

APRIL 1994

Clark Hubbs—President-Elect Winner

If at first you don't succeed . . . A few years ago Dr. Clark Hubbs came close in the President-Elect election, losing by one vote. In the meantime, he learned how to do it, and he won this time by a comfortable margin. AIFRB had two outstanding candidates again, and it is unfortunate that we cannot have both Bob Stickney and Clark Hubbs as leaders for the next cycle.



Clark will take office at the 1994 Board of Control meeting in August and will serve as President-Elect for a year before succeeding Vaughn Anthony as President in 1995. Under our new rules, Clark will serve as President for three years.

AIFRB was fortunate in having a large return in the voting, and we thank all those who mailed ballots.

We all look forward to the leadership Clark Hubbs will give us during his tenure as President.

W.F. Thompson Award Winner for 1991

Dr. Sharon H. Kramer, now with the Sea Grant College, Scripps Institution of Oceanography, La Jolla, California, has won the W. F. Thompson Award for the best student paper of 1991. Her paper, "Growth, Mortality, and Movements of Juvenile California Halibut *Paralichthys californicus* in Shallow Coastal and Bay Habitats of San Diego County, California", is based on her Ph.D. dissertation submitted to Scripps Institution of Oceanography, University of California at San Diego. It was published in the Fishery Bulletin of the U.S.

National Marine Fisheries Service, Vol. 89, No. 2. Dr. Kramer has received a cash award of \$750.00.

An announcement regarding the W.F. Thompson Awards for 1992 and 1993 appeared in BRIEFS, Vol. 23, No. 1.

Hasler Receives Outstanding Achievement Award

Thirty-five people gathered at the University of Wisconsin's Center for Limnology on February 2, 1994 to participate in an award ceremony to present AIFRB's 13th Outstanding Achievement Award for Individuals to Dr. Arthur Hasler. Dr. Vaughn Anthony, AIFRB President, made the presentation during the ceremony, which was arranged by Dr. John Magnuson, Center Director, and Linda Holthaus, Arthur Hasler's secretary. Faculty and students heard Dr. Hasler give an emotional acceptance speech that impressed everyone.

Arthur Hasler is 86 years old and in poor health, but has a sharp mind, goes to work daily, and is highly regarded by faculty and students.

Dr. Arthur Hasler is truly a worthy recipient of our Outstanding Achievement Award. We chose well!



Dr. Vaughn Anthony, AIFRB President, presents the Outstanding Achievement Award to Dr. Arthur Hasler.

Our People

The new president of the Aquaculture Committee of the Italian Society for Marine Biology is **Marco Bianchini** (AIFRB Fellow 1991) of Rome, Italy.

Kenneth Chew (AIFRB Fellow 1972) has received an award for Distinguished Teaching in the College of Ocean and Fishery Sciences at the University of Washington. Ken, a member of the Fishery faculty since 1955, teaches shellfish biology and culture.

Churchill Grimes (AIFRB Fellow 1990) was recently selected as Director of the U.S. National Marine Fishery Service Laboratory in Panama City, Florida. The laboratory conducts research relevant to the rational management of marine fishery resources in the southeastern U.S.

After serving on the faculty of Virginia Polytechnic Institute for 17 years (5 years as head of the Department of Fisheries and Wildlife Sciences), **Larry Nielsen** (AIFRB Fellow 1989) has accepted the position of Director of the School of Forest Resources at The Pennsylvania State University.

Richard A. Ryder (AIFRB Fellow 1979) has received the Amethyst Award, an award for outstanding achievement in the Ontario Public Service. Dick is a research scientist with the Ontario Ministry of Natural Resources.

UW Fisheries Reunion

This year the University of Washington School of Fisheries is proud to announce its 75th anniversary. Founded on April 2, 1919, the School has over 2,000 graduates, many of whom have become renowned fisheries professionals in national and international arenas. The School has an established reputation in the fisheries arena and is considered one of the top educational institutions of its kind in the United States. In honor of this long tradition of excellence, we have planned a series of

events for alumni and friends during the University of Washington's Homecoming Week, October 26-29, 1994. We hope you will join us in celebrating this milestone and sharing camaraderie with fellow graduates and compatriots.

Some of the special activities which are being planned include: A series of lectures and panel discussions; a gala banquet; open house; field trips; and a UW football game and pregame party.

For information on housing and other arrangements, write or call School of Fisheries WH-10, 75th Anniversary, University of Washington, Seattle, WA 98195 (206-543-4270).

A Future for Sanctuaries

For the first time in its twenty-one year history, the National Marine Sanctuary Program (NMSP) has developed its own Strategic Plan. Although it is still in draft form, the plan's completion marks a major milestone for the program, and has given those who work with marine sanctuaries a new sense of purpose, pride, and unity.

When completed, the final Strategic Plan is intended to guide the NMSP over the next 3-5 years and set a new course for marine resource protection and management into the next century. The plan is based on the following four assumptions: (1) The Marine Sanctuaries Act (MPRSA Title II) articulates the mission, goals, and objectives of the NMSP; (2) the program's principle work, resource protection, is performed primarily by sanctuary field staff in coordination with headquarters; (3) strategic planning will build consensus and direction among those who work in and with sanctuaries; and (4) effective sanctuary management requires the support and partnership of other agencies and institutions.

The draft plan is currently being reviewed by both interagency and non-governmental panels. Critiques by these panels will be used to help finalize the plan by March 1994.

Cont. on page 4

A Modular Inclined Fish Screen

Electric Power Research Institute has been developing a Modular Inclined Screen—a high-velocity fish screen that shows promise for protecting a wide range of fish species. The screen is similar to the Eicher penstock screen, but with a "modular" design, improved hydraulic characteristics, and application to a broad range of water intakes. Unlike the penstock screen, this screen can be placed in canals, forebays, or pumping plant intakes.

The MIS consists of a fully submerged, rectangular culvert with a trashrack over the entrance; dewatering stoplogs; an inclined wedgewire screen set at a shallow angle of 15 degrees to the flow; and a bypass for diverting fish into a transport pipe. (see plan and section view at right.) The screen is mounted on a pivot shaft so it can be cleaned via rotation and backflushing. Depending on fish species and life stages to be protected, the module can operate at water velocities from 2 to 10 feet per second.

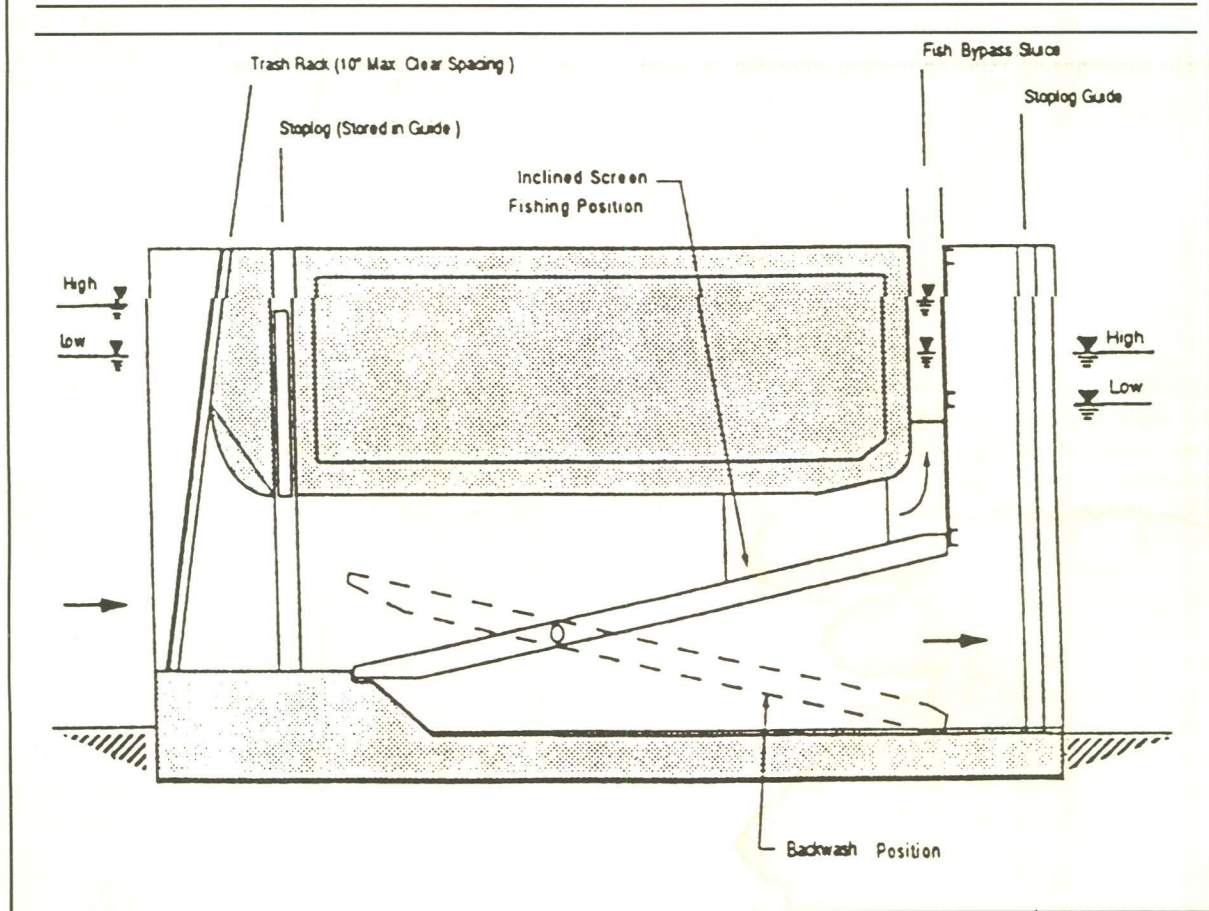
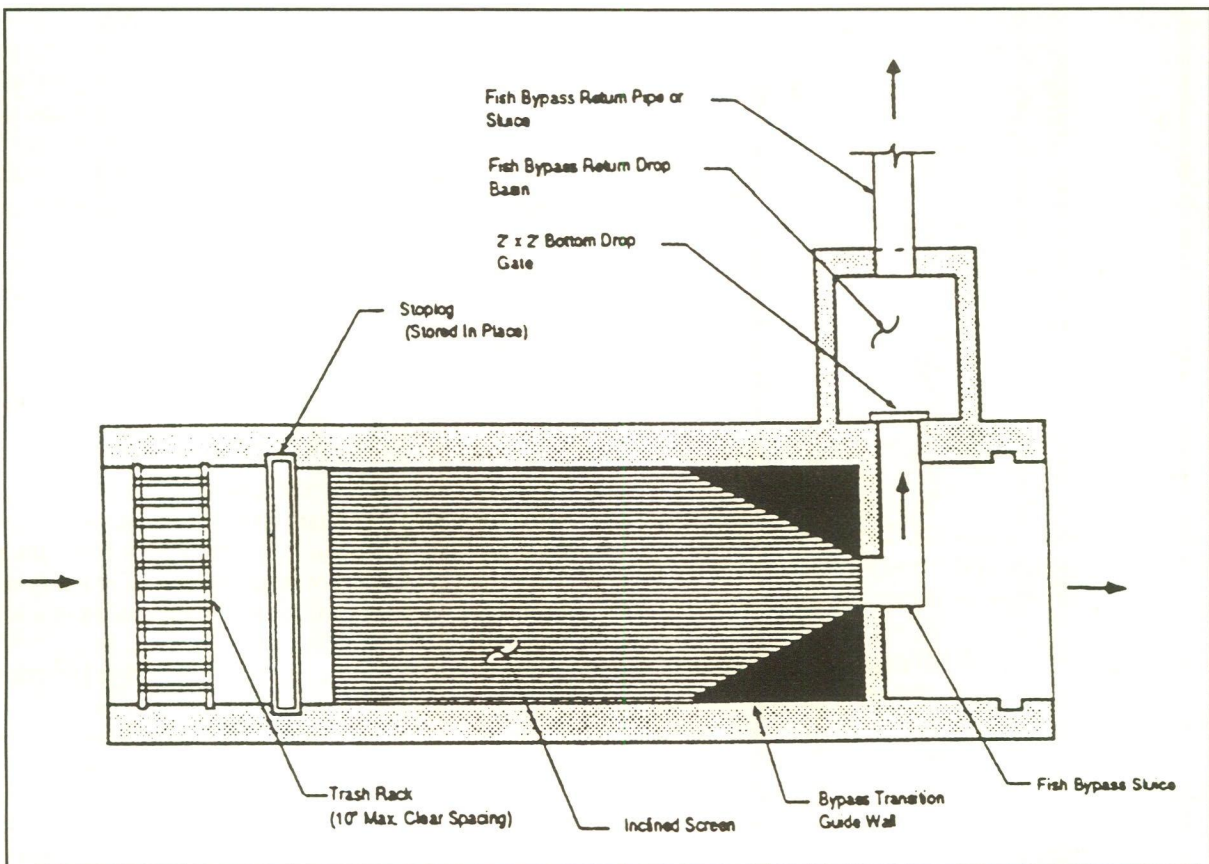
Due to a standardized design size (screens about 10 feet wide by 30 feet long), additional modules can be placed side by side to achieve desired approach velocities. This design

may have several advantages over traditional screening systems:

- It can operate over a range of fluctuating water levels and flow conditions.
- Fish are exposed to the screen for only a short time.
- Each module can be dewatered easily.
- Because it is compact, cost savings would be significant.

Biological studies are being conducted in a 1:3.33-scaled prototype at Alden Research Laboratory in Holden, Massachusetts. Passage survival above 95 percent was achieved over a range of velocities (2-10 fps) with juvenile (45-170mm) Chinook, coho, and Atlantic salmon. Other species tested, with similar results, include bluegill, walleye, rainbow trout fry, catfish, and alosid juveniles. In fall 1994, a single 1:1.7-scaled unit will be tested in the Hudson River in New York. Additional field studies with delta species will be necessary before the design is acceptable to state and federal regulatory agencies.

From Interagency Ecological Studies Program Newsletter, Oct. 1993



The Center for Marine Conservation staff and board members are serving on the non-governmental panel. This group has reached the consensus that the draft plan is a good start, but that supplementary material is needed to give the plan more long-term vision. Over the next few months the panel will be defining and developing this material.

The plan addresses the program's mission, and its operational policies, and lists seven basic areas in which the program must succeed in order to be effective. The emphasis is on protection of the resources as well as coordination with other agencies and user groups in order to make such protection more enforceable.

The National Oceanic and Atmospheric Administration (NOAA) still has a long way to go before it fully embraces the National Marine Sanctuary Program, but the strategic plan is a solid first step. Full recognition and support by NOAA of the NMSP and NOAA's other conservation and management programs will be essential for the agency to meet its stated mission of promoting global environmental stewardship.

The National Marine Sanctuary Program's strategic plan identifies these basic program elements on which to focus:

1. **National Program Framework:** Establish and maintain an effective national program to support sanctuary requirements.
2. **Education:** Develop education programs that promote, encourage, and provide opportunities for the public to be wise stewards of the marine environment.
3. **Enforcement:** Promote public stewardship to achieve compliance with sanctuary regulations.
4. **Research and Monitoring:** Facilitate applied and basic research in sanctuaries. Monitor the resources and uses of sanctuaries. Use the results of both research and monitoring to make informed decisions about resource protection.
5. **Contingency Planning and Response:** Protect and preserve sanctuary resources through advance planning and coordination in order to minimize impacts from natural and man-made threats.
6. **Damage Assessment and Restoration:** Assess impacts to injured resources, pursue damage compensation and restore injured resources where possible in an efficient and effective manner.
7. **Public Relations and Fundraising:** Support and promote the sanctuary program by increasing its visibility and by obtaining funding or other resources to supplement Congressional appropriations.

Although these elements have been discussed in other documents, such as Environmental Impact Statements, this is the first time that they have been pulled together in one place and given the priority they deserve. If you're interested in reading the entire Strategic Plan, please contact the National Marine Sanctuary Program at 301-713-3125.

From Sanctuary Currents, Winter 1994

U.S. Helps Protect Nicaragua's Sea Sanctuary

A \$1.3 million cooperative agreement with the U.S. Agency for International Development has given the Caribbean Conservation Corporation a rare opportunity to help preserve one

of the last unspoiled marine ecosystems in the Caribbean, the Miskito Coast of northeastern Nicaragua.

The area is very important to the United States because vast seagrass beds along the Miskito Coast are one of the world's richest spawning and nurturing grounds for lobster, fish, shrimp, and other marine creatures that eventually ride ocean currents to North American coastal fishing grounds.

"The marine environment of the Miskito Coast is probably the most biologically productive in the Caribbean basin," said William Alevizon, Caribbean Conservation's project manager for the Miskito Coast Protected Area. "From an international conservation standpoint, it's invaluable because it contains some of the last almost totally pristine coastal habitats in the Caribbean, including coral reefs, mangroves, and huge seagrass beds that remain largely untouched by tourism, coastal development, or commercial exploitation."

The Miskito Coast also is the most significant feeding area in the Atlantic for endangered green turtles, which are on the brink of extinction. The area is unusually fertile because the continental shelf extends 30 to 40 miles offshore there, supporting an expansive underwater meadow of seagrass that fosters all kinds of marine life on the edge of the drop-off to the cool, dark deep.

"Probably every green turtle in the Caribbean spends some time in the Miskito Cays," said Karen Bjorndal, director of the Archie Carr Center for Sea Turtle Research at the University of Florida. "It's also a very important foraging area for endangered hawksbill and loggerhead sea turtles because it is the only place in the Caribbean with seagrass beds that large."

Endangered manatees and rare grey river dolphins also live in brackish lagoons ringed by flourishing mangrove forests along the Miskito Coast, while jaguars, tapirs, uncommon waterbirds, and other threatened wildlife roam the area's lush pine savannas, gallery forests, and vast wetlands. The coast is named for the indigenous Miskito Indians, who have lived in balance with the environment for centuries. For them, our concept of "conservation" is a traditional way of life.

Caribbean Conservation, a 34-year-old non-profit environmental organization based in Gainesville, Fla., was chosen over more than 30 other groups that applied to U.S. AID to develop a management plan for the Miskito Coast, said Ralph Conley, AID's natural resources and environmental officer for Nicaragua.

"Nicaragua has resources that are of global significance," Conley said. "It has the largest stretch of tropical rainforest north of the Amazon, the largest system of great lakes in Central America, and an untold number of plant and animal species that have not yet been fully inventoried."

Although Nicaragua's long civil war prevented development along the Miskito Coast, economic pressures unleashed since the war's end in 1989 are jeopardizing this pristine habitat. Inland deforestation is contaminating coastal ecosystems with sun-blocking silt washed downstream from slash-and-burn subsistence farms. Foreign resource pirates are illegally hauling in huge catches of the area's commercially valuable fisheries with no regard for sustaining the future or for the welfare of the indigenous Miskito people. Hastily concocted schemes to exploit natural resources for short-term gain persist, including potentially disastrous requests for toxic waste dumping and gravel mining along the coast.

Alevizon said Caribbean Conservation's project is very unusual because it is the first time that a management plan is being created to protect a large area in the Caribbean *before* harmful activities are allowed to occur.

Caribbean Conservation has had a long association with the Miskito Coast. The organization's founding director, Dr. Archie F. Carr, Jr., first promoted the concept of a refuge in the Miskito Cays during the mid-1970's. Carr, a zoology professor at the University of Florida, was a high-octane combination of Charles Darwin and Will Rogers whose ability to translate science into literature brought international attention to the plight of the sea turtles. He wrote 11 books and more than 120 scientific articles about sea turtles before his death in 1987.

Aside from its contribution to fisheries, American scientists are especially interested in the Miskito Coast because of its environmental similarity to the Florida Keys and the Everglades, which have been severely affected by humans.

"Studying the Miskito Coast gives ecologists a way to look at these ecosystems in their natural state so they can compare them to the heavily impacted areas of South Florida," Alevizon said. "It's also an extremely important nesting and feeding area for a wide variety of creatures that spend most of their lives in other parts of the Americas."

Although the most immediate beneficiaries of the project will be the Miskito people, the impact of establishing the Miskito Coast Protected Area continues well beyond Nicaragua's borders, said David Carr, executive director of Caribbean Conservation. By integrating environmental and economic interests and promoting cooperation between indigenous peoples and national government, the Miskito Coast project could become an important model for marine resource conservation throughout Latin America, he said.

Over the next three years, Caribbean Conservation will provide facilities, equipment, initial staff, and staff training for managers of the protected area; collect scientific information for a recommended management plan; involve resident Miskito communities in establishing and managing the protected area; and develop a Miskito fisheries cooperative to ensure sustained economic development through ecologically sound harvesting of the area's rich fisheries.

The Liz Claiborne and Art Ortenberg Foundation also support the project, as do other private donors and Caribbean Conservation members.

For more information about sea turtles and other coastal and marine wildlife and their habitats, or to Adopt a Sea Turtle, call the Caribbean Conservation Corporation at 1-800-678-7853.

Meetings and New Publications

Conference—Evolution and the Aquatic Ecosystem

The American Fisheries Society is sponsoring a three-day conference which will influence the future decisions of population conservation and biological diversity issues.

Evolution and the Aquatic Ecosystem: Defining Unique Units in Population Conservation will be the focus of the conference scheduled 23-25 May 1994 at the Doubletree Inn in Monterey, CA. This conference will be as relevant for the conservation of plant and terrestrial animal species as it will be for the protection of fish and other aquatic populations.

Research biologists, managers, decision makers, and politicians are frequently faced with the question of what populations

of fish to save. Increasingly there is a new set of questions generated from these queries: what is a unique population, what is a founding population, and what is the relationship between populations? These questions have been pursued by a number of disciplines, but so far definitive answers are hard to come by.

There is a need for experts from these disciplines to combine their information, to learn new answers, and to identify new research. Speakers, including Robin Waples, with the National Marine Fisheries Service, who brought the term of *evolutionarily significant units* into the regulatory arena; Robert J. Behnke, professor in the Department of Fishery and Wildlife Biology, Colorado State University; J. Baird Callicott, professor of Philosophy and Natural Resources, University of Wisconsin-Stevens Point; and Peter A. Bisson, aquatic biologist at Weyerhaeuser Company, will all be discussing ways in which the scientific and management communities can understand **subunits of fish species for conservation purposes**.

For more information on the conference and registration, contact Christine Gan or Cindy Carpanzano, Department of Molecular and Cell Biology, 401 Barker Hall, AC Wilson Laboratory, University of California, Berkeley, CA 94720-3202, 510/642/7525, FAX 510/643/5035.

Wildbranch Workshop

The *Wildbranch Workshop in Outdoor, Natural History, and Environmental Writing* is for people with either personal or professional interests. The workshop is a week of classes, lectures, discussion groups, and readings in the craft and techniques of fine writing. The seventh annual workshop will be offered June 19-25, 1994 at Sterling College, a small college in northern Vermont known for its hands-on approach to the study of natural resources.

This year's faculty will include outdoor writers Steve Bodio and Joel Vance; natural history writer Gale Lawrence; Jim Schley, Managing Editor of Chelsea Green Publishing; Aina Niemela, a founding editor and former managing editor of *Orion*; environmental journalist Robert Kimber; and freelance journalists Joyce and Richard Wolkomir.

For additional information, contact Wildbranch, Sterling College, Craftsbury Common, VT 05827 or call 1-800-648-3591.

Trout Stream Improvement Workshop

The 1994 *International Trout Stream Habitat Improvement Workshop* will be taking place at the Marlborough Inn, Calgary, Alberta, Canada on September 6, 7, 8 & 9, 1994. The workshop will include two days of field tours highlighting stream and riparian habitat projects on a variety of Alberta's streams and rivers.

Contacts: Garry Szabo, Trout Unlimited Canada. Tel: 403-221-8365; Fax: 403-221-8368 or Lorne Fitch, Alberta Fish & Wildlife Service, Tel: 403-381-5281.

Symposium—Urban Wildlife

A *National Symposium on Urban Wildlife* is scheduled for 22-26 October 1994, at the Embassy Suites Hotel, Seattle-Bellevue, Washington. For information, contact: Dr. Lowell Adams, National Institute for Urban Wildlife, 10921 Trotting Ridge Way, Columbia, MD 21044 (301) 596-3311 or (410) 995-1119.

Southeastern Association Conference

The 48th Annual Conference of the Southeastern Association of Fish and Wildlife Agencies will be held October 23-26, 1994, at the Mississippi Coast Coliseum and Convention Center in

Biloxi, Mississippi. The Mississippi Department of Wildlife, Fisheries and Parks is honored to serve as your host agency. We cordially invite you to Mississippi's Gulf Coast to sample the area's rich historic, cultural, recreational, and culinary offerings. With attractions as varied as Gulf Islands National Seashore, deep-sea fishing charter boats, the last home of Confederate President Jefferson Davis, and numerous dockside gaming establishments, there is sure to be something of interest for all our guests.

The conference theme this year will be "Attitudes Will Chart the Course". This is a time of ever-increasing demands on natural resources which must be considered in allocation decisions. Wildlife management has been an unparalleled success story in the Southeast, but no one can deny that the times are rapidly changing. Our charge is to maintain traditionally successful programs while remaining adaptable and receptive to new, non-traditional management strategies. We must remember that the will of the people may not always be right, but it always will be served. It is imperative that we, as resource professionals, assume the leadership role in directing public attitudes, not merely responding to them. This is true because these attitudes ultimately will determine land-use patterns, environmental quality, recreational opportunities, and wildlife populations.

For information, write the Mississippi Department of Wildlife, Fisheries and Parks, 506 Highway 43 South, Canton, MS 39046.

Marine Science Handbook

Practical Handbook of Marine Science, Second Edition is edited by Michael J. Kennish. The book provides comprehensive coverage of significant developments in marine biology, marine chemistry, marine geology, marine pollution, and physical oceanography. Containing more than 600 pages of selected physical, chemical, and biological reference data on the ocean environment, the book investigates current knowledge and recent advances pertaining to the sea. It addresses natural phenomena in estuaries, lagoons, continental shelves, continental slopes, continental rises, abyssal regions, mid-ocean ridges, along with neritic and pelagic waters of the ocean. The book also examines in detail anthropogenic effects on estuarine and marine ecosystems from local, regional, and global perspectives.

Order for \$89.95 from CRC Press, 2000 Corporate Blvd., NW, Boca Raton, FL 33431.

Bacterial Diseases of Fish

Valerie Inglis, Ronald J. Roberts, and Naill R. Bromage have written *Bacterial Diseases of Fish*, a 312-page volume published in 1993.

Bacterial diseases are the most important causes of loss among fish farm stocks and play an important role in the spoilage of fish intended for human consumption. Although much has been written about the identification and classification of bacteria, this is the first book to cover the pathogenesis, ecology, and environmental aspects of bacterial fish diseases—with important implications for management and control.

Microbiologists and fisheries scientists will find in-depth chapters on the taxonomy, biochemistry, immunology and pathogenicity of etiological agents...job-tested control measures...how to isolate and identify fish bacterial pathogens...public health aspects...and much more!

Topics covered are Cytophagaceae, Enterobacteriaceae, Vibrionaceae, Pasteurellaceae, Pseudomonadaceae, Gram-Positive Fish Pathogens, Acid-Fast Fish Pathogens, Rickettsias and Chlamydias, The Practice of Fish Bacteriology.

The book costs \$89.95 from Patricia Ledlie Bookseller, 1 Bean Road, Box 90, Buckfield, ME 04220.

Fishery Publications Catalog

The American Fisheries Society has issued its *1994 Publications Catalog*, a 24-page schedule of fishery and fishery-related books for sale by the Society. The catalog, containing new releases, special publications, symposium proceedings, monographs, texts, manuals, tapes, and other publications, was included in the center of the January 1994 issue of *Fisheries*.

Plastic Pellets in the Aquatic Environment

The U.S. Environmental Protection Agency has issued EPA 842-S-93-001, *Plastic Pellets in the Aquatic Environment: Sources and Recommendations—A Summary*, a 12-page brochure.

The brochure highlights a more technical EPA report which represents the first comprehensive assembly of information regarding the presence and ecological effects of plastic pellets in the aquatic environment. The brochure was designed to reach and educate a much broader audience, raising awareness on the problem and its control. It can be used as a quick reference source of information on the problem.

Plastic pellets are the raw material from which plastic products are made. Although pellets may not be as aesthetically displeasing as other types of debris, such as sewage and medical debris, the quantities present and their persistence in the environment are of great concern. Most importantly, they may cause serious consequences to marine life if ingested.

The plastic pellets report, which this brochure summarizes, was developed with the cooperation of the Society of Plastics Industry to determine possible sources of plastic pellets within the plastics industry, and make recommendations to control and prevent the release of pellets by such sources. The report constitutes an example of the Government and private sector working together to achieve environmental goals.

Copies of the brochure are available by writing to: Plastic Pellets in the Aquatic Environment: Sources and Recommendations (EPA 842-S-93-001), NCEPI, P.O. Box 42419, Cincinnati, OH 45242-2419. For a copy of the complete report, write NCEPI, Box 42419, Cincinnati, OH 45242-2419.

Water Quality and Early Life Stages

The American Fisheries Society has published its Symposium 14, *Water Quality and the Early Life Stages of Fishes*. Edited by L.A. Fuiman, this paper-bound, 192-page volume costs \$25.

The early life stages of fishes (embryos, larvae, and early juveniles) are critical to fish population dynamics, and yet fishes in these stages suffer a variety of adverse interactions with humans, ranging from exposure to toxic chemicals and habitat degradation to power-plant entrainment.

Given the international interest in environmental quality, members of the American Fisheries Society Early Life History Section organized the 16th Annual Larval Fish Conference around the theme *Environmental Quality and the Early Life Stages of Fishes*. This volume represents a selection of presentations from that 1992 symposium. Organized into three major sections—laboratory and field studies, methodology, and management issues—this valuable reference provides a thorough yet concise overview of impacts of water quality (including contaminants and naturally varying biotic

and abiotic conditions) on fishes, ways of measuring those impacts, and mitigating losses. Individual contributions explore water quality effects on biochemistry, developmental anomalies, pathology, behavior, survival, and population dynamics.

Books may be ordered from the American Fisheries Society, Fulfillment Department, PO Box 1056, Evans City, PA 16033.

Thesis Abstracts

Developmental Instability Studies in Coho Salmon: An Experiment Involving Genomic Heterozygosity and Environmental Stress

William Bruce Campbell, M.S. 1993
University of Washington

An accumulating body of evidence suggests that stress can disrupt development. The resulting developmental instability may be reflected in a number of easily measured phenotypic characters such as the right-left asymmetry of normally bilaterally symmetric characters (fluctuating asymmetry). Some previous studies involving genic heterozygosity and fluctuating asymmetry have revealed significant negative correlations, suggesting that heterozygosity acts as a buffer against the adverse effects of developmental stress.

Coho salmon have been reported to contain low levels of genetic variance and low average genic heterozygosity (as measured by protein electrophoresis). This project was implemented to test the efficacy of using developmental instability analyses to assess the impact of differing patterns of thermal variance (environmental stress) on early development and gather insight into the coho salmon genome.

Coho broodstock from two western Washington hatcheries (University of Washington and Skykomish) were crossbred using a factorial design to create four crosses containing putatively different levels of genomic heterozygosity. The progeny were exposed to different levels of thermal variability and subsequently measured for changes in mortality, early growth, and the fluctuating asymmetry of five bilateral meristic characters: mandibular pores, pectoral fin-rays, pelvic fin-rays, and gillrakers on the upper and lower arms of the first branchial arch.

Analysis of early growth based on yolk absorption data revealed very similar responses for all UW maternal crosses, irrespective of treatment. Strong maternal dominance was also shown in progeny from Skykomish maternal crosses, as well as significantly greater variability in growth responses between treatments. Analyses of the meristic data (fluctuating asymmetry), however, did not reveal any evidence of maternal dominance, or heterosis. Instead, gillrakers on the lower limb of the first branchial arch revealed increased asymmetry under ambient thermal conditions, while pelvic fin-ray counts showed increased asymmetry under fluctuating thermal treatments.

Although mortality levels were not significantly different between treatments, the data were suggestive of increased developmental stress when exposed to fluctuating temperatures, thus supporting the asymmetry observations on pelvic fin-ray counts. The most probable explanation for the higher levels of asymmetry observed in fish exposed to ambient temperatures is that the response is a product of reduced pressure from selective mortality that fish exposed to fluctuating temperatures may have experienced. However, the possibility of different character responses to alternate forms of stress from thermal variance cannot be discounted. It is also suggested that levels of genetic variance between stocks for bilateral meristic characters may be different than those for early growth. However, the overshadowing effects of maternal dominance and the lack of concurrent electrophoretic data complicate both the phenotypic detection of heterosis during early growth and development and conclusions regarding genetic divergence between these two hatchery stocks.

Genetic, Morphometric, and Life History Characteristics of Sockeye Salmon (*Oncorhynchus nerka*) in the Wood River Lake System, Alaska

Lisa Anne Wetzel, M.S. 1993
University of Washington

Stock differences were investigated among the spawning populations of the Wood River lake system, Bristol Bay, Alaska. Characterization of stock differences is important for understanding the biology of the species and for proper management of each population. No differences in allele frequencies were detected with starch-gel electrophoresis for the LDH-4 and PGM-1 enzyme systems. Morphometry of salmon from different spawning areas was assessed by measuring body depth, snout length, caudal peduncle depth, and body length. Body depth and snout length were most variable in males among spawning habitats and lakes. Body depth was positively correlated with water depth.

Population-specific variation in age at maturity, fecundity, and egg quality were examined. Age at maturity was highly variable among populations, spawning habitat, sexes, and years. Fecundity varied between lakes and little variation was observed in the two measures of egg quality: egg size and the caloric content of the eggs. Variation among spawning habitats was related to water depth and predation levels. Variation between lakes was due to the difference in age composition between the study lakes.

In Memoriam

Walter Rutherford Crowe
AIFRB Emeritus 1980
August 10, 1993

Walter (Walt) Crowe died August 10, 1993, after a prolonged illness following heart bypass surgery and a stroke. Walt was born August 31, 1914, in New Wilmington, Pennsylvania, but spent several years of his youth, ages 9 to 17, in the Punjab, India (now Pakistan), where his father was founder and administrator of a missionary Boys Industrial Home. Walter learned Urdu and Hindustani and experienced a culture shared by few Americans. There he became an avid reader and acquired writing and editorial skills that remained hallmarks of his professional career. In 1932, he participated in a memorable six-week trip by sea and overland through the Near East and Europe en route to the United States to continue his schooling. He received his B.A. degree from the College of Wooster in 1936 and his M.A. from the University of Michigan in 1937, specializing in fisheries, aquatic biology, and zoology. He continued graduate study and then was a fisheries biologist with the Institute for Fisheries Research of the Michigan Department of Conservation from 1941 until 1964. This was interrupted by service in the U.S. Navy as a Lt. (jg) from 1943 until 1946, for 8-9 months as commanding officer of an LSM (landing ship medium) in the Pacific and Japan.

In his years with the Institute, Walt experienced a wide spectrum of activities, including significant contributions to studies of walleye and white sucker in inland lakes, responsibility for fish tagging and record coordination, liaison with district supervisors, general management of inland sport fisheries, directing efforts in research and completion of final publications, and supervisory and administrative matters.

In 1964, he transferred to the Fish Division of the Michigan Department of Natural Resources in Lansing, where he was responsible for program planning of Great Lakes Commercial and Sport Fisheries, a position he occupied until retirement in 1970.

Thereafter, Walter remained active in fisheries, chiefly on the urging of colleagues who sought his expertise, sometimes on a full-time basis, at others part-time. Included were work with the Michigan Sea Grant Program and the Great Lakes Fishery Commission as a consultant until 1978. Carlos Fetterolf, then Executive Secretary of the Commission, recalls that on one occasion when he asked Walter to lend a hand for a few days, Walt replied, characteristically, "Sorry, Carlos, but I'm too darn busy doing unimportant things."

Walter was long active in the First Congregational Church in Ann Arbor, and a supportive alumnus of Wooster College. He and his first wife, Allene Gates Crowe, had two sons, James and John, who survive. Following Allene's death in 1984, he married Marjorie Glenn Bussert, a college classmate at Wooster, in 1986. She lives at 1718 Sanford Place, Ann Arbor, MI 48103.

Walter was an avid outdoorsman, fisherman, and dedicated University of Michigan sports fan (while in Woodstock School in India, he was for two years the school tennis champion). He is remembered with affection by a host of AIFRB members and other friends.

Reeve M. Bailey

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 District, 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, Northeast Fisheries Center, 166 Water St., Woods Hole, Massachusetts 02543, President; Katherine Myers, Fisheries Research Inst., WH-10, University of Washington, Seattle, Washington 98195, Secretary; Joseph Rachlin, Lehman College Bio., Bedford Park Blvd. West, Bronx, New York 10468, Treasurer.

ISSN-8755-0075

Membership Report

Promoted to Fellow

Dr. Thomas W. Gengerke	IA
Dr. David M. Green	NY
Dr. William W. Smoker	AK
Dr. R. V. Miller	WA
Dr. J. E. Reeves	WA
Dr. George R. Spangler	MN
Dr. Daniel K. Odell	FL
Dr. Donald R. Gunderson	WA
Dr. Peter K. Bergman	WA
Dr. Michael P. Sissenwine	MD
Dr. Richard W. Soderberg	PA
Paul J. Wingate	MN

New Fellows

Dr. Louis A. Helfrich	VA
Dr. Linda L. Jones	WA

Emeritus

James M. Fraser	Ont
-----------------	-----

Promoted to Member

Malcolm Johnson	TX
Dr. Thomas E. Helser	MA
Dr. Mark S. Tisa	MA
John V. Miglarese	SC
Bruce A. Halgren	NJ
Dr. Thomas W. Schmidt	FL
Dr. Scott LaPatra	ID

New Members

Dr. Luiz R. Barbieri	GA
Dr. Melvin L. Warren, Jr.	MS
Dr. L. S. Parsons	Ont
Dr. Robert S. Hayward	MO
C. Lance Robinson	TX

Associates (Student)

Alan M. Friedlander	HI
Christopher S. Guy	SD
Vasana Weerasinghe	OR
Stephen D. Koenig	WV

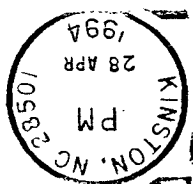
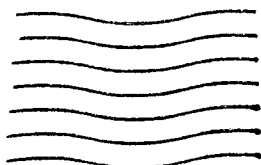
Sammy M. Ray, Membership Chairman
Texas A&M University at Galveston
5007 Avenue U
Galveston, Texas 77551
Direct membership inquiries to the
Membership Chairman.

FIRST CLASS

Address Correction Requested

Bedford Park Boulevard West
 Lehman College, Biology
 c/o Joseph Rachlin
 Bronx, NY 10468-1589

*American Institute of Fishery
 Research Biologists*



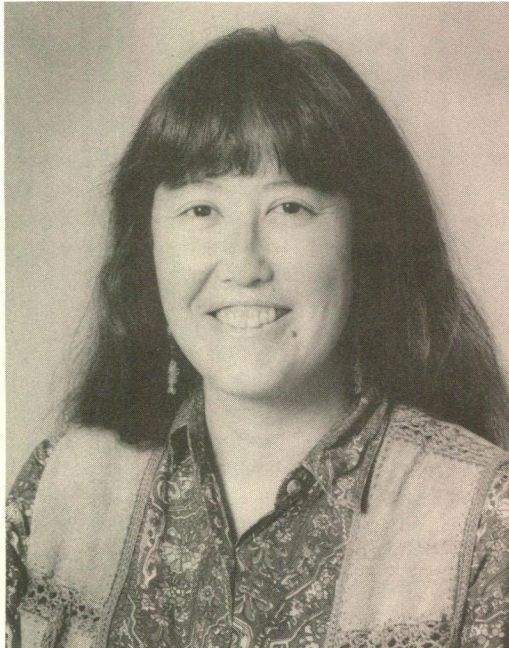
Dr. William H. Bayliff
 IATTC, Scripps Inst. Oceanog.
 8604 La Jolla Shores Drive
 La Jolla, CA 92037-1508

... BRIEFS ...

VOL. 23, NO. 3

JUNE 1994

1991 Thompson Award Winner



Dr. Sharon H. Kramer (AIFRB Member 1991) won the W.F. Thompson Award for the best student paper of 1991 for her excellent paper on juvenile California halibut.

Scientists Begin Addressing Ethics

Scientists can't agree on what constitutes research misconduct, so they also can't agree on how widespread it is or what motivates scientists to cheat. With little training in ethics, scientists and graduate students are often confused about what is proper behavior in research.

In recent years, the scientific community has been divided over the definition of research misconduct. In an attempt to clarify matters, a 1992 National Academy of Sciences (NAS) panel defined misconduct as fabrication, falsification, or plagiarism in research. Fabrication is making up data or results of research. Falsification is changing data or results of research. Plagiarism is stealing ideas or words from others.

The NAS panel made a sharp distinction between misconduct and certain "questionable research practices," including "massaging" data to enhance the significance of research results; misrepresenting speculations as fact; refusing to give peers reasonable access to unique research materials that support published papers; and inadequately supervising research subordinates. None of these "questionable practices" would be considered misconduct, according to the panel. But some analysts are troubled by the narrowness of this definition, because it addresses only the most egregious forms of cheating.

The National Institutes of Health and the National Science Foundation's definitions are broader and say that "serious deviation from accepted practices" in research also can be considered misconduct. But what is a "serious deviation"? Is it the same thing as the NAS' "questionable practice"?

But the NIH/ NSF definition is too broad and ambiguous, many scientists say, so the NIH is in the process of making it more specific, "though the new definition will still be open-ended," says Lawrence Rhoades, director of the division of policy and education at the Public Health Service's (PHS) Office of Research Integrity, which has jurisdiction over NIH research. "You can't name everything that would be misconduct."

NSF has no plans to change its definition, says Amy Eisenstadt, assistant general counsel.

Although confirmed cases of scientific misconduct are rare, recent research suggests that cheating could be widespread in the scientific community.

The first detailed national survey of misconduct in science, published in *American Scientist* in November 1993, showed that six percent of faculty and eight percent of students reported observing the falsifying of research data by faculty members. In addition, 44 percent of graduate students and 50 percent of faculty members reported direct knowledge of more than one kind of cheating in research, including lesser ethical violations. The survey, with responses from 2,600 students and faculty at 99 institutions, was conducted by the Acadia Institute in Maine, an organization specializing in studies of professional responsibility.

Despite scientists' perceptions of widespread cheating, the NAS report estimates there were only 40-100 confirmed cases of misconduct in the United States between 1980-1990. One reason for the large range in this estimate is that government summaries of misconduct cases have not disclosed researchers' names, protecting the anonymity of those caught cheating. (In 1993, PHS broke with tradition and published in the *Federal Register* the names of 14 researchers found to have committed misconduct since May 1992.)

Confirmed misconduct cases are rare partly because scientists disagree about what is fair play in research. There are many gray areas in science, where researchers can differ over experimental techniques and interpretations of data. A technique that is valid to one researcher could be considered shoddy to another.

For example, scientists routinely toss out some experimental results that have been polluted by "noise," that is, by variables that don't belong in the experiment. Other scientists routinely throw out extremely high and low results of experiments because such data represents errors in measurement. Yet few scientists will admit to such selective reporting of results, because sometimes such practices could be considered as "massaging" experimental results—that is, manipulating numbers to show what scientists want to prove.

"It's not unusual for some scientists to fish around until they can find the research results they want," says Paul J. Friedman, radiology professor and dean for academic affairs at the University of California, San Diego medical school.

Even some distinguished scientists may have massaged experimental results, wrote Lewis Wolpert, a British medical researcher, in *The Unnatural Nature of Science*.

Scientists are motivated to massage results because they want to prove their theories as unambiguously as possible. "The desire to present one's results in the best light can be difficult to resist."

So where is the line between ethical research practices and unethical ones? "The proper conduct of science is not well defined," Friedman says. "It is difficult to determine what is the right (scientific method) in each research situation."

The scientific community acknowledges that it has failed to address ethical issues in research. So now, faced with stagnant funding and public skepticism, researchers are working on measures to protect science's reputation.

In recent years, professional science societies have written codes of ethics, several universities have begun applied-ethics programs, journals about practical ethical issues have started up, and the Association of Applied Ethics has been established at the University of Indiana.

In September 1993, Duke University opened the school's Center for Applied Ethics, one of the first of its kind in the Southeast, directed by Aarne Vesilind, professor of civil engineering.

"We don't depend on ethical theory; we try to address practical ways to solve problems," Vesilind says.

The center will provide training for graduate students in every department, including non-scientific fields. Representative faculty members from each of the 40 departments will receive training in addressing ethical issues, and then will run workshops and discussion groups in their departments.

At the University of South Carolina's School of Medicine, the new Office of Medicine, Humanities, and Society prepares monthly ethics seminars for students and the entire staff. In addition, first- and second-year students take required coursework in medical ethics.

The Medical University of South Carolina's new Program in Biomedical Ethics, directed by Mary Faith Marshall, will provide continuing education in ethics for the university's staff, establish master's and doctoral programs in ethics, and will develop an outreach system for smaller hospitals. MUSC plans to provide education programs in medical ethics issues for target groups such as legislators, judges, clergy, and science and health journalists.

Further Reading

Grinnell, Frederick. *The Scientific Attitude*. New York: Guilford Press, 1992.

Miller, David J. and Michael Hersen. *Research Fraud in the Behavioral and Biomedical Sciences*. New York, John Wiley & Sons, 1992.

Responsible Science: Ensuring the Integrity of the Research Process, Volume I. Washington, D.C.: National Academy Press, 1992.

Taubes, Gary. *Bad Science: The Short Life and Weird Times of Cold Fusion*. New York: Random House, 1993.

Wolpert, Lewis. *The Unnatural Nature of Science*. Cambridge: Harvard University Press, 1992.

From Coastal Heritage, Winter 1993-94

1994 AIFRB Research Assistance Award Program

Tom Lambert, Chair of the Research Assistance Award Program, announces 11 associate members of AIFRB were selected to receive awards. A total of \$3,300 will be distributed to the recipients to defray travel expenses to present papers at scientific meetings. Here are the selectees, their affiliation, sponsors, and abstracts of their papers:

J. Kevin Craig, a graduate student at the University of Washington, presented part of his master's thesis research he conducted with his advisor Dr. Chris Foote. The paper was presented at the Ecological and Evolutionary Ethology of Fishes conference held in Victoria, British Columbia, May 15-18, 1994.

The Genetics of Color in Sympatric Forms of Sockeye Salmon (*Oncorhynchus nerka*): Investigations of an Unknown Form.

J. Kevin Craig

Sockeye salmon, *Oncorhynchus nerka*, occurs as three forms. Sockeye and kokanee are the anadromous and nonanadromous forms, respectively. Residuals are the nonanadromous progeny of sockeye. The three forms either differ in color or are the same color but differ in exposure to carotenoids, pigments responsible for red coloration. Recently, a possible new form has been found. These fish have characteristics in common with both sockeye and kokanee. In addition, they exhibit green spawning coloration similar to residuals. To determine the identity of the green form, a genetic experiment was performed in which crosses between the forms were raised under identical environmental conditions. Color measurements of the flesh and skin were taken and tissues sampled for pigment extraction. By comparing color and pigment concentration among the cross types, I evaluate the hypotheses that the green fish are 1) a color morph of kokanee; 2) residuals; or 3) hybrids between sockeye and kokanee.

Gregory A. DeBrosse, a graduate student at Rutgers, presented a paper summarizing two years of research conducted at Haskin Shellfish Research Laboratory under the direction of Dr. Standish K. Allen, Jr. The paper was presented at the 86th Annual National Shellfisheries Association meeting held April 24-28, 1994 in Charleston, South Carolina.

The Suitability of Land-Based Evaluations of *Crassostrea gigas* as an Indicator of Performance in the Field.

Gregory A. DeBrosse and Standish K. Allen

Besides disease resistance, there are a host of ecological questions regarding the suitability of *Crassostrea gigas* for introduction to the mid-Atlantic. Are tank-based comparisons of survival, growth, disease resistance, etc. suitable for estimating the performance of *C. gigas* in the field?

In June 1991, equal numbers of spat from three crosses—WFLA (*Crassostrea virginica*), YWAA (*C. gigas* form Miyagi), and XJPNA (*C. gigas* form Hiroshima)—were split into two replicates and reared in upwellers for the first summer and in a land-based tank the second. After the first season, *C. virginica* had the highest mortality (65%, 36%, and 13% for WFLA, YWAA, and XJPNA, respectively) and average spat size was about 30% greater in both *C. gigas* groups. For the second year, the three crosses were transferred to a 4200-gallon tank; two replicates of WFLA were also placed in Delaware Bay. Cumulative mortality for the second season (through November, 1992) was WFLA—60%; YWAA—73%; XJPNA—93%; and WFLA (Delaware Bay)—37%. YWAA grew fastest followed by XJPNA and WFLA; however WFLA grown on the tidal flats were larger than all tank-reared groups. All oysters in the tank were infested with *Polydora websteri*, *C. gigas* heavily and WFLA lightly; WFLA (Delaware Bay) were virtually free of infestation. These data indicate that tank-based comparisons are not likely to be a true measure of performance in the local environment.

Elizabeth A. Hale, a doctoral student at Pennsylvania State University studying under Dr. Jay R. Stauffer, will be presenting her paper in June at the 1994 meeting of the American Society of Ichthyologists and Herpetologists at the University of Southern California, Los Angeles.

**Analysis of Feeding Angles of Rock-Dwellings Cichlids
(Pisces: Cichlidae) from Lake Malawi, Africa**

Elizabeth Hale and Jay R. Stauffer, Jr.

Lake Malawi harbors the most speciose ichthyofauna of all of the world's lakes. Resource partitioning among five species is investigated by observing differential feeding angle of rock-dwelling cichlids. Cichlids held in aquaria fed at specific angles to the substrate. Data collected in situ confirm this observation. In addition, laboratory data show feeding angle is modified by the presence of hetero- and conspecifics.

Tung-shi Huang, Ph.D., a Post-Doctoral Research Fellow at the University of Florida, will present two papers at the Institute of Food Technologists annual meeting at Atlanta, Georgia, June 25-29, 1994. He is conducting seafood species identification research with professor Cheng-I Wei.

**Identification of Red Snapper (*Lutjanus campechanus*) Using
Electrophoretic Techniques**

T.S. Huang, M.R. Marshall, and C.I. Wei

Isoelectric focusing (IEF), sodium dodecyl sulfate-polyacrylamide gel electrophoresis (SDS-PAGE), and two-dimensional (2-D) gel electrophoresis were employed to produce protein profiles for species identification of red snapper and eleven other related fish species including vermilion snapper, gray snapper, lane snapper, mutton snapper, yellowtail snapper, onspot snapper, blackspot snapper, Madras snapper, pink porgy, white grunt, and hogfish. By comparing the distinctive protein patterns for each fish species on IEF and SDS gels, red snapper could be identified. IEF gel using an ampholyte mixture of 20% pH 3-10 and 80% pH 4-6.5 was found to produce better resolution than gels containing ampholyte of pH 3-10, 4-6.5, 6-8, or 5-6 for species identification. The 10 and 12.5% SDS gels were found to produce better SDS-PAGE protein profiles than 7.5 and 15% gels for species identification. Since the seven authentic fish species (red snapper, vermilion snapper, gray snapper, hogfish, lane snapper, mutton snapper, and yellowtail snapper) also showed species-specific protein patterns using 2-D gel electrophoresis, this technique could also be used to identify fish species. The 2-D gel electrophoresis was more tedious to run than IEF and SDS-PAGE.

**Development of Monoclonal Antibody for Red Snapper
(*Lutjanus campechanus*) Identification Using Enzyme-Linked
Immunosorbent Assay**

T.S. Huang, M.R. Marshall, K.J. Kao, W.S. Otwell, and C.I. Wei

Due to its high cost, popularity, and demand, red snapper fillet is susceptible to substitution using less expensive fish species and other snappers such as scarlet, gray, vermilion, etc. Analytical methods that identify fish species is therefore important for preventing willful or unintentional substitution for red snapper. Four IgG1 monoclonal antibodies (McAbs), C1C1, A1B2, A2C3, and C2A2 against red snapper protein "a" from stained IEF gels, were produced using hybridoma technique. McAb C1C1 showed strong reactivity with red snapper, and cross-reactivity with vermilion, lane, mutton, and yellowtail snappers using ELISA and immunodot blotting. The other McAbs showed lower reactivity with red snapper, vermilion snapper, lane snapper, mutton snapper, and yellowtail snapper. The four McAbs, when employed simultaneously in a blind study with 36 various seafood and meat extracts using ELISA, correctly identified red snapper. C1C1 was used to reduce the 36 test samples to only five, including red, vermilion, lane, mutton, and yellowtail snappers. The use of A1B2, A2C3, and C2A2 then produced reaction patterns specific for red snapper. Differentiation of red snapper from the other four species was thus possible. ELISA tests using these McAbs were applied with thin-layer and slab gel electrophoresis to check 24

commercial fish samples claimed to be mutton snapper, red snapper, Caribbean red snapper, scarlet red snapper, malabar red snapper, Pacific snapper, and imported red snapper by seafood retail stores. All claimed mutton snapper samples were labeled correctly; whereas the Caribbean red snapper and only one of the 19 claimed red snapper samples were identified as red snapper. These four McAbs can therefore be used to identify red snapper.

Tein M. Lin is in the second year of his Ph.D. program at Oregon State University under the direction of advisor Dr. Jae W. Park. He will be presenting his paper at the Institute of Food Technologists meeting at Atlanta, Georgia, June 25-29, 1994.

**Protein Recovery and Water Recondition from Surimi
Processing Wash Water**

T.M. Lin, J.W. Park, and M.T. Morrissey

During washing and dewatering of the surimi process, about 40 to 50 percent of the minced fish solids are lost. A certain portion of soluble solids lost in wash water is now believed to be the highly functional myofibrillar proteins. The objectives of this research were to recover and characterize those valuable proteins, as well as to minimize water use and reduce waste disposal through recycling water in surimi processing.

As surimi was processed from Pacific whiting (*Merluccius productus*) fillets, wash water was collected at different points in the processing line. Microfiltration and ultrafiltration units were applied to concentrate reusable proteins and to recondition wash water. Different portions of recovered solids were blended into regular surimi and their functional properties were evaluated. Wash water output from the ultrafiltration unit was tested to evaluate water quality.

The particulates lost in the leachwater from screw press were successfully collected and concentrated. Substitution of regular surimi with 10% or 20% recovered meat did not deteriorate gel hardness and gel elasticity as compared with the control surimi gel. Lightness of gels was similar regardless of meat combination; however, expressible moisture of recovered meat gels was slightly higher than the control gel. Chemical oxygen demand, aerobic plate count, and protease activity of water permeate from ultrafiltration were substantially reduced and also water clarity was greatly increased by the ultrafiltration treatment.

Edda Magnusdottir, who is working toward a Masters degree at Oregon State University's Seafood Laboratory in Astoria, Oregon, will present a paper at the Institute of Food Technologists meeting at Atlanta, Georgia, June 25-29, 1994. She is conducting her research with advisor Dr. Michael T. Morrissey.

**Chemical and Physical Properties of Pacific Whiting Fish
Mince During Frozen Storage**

E. Magnusdottir, E. Kolbe, and M.T. Morrissey

Pacific whiting (*Merluccius productus*) is the largest groundfish resource off the west coast of the United States. Annual catch normally exceeds 200,000 metric tons per year. A potential use of the harvest is frozen fish mince. Expanded use of this product has been limited by its deterioration during frozen storage, including loss of texture characteristics. The objectives of this study are to determine whether cryoprotectants can prevent the loss of the quality characteristics of fish mince during frozen storage.

A number of cryoprotectants (sorbitol/ sucrose, polydextrose, maltodextrin/ sucrose, and dry whole whey) were mixed (8% level) with Pacific whiting mince. Beef plasma protein (1%) was added to inhibit the activity of protease enzymes in the mince. The stabilized minces were vacuum packed and kept in frozen storage (-20°C). The samples were analyzed at 0, 1, 4, and 8 weeks of frozen storage. Texture parameters were determined by torsion-measuring stress and strain of heat set gels. Salt-soluble protein (SSP), thiobarbituric acid (TBA), and dimethylamine (DMA) were also analyzed.

All test samples showed higher strain values than control samples without cryoprotectants. Stabilized mince samples with polydextrose

or dry whole whey had the highest values and best texture properties. There was no significant difference in stress. After 8 weeks of frozen storage all of the samples with cryoprotectants has SSP levels similar to the original value while the control sample decreased 37% from initial values. TBA values remained low for all test samples, including control. Color analysis of the gels with cryoprotectants also showed values similar to control. Stabilization of Pacific whiting mince with cryoprotectants improves the overall gel strength of the mince without adversely affecting other quality parameters of mince.

Andrew M. Shadlock, a first-year doctoral student at the University of Washington, will be presenting material from research being conducted at Scripps Institution and UW's Marine Molecular Biology Laboratory under the sponsorship of Dr. Theodore W. Pietsch. He will present his findings at the 1994 annual meeting of the American Society of Ichthyologists and Herpetologists in June at the University of Southern California.

Molecular Phylogeny of Deep-Sea Anglerfishes and their Luminescent Bacterial Symbionts

A.M. Shadlock, T.W. Pietsch, and M.G. Haygood

Deep-sea anglerfishes (suborder Ceratioidei) represent a particularly challenging group in terms of systematic ichthyology. No satisfactory and well-established hypothesis for their phylogenetic relationships exists. They possess an adaptation, sexual parasitism, that is unique among the vertebrates. A sound phylogeny for this group is necessary in order to analyze the evolution of this phenomenon. In addition, ceratioids are one of only two groups of fishes known to possess obligate bacterial light organ symbionts. An investigation of co-evolution between hosts and symbionts requires phylogenetic analysis of both parties. Morphological characters are problematic in the ceratioids, and bacterial phylogeny is most suitably studied by DNA sequence analysis. Cytochrome b and 16S rRNA mitochondrial genes have been PCR-amplified and sequenced from six ceratioid genera in four of the eleven families, as well as from outgroups representing the four remaining lophiiform suborders. In addition, 16S rRNA sequences have been characterized from the light-organ symbionts of two divergent ceratioid families. Results from comparative analyses of these data will be compared to earlier hypotheses of lophiiform relationships and to established taxonomy of bacterial 16S rRNA genes. Implications for further research on the molecular systematics and life history evolution of these complex organisms will be discussed.

Ellen S. van Snik is a doctoral student at Pennsylvania State University studying under the direction of advisor Dr. Jay R. Stauffer, Jr. She will present her paper at the 74th annual meeting of the American Society of Ichthyologists and Herpetologists in June at the University of Southern California.

Two New Species of Rock-Dwelling Cichlids (Pisces: Cichlidae) from Lake Malawi, Africa

Ellen S. van Snik and Jay R. Stauffer, Jr.

The recent explosive speciation and lack of complete morphological and genetic divergence in the Lake Malawi cichlids makes alpha taxonomy of this group troublesome. The presence of distinct color patterns, especially in males, has been used to distinguish cichlid species. Cluster analysis using morphological and meristic data was performed on several populations of the *Pseudotropheus tropheops* complex. Two new species are described. One of the species is endemic to Chinyamwezi Island and the other is endemic to Chinyankwazi Island. The new species are morphologically similar to *Pseudotropheus tropheops*, but differ significantly from the latter and each other in coloration patterns and meristic values.

S. Gregory Tolley, a doctoral student sponsored by Professor Joseph J. Torres at the University of South Florida, will present his findings at the American Society of Ichthyologists and Herpetologists annual meeting in June. The meeting will be held on the campus of the University of Southern California.

Oxygen Consumption and Swimming Activity in Juvenile Snook (*Centropomus undecimalis*)

S. Gregory Tolley

Oxygen consumption was related exponentially to swimming speed in juvenile snook. Total oxygen consumption scaled allometrically with weight, with a weight exponent intermediate to that predicted for larval and adult fishes. Scope for activity was estimated at 321.95 ml O₂ Kg⁻¹H⁻¹ and metabolic expansibility was relatively high. Absolute critical swimming speed (cm s⁻¹) did not vary with size; however, relative critical swimming velocities (body lengths s⁻¹) decreased isometrically with increasing fish length. These data imply that small juveniles were capable of prolonged swimming in the same velocity regimes as larger juveniles. Cost-of-transport analysis suggested that swimming efficiencies were highest in the transitional zone between pectoral (low-speed) and caudal (high-speed) swimming. This may reflect an energetic advantage associated with using both fin types simultaneously to develop thrust. Juvenile snook of the size range tested were nocturnal, with peak swimming activity occurring late at night or early in the morning. Swimming activity averaged 0.16 bl s⁻¹ for this sit-and-wait predator and comprised only a minor portion (2%) of the daily energy budget.

Vasana Weerasinghe, who is working on a Masters degree at Oregon State University's Seafood Laboratory, will be presenting a paper at the 55th annual meeting of the Institute of Food Technologists to be held in June at Atlanta, Georgia. Ms. Weerasinghe is studying under her major professor, Haejung An.

Catheptic Degradation of Pacific Whiting Surimi Myofibrils

V. Weerasinghe, M.T. Morrissey, T.A. Seymour, and H. An

Pacific whiting (*Merluccius productus*) has been used successfully for surimi production due to its bland taste, color, and low price compared with that of commonly used Alaskan pollock. Pacific whiting surimi, however, presents a significant technical challenge in proper gelation because of its proteolytic degradation of the myofibrillar components. The degradation was observed to be highest at temperatures around 55°C, resulting in a serious loss of surimi gel strength. Crude preparation of this enzyme was shown to have the maximal activity at 55°C and pH 5.5.

When activities of the most active cysteine proteinases (cathepsins L, B, and H) were compared, cathepsin B showed the highest activity in fish fillets, and cathepsin L in surimi. Washing during surimi processing selectively removed cathepsins B and H but not cathepsin L. Cathepsin L showed the maximum activity at 55°C in both fish fillets and surimi, indicating its activity is mainly responsible for degradation of muscle tissue and surimi gel.

Autolytic analysis of surimi proteins showed that myosin was the primary target, while actin showed only limited hydrolysis during 2 hr incubation. A purified Pacific whiting proteinase was incubated with various components of fish muscle protein. The proteinase was capable of hydrolysing purified myofibrils, myosin, actin, and insoluble and heat-denatured stroma from Pacific whiting. This result contributed to the growing body of evidence that the purified proteinase from Pacific whiting muscle is cathepsin L.

Bradley M. Wetherbee is a doctoral student at the University of Hawaii nearing completion of the Ph.D. program under advisor James D. Parrish, leader of the Hawaii Cooperative Fishery Research Unit. Mr. Wetherbee will present two papers at the annual meeting of the American Society of Ichthyologists and Herpetologists in June at the University of Southern California.

Biology of Deep-Sea Sharks from the Chatham Rise, New Zealand

B.M. Wetherbee

Sharks make up a substantial portion of the by-catch in deep-sea trawl fisheries of New Zealand, but the biology of these sharks is poorly known. To increase understanding of the impacts of exploi-

tation on these populations of deep-sea sharks, species captured from the Chatham Rise, New Zealand were examined, and information on their biology and distribution was recorded. The most abundant species by biomass was *Deania calcea*, followed by *Centroscymnus crepidater*, *Etmopterus baxteri*, and *Centroscymnus owstoni*. Highest catch rates for the most prevalent species were at depths between 800 and 1000 m, but fishing depths appeared to be near the deeper limits for several species. There was no strong evidence of segregation according to size or sex. Size at maturity for *Deania calcea* was approximately 75 cm total length for males and 100 cm for females. *Centroscymnus crepidater* males were mature at 65 cm and females at 85 cm. *Etmopterus baxteri* reached maturity at 55 cm for males and 63 cm for females. This information may be used in models aimed at assessing the susceptibility of these populations to overfishing.

Review of Shark Control in Hawaii with Recommendations for Future Research

B.M. Wetherbee, C.G. Lowe, and G.L. Crow

In response to public fears, the state of Hawaii spent over \$300,000 on shark control programs between 1959-1976. Six control programs resulted in the killing of 4,668 sharks (\$182 per shark). The programs furnished information on diet, reproduction, and distribution of sharks, but research efforts of the programs had shortcomings. Estimates of shark populations based on catch data from the programs are unreliable because of sampling biases, and results of the programs are not readily available to the scientific community. Research was centered on sharks other than the tiger shark, *Galeocerdo cuvier*, which is responsible for most attacks on humans in Hawaii. Success in reducing shark populations and removing large sharks from Hawaiian waters may have been overestimated, considering seasonal changes observed in shark abundance and the variable fishing effort. Shark-control programs do not appear to have had measurable effects on the rate of shark attack in Hawaii. Implementation of large-scale control programs in Hawaii in the future may not be appropriate. Acoustic telemetry, conventional tagging, and studies on population dynamics concentrating primarily on the tiger shark would provide information on activity patterns, distribution, and population parameters that may prove useful for reducing the risk of shark attack in Hawaii and elsewhere.

U.S., Mexico to Study Return of Historic Sardine Fishery

U.S. and Mexican scientists embarked on an unprecedented survey of U.S. and Mexican west coast waters Thursday, April 14, to investigate the resurgence of the Pacific sardine, an economically important fish making a comeback after disappearing more than two decades ago, the Commerce Department's National Oceanic and Atmospheric Administration has announced.

Scientists from NOAA's National Marine Fisheries Service, the Mexican Secretariat of Fisheries (SEPESCA), and the California Department of Fish and Game (CDF&G) are conducting experiments, slated to last a month, aboard five research vessels to best determine the size and scope of the Pacific sardine population. Researchers will sample sardine eggs and adult fish found in the sardine's 20,000-square-mile historic range from San Francisco southward to Punta Abreojos, Baja California, Mexico.

"This is the biggest and most comprehensive fish survey of its type ever conducted," said Pablo Arenas of the Inter-American Tropical Tuna Commission and project coordinator at the NOAA's Southwest Fisheries Science Center in La Jolla, California.

The Pacific sardine fishery, immortalized by John Steinbeck in the book *Cannery Row*, once supported the largest fishery in the western hemisphere before its collapse in the late 1960s. In its heyday from the mid-1930s to mid-1940s, the catch averaged 600,000 tons a year.

Signs of recovery began in the 1980s, but until now, scientists have been unable to map the full extent of the Pacific sardine population, due to its trans-boundary range and because, working separately, the United States and Mexico lacked the resources to accomplish such a comprehensive project.

"Accurate information on the sardine's current distribution and abundance is vital for properly managing both the U.S. and Mexican sardine fisheries to ensure the continued recovery of the resource," Arenas said.

According to fisheries economists, fishermen from both countries will benefit if the sardine population continues to recover. If the fishery should fully recover, the sardine population may be able to sustain an annual U.S. fishery harvest of 227,000 tons, with a current-day value to fishermen of about \$20 million. Mexican yields could be similar.

"This survey goes far beyond measuring the abundance of the sardine," said John Hunter (AIFRB Fellow 1984), Chief of the Coastal Fisheries Resources Division at the La Jolla laboratory. "Out of this joint effort, additional U.S. and Mexican scientific partnerships are being formed to study many other physical and biological aspects of the California Current."

Two NOAA research vessels, *McArthur* and *David Starr Jordan*; two research vessels from Mexico, *Puma* and *BIP XII*; and one vessel from CDF&G, *Mako*, will participate in the study. Scientists from the fisheries service's La Jolla laboratory and those of CDF&G will be responsible for determining the Pacific sardine population along the U.S. west coast. Scientists from SEPESCA's Instituto Nacional de la Pesca will study the population found on the Mexican west coast.

In addition to scientists from the Instituto Nacional de la Pesca, Mexican researchers participating in the project are from the Universidad Nacional Autonoma de Mexico, Centro de Investigacion de Ciencias del Mar, Centro de Investigacion Cientifica y de Educacion Superior de Ensenada, and from other institutions in Baja California, Sonora, and Mexico City.

Oil Spill Risk in Chesapeake Bay

Federal regulations enacted after the Exxon Valdez oil spill do little to reduce the risk of a disastrous spill in the Chesapeake Bay, according to a report released last month by the Chesapeake Bay Foundation.

CBF said the Bay was a "prime risk for large, damaging oil spills," because most vessels on the Bay don't have to meet regulations in the Oil Pollution Act of 1990.

The act requires tanker ships larger than 5,000 gross tons to have double hulls to prevent oil spills, phasing them in by 2015. But most of the 4 billion gallons of oil transported every year in the Chesapeake is done in barges smaller than 5,000 gross tons, said Ann Powers, vice president and chief counsel for the Chesapeake Bay Foundation.

Also, tugboat captains are not subject to the same federal licensing requirements as oil tanker pilots, she said.

Moreover, the U.S. Department of Energy estimates that petroleum transport in the Bay region will increase by more than 5 million gallons a day, CBF said.

CBF said the Chesapeake is far more fragile than Prince William Sound, where the Exxon Valdez spilled 10.8 million gallons of crude oil in 1989, because its marshes are like sponges from which it would be practically impossible to clean large amounts of oil.

The report recommends changes in oil shipping regulations, including double hulls for all tank vessels on the bay,

stricter training requirements for tugboat pilots, tougher inspection standards for barges, and better monitoring of tanks to keep them from overfilling.

CBF also called for faster installation, and more extensive use, of devices to measure oil tank levels and pressure than the federal government requires. On two of the most serious spills in the Bay—250,000 gallons in 1976 and 212,000 gallons in 1988—the crews were unaware that oil was spilling from their vessels.

The report also said that the Coast Guard should have a “vessel traffic service system”—which would give ship operators information about the location of other vessels—in the Bay, but none is planned.

“Prevention is not as strong as the foundation would like. . . but there have been some definite improvements,” said Capt. Richard Vlaun, a marine safety specialist with the Coast Guard in Portsmouth, Va.

Tugboat pilots have their own adequate licensing requirements, he said. The Coast Guard has been more vigilant about boarding and inspecting tugboats and barges in the wake of a deadly barge accident in Alabama last year, Vlaun said.

He added that some consideration has to be given to economics. “If you double-hull a small vessel you put it out of business,” by reducing the cargo capacity, Vlaun said.

Besides federal efforts, the state of Maryland is finalizing regulations that would require more training for petroleum transport crews.

The report did commend the federal, state, and local governments for their work in developing oil spill response programs.

CBF also stressed the need for more stringent regulations governing the transport of petroleum by pipeline, which is becoming a favored way of moving oil. Maryland and Virginia have had three pipeline spills each since 1990. While the permitting process to lay pipe is relatively stringent, the report said the federal government lacks adequate guidelines for pipeline operation and inspections.

For pipeline laid underwater, the report said, there are no comprehensive requirements for mapping and inspection, making them vulnerable to deterioration and breakage.

In 1991, a pipeline owned by Colonial Pipeline Company spilled more than 200,000 gallons of kerosene near Fredericksburg, Va., contaminating the Rappahannock River and closing the city’s water treatment plant for nine days. The failure was attributed to “pipeline fatigue.”

In March 1993, another pipeline owned by Colonial failed, spilling 407,000 gallons of diesel fuel near—and into—Sugarland Run Creek, and tributary of the Potomac River near Reston, Va. The report said the pipeline may have been damaged by a construction project near the line, and that the leak stemmed from a slight rupture that gradually worsened.

From Bay Journal, April 1994

Our People

Doug Eggers (AIFRB Fellow 1988), **Terrance Quinn** (AIFRB Member 1984), and **Jack Tagart** (AIFRB Member 1981) are members of the North Pacific Fishery Management Council.

Glenn Flittner (AIFRB Fellow 1970), Director of the National Marine Fisheries Service Office of Research and Environmental Information, retired in January, 1994 after more than 35 years as a federal employee. He headed the Service’s fisheries statistical strategic planning workshops as well as the first edition of *Our Living Oceans*.

Nick C. Parker (AIFRB Fellow 1989) and **William W. Taylor** (AIFRB Fellow 1981) are the two candidates for the position of Second Vice-president of the American Fisheries Society.

Michael F. Tillman (AIFRB Fellow 1984), Director of Science and Research at the NMFS Southwest Fisheries Science Center at La Jolla, has received the Schweitzer Medal from the Animal Welfare Institute. The award was for his contribution to the international conservation of whales.

Bill Wilson (AIFRB Member 1983) was the recipient in November of the Meritorious Service Award of the Alaska Chapter of the American Fisheries Society. The honor was for his continuing support of fisheries research in Alaska and in particular for his work on the Arctic where for many years he has been conducting fisheries assessments associated with oil and gas developments near Prudhoe Bay. His work has focused on assessing the effects of solid-fill causeways on Arctic fish populations.

District News

Northwest Washington

Gregory T. Ruggerone, *Director*

The February 1994 meeting of the Northwest Washington District featured a presentation by Gayle Brown, COOP/SCF & the Biological Science Center-Seattle. Gayle Brown said:

Loss of genetic variability, inbreeding depression and outbreeding depression are sources of deleterious genetic change that concern scientists and hatchery managers alike. This is because of their potential to decrease the productivity of hatchery populations and also the productivity of wild populations that interbreed with hatchery populations. These sources of genetic degradation are real concerns; nonetheless, they should be preventable through use of sufficient numbers of breeding pairs taken from the wild population local to a hatchery. Another source of genetic change, domestication selection (selection for increased fitness in the hatchery environment), which we do not yet know how to prevent, has not been given similar concern. This is puzzling since independent studies of three production hatchery steelhead populations have provided strong evidence of its occurrence.

These studies have also revealed that increased fitness in the hatchery environment results in decreased fitness for rearing in the natural environment. Such fitness changes can occur within two generations in the absence of any intentional selection and with breeding protocols designed to prevent genetic change. These facts demand the cautious use of hatchery releases in the supplementation or restoration of depleted wild populations. I will discuss the evidence for domestication selection, how it can occur, and the features of hatchery environments likely instrumental in its occurrence.

Meetings and New Publications

Oil Spill Symposium

Gulf of Mexico and Caribbean Oil Spills in Coastal Ecosystems: Assessing Effects, Natural Recovery, and Progress in Remediation Research is the title of a symposium to take place on July 14 and 15, 1994 at the Hotel Inter-Continental in New Orleans, Louisiana. The sponsors are the Minerals Management Service, U.S. Department of the Interior; the Louisiana Environmental Research Center at McNeese State University; and the Spill Remediation Research Consortium.

Session I deals with experiments and case studies on the effects of oil spills on sea grass, tidal marsh, and mangrove ecosystems. Session II concerns remediation techniques: reviews and current research. Session III focuses on an overview of bioremediation studies in the Gulf of Mexico. Session IV deals with discussion and planning to recommend the best approaches for the study of the effects and remediation of oil spills in coastal ecosystems.

For information on registration and arrangements, contact Dr. Edward Proffitt, Director, Louisiana Environmental Research Center, McNeese State University, P.O. Box 90655, Lake Charles, LA 70609-0655. Tel. (318) 475-5917.

Fish Physiology Symposium

The Fish Physiology Association and the Physiology Section of the American Fisheries Society will sponsor an international symposium, *High Performance Fish*, on July 16-21, 1994 at the University of British Columbia.

The theme of the symposium is: Practical Applications of Fish Biology. No matter the species, the location, or the purpose, fish biologists want the fish under their care to be as healthy and productive as they can be. High performance does not just refer to tuna in the open sea or salmon leaping a waterfall, but includes any fish under wild or captive conditions that are growing, surviving, and reproducing up to their inborn maximum. The theme of this symposium is to look at the many aspects of a fish's biology that might limit its performance and show what techniques are being applied now and might be applied in the future to reduce those limitations. While a great deal of science will be presented, that science has vital relevance to the management of all groups of wild and cultured fishes and to the health of the environments in which they live.

The symposium has something for all practicing fish biologists. Sessions will address culture chemical availability crisis, biotechnology applications, performance perspectives, new feeds and feeding strategies, basic and applied reproductive biology, optimizing smolt performance, fish stress in culture and the wild, criteria for a high quality water, health assessment, water quality issues and experiences, endocrinology, and performance physiology and biochemistry.

The plenary session, *Great Expectations for Practical Fish Biology*, will cover new horizons in fish physiology; applications of physiological knowledge in fish management; toxicology, water pollution, and fish physiology; responses of fish to environmental change; ecophysiology of marine fish recruitment; and the application of biotechnology to aquaculture.

There will also be courses on health condition assessment, experimental design and analysis, and experimental procedures, and a lab/hatchery tour.

For information on registration and accommodations, contact High Performance Fish, UBC Conference Center, 5961 Student Union Blvd., Vancouver, BC, Canada V6T 2C9. Phone (604) 822-1050. Fax (604) 822-1069.

American Fisheries Society Meeting

Fisheries professionals from around the world are traveling to the World Trade and Convention Center in Halifax, Nova Scotia, August 21-25, 1994 for the 124th annual meeting of the American Fisheries Society (AFS).

Many of the hundreds of scheduled technical papers focus on the meeting's theme, "Managing Now for the 21st Century: Food, Recreation and Diversity." Ovid Mercredi, chief of the Assembly of First Nations; Cabot Martin, a Canadian journalist and lawyer; and top fisheries experts are among the major speakers at the meeting. Poster sessions, business meetings, and social events also are on the agenda, and a trade show with more than 50 organizations and companies runs for two days.

Registration before July 30 is \$210 for non-AFS members, \$160 for AFS members, \$70 for AFS students, \$110 for non-AFS students, and \$60 for companions. *All rates are in Canadian dollars.* Attendees are encouraged to register early to take advantage of lower rates. For more information contact AFS, 301/897-8616

Aquatic Toxicity Workshop

An announcement and call for sessions has been issued for the *21st Annual Aquatic Toxicity Workshop*, to take place at Sarnia, Ontario, Canada on October 2-5, 1994. This is one of a continuing series of workshops in Canada that promotes informal information exchange of ideas and knowledge among industry, consultants, government, and universities.

The themes at the workshop will be assessing large ecosystem health, toxicity testing in decision making, and pathways affecting ecosystems. Focus will be on aquatic toxicity issues and challenges in large ecosystems such as the Great Lakes Basin.

This workshop is the principle forum for Canadian researchers, regulators, consultants, and industry to exchange views, and to discuss new approaches, pending regulations, and issues of mutual concern.

The organizers solicit session topics related to the major themes. This workshop will have concurrent sessions, a plenary, posters, and student awards.

For further information, call Marianne Lines at (519) 337-3429. Fax (519) 337-3486.

Fisheries Publication Catalogue

Blackwell Scientific Publications has issued *Fishing News Books—1994 Catalogue*, a 108-page schedule of books, journals, training

manuals, and wall charts dealing with marine and freshwater fishery and fishing topics. The items emanate from many parts of the world, but have primarily a North American and European perspective.

Topics included in this comprehensive catalogue are ecology, aquaculture, fish diseases, oceanography, biology, fisheries technology, fisheries management, nutrition, fisheries research, ichthyology, commercial and sport fishing methods, fisheries economics, faunistics, fisheries policies, population dynamics, fisheries engineering, and water resources.

Fishes, marine mammals, crustaceans, and molluscs are the principal animal groups covered in this collection.

Fishing News Books—1994 Catalogue, and the publications themselves, can be obtained from Blackwell Scientific Publications, Inc., Suite 500, 238 Main Street, Boston, MA 02142. Tel. (617) 876-7000.

Ownership of Marine Resources

The Northeast Fisheries Science Center of the National Marine Fisheries Service has published NOAA Tech. Memo. NMFS-F/NEC-99, *Sole Ownership of Living Marine Resources*, by Steven F. Edwards, Allen J. Bejda, and R. Anne Richards.

In this document, they explore the meaning and application of sole ownership of living marine resources, hoping to promote and informed and timely discussion of its utility and feasibility. Why open access depletes fish resources is explained; both public and private forms of sole ownership are characterized; private ownership is contrasted with extant forms of state ownership, particularly limited entry and individual transferable quotas (ITQ); the political economy of natural resource management in general is surveyed; and a sole ownership strawman of the Northwest Atlantic groundfish resource in U.S. waters is begun.

Major findings and conclusions are as follows:

1. The only holdings of natural resources by the U.S. government that are subject to open-access exploitation are marine fish resources and, to a large extent, grazing land.
2. Overfishing dissipates several hundred million-possibly a couple billion-dollars of resource value each year.
3. Conventional fishery quotas and effort restrictions address only the symptoms of open access, not the fundamental problem of attenuated property rights to fish resources.
4. Incentives that influence fishermen, politicians, regulators, and other claimants are fundamental to the presence of both "market failure" and "government failure".
5. Private forms of sole ownership-common property or individual private property-appear more likely than limited entry, ITQs, or other forms of state ownership to conserve living marine resources and to secure significant net economic benefits for the nation.

The preliminary status of this investigation of sole ownership is emphasized. Further work is needed on the application of property rights, contracting, social cost, and public-choice theories to management of living marine resources. Also, the theory and practice of private forms of sole ownership should be reviewed and compared to limited entry, ITQs and state ownership in general. Finally, some of the needs, pitfalls, and benefits of a "real world" sole-ownership fishery could be learned by further developing and reviewing the strawman for Northeast groundfishes. Contact the first author for other writings that evolved from this investigation.

Given the deficiencies of limited entry and ITQs for achieving optimum yield as directed by the Magnuson Fishery Conservation and Management Act (Magnuson Act), the authors recommend that the Northeast Fisheries Science Center and National Marine Fisheries Service soon evaluate sole ownership of living marine resources as a management option for the Northeast U.S. Shelf Ecosystem.

Copies are available from the Northeast Fisheries Science Center, Woods Hole, Massachusetts.

Global Oceans Directory

The Global Oceans Directory is a compendium of organizations dedicated to marine conservation. It includes U.S. government agencies, United Nations agencies, non-governmental organizations, Canadian agencies, and marine policy centers. Available free of charge from EPA Office of Wetlands, Oceans and Watersheds. Contact: Ms. Ann Robertson, U.S. EPA, OWOW, 401 M Street, S.W., Washington, DC 20460, (202) 260-9112.

Pollution Equipment News

Pollution Equipment News annually provides details on thousands of products and services that will help you meet federal, state, and local pollution control, abatement and elimination requirements. Air, water, wastewater, hazardous waste and solid waste products and services are featured in every issue. Supplier selection charts on specific subjects, case history, and other articles are included in each issue.

Your subscription also includes the annual Buyer's Guide issue published each November. This 520-page buying reference includes over 2,500 companies listed under 700 product headings and subheadings.

For information on a free subscription, write Pollution Equipment News, 8650 Babcock Boulevard, Pittsburgh, PA 15237-9915.

Thesis Abstract

Dynamics of Fish Assemblages Associated with an Offshore Artificial Reef in the Southern Mid-Atlantic Bight

Aaron J. Adams, M.A. 1993

College of William and Mary in Virginia

There is limited natural hard bottom in the Mid-Atlantic Bight, thus artificial reefs have been placed in offshore waters to provide additional shelter. High concentrations of fishes have been observed at these reefs but there is little information on the dynamics of these fish assemblages. The dynamics of the fish assemblages associated with a 10-year-old artificial reef, located on sand bottom 14 km offshore of southern Virginia, were assessed at two-week intervals from June to October, 1991, monthly intervals from November, 1991 to May, 1992, and weekly intervals from June to October, 1992. The abundance and size of fish were estimated with a stationary point visual census method using SCUBA over three reef strata (reef crest, reef edge, and open sand). Species (24 total) were divided into four groups based on their use of the structure and duration of stay at the site: 1) core resident species (all demersal species) used the reef for shelter and were present for extended periods, 2) seasonal resident species (all demersal species) used the reef for shelter but were only present for brief periods, 3) transient species

(all pelagic species) were seasonally associated with the reef but did not use the reef for shelter, and 4) visitor species (all demersal species) were observed near the reef on a sporadic basis but did not use the reef for shelter. Total reef abundance and species richness were positively correlated with bottom water temperature, and species composition and relative abundance varied seasonally. Seasonal resident species and transient species were only present from mid-August to October, months of highest temperatures. All species were closely associated with the reef.

Core resident species (black sea bass, *Centropristis striata*, scup, *Stenotomus chrysops*, tautog, *Tautoga onitis*, and cunner, *Tautoglabrus adspersus*) were the primary users of the reef structure and relied on the reef for shelter. Their abundance varied seasonally. Mean abundance of these species was highest on the reef crest and edge strata. Only black sea bass and scup also utilized the open sand stratum. Most colonization by black sea bass, tautog, and cunner was by fish age I or older, but most scup were young-of-the-year. Reproductive activity was not observed. The 4A Reef appeared to provide habitat for adults of all the demersal species, and recruitment habitat for scup, black sea bass, and cunner, but only concentrated pelagic species.

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 District, 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, Northeast Fisheries Center, 166 Water St., Woods Hole, Massachusetts 02543, President; Katherine Myers, Fisheries Research Inst., WH-10, University of Washington, Seattle, Washington 98195, Secretary; Joseph Rachlin, Lehman College Bio., Bedford Park Blvd. West, Bronx, New York 10468, Treasurer. ISSN-8755-0075

FIRST CLASS

Address Correction Requested

Bronx, NY 10468-1589
Bedford Park Boulevard West
Lehman College, Biology
c/o Joseph Rachlin

*American Institute of Fishery
Research Biologists*



... BRIEFS ...

VOL. 23, NO. 4

AUGUST 1994

Board of Control Meeting—1994

The annual meeting of AIFRB (Board of Control Meeting) will take place at the Sheraton Halifax Hotel, Halifax, Nova Scotia on August 20 and 21, 1994. President Vaughn Anthony emphasizes that additional agenda items will be welcome; such items should be submitted to him prior to the meeting. As always, all AIFRB members are encouraged to attend the meeting.

The following agenda will be used:

1. Call to order by the President, 9:00 a.m., Saturday, August 20, 1994
2. Introductions
3. Welcome to President-Elect
4. Review and Adoption of Agenda
5. Approval of minutes of 1993 Annual Meeting at Portland, OR (Myers)
6. Secretary's Report (Myers)
 - a. AIFRB archives
 - b. Status of Principles
7. President's Report (Anthony)
8. Treasurer's Report (Rachlin)
 - a. Review of assets and investments
 - b. Problem of delinquent dues
9. Membership
 - a. Review of demographics (Anthony)
 - b. Report of Membership Committee (Ray)
 - c. Membership Drive
 - d. Emeritus status candidates
10. **BRIEFS**
 - a. Report of **BRIEFS** Editor (Cope)
 - b. Content of **BRIEFS** for 1995
11. Report of Publishing Editor (Merriner)
 - a. Brochure
 - b. Directory
 - c. Charter
 - d. Lapel Pins
12. District Activities
 - a. Reports from District Directors
 - b. New Directors
 - c. New Districts (Warkentine)
13. Awards
 - a. Travel Assistance Awards (Lambert)
 - b. District Awards
 - c. W.F. Thompson Best Paper Awards (Anthony)
 - d. Outstanding Achievement Award for individuals
 - e. AIFRB Group Award of Excellence
 - f. Distinguished Service Award
14. Use of Logo (Anthony)
15. Other business
 - a. Advocacy and Ethics
 - b. Executive Secretary
16. Arrangements for 1995 Meeting
17. Appointments by the President

1992 W.F. Thompson Award

The Award Committee of AIFRB has reviewed 20 outstanding papers and has decided that the W.F. Thompson Award for the best student paper of 1992 should go to Murdoch V. McAllister of the University of Washington. The paper, *Statistical evaluation of a large-scale fishing experiment designed to test for a genetic effect of size-selective fishing on British Columbia pink salmon* (*Oncorhynchus gorbuscha*) by Murdoch McAllister, Randall Peterman, and Darren Gillis (Can. J. Fish. Aquat. Sci. 49(7): 1305-1314), was a clear consensus for the award.

Mr. McAllister receives \$750 and a certificate; Drs. Peterman and Gillis receive certificates.

Measuring Solar Radiation Damage to Sea Life

NOAA scientists in La Jolla, Calif., have developed a method of monitoring the effects of ultraviolet sunlight rays (UV-B) on marine organisms that permits researchers to measure molecular damage within cells of fish eggs and larvae smaller than one millimeter in diameter.

The breakthrough enables NMFS scientists to measure and observe precisely the level of UV-B damage to sea life at various times of the year and depths in the ocean. That allows scientists to determine and predict how sensitive and adaptable different species are to increases in UV-B exposure caused by the depletion of the earth's ozone layer.

The work was supported by NOAA's Climate and Global Change Program and carried out at the Southwest Fisheries Science Center in La Jolla in collaboration with the University of California at Santa Barbara. It is part of NOAA's effort to quantify and predict what impact increased doses of the sun's ultraviolet rays may have on sea life.

Fish eggs and larvae are particularly sensitive to UV-B because they float at the ocean surface where irradiance is highest. Many eggs and larvae, like the northern anchovy studied, are mostly transparent, allowing the damaging radiation to penetrate deeply into vital tissues.

"We now have a method that can be used in field tests to determine whether fish eggs and larvae in the upper ocean are undergoing cellular DNA damage specifically caused by UV-B exposure," said Russell Vetter, leader of the genetics and physiology program at the La Jolla facility.

Prior to the study, scientists could measure only indirect effects of UV exposure under controlled laboratory conditions, drawing conclusions mainly from responses of fish to different levels of exposure.

The new method detects a special deformity in the chemical arrangement of the DNA molecule inside the fish's cells that occurs after exposure to UV-B light. The deformity, called a thymine dimer, is an abnormal "spot weld" on the rungs of the DNA ladder.

cont. on page 2

Measure Damage cont.

The deformity is detected by adapting a special immunological procedure and antibody originally developed by Japanese scientists for use in detecting UV-B damage in human cells.

In laboratory experiments, scientists also found a cycle in UV-B damage to fish over the course of a day and evidence that there is daily, partial repair of the damage, called photorepair, which takes place primarily in the late afternoon.

"We knew that photorepair occurs in animals, plants and bacteria, but we were surprised to learn the extent to which larval fish depend on this type of repair to keep their DNA healthy," Vetter said. However, if the DNA damage rate exceeds the repair rate, larval growth may slow and death may result, he added.

Running field tests at sea, fisheries service scientists found DNA damage from UV-B in eggs and larvae of northern anchovy and Pacific sardines. The damage decreased with water depth and followed the same daily photorepair cycle observed in the laboratory exposures. The anchovy and sardine species are important food sources for many fishes, seabirds, and marine mammals off the West Coast.

Observed primarily at the earth's poles in the past, ozone depletion and increased UV-B radiation has recently been seen at mid-latitudes of the Northern Hemisphere, including the shores of the United States.

From NOAA Report, Vol. III, No. 2

Atlantic Salmon in Danger?

The National Marine Fisheries Service and the U.S. Fish and Wildlife Service are beginning a joint study to determine whether populations of anadromous Atlantic salmon in New England should be listed as threatened or endangered under the Endangered Species Act.

The action comes after a 90-day review of a petition submitted to the Fish and Wildlife Service last October and to NMFS in November. The petition, filed by the Biodiversity Legal Foundation, RESTORE: The North Woods, and Jeffrey Elliott, seeks listing of the species throughout its U.S. range—from the Connecticut River to the St. Croix River on the New Brunswick border.

The petition introduces information on current and historical Atlantic salmon populations, identifies possible threats, and cites numerous scientific articles. Based on the review of the petition and other available data, the agencies believe listing may be warranted and will now review all pertinent information. A decision on whether to initiate listing procedures will be made by October 1994.

"We have been working cooperatively with the U.S. Fish and Wildlife Service in the Northeast for the restoration of self-sustaining populations of Atlantic salmon for years," said NMFS director Rolland Schmitten. "Work on this petition will set precedent for the two agencies to combine resources, assess progress, and plan strategies together.

"Atlantic salmon are one of the wonders of our northeastern rivers," said Mollie Beattie, director of the Fish and Wildlife Service. "We will seek information from all those who care about the salmon before we decide whether this species should be proposed for protection under the Endangered Species Act."

From NOAA Report, Vol III, No. 2

Our People

Gerald Bouck (AIFRB Fellow 1982) received the Bonneville Power Administration's Award for Distinguished Service on April 27. This honor was in recognition of his technical accomplishments and high standards of professional excellence.

L. Eugene Cronin (AIFRB Emeritus 1983) has been awarded the Mathias Medal in recognition of scientific excellence by the Chesapeake Research Consortium and the Sea Grant Programs of Virginia and Maryland. They recognized his work since 1940 in research, research administration, governmental advisement, and public education.

Gene began his career in studies of the blue crab, directed the Chesapeake Biological Laboratory of the University of Maryland for 20 years, and the Chesapeake Research Consortium for 7. He is now a lecturer and coastal consultant.

Kate Myers (AIFRB Member 1986 and AIFRB Secretary) has received the Professional Staff Organization Award for Excellence of the University of Washington. Kate, senior biologist for the School of Fisheries' high seas salmon project, heads a unique program...in trying times in the international fisheries arena. She is described as having an extraordinary talent for diplomacy and negotiation in addition to her research abilities.

G. Morris Southward (AIFRB Fellow 1972) has retired from his fisheries career. Holding three degrees from the College of Fisheries, University of Washington; his research and consulting have involved sampling and experimental design. His teaching positions took him to Washington State University, the University of Wisconsin, New Mexico State University, the University of Edinburgh in Scotland, and an agriculture experiment station in Valencia, Spain. In addition, Dr. Southward was employed by the Idaho Fish and Game Department, the International Pacific Halibut Commission, and the FAO in New Delhi, India.

District News

Northwest Washington

Gregory T. Ruggerone, Director

Residents of the Seattle metropolitan area are fortunate to have a significant sockeye salmon population returning to the Lake Washington watershed. Perhaps no other large city has such a highly prized and abundant fish returning to within its city limits.

Unfortunately, the Lake Washington sockeye salmon population has declined rapidly during the past several years.

On May 5, Kurt Fresh, Washington Department of Fish and Wildlife, described to a group of 25 AIFRB members his studies on factors that might be affecting the decline of these salmon. Kurt noted that the proposed sockeye salmon spawning channel, which was approved by the state legislature, has been postponed until they have a better idea of why the sockeye run has declined. Kurt mentioned about 10 potential factors that may be contributing to the salmon decline. The "bottleneck" appears to be in the lake rather than on the spawning grounds or in the ocean because historical hydroacoustic/trawl surveys of the lake have documented relatively few pre-smolt sockeye during spring of recent years. Recent estimates of sockeye fry entering the lake

cont. on page 3

District News cont.

indicate egg-to-fry survival have been reasonable. Estimates of survival at sea, based on the pre-smolt index and adult returns, do not indicate a decline in marine survival over time.

As in many sockeye lakes, predation is believed to be a significant factor influencing sockeye survival in Lake Washington. Major predators in Lake Washington include squawfish, perch, sculpin, and other fishes. Kurt briefly described his recently initiated study to identify periods of high mortality. He and his colleagues marked several million sockeye fry using a cold shock treatment that leaves a distinct pattern on the salmon otoliths. These fry were released back into the Cedar River. Kurt hopes that the recapture of marked and unmarked sockeye in the lake will help identify the period of significant mortality. We look forward to hearing more about this interesting investigation.

Meetings and New Publications

Workshop on Salmon Ecosystem Restoration

A First Notice and Call for Papers has been issued for the 1994 Northeast Pacific Chinook and Coho Salmon Workshop, *Salmon Ecosystem Restoration: Myth and Reality*. This workshop, sponsored by the Oregon Chapter and the Western Division of the American Fisheries Society, will take place at the Hilton Hotel in Eugene, Oregon on November 7-10, 1994.

The purpose of this workshop is to facilitate the exchange of information critical to the restoration and management of Northeastern Pacific chinook and coho salmon. The format will be four sessions with invited speakers providing engaging commentary as well as ample discussion of salmonid ecosystem management. In addition, we are requesting abstracts for a complementary poster session. There will be a hosted evening social concomitant with the presentation of the contributed posters. A proceedings of the workshop will be published.

Abstracts for poster presentation must be limited to 200 words or less (follow AFS format as in *Fisheries* 17(6):27) and must be submitted by July 1, 1994 to Mary Louise Keefe, Oregon Dept. of Fish and Wildlife, Inlow Hall, Eastern Oregon State College, 1410 "L" Avenue, LaGrande, OR 97850, (503) 962-3777; Fax (503) 962-3849. Questions about workshop arrangements should be directed to Jeff Dose, USDA Forest Service, Umpqua National Forest, P.O. Box 1008, Roseburg, OR 97470, (503) 672-6601; Fax (503) 673-4017.

Conference—Coastal Ocean Research

A 5-day conference will be sponsored by the South Carolina Sea Grant Consortium on November 16-20, 1994 at Seabrook Island, South Carolina. This will be the 1st Biennial Conference on Southeast Coastal Ocean Research (SECOR '94), with the theme, *Interactions Across Boundaries*.

The conference will focus on the spatial and temporal variability of physical and biological gradients within the South Atlantic Bight, between Cape Hatteras, NC and Cape Canaveral, FL.

The agenda will include Gulf Stream/Coastal Interactions, Coastal/Estuarine Interactions, and Land Margin Interactions.

Some topics will include Gulf Stream physical oceanography, coastal evolution, biogeochemistry inshore/offshore, marine policy, fish population dynamics, and the biology of inlets.

Lodging, food, and registration information is available from Dr. Leslie Sautter, SECOR '94 Chair, Dept. of Geology, University of Charleston, Charleston, SC 29424.

Guide to Marine Invertebrates—Alaska to Baja California

Daniel W. Gotshall (AIFRB Emeritus 1988) is the author of this field guide of 112 pages and 254 color photos. Published by Sea Challengers, noted for its beautifully illustrated field manuals dealing with aquatic topics, this book covers 254 species in quality paperback.

This new field guide covers inshore, subtidal marine invertebrates that are commonly observed by biologists, divers, and naturalists. It covers the area from the Gulf of Alaska to Central Baja California. Each species is illustrated with at least one color photo; includes descriptions of 28 species of sponges; 49 anemones, jellyfishes, corals and gorgonians; 16 worms; 39 snails, clams and octopus; 44 crabs and shrimp; 51 cucumbers, urchins and sea stars; and 14 tunicates.

The narrative for each species includes identification, characteristics, size, geographic and depth range, habitat, and for most species, natural history notes. This field guide also includes descriptions of each of the 12 phyla included, a pictorial key, glossary, and index.

The book sells for \$22.95 plus \$3.50 for shipping. Order from Sea Challengers, 4 Sommerset Rise, Monterey, CA 93940.

Nutrient Requirements of Fish

The subcommittee on Fish Nutrition, National Research Council, has prepared a 124-page book, *Nutrient Requirements of Fish*.

Using the latest research in fish nutrition, this volume revises and combines the 1981 edition on coldwater fish and the 1983 edition on warmwater fish and shellfish.

In addition to updating requirements for energy, protein, minerals, and vitamins, this book will provide, for the first time, summary tables on nutrient requirements of a variety of fish species, including channel catfish, rainbow trout, Pacific salmon, carp, and tilapia. Tabular data on amino acid requirements of 11 species are also included. Shellfish have been deleted from this edition due to the lack of scientific information on nutrient requirements for these species.

Chapters cover dietary requirements, other dietary components, antinutrients and adventitious toxins, digestibility and absorption, diet formulation and processing, and feeding practices. Also included are a nutrient requirements table, composition of feed ingredients, references, and an appendix.

Order from the National Academy Press, 2101 Constitution Avenue, NW, Lockbox 285, Washington, DC 20055. The price is \$24.95.

Health Maintenance of Cultured Fishes

John A. Plumb of Auburn University is the author of a 1994 book, *Health Maintenance of Cultured Fishes—Principal Microbial Diseases*. This book applies 22 health maintenance principles of food animal management to aquaculture and discusses how these principles improve the health of cultured

cont. on page 4

Meetings and New Publications cont.

fish. It addresses epizootiology of major fish viral and bacterial diseases and emphasizes the relationship between infectious disease of cultured fishes and environmental quality. Viral and bacterial diseases are organized according to the species, families, or groups of fish most affected by the pathogens. Etiology, geographical range, species susceptibility, clinical signs, epizootiology, significance, pathological manifestations, and management approaches (including chemotherapy) are included.

Order this 272-page volume for \$169.95 from CRC Press, Inc., 2000 Corporate Blvd., N.W., Boca Raton, FL 33431.

Dissertation Abstracts

Interspecific and Intraspecific Variability in Placoid Scale Morphology in Relation to Body Form Variability in Squaliformes

Christopher R. Tabit, Ph.D. 1993
College of William and Mary in Virginia

An ontogenetic series of nine species; *Centrophorus granulosus*, *Centroscymnus coelolepis*, *Dalatias licha*, *Deania calcea*, *Echinorhinus cookei*, *Isistius brasiliensis*, *Oxyotus centrina* and *Squalus acanthias* were studied to determine swimming capabilities, boundary-layer flow conditions, and placoid scale functional morphologies. Body morphometric variables included the girth and the distance from snout to the orbitals, origin of the median and paired fins, and the caudal peduncle, body and fin surface area, fin aspect ratios, and caudal fin angles. Placoid scales were sampled from sixteen regions across the body. Morphometric variables included the number of scales per area of integument, scale crown width, length and area, and scale weight.

Body shape morphometry coupled with published natural histories suggest a majority of the species examined are probably capable of moderate to fast swimming speeds. There was a correlation between low fin aspect ratios and near-neutral buoyancy among the species examined, suggesting functions other than dynamic lift for the paired fins. Likewise, there was a trend for these fins to be reduced in size, suggesting decreased drag. Freed from functioning in generating lift, the pectoral fins probably provide a high degree of vertical directional control. Larger fins with relatively high aspect ratios were correlated with negatively buoyant species, suggesting a role in providing dynamic lift. These sharks were more typical in body form of coastal pelagic or benthic sharks of family Carcharinidae.

The squaloid sharks have been recognized to possess the most morphologically diverse placoid scales. Among the nine species examined, three general crown morphologies were distinguished; traditional plate-like crowns, spike or thorn-like crowns, and concave trapezoidal crowns. Ontogenetic, sexual dimorphic, and spatial variability within a specimen was observed in all species and interspecific variability was observed in the trends of placoid scale variability. Placoid scale functional morphologies are hypothesized from intraspecific and interspecific variability, body shape morphologies, and natural histories.

Life History, Population Dynamics, and Yield-Per-Recruit Modeling of Atlantic Croaker, *Micropogonius undulatus*, in the Chesapeake Bay Area

Luiz R. Barbieri, Ph.D. 1993

College of William and Mary in Virginia

Otoliths, scales, dorsal spines, and pectoral fin rays of Atlantic croaker, *Micropogonias undulatus*, were compared for legibility of presumed annual marks and precision in repeated readings to determine the best hard part for ageing. Marks on transverse otolith sections were easiest to read and showed the best agreement between readings. Atlantic croaker collected from commercial catches in Chesapeake Bay and in Virginia and North Carolina coastal waters during 1988-1991 were then aged using otolith sections. Ages 1-8 were recorded, but eight-year-old fish were rare. Marginal increment analysis showed that for ages 1-7 annuli are formed once a year during the period April-May. Otolith age readings were very precise, with percent agreement within and between readers greater than 99%. Observed lengths-at-age were highly variable and showed a rapid decrease in growth after the first year. Observed lengths for ages 1-7 showed a very good fit to the von Bertalanffy growth model ($r^2=0.99$; $n=753$). No differences were found between sexes. Total annual instantaneous mortality (Z) estimated from maximum age and from a catch curve of combined Chesapeake Bay catches ranged from 0.55 to 0.63.

Atlantic croaker are multiple spawners with asynchronous oocyte development and indeterminate fecundity. Mean length at first maturity for males and females was 182 and 173 mm TL, respectively. More than 85% of both sexes were mature by the end of their first year and all were mature by age 2. Spawning extends over a protracted period (July-December), but individual fish spawn for only 2-3 months. Spawning starts in Chesapeake Bay and continues offshore and south as Atlantic croaker migrate from the estuary. However, some individuals seem to complete spawning in estuarine waters. Seasonal fluctuations in sex ratios suggest that males start leaving the estuary earlier than females. A high incidence of atretic advanced yolked oocytes in spawning females suggests that a surplus production of yolked oocytes is part of Atlantic croaker reproductive strategy. Females would hydrate and spawn more or less of these yolked oocytes, depending on environmental conditions.

Yield-per-recruit modeling results indicated that, over a likely range of natural mortality values, present levels of harvest in Chesapeake Bay are below the maximum potential yield-per-recruit.

Results from this study do not indicate the existence of a group of larger, older fish in the Chesapeake Bay region and suggest that the hypothesis of a different population dynamics pattern for Atlantic croaker north and south of North Carolina should be reevaluated.

The Structure of the Holocephalan Head and the Relationships of the Chondrichthyes

Eileen D. Grogan, Ph.D. 1993

College of William and Mary in Virginia

The interrelationship of the chondrichthyan subclasses is evaluated based on divergences in the nature of the suspensorium, the preorbital cranial anatomy, the distribution

cont. on page 5

Abstracts cont.

of major venous sinuses and localization of hematopoietic tissue. The anatomy of representative extant taxa was examined by radiography and/or dissection. Fossil selachians, paraselachians, and holocephalans of the Bear Gulch of Montana, U.S.A. (Mississippian, Namurian E2B) were studied for evidence of vascular pigmentation, suspensorium, and cranial, branchial, and pectoral anatomy. These studies validate the suspensorial condition of autodiastyly and suggest autodiastyly is a fundamental condition involved in the basic radiation of Chondrichthyes.

The plesiomorphous condition of all gnathostomes is proposed to be autodiastyletic, with the hyoid arch modified for the support of an opercular covering. A precerebral fontanelle is primary within Chondrichthyes, being lost in Holocephali as cranial remodeling induces ethmoid canal formation. The holocephalan pattern of cranial vascularization is based on the more general selachian plan. Thus, given the formulation of a morphocline based on selachian, paraselachian, and holocephalan data, seemingly distinct selachian and holocephalan vascular elements are shown to be analogous. Similarly, the unique patterns of lymphomyeloid tissue distribution identified for each subclass may also be explained on the basis of a general plan which has been subject to relocalization stresses. Finally, both the morphocline and a cladistical analysis of the data support a coelodont ancestry for extant holocephalans.

Life History and Fisheries Ecology of Weakfish, *Cynoscion regalis*, in the Chesapeake Bay Region

Susan K. Lowerre-Barbieri, Ph.D. 1994

College of William and Mary in Virginia

Otoliths, scales, dorsal spines, and pectoral fin rays were compared to determine the best hardpart for ageing weakfish, *Cynoscion regalis*. Sectioned otoliths showed the clearest marks and were validated by the marginal increment method for ages 1-5. This validated method of ageing weakfish was then compared to the traditionally used scale method, which was found to be less-precise and to underage older fish. Ages of fish were consequently based on sectioned otoliths. Most weakfish from the Chesapeake Bay region were 200-600 mm TL and ages 1-4. Weakfish were not fully-recruited to commercial foodfish grades until age 2. Current maximum observed ages were age 12 in Chesapeake Bay and age 11 in Delaware Bay, although a fish collected in Delaware Bay in 1985 was age 17. Fish older than age 6 were rare in both areas. A probable range of total instantaneous mortality rates, based on a range of maximum ages (6-12), was 0.38-0.77. Although weakfish size was a poor predictor of growth, weakfish growth was well-described by the von Bertalanffy growth model ($R^2=0.98$, $N=857$). There was no evidence Delaware Bay weakfish reached a larger asymptotic length or size-at-age than Chesapeake Bay fish. However, maximum size and age fluctuated in Chesapeake and Delaware Bays over the past thirty years. Maximum size in both areas greatly increased from the late 1960's until roughly 1985, as did the numbers of large fish, apparently due to a series of strong year-classes, beginning in the late 1960's.

Weakfish are multiple spawners with indeterminate fecundity and a spawning season from May to August, in the

Chesapeake Bay region. Sex ratios were approximately 3:1, females to males, in 1990-1992. Mean length at first maturity for males and females was 164 and 170 mm TL, respectively. Most fish were mature by age one and all fish were mature by age 2. Weakfish showed a strong diel periodicity, with almost all fish spawning at dusk. Most spawning females were 2- and 3-year-olds. Spawning activity was not consistent throughout the spawning season or between 1991 and 1992. Batch fecundities ranged from 75,289-517,845 eggs/female and significantly increased with both TL and somatic weight ($P=0.0001$). However, spawning frequency was higher in 1991 (every 2-3 days) than in 1992 (every 12-13 days), leading to an average annual fecundity of 7,369,750 eggs/females in 1991 and 1,808,056 eggs/females in 1992. Patterns of spawning activity within and between years appeared closely associated with feeding success.

Yield-per-recruit analysis indicated that, over a likely range of natural mortality rates, growth overfishing is currently occurring in the Chesapeake Bay region. Current t_c is \leq age 2, whereas maximum yield consistently occurred at $t_c \geq$ age 6.

--- In Memoriam ---

**Leo Shapovalov
AIFRB Emeritus 1974
February 28, 1994**

Leo Shapovalov, who joined AIFRB in 1960, passed away on February 28, 1994.

Born in Estonia on April 14, 1908, Mr. Shapovalov moved to Maine at age 5, and later moved to Riverside, California. He majored in biological sciences at Stanford University and graduated in 1930. After graduate study at Stanford's Hopkins Marine Station and on the main campus, he earned a master's degree in zoology, and in 1932 joined the California Division of Fish and Game. He is considered a pioneer in the field of fishery biology.

After various assignments, he became district fisheries biologist in 1944. In 1949, he was promoted to supervising fisheries biologist in charge of statewide fisheries research and management. Three years later, he was named assistant chief of the Inland Fisheries Branch, which he served as until his retirement in 1973.

Mr. Shapovalov headed a 9-year salmon and steelhead research program that culminated in publication of the well-known department Fish Bulletin *The Life Histories of the Steelhead Rainbow Trout and Silver Salmon*. The publication won The Wildlife Society's award as most outstanding publication in wildlife ecology and management in 1954-55.

Mr. Shapovalov was a fellow of the American Association for the Advancement of Science and International Academy of Fishery Scientists. He also was a charter member of The Wildlife Society and a member of the Society of Ichthyologists and Herpetologists. In addition, he was past-president of the Pacific Fishery Biologists and served as chair or member of numerous AFS and other national and regional committees.

Mr. Shapovalov was a staunch advocate of clear and concise writing. He was author of more than 20 articles in

cont. on page 6

Membership Report

Promoted to Fellow

Dr. Scott H. Newton	VA
Dr. Terrance J. Quinn II	AK
Dr. Stephen Howard Clark	MA
Dr. Brian R. Murphy	TX
Dr. Fredric M. Serchuk	MA
Dr. Michael L. Dahlberg	AK
Dr. Michael H. Prager	FL

Promoted to Member

Clarence R. Hickey	MD
Dr. Richard D. Brodner	WA

New Members

Dr. Martin A. Hall	CA
Richard L. Benefield	TX
Alan F. Olson	WA

New Associates

Heather Lynn Roffey	WA
Edda Magnúsdóttir	OR
J. Kevin Craig	WA
Elizabeth A. Hale	PA
Bethany S. Arndt	RI
Tein M. Lin	OR
Ellen S. van Snik	PA

Emeritus

Michael B. Dell	WA
-----------------	----

Sammy M. Ray, Membership Chairman
Texas A&M University at Galveston
5007 Avenue U
Galveston, TX 77551

Direct membership inquiries to the Membership Chairman.

Leo Shapovalov cont.

Transactions of the American Fisheries Society and other professional publications and wrote many popular and semi-scientific articles. He also served two four-year terms as editor-in-chief of *California Fish and Game*. Mr. Shapovalov will be remembered for an engaging sense of humor and a thoughtful, kind, and patient way of dealing with all who worked for or with him.

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 District, 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, Northeast Fisheries Center, 166 Water St., Woods Hole, Massachusetts 02543, President; Katherine Myers, Fisheries Research Inst., WH-10, University of Washington, Seattle, Washington 98195, Secretary; Joseph Rachlin, Lehman College Bio., Bedford Park Blvd. West, Bronx, New York 10468, Treasurer. ISSN-8755-0075

FIRST CLASS

Address Correction Requested

Bronx, NY 10468-1589
Bedford Park Boulevard West
Lehman College, Biology
c/o Joseph Rachlin

*American Institute of Fishery
Research Biologists*

... BRIEFS ...

VOL. 23, NO. 5

OCTOBER 1994

President's Report
The Board of Control, 1994

Halifax

At the 1994 Board of Control Meeting in Halifax, Nova Scotia, August 20-21, I presented the President's Report to the officials of AIFRB. This report also includes those ideas that moved forward at this meeting. During the year, many ideas are discussed but until all officials discuss the subject and vote on them, progress is limited. It's appropriate, therefore, that the President sum up the past year's activities after items have been aired, clarified, and voted upon at the Board of Control Meeting. Again, our annual meeting was held in conjunction with the American Fisheries Society and we owe Betsy Fritz of AFS and Peter Amiro of the Department of Fisheries and Oceans in Halifax our thanks for assisting us in providing a room for our activities and a good traffic area for our display. The display, largely built by John Merriner, our Production Editor, has seen its better days and died a graceful death at

Halifax. Being pushed around the country through the Postal Service has taken its toll! This display has been very useful in letting people know about the W.F. Thompson Award, our Research Assistance Awards, the Principles of Professional Conduct, what BRIEFS look like, recruitment, etc. People are very interested in AIFRB and nearly 150 copies of the Principles of Professional Conduct were picked up by people this year. A display committee was organized consisting of Bill Wilson, Chuck Mitchell, Greg Ruggerone, Kate Myers, and John Merriner, who will design and create a new display as soon as possible. We encourage AIFRB members to borrow this display where fisheries people meet during the year. Setting the display up at universities during the year is an especially attractive idea. The display can be mailed surprisingly easily.

The agenda of the Board of Control meeting was given in the August issue of BRIEFS and was adopted without major changes. Details of the Board of Control meeting and other official's reports will be given elsewhere in this issue of

cont. on page 2



The Board of Control at Halifax, 1994. Front row: Doug Vaughan, Director, Carolina District; Vaughn Anthony, President; Barbara Warkentine, Director, NY-NJ District; Sammy Ray, Membership Chairman; Kate Myers, Secretary; Greg Ruggerone, Director, NW Washington District; Back row: Jack Helle, Past-President; Clark Hubbs, President-Elect; Bill Wilson, Northern Alaska District; Charles Mitchell, Director, Southern California District; Oliver Cope, BRIEFS Editor; Joe Rachlin, Treasurer; Dick Heimann, Director, Northern California District; and John Palmisano, Director, Oregon-SW Washington District.

President's Report cont. from page 1

BRIEFS. All members are invited to attend any and all parts of the Board of Control meeting. We have a few who do every year.

President-Elect and Districts

This year, for the first time, we have a President-Elect for an entire year before he becomes President. This is due to the changes made a year ago in the length of terms of the President, Past President, and President-Elect. This allows the incoming President to be more effective and prepared when he assumes the role of Presidency. We also have two new District Directors; John Palmisano, for the Oregon-Southwest Washington District and Douglas Vaughan of the Carolina District. We have been talking about restructuring some of the districts for some time and we finalized the restructuring of the Northeastern Region at this Board of Control Meeting, subject to approval of the Northeastern members. Barbara Warkentine, the Regional Director, will attempt to ascertain whether or not this is acceptable to the members in her area. If other members-at-large have comments, please send them to me.

The plans are for a Keystone District, consisting of the states of New York, New Jersey, Pennsylvania, and Connecticut, a Capitol District (replacing the old Metro-Washington, DC District), and a New England District, consisting of the New England states except for Connecticut. Barbara Warkentine is District Director for the Keystone District and the other two districts are vacant at the moment. This leaves the Atlantic Provinces of Canada as the remaining district within the Region and efforts are currently underway to obtain a Director for this area. Florida and the Great Lakes areas are conspicuous for their current lack of leadership and I would welcome comments from the members of AIFRB on people who might want to assume this role for these areas. The responsibilities of District Directors, as I interpret them, were reviewed in a December, 1993 BRIEFS article entitled "The Question of District Directors". It is a satisfying position to hold and adds considerably, I understand, to a person's C.V.

Archives

The archives of AIFRB are now firmly entrenched in total at the Fisheries Research Institute at the University of Washington. I request, therefore, that any material dealing with the past happenings of AIFRB be sent to Kate Myers for improvement of these archives. In particular, I would very much welcome old letters or any correspondence that the Founding Members may have concerning the early years of the Institute. A very interesting thing occurred while transferring the materials for the archives from the Northeast Fisheries Science Center Library to the Fisheries Research Institute; Kate Myers found an old key which appears to fit a safety deposit box. If anyone knows of records that were kept under lock and key (as W. F. Thompson would very likely have done), please notify Kate Myers as soon as possible.

Budget and Recruitment

The budget of AIFRB continues to remain healthy even though our expenses have continued to rise. We increased the amount of money for the support our Research Assistance Awards this year, and we purchased and recently sent logo pins to all members in good standing, free of charge. Considering that logo pins are worth about \$5.00 and dues are only \$20.00, receiving BRIEFS for a net of \$15.00 cost during the year is a very good bargain indeed. Shortly the membership will also receive the Principles of Professional Conduct in a format suitable for framing; this should be a very welcome addition to your office wall. Because we wish to keep the dues at \$20.00, yet still support our members and the profession, you should be constantly recruiting good scientists to belong to this Institute. While our membership continues to increase slightly, it needs to increase more to be more representative of the fine professional scientists throughout the country. The officials of AIFRB have also decided to make it more restrictive for people to join AIFRB to insure that membership truly means a great deal to those who are members. This is an important change and I have written a special note concerning this elsewhere in BRIEFS entitled "The Need for Selectivity in the Recruitment Process." Please read it. Comments are welcome. The procedure is that the 1995 brochures will indicate that new members, other than students (who have not been in the profession long enough for them to be able to be reasonably evaluated), will have to be nominated by at least one existing member of AIFRB in order to be considered for membership. Our goal in AIFRB is not to get as many people in the Institute as possible, but to obtain a proportionally proper membership in North America which represents the good professional scientists insofar as possible. There are some fishery biologists who are not ethical and do not exhibit proper standards of conduct which in some cases may be blatantly obvious. These are the people that we do not want to join AIFRB. If you work with a good scientist with proper ethics, however, please go out of your way to ask her or him to join AIFRB.

During the coming year, we will have a new Directory available to members, and the Charter will also be reprinted. The last edition of the Charter was printed in February of 1983. This new edition incorporates significant changes made in the Bylaws over the last two years. The Directory, new Charter, and new 1995 Brochures will be distributed free to the members of AIFRB. The Directory will be in a new, user-friendly format so that District Directors can utilize the membership listing more easily than in the past. It will, of course, be alphabetized in total. Chuck Mitchell of the Southern California District is looking at ways to print the Directory in various formats to make it as useful as possible.

Emeritus Standing

Another change made in the Charter this year deals with the designation of Emeritus Fellows and Emeritus Members. One of the Bylaws, under Section 4, Article 1, states that Emeritus

cont. on page 3

President's Report cont. from page 2

Fellows or Members shall not hold office or vote in the election of officers or in the amendment of the Articles of Incorporation or the Bylaws. This met with some consternation from some of the members this year. The Emeritus people in AIFRB, in fact, have been contributing greatly to many of our activities and it seems (as we get older) that more and more good people are retiring. There is no question that these members have the most experience, long-term knowledge, and now time to spend on these things that are important to AIFRB. The Board of Control felt that, in general, these Emeritus individuals should be allowed to hold *local* office of some kind and perhaps be allowed to participate in a greater way than indicated in the Charter. An ad hoc committee therefore was set up consisting of myself, Clark Hubbs, Jack Helle, and Chuck Mitchell to review the Emeritus status and how these people can be better utilized in the Institute. I therefore ask each of you to think of this problem and send me a letter with any ideas that you have about on the suitability of Emeritus Fellows and Members to hold either local or national office, being able to vote in elections and on amendments in the Articles of Incorporation, and, in general, participate in other activities within AIFRB.

Recognizing Achievement Through BRIEFS

One of the goals of AIFRB is recognizing achievement and competence of professional fishery biologists. In fact, Article IV of the Articles of Incorporation states under Purposes, that ... "the primary role of the Institute shall be concerned with the professional development and performance of its members and the recognition of their competence and achievement." We certainly don't do enough of that and we decided to attempt to change that slightly at this Board of Control meeting. The plan is that each issue of BRIEFS will recognize an individual Member or Fellow who exemplifies those ideals that this Institute was meant to support. I appointed an Ad Hoc Committee consisting of Oliver Cope as Chairman, Bill Wilson, Clark Hubbs, and John Palmisano to develop procedures for accomplishing this in the coming year. We are not looking for just the stars in each part of the country, but some of those people who deserve recognition for their years of hard, productive work, yet have never received the credit that they deserved and perhaps never will. As we all know, productivity is based on the performance of many highly skilled workers, not just one or two leaders. It is these people who are the backbone of most institutions who really are the ones that make things happen. It is those people who exceed expectations but never get properly recognized that we want to expose to the rest of the Institute. Please pass suggestions along directly to your District Directors or, if you are in an area where there is no District Director, please send them directly to Ollie Cope. We anticipate simply a one or two page description with the appropriate photo of a person who deserves recognition for his/her competence and achievement.

BRIEFS will also carry the list of District Directors at least twice a year so that you can all keep track of who is running things in our Institute these days. BRIEFS Editor Ollie Cope is looking diligently for photos of our members. If you have any that are fit to print, he would welcome receiving them. Everyone likes to look at pictures of old friends doing productive things.

Awards

I'm extremely pleased with our progress in this area. The past year was capped off with the Outstanding Achievement Award given to Dr. Arthur D. Hasler at the University of Wisconsin. It was a very satisfying experience for me and we owe John Magnuson, Director of the Center for Limnology, and Dr. Hasler's secretary, Linda Holthaus, a great deal of thanks for assisting in the ceremony.

The Board of Control agreed this year on another Outstanding Achievement Award for an individual and that will be announced later. We had a long deliberation on the Outstanding Achievement Award for a Group. We are still considering that award and a review committee is in place. A decision of a winner may or may not be announced in the future.

The Research Assistance awards increased dramatically during the past year. Tom Lambert, Past District Director from the Northern California District, presented eleven awards, an increase from eight the previous year. These awards allowed young scientists to participate at various meetings around the country and to present their research papers. The increase in funding for this award program was approved last year at the Board of Control Meeting and will continue.

The W.F. Thompson Award has also made great strides recently. We have now caught up to the annual awards by issuing two awards in 1994, one for the 1991 papers and one for the 1992 papers. The 1993 award is now being debated. Over 30 papers were received by Dr. Jack Pearce for the 1993 award. He already has several for 1994, even though the closure date for receiving them is not until August 1 of 1995. Dr. Pearce and his good review committee had approximately 20 papers to choose from for the 1992 award. We owe thanks to him and his review committee, consisting of Linda Deegan, John Boreman, Arthur Neill, Tom Lambert, and Ford "Bud" Cross. The 1991 award winner, Dr. Sharon Kramer, was announced in the April 1994 BRIEFS and her picture appeared in the June edition of BRIEFS in 1994. The 1992 award winners were Murdoch McAllister, Randall Peterman, and Darren Gillis. This recognition was made in the August 1994 issue of BRIEFS. This award is an excellent award. I have discovered that people who have received it have benefited greatly from this achievement over the years. It apparently has meant a very great deal to people on their curriculum vitae when they have changed jobs. I'm very pleased that this award program has been working so well since 1963. If you have won the award, you know what I mean; if you have not, ask someone who has.

cont. on page 4

President's Report cont. from page 3

Another award which I originated last year was announced to the Board of Control this year. This is the Distinguished Service Award for outstanding members in AIFRB who deserve special recognition for their work to make the Institute as good as it can be. The winner will be appropriately announced in a copy of BRIEFS in the near future. We were all very pleased with the recipient of the award this year and I'm sure you will be, as well.

I came up with another award this year at the Board of Control. I announced to the District Directors that I would present a prize (to be determined) to the District Director who brings in the most new members over the next year. After thinking of this further, I've decided to present this prize to any person in AIFRB who produces the most new members over the next year, not just the District Directors. These must be individuals in good standing that become members, not just a list of people who are nominated. Send your list of nominations to Dr. Sammy Ray, Membership Chairperson, Texas A&M University, 5007 Avenue U, Galveston, TX 77551.

Other

The new logo pins that were sent out to members in good standing, i.e. those who have regularly paid their dues, have been a big hit. All comments received to date have been positive and many people at the American Fisheries Society were found wearing their pins. Please wear them whenever and wherever possible to advertise both the AIFRB and the fact that you are a professional biologist in good standing. Additional pins are available from our Treasurer, Joe Rachlin, at a cost of \$5.00. When you pay your dues for next year, I suggest you add \$5.00 and pick up another pin in case yours gets lost.

For those of you who were not at the American Fisheries Society meeting and the banquet, the Executive Director of AFS, Paul Brouha, acknowledged the AIFRB President and President-Elect and hoped that we would continue to work closer with AFS, and he even suggested taking over a "research section" within AFS. I thanked him after the meeting for that recognition, told him that we would work very closely with AFS, that we certainly support the American Fisheries Society, and that it was to our mutual advantage to do so. I mentioned, however, that we could not become a subsection of AFS as several people have suggested we do over the years. That is because of what AIFRB stands for and why it was created in the first place. When you receive your new Charter this year, which consists of the Articles of Incorporation, the Bylaws, and the Policy Statements, please read carefully Policy Statement #4 and Article 6 of the Articles of Incorporation. Policy Statement #4 says, in part, "Consideration of the problems raised by affiliation of the American Institute of Fishery Research Biologists with other biological organizations, and of the role of the American Institute of Fishery Research Biologists, demonstrates the continuing need for an independent, fully professional organization. Accordingly, the American Institute of Fishery Research Biologists will not

affiliate or merge with any other group." Further, this Institute went so far as to state at Board of Control meetings in a formal way in 1964, 1970, 1991, and 1992 that this policy was reaffirmed. Remember, the purposes of AIFRB and AFS are not the same. Ours deals with the professionalism of our members and then to recognize their competence and achievement. AIFRB deals with the quality of people, in particular the quality of professional fishery biologists and, of course, such people are the backbone of a good American Fisheries Society as well.

Board of Control Meeting Highlights

The August 20-21 Board of Control annual meeting took place at the Halifax Sheraton in Halifax, Nova Scotia. On board were Vaughn Anthony, President; Jack Helle, Past-President; Clark Hubbs, President-Elect; Kate Myers, Secretary; Joseph Rachlin, Treasurer; Sammy Ray, Membership Chairman; Oliver Cope, BRIEFS Editor; Charles Mitchell, Southern California District Director; Greg Ruggerone, NW Washington District Director; Doug Vaughan, Carolina District Director; Mrs. Vaughan; Richard Heimann, Northern California District Director; John Palmisano, Oregon-SW Washington District Director; Barbara Warkentine, NY-NJ District Director; and Bill Wilson, Northern Alaska District.

Treasurer's Report

Treasurer Joseph Rachlin presented a comprehensive report on the state of AIFRB finances. This included a summary of expenses for the past 10 years, summaries of income and expenses for 1993-1994, analyses of income and expenses, and actual transactions.

INCOME/EXPENSE - FISCAL/1994

INCOME

Due Receipts	\$16,002.00
List Rental	270.00
Mutual Fund Transfer	3,000.00
Income - Other	5.31
Total Income	\$19,277.31

EXPENSES

Assoc. Research Award	\$ 3,300.00
Bank Service Charge	80.54
BRIEFS	4,921.00
Contrib. to AFS	300.00
District Reimbursement	420.00
Editor's Expenses	44.29
Membership Costs	276.96
Membership Secretary	2,000.00
Other	70.50
President Costs	1,953.18
Production	2,300.00
Secretary Expenses	191.65
Travel to Bd. Meeting	4,445.87
Treasurer's Expenses	919.02
W.F. Thompson Award	1,500.00
Total Expenses	\$22,723.01

cont. on page 5

Meeting Highlights cont. from page 4

TOTAL INCOME/EXPENSE	\$-3,445.70
BALANCE FORWARD	\$ 8,003.33
OVERALL TOTAL	\$ 4,557.63

AIFRB TREASURER'S REPORT — FISCAL 1994 ANALYSIS

INCOME COMPOSITION

a) Dues Receipts + Contributions	83%
b) Transfer of Funds from Portfolio	16%
c) Membership List Rental	1%

EXPENSES BY MAJOR CATEGORY

a) BRIEFS	22%
b) Travel to Board of Control Meeting	20%
c) Associate Research Awards	15%
d) Production Expenses	10%
e) Membership Secretary	9%
f) President's Expenses, Including AIFRB Pins	8%
g) W.F. Thompson Award	7%
h) Treasurer's Expenses	3%
i) Other	
Bank Service Charge	
Editor's Expenses	
Membership Chair's Expenses	
AIFRB Secretary's Expenses	
Reimbursement to Jack Helle	3%
j) District Reimbursement	2%
k) AFS Contribution	1%

AIFRB Current Portfolio Status as of August 2, 1994

Name	Quantity	Market Value
Aim Balanced FD, CLA	917 Shares @ 15.400	\$14,122
Franklin NJ Tax Free Inc. FD	608 Shares @ 11.350	\$ 6,844
Pru. Equity FD, Class B	672 Shares @ 14.030	\$ 9,428
Pru. NJ Muni FD, Class B	1,568 Shares @ 10.830	\$16,981
Putnam Invst. Grd. Muni Trst.	440 Shares @ 13.375	\$ 5,885
Pru. Tax Free Money Mkt. FD	165 Shares @ 1.000	\$ 165
Total Value of Portfolio = \$53,425		

In reporting on dues status, the Treasurer revealed that 34 members have 3-year delinquencies in AIFRB dues and are eligible to be dropped from membership. There are 100 others who are delinquent by 1 or 2 years. The total shortfall in dues is \$4,040.

Membership Report

Sammy Ray, Chairman of AIFRB's Membership Committee, recounted the activities of his committee in 1993-1994 and summarized the results of the reviews of applications for membership and promotion.

The committee examined 43 applications for membership; 41 were approved by the committee and the Board of Control.

Of the 41, 16 were assigned as Student Associates, 4 as Professional Associates, 17 as Members, and 4 as Fellows. Promotions were granted, as follows: 16 to Member, 26 to Fellow, and 10 to Emeritus.

The Board discussed Emeritus status—definition, voting rights, and holding office—and voted in favor of Emeritus members holding District offices but not national offices. A committee was formed to review several questions about Emeritus status and report to the Board in 1995.

BRIEFS

Oliver Cope, BRIEFS Editor, reported on the six issues that appeared during the past year. He brought out the fact that only one District forwarded reports of District meetings, and no District sent obituaries. Three hundred and three items were sent to the Editor for publication in BRIEFS; 84 were used.

It was decided that names and addresses of District Directors will appear in BRIEFS next year, and that a new series will be initiated to honor outstanding people in the membership, one article to appear in each issue.

Production Editor's Report

Production Editor John Merriner's report described his relationship with the Editor, the Treasurer, and the printer. The system seems to be working well, with BRIEFS reaching the membership during the month of publication.

The distribution of the new lapel pins to paid-up members was a success, with members receiving their pins in August after minimal delay.

A proof copy of our 1994 version of the AIFRB brochure was received in July, and the printing was completed in August. A quantity was forwarded to President Anthony, and supplies were to be sent to District Directors by the end of August. A 1995 brochure will reflect changes in officer names, and perhaps other details.

The 1992 Membership Directory was most useful, but the dynamics of membership change dictate that a new one appear in 1995. The Production Editor is prepared to coordinate the production of a 1995 version after it is decided which format should be used.

Within the next 6 weeks, we shall print the revised version of the Charter and Bylaws according to the specifications furnished by the Board of Control.

District Activities

Northern Alaska District

Bill Wilson, Past District Director, presented a report by District Director Steven Davis.

A major effort has been made to increase AIFRB visibility in Alaska. Four new members were recruited this year.

A District newsletter was issued in January, and another was to be distributed in September.

cont. on page 6

Meeting Highlights cont. from page 5

This summer the District is participating in an elderhostel program by providing speakers to lecture on Alaska's fisheries and the state of fisheries science.

Southeast Alaska District

District Director John Strand moved to Seattle during the year, so President Anthony appointed Malin Babcock to complete the term. Malin's report described meetings in October and May.

In October, a focus was on the U.S. Forest Service refusal to consider Indian Creek as a Research Natural Area. The District has urged this status in light of an historical database for this watershed. Also at this meeting, Jon Heifetz spoke on choosing a harvest strategy for rebuilding Pacific Ocean perch in the Gulf of Alaska. The May meeting fostered a discussion of a District-supported issue—the establishment of an endowment for academic chairs in the area of marine conservation, using funds from the *Exxon Valdez* settlement. Then, a lecture was given by Mitch Lorenz on Dutch Creek restoration, an urban, interagency restoration effort in the Juneau area.

Northern California District

Richard Heimann, District Director, described the meetings held during the past year—a business and planning meeting, a banquet, and three dinner meetings featuring guest speakers.

At the September 1993 business meeting at Tom Lambert's cabin, tentative speakers for the year were selected and nominations were made for Vice Director and Secretary-Treasurer positions.

At the dinner meeting in San Raphael, John McCooke, Senior Scientist at the California Academy of Sciences, spoke on "Shoals, Politics, and Other Stuff" and drew an overflow crowd. The final dinner meeting, in Berkeley, featured Sylvia Earle, a former NOAA Senior Scientist, who spoke on "Marine Sanctuaries: Issues, Problems, and Solutions."

The District gained one new member, bringing the membership to 81.

Dan Howard is Vice-Director and Tom Moore is Secretary-Treasurer; they will serve through 1995.

Southern California District

District Director Charles Mitchell reported on two business meetings with speakers. In November, Cindy Thompson, NMFS, spoke on the role of economics in environmental litigation, and in February Charles Mitchell spoke on the dirftnet fishery in the North Pacific Transition Zone.

District Officers were Charles T. Mitchell, Director; Kevin T. Herbinson, Vice-Director; and John L. Butler, Secretary-Treasurer.

The District has about 69 members, 5 of whom are new; 25 generally attend meetings.

The District awarded \$100 to Blaise Eitner, NMFS, for the best student paper in fishery biology given at the Southern California Academy of Sciences annual meeting; his topic was the assessment of the population structure of *Alopius vulpinus* from the waters adjacent to the western coast of North America.

The District is planning a workshop on fisheries statistics.

The treasury had \$3,231.31 on August 1. Significant donations have been received and are earmarked for student assistance and awards.

Carolina District

Douglas Vaughan was appointed Interim District Director during the year. He planned to hold elections in September to fill the Director and Vice-Director positions in the Carolina District. Doug would be a candidate for Director.

The current membership numbers 34, and there will be a push to enlarge the roster, especially in the Raleigh, NC area. Doug also wants to solve the problem of drawing together large gatherings of members from widely separated geographic areas within the District. The District will also address the problem of delinquencies.

New York-New Jersey District

Barbara Warkentine, reporting as Director of the Northeast Region and as Director of the New York-New Jersey District, stated that the Northeast Region has 186 members, with 89.8% in good standing, while the NY-NJ District's 37 members claim only 2 delinquencies.

Six members in the Region received promotions this year, and five new members were welcomed. Three in the Region received awards in the Research Assistance Program.

Barbara Warkentine represented AIFRB at the 50th Annual Northeast Fish and Wildlife Conference in Burlington, VT in May, and displayed AIFRB materials and distributed brochures and application forms.

Barbara proposed that the large Northeast Region be restructured to include three Districts to replace the two Districts we now have (Metro-Washington and NY-NJ). The new plan would contain a "Capitol District," to include Washington, D.C., Virginia, Delaware, and Maryland; a "Keystone District," to include New York, New Jersey, Pennsylvania, and Connecticut; and a "New England District," to include Maine, Massachusetts, Vermont, Rhode Island, and New Hampshire. The board approved these changes in District names, boundaries, and composition.

Oregon-Southwest Washington District

District Director John Palmisano described his efforts to revitalize District activities and increase the membership. He will improve communications within the District and arrange for meetings.

The District gained three new members during the past year.

cont. on page 7

Meeting Highlights cont. from page 6

Texas District

Sammy Ray, District Director, reported that the District took in three new members this year. Three members were promoted.

Northwest Washington District

District Director Greg Ruggerone told of another year of rewarding activities in his District. Close contact was maintained with the membership through the District newsletter, which contains notices of meetings, descriptions of previous meetings, biographical articles about selected members, and other relevant news.

Five meetings were held this year, each with a guest speaker. Topics included "Academic Freedom Within a Public Agency," "Bristol Bay Sockeye Salmon," "Hatcheries for the Future," "Decline of Lake Washington Sockeye Salmon," and "Status of Puget Sound Marine Fishes." One meeting, a dinner get-together, was attended by scientists from Russia and Japan.

The treasury has \$384.22.

Awards

Research Assistance Awards

Tom Lambert, Chair of the Research Assistance Program, sent a report showing that 11 Associate Members received \$300 awards from AIFRB this year. Winners presented papers at meetings of the American Society of Ichthyologists and Herpetologists, the Institute of Food Scientists, and the National Shellfisheries Association.

W.F. Thompson Award

Two W.F. Thompson Awards for best student papers were made this year, one for a 1991 publication and one for a 1992 paper.

Sharon H. Kramer received the 1991 award for her paper on growth, mortality, and movements of juvenile California halibut in the U.S. Nat. Mar. Fish. Serv. Fish Bull. 89 (2): 195-207.

The winners for 1992 were Murdoch McAllister, Randall Peterman, and Darren Gillis for their paper on statistical evaluation of a large-scale fishing experiment designed to test for a genetic effect of size-selective fishing on British Columbia pink salmon in the Can. Jour. Fish. Aquatic Sci. 49 (7): 1305-1314.

Outstanding Achievement Award for Individuals

The award for 1993 went to Dr. Arthur Hasler; this is discussed in the President's Report in this issue.

The Board chose an individual for the 1994 award; the selection will be announced at a later date.

Group Award of Excellence

The Board did not reach a consensus for this award for 1994, but a committee will explore the justification for making the award to a group that was nominated. The result will be announced later.

Distinguished Service Award

In 1993 the Board decided that this new honor be given to an individual who has rendered outstanding service to AIFRB. A winner was selected this year, and the name will be announced later.

AIFRB Logo

It was pleasing to see that Board members all wore the new AIFRB lapel pin at the meeting, and that many pins were worn during the American Fisheries Society meetings. A member was also seen in the air terminal at Boston, wearing his pin on his lapel on the way home from the meetings.

The Board discussed possible uses of the logo on coffee mugs, tote bags, T-shirts, jewelry, and other items, with or without lettering. No decision was made.

Appointments by the President

The President made the following AIFRB officer appointments for the 1994-1995 year: Kate Myers, Secretary; Joseph Rachlin, Treasurer; Sammy Ray, Membership Chairman; Oliver Cope, BRIEFS Editor; John Merriner, Production Editor; and Tom Lambert, Research Assistance Awards Chairman.

W.F. Thompson Award



Murdoch McAllister receives the W.F. Thompson Award for 1992 from Kate Myers, AIFRB Secretary. (See BRIEFS, August 1994)

The Need for Selectivity in the Recruitment Process

Vaughn Anthony, *President*

Whenever we ask someone to join AIFRB, the same question emerges: how is AIFRB different from other societies such as the American Fisheries Society? The standard definitions and explanations are given: the primary role of the Institute is the professional development and performance of its members, and then, the recognition of their competence and achievement.

This is done by:

1. Adherence to the "Principles of Professional Conduct for Fishery Biologists."
2. Demanding and maintaining high professional standards.
3. Recognizing achievement.
4. Advancement of the theory, practice, and application of the science of fishery biology.

The primary role of AFS is "...promoting the development of wise use of the fisheries."

But perhaps the best way to clarify this answer is to review what our founding members said nearly forty years ago when they felt there was a need for this Institute. W.F. Thompson, in 1958, wrote a report to the membership to explain the experience he had as President during the first few years in attempting to organize the Institute. That report provides an insight about the kind of institute we needed then and still need today. W.F. Thompson noted that most organizations are developed to hold meetings with some sort of program around which activities are planned, dues are collected, and if the idea appeals, the organization lives on. In our case, however, he said our objectives are very different. This Institute is not based on such meetings and activities but the quality of people. Our members must be the best that the profession has to offer..." in the sense that they serve the ideals which the organization was formed to foster. Such [men] people must be of good caliber because they must put into widely-acceptable form the Code of Ethics and Standards of Behavior which embody these ideals and this they can do best if they hold them personally. The acceptance by the public, and by the profession itself of the ideals in these Codes and Standards, depends upon the respect in which the [men] people supporting them are held." This means that the people in AIFRB must be of the highest caliber in their methods of doing business.

In those first few years, it was apparent to Dr. Thompson that the states across the country had different problems and attitudes towards research. The size of staffs addressing various problems varied as did the problems themselves. The essential core in any kind of fisheries research was the caliber and attainment of teachers which was of great or even dominant importance to fisheries science. Dr. Thompson found that, nationwide, fishery scientists had the same basic profes-

sional needs as scientists in the Pacific Northwest. Young fishery scientists needed to belong to a professional group with the proper standards and ethics to whose ideals they could adhere and whose standards they could meet. They needed a formulation of codes and standards, so that the non-scientist who often is in control can be shown what to expect from a fishery scientist and, in turn, how to treat such a scientist. The better the caliber of the individual, the more conscious that person was of his/her obligation to the science and, his/her responsibility as an intellectual leader and as a teacher. W.F. Thompson reported on behalf of the Founding Members that AIFRB could be of great service to fishery scientists through the adoption of well-worded codes and standards which "...would be a potent influence, on the one hand restraining the politician, and on the other hand, giving the scientist something to demand and defend as [his] his/her right to proper treatment." Fishery biologists were not all of one kind, and AIFRB must allow for representation on a wide technical and geographical basis. The biologist exists in many strata, and the problems of sampling for membership were akin to those that we meet in many ways in our own research.

Thompson reiterated in the conclusions of his report "...that if codes and standards were to be effective and command general respect, they must be formulated by the best [men] scientists in the profession. This means that membership in AIFRB must be selective, made so impartially and deliberately. It means that membership would be a recognition of merit and achievement, an award respected only if it is given with care and impartiality." Potential members should be sincerely interested in the objectives of high standards, merit, and achievement. Membership in AIFRB should be an asset to any person's reputation. Fishery biologists must, in the end, think for themselves and must decide for themselves what they will endorse and support. There should not be a hurried adoption of concepts and advocacy or the control of one given group or clique.

The founding members of AIFRB were each asked to nominate two new members, each to be endorsed by four of the existing members. Growth then continued and names were added by this established selective procedure. Membership in it was valued to the degree that care was used in the selection and in its impartiality. When the American Fisheries Society began to discuss a "register" of fishery biologists, there was a feeling that the membership of AIFRB should be quickly enlarged because of the large number of fishery scientists on this "register." By its very nature, however, the "register" could not be selective, whereas our membership was. W.F. Thompson did acknowledge that there was some merit in attaining a membership sufficient in size to command respect. Accordingly, the membership of AIFRB was requested to follow Drs. Ed Raney and Ken Carlander's idea of providing additional lists of people suitable as future members. The active voluntary advocacy of candidates was far more useful in expanding our membership than merely accepting individuals who, by themselves, apply.

cont. on page 9

Need for Selectivity cont. from page 8

In 1958, more than 25 lists of good candidates were received by W.F. Thompson containing 285 names, many of which were repeated on other people's lists. By carefully evaluating the attainments and characteristics of the people on these lists, a composite picture of what was regarded as a "fishery biologist" emerged. People were nominated not just because they were fishery biologists, but because of their merit and high standing in the fisheries field. Dr. Thompson went on to recommend that as a condition of membership in AIFRB at that time, each member should submit annually a list of prospective candidates for possible membership. This was better than asking the general population of biologists to apply and then evaluating their suitability for membership according to AIFRB standards. As Dr. Thompson said in 1958, "Active voluntary advocacy of a candidate is far more convincing than a mere passive reluctance to condemn."

At the Board of Control meeting in Halifax, therefore, two changes were made in our recruitment procedures. First, I asked each officer of AIFRB to submit, at least 5 candidates for membership during the coming year to Dr. Sammy Ray, our Chairman of the Membership Committee. District Directors were also encouraged to ask their members to submit names of "good" people to the Membership Committee. Through this message, I am also asking our members-at-large to think about their colleagues and nominate them to Sammy Ray. We are especially underrepresented in the Central and Northeastern areas of the country, as compared with the American Fisheries Society. Such a comparison is not ideal because our membership is not designed to be the same as AFS, but general comparisons are useful. Membership in AFS expressed as percent of total membership is derived mostly from the Central (22.4%) and Northeastern (20.5%) states. Membership in AIFRB is small in these areas; only 12.3% of the total members come from the Central states and 16.7% from the Northeast. These are clearly two areas where selective recruitment should be pursued.

The second change was to require aspiring members (other than students) to be nominated by existing members with a letter of recommendation to the Membership Committee Chairman. This change is designed to improve the quality of our membership by not admitting unethical individuals into the Institute. We all know people who do not represent the fishery biologist profession very well and there is no reason to expect that they would follow the proper standards of professional conduct any better as a member. I must caution, however, that with any selection process, we are dealing with conduct as a professional biologist without any prejudice whatsoever as to sex, religion, ethnic background, color, etc.

These two changes are more in line with the thoughts of the Founding Members of AIFRB led by W.F. Thompson in 1957-1960 and should continue the improvement of AIFRB and the value of membership. The 1995 application brochure will reflect the need for nomination.

Our People

AIFRB members who were installed in August as 1994-1995 officers of the American Fisheries Society are: **Paul Wingate** (AIFRB Member 1980), AFS President-Elect; **Charles Coutant** (AIFRB Fellow 1978), AFS First Vice-President; and **Bill Taylor** (AIFRB Fellow 1991), AFS Second Vice-President.

Douglas Austen (AIFRB Associate 1984) has been named as head of the new Fisheries Analysis Section of the Illinois Department of Conservation.

Delano Graff (AIFRB Member 1973) has been awarded the 1994 Dwight Webster Memorial Award of the Northeastern Division of the American Fisheries Society for his distinguished career in fisheries.

Saul Sails (AIFRB Fellow 1984) received the 1994 Oscar Elton Sette Outstanding Marine Fishery Biologist Award of the Marine Fisheries Section of the American Fisheries Society for his work as an educator and researcher in the marine fisheries area.

Fredric Serchuck (AIFRB Member 1980) has been named Chief, NMFS' Northeast Fisheries Science Center's Conservation and Utilization Division, based at Woods Hole, Massachusetts. He will direct studies on ecological health, resource status, resource harvest, and seafood quality. He will also advise on resource management for marine and coastal waters from the Canadian border to Cape Hatteras, NC.

Kendall Warner (AIFRB Fellow 1971), supervisor of Fisheries Research and Management for the Department of Inland Fisheries and Wildlife for the State of Maine, has received an award for his work in seeking to restore Atlantic salmon in the Aroostook River in northern Maine.

Meetings and New Publications

International Symposium—NA Lake Management Society

The 14th Annual Symposium of the North American Lake Management Society will take place at the Hyatt Orlando on October 31 - November 5, 1994.

The theme for this Symposium in Orlando, Florida will be *Managing Water Resources in the 21st Century: Finding Workable Solutions*. Sessions will cover concerns in managing aquatic macrophytes, building coalitions for managing aquatic systems, assessing lake/stream quality, forested watersheds and water quality, lower Snake River salmonid populations, water quality and macrophytes, ecoregions and lake management, fish and water quality relationships, lake restoration case studies, multi use management, macrophytes

cont. on page 10

Meetings and Publication cont. from page 9

and largemouth bass, tools for assessing lake quality, nutrient inactivation using alum and lime, biocontrol of macrophytes, Lake Apopka restoration, wetlands treatment, aeration, sediment in lakes, management of oxygen in reservoirs, grass carp and macrophytes, contaminants, phytoplankton variability, environmental contaminants, phosphorus management, models in lake management, sinkhole lakes, and other topics.

Information on registration is available from NALMS, Box 101294, Denver, CO 80250.

Methods in Aquatic Microbial Ecology

Paul F. Kemp, Barry F. Sherr, Evelyn B. Sherr, and Jonathan J. Cole are the editors of *Handbook of Methods in Aquatic Microbial Ecology*, a book of 800 pages.

This handbook is the first comprehensive compilation of 85 fundamental methods in modern aquatic microbial ecology. Each method is presented in a detailed, step-by-step format that allows readers to adopt new methods with little difficulty. The methods represent the state of the art, and many have become standard procedures in microbial research and environmental assessment. The book also presents practical advice on how to apply the methods. It will be an indispensable reference for marine and freshwater research laboratories, environmental assessment laboratories, and industrial research labs concerned with microbial measurements in water.

Topics covered are isolation of living cells; identification, enumeration, and diversity; biomass; activity, respiration, and growth; and food webs and trophic interactions.

The book costs \$129.95 from Lewis Publishers, 2000 Corporate Blvd., N.W., Boca Raton, Florida 33431.

Freshwater Fishes of the Carolinas

The University of North Carolina Press has published *Freshwater Fishes of the Carolinas, Virginia, Maryland, and Delaware*. Authored by Fred C. Rohde, Rudolf G. Arndt, David G. Lindquist, and James F. Parnell, this 1994 book has 222 pages, color photos, and line drawings.

The book provides detailed descriptions of the more than 26 families of fishes comprising more than 260 species inhabiting the mid-Atlantic region. For each species, the authors provide notes on their habits, distribution and abundance, habitat, and natural history. The book also has more than 200 high-quality color photos of various species, an invaluable aid to identification. Also included is a description of the effects of deteriorating water quality on many of the lesser-known endangered and threatened species.

Sure to be of interest to aquarium enthusiasts are the tips on where and how to catch many of the colorful species, how to observe and photograph them, and how to maintain them in captivity. Range maps show the distribution of each species.

Order from the University of North Carolina Press, P.O. Box 2288, Chapel Hill, NC 27515. (price unknown)

Pathobiology of Marine and Estuarine Organisms

CRC Press has issued *Pathobiology of Marine and Estuarine Organisms*, a 1993 book edited by John A. Couch and John W. Fournie. This 576-page, well-illustrated volume is a comprehensive, up-to-date review of aquatic animal pathobiology covering infectious and non-infectious diseases of vertebrates such as marine mammals and fishes, in addition to diseases of invertebrates such as crustacea, mollusks, and lower phyla. The book provides critical information on viral, fungal, bacterial, parasitic, and neoplastic diseases of fish and invertebrates.

Written by top-notch experts in the field, *Pathobiology of Marine and Estuarine Organisms* emphasizes pollution-associated diseases and includes an important review on the effects of pollution on marine mammals. The book will be a welcome addition to the libraries of aquatic and marine biologists, aquatic toxicologists, fisheries biologists, aquaculturalists, fish and invertebrate pathologists, and aquatic animal parasitologists.

The book sells for \$84.95 from CRC Press, Inc., 2000 Corporate Blvd., N.W., Boca Raton, Florida 33431.

Economics of Aquaculture

Edited by Curtis M. Jolly and Howard A. Clonts, *Economics of Aquaculture* is a 322-page volume published in 1993. The book presents a comprehensive view of economic principles necessary for building, operating, and managing an aquaculture production unit as well as marketing and selling the products of the system. Examples of economic solutions to common problems help readers understand the nature of economics, the need for economic application to aquaculture, and the success that may come with sound economic planning and management. It also provides adequate coverage of virtually all basic principles of microeconomics, farm management finance, and marketing applicable to the aquaculture industry.

Professional aquaculturalists will find the topics of basic production economics, marketing, and cost analysis particularly relevant, and governmental administrators will find the presentation of basic principles, time value of money, capital budgeting, and the role of government in aquaculture a valuable resource for years to come.

Additionally, producers and students alike will find that application of careful economic planning results in long-term viability for individual producers as well as community projects, cooperatives, or even governmental projects. Special sections in the book illustrate the savings or costs of right and wrong decisions as well as those related to short versus longer-term planning and investment.

This book is available for \$44.95 in hard cover and \$34.95 in soft cover from Food Products Press, 10 Alice St., Binghamton, New York 13904-1580.

Dissertation and Thesis Abstracts

Seasonal and Spatial Abundance and Size Distribution of Fishes Associated with a Petroleum Platform in the Northern Gulf of Mexico

David Robert Stanley, Ph.D. 1994
Louisiana State University

The purpose of this study was to demonstrate the utility of dual-beam hydroacoustics in measuring abundance and target strength of fishes near a petroleum platform in the northern Gulf of Mexico. From September to November 1990, fish densities ranged from 0 to 1.88 fish/m³ and varied with platform side, depth, time of day, and month. Densities were highest adjacent to the platform and decreased significantly beyond 9 m. Approximately 2,400 to 8,300 fish were associated with the platform, depending on month. Target strengths ranged from -56 to -24 dB and varied with side of the platform and month. Mean monthly target strengths ranged from -39.4 to 34.3 dB.

The effect of the presence of SCUBA divers on fish density and target strengths was examined during November 1991 and February, March, and June of 1992. Mean densities and fish target strengths declined significantly when divers were present. Densities dropped from 41.5% to 76.5% and target strength decreased by 0.5% to 9.1% when divers were present. The decrease in target strengths were not uniform; fish with target strengths from -43 to -37 dB decreased at the highest rate.

Stationary dual-beam hydroacoustics and visual point count surveys were used in tandem to measure the density, target strength, and species composition of fishes associated with a petroleum platform. Fish densities ranged from 0 to 10.5 fish/m³ for monthly sampling trips from January 1991 to May 1992. Density and target strength were spatially and temporally variable. Target strengths varied significantly with side of the platform, month, and east and north current vectors. Density varied significantly with platform side, month, east current vector and depth. No variation in density or target strength was detected over 24-hour periods or with water temperature. Fish densities were highest adjacent to the platform and decreased significantly beyond 16 m. Approximately 1,990 to 28,100 fish were associated with the platform, depending on the month. A total of 19 species were observed at the platform with Atlantic spadefish, bluerunner, bluefish, greater amberjack, gray triggerfish, red snapper, and sheepshead constituting 97% of observed species.

Alternative Management Programs Within the Atlantic Sea Scallop *Placopecten magellanicus* Fishery: Property Rights, Transferable Quotas, and Fishing Effort

Niels E. Moore, M.N. 1994
College of William and Mary in Virginia

Alternative management programs for the sea scallop *Placopecten magellanicus* were discussed and compared. Net economic rents (profits) under three different management options including non-transferable effort (NTE), individual

transferable effort (ITE), and individual transferable quota (ITQ) regulations were estimated for a panel data sample of nine scallop vessels.

Through linear programming models, rental/lease prices for quota (shadow values) were determined by vessel. These values along with their corresponding quota amounts were regressed utilizing Tobin's censored regression technique, thereby forming an inverse derived demand function for each vessel. The most efficient vessels within the fleet were willing to pay the greatest amount per unit of quota at the various levels of quota supplied.

Through the summation of all vessels' demand functions, an aggregate inverse demand curve for the fleet and total fleet rents before trade were approximated. Resulting equilibrium market prices for quota were calculated for the ITE and ITQ programs. Finally, total fleet rent gains from trade (ITE and ITQ programs only) were examined.

ITE- and ITQ-based management programs offered the sample fleet greater economic rents compared to the current NTE-oriented management program. Although these results may or may not reflect the potential outcome of either approach on the East coast scallop fleet as a whole, if these results were extrapolated over the whole fleet, approximately \$1,900,000 in total rent would be generated by the vessels remaining in the fishery at pre-Amendment 4 inception approximate catch levels if trading of effort were allowed. The potential economic benefits garnered from either property-rights based management program would be greatest (on a percentage basis) if catch rates were roughly 50% of 1987-1991 levels, as less efficient vessels would essentially be forced to leave the fishery.

Membership Report

Promoted to Fellow

Dr. Gary C. Matlock TX

New Fellow

Dr. Brian J. Rothschild MD

Promoted to Member

Dr. Mark R. Jennings CA

Alex C. Wertheimer CA

New Members

Allen M. Shimada MD

David B. Holts CA

Dr. David B. Powell WA

Dr. Arnold G. Woodward GA

New Associates

Gregory D. Williams WA

Kevin Thomas Bentler CA

Sammy M. Ray, Membership
Texas A&M University at
56

Direct membership inquiries to

District Directors

Alaska, Northern

Steven K. Davis
4175 Tudor Centre Dr. #101
Anchorage, AK 99508

Alaska, Southeast

Malin M. Babcock
Auke Bay Fisheries Lab.
Juneau, AK 99801

California, Northern

Richard F.G. Heimann
20 Lower Ragsdale Drive, Suite 100
Monterey, CA 93940

California, Southern

Charles T. Mitchell
3040 Redhill Avenue
Costa Mesa, CA 92626-4524

Carolina

Douglas S. Vaughan
173B Shell Landing Road
Beaufort, NC 28516-9802

Florida

Vacant

Great Lakes, South Central

Vacant

Gulf of Mexico, Northeast

Vacant

New York-New Jersey

Barbara E. Warkentine
1329 Balcom Avenue
Bronx, NY 10461

Oregon-SW Washington

John F. Palmisano
1990 NW 156th Avenue
Beaverton, OR 97006-5307

Texas

Sammy M. Ray
P.O. Box 1675
Galveston, TX 77553

Washington, DC

Vacant

Washington, NW

Gregory T. Ruggerone
4055 21st Ave. West, Suite 200
Seattle, WA 98199

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 District, 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, Northeast Fisheries Center, 166 Water St., Woods Hole, Massachusetts 02543, President; Katherine Myers, Fisheries Research Inst., WH-10, University of Washington, Seattle, Washington 98195, Secretary; Joseph Rachlin, Lehman College Bio., Bedford Park Blvd. West, Bronx, New York 10468, Treasurer.

ISSN-8755-0075

FIRST CLASS



*American Institute of Fishery
Research Biologists*
c/o Joseph Rachlin
Lehman College, Biology
Bedford Park Boulevard West
Bronx, NY 10468-1589
Address Correction Requested

... BRIEFS ...

VOL. 23, NO. 6

DECEMBER 1994

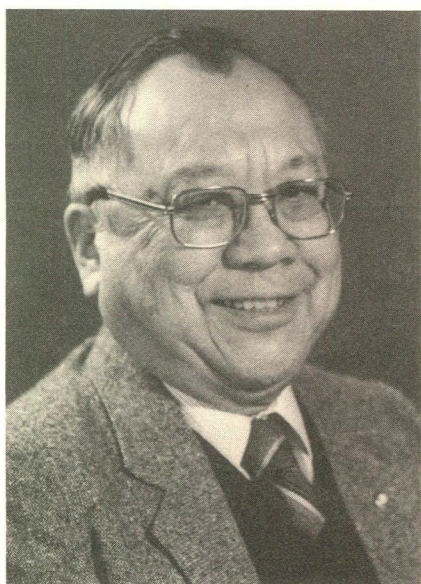
Who's Who in AIFRB

This is the first in a new series of BRIEFS articles featuring noted scientists within the AIFRB membership. We hope to include one Who's Who in each issue, and the Editor encourages members to forward submissions, with photos, and preferably through District Directors, for future BRIEFS issues.

ROY NAKATANI

Roy Nakatani of the Northwest Washington District has advanced the purposes of AIFRB and maintained high professional standards in fishery research biology throughout the 35 years that he has been a member of the Institute. BRIEFS is honored to salute him, staunch supporter of AIFRB and topflight scientist and research administrator.

Roy was born in 1918 in Seattle, where he attended public schools. He enrolled in the School of Fisheries at the University of Washington in 1938. His undergraduate study was interrupted in 1941 when he entered the U.S. Army, in which he served about five years. He returned to the UW in 1946, worked one summer in a salmon cannery in Alaska, and received his B.S. degree in fisheries in 1947, graduating cum laude. He then was employed as a biological scientist by the UW's Fisheries Research Institute and worked in Bristol Bay in Alaska during the summer of 1947.



Roy's budding fisheries career came to a halt when he was hospitalized in 1948 for tuberculosis, a disease which he had contracted while in military service. He was in a TB sanatorium in Seattle until 1952. He returned to the UW in 1954 and was a graduate student and research associate in the School of Fisheries until 1959, when he accepted a position as a biological scientist at General Electric's Hanford Labs at Richland, Washington. He held that position for three years, during which time (in 1960) he received his Ph.D. in fisheries from the UW.

From 1962 to 1966 Roy managed GE's Aquatic Biology program at Hanford. He remained in a managerial position after Battelle Northwest acquired the Hanford Labs from GE in 1966, being in charge of Battelle's ecology studies at Richland until 1970.

Roy returned to the University of Washington in 1970, this time as Associate Professor in the School of Fisheries and Assistant Director of the Fisheries Institute. In 1973 he was appointed Professor in the School and Associate Director of FRI, positions he held until he retired as Professor Emeritus in 1988.

Roy is author or coauthor of approximately three dozen articles published in journals, books, or proceedings of scientific symposia, many of the articles having to do with fish diseases, water quality, or the effects of radiation on living organisms. In addition, he has written more than 100 reports on aquatic biological subjects ranging from radiation biology to oil pollution. He has served as technical advisor for a number of governmental agencies and has been a consultant for various corporate entities, conservation organizations, and professional societies. Besides AIFRB, Roy has been a member of the American Association for the Advancement of Science, American Fisheries Society, Western Society of Naturalists, International Academy of Fishery Scientists, Pacific Fishery Biologists and Sigma Xi. He was national secretary for AIFRB, 1986-90.

Roy has four sons, one daughter, and six grandchildren. He and his wife Hari live in the Seattle area. Sports fishing for salmon has long been his favorite hobby.

For several years now, Roy has arranged bimonthly luncheons for fisheries retirees who live in the Seattle area. Not all of them are AIFRB members, but they all would heartily concur with this tribute to Roy, one helluva great guy.

Pulsed Ecosystems: A New Paradigm?

A symposium entitled "Pulsed Ecosystems: A New Paradigm?" dedicated to Dr. William E. Odum and his contributions to estuarine science was held in conjunction with the Estuarine Research Federation Meeting in November 1993 on Hilton Head Island, South Carolina. The day-long session included a keynote presentation by Drs. Eugene P. and Howard T. Odum, and papers by eminent estuarine scientists including all of Bill Odum's former Ph.D. students.

The keynote address, "Nature's Pulsing Paradigm," focused on pulsed behavior of ecosystem steady state using tidal salt marshes, tidal freshwater marshes, and seasonally flooded freshwater wetlands as examples, but stressed that the concept of pulsing may be generally applicable to all ecosystems. Much of the data presented by the Odums and showing the relationship between biologically-mediated internal pulsing and physical external pulsing were collected by Bill Odum during his career. The hypothesis that ecosystem performance is enhanced when external and internal pulses are coupled was offered as an alternative to the more traditional view of pulses

cont. on page 2

Pulsed Ecosystems: A New Paradigm? cont. from pg.1

as deleterious to ecosystems. Gene and Howard Odum suggested "that if pulsing is generally applicable to ecosystems, then what is sustainable in ecosystems is a repeating oscillation that is often poised on the edge of chaos."

Presentations following the keynote address considered specific examples of estuarine systems with differing frequencies and amplitudes of pulsing at several spatial scales as ideal ecosystems in which to study pulsing. The topics discussed fell into three general categories: (i) identification of pulses that structure populations, communities, or ecosystems, (ii) the role of timing, intensity, and duration of pulses as stabilizing factors, and (iii) alteration of pulses by human activities.

Several presentations focused on understanding "structuring pulses" and their effects on populations, communities, and ecosystems. Tom Smith drew on examples of mangrove forests in the Indo-West Pacific and the Eastern Pacific-Caribbean regions to show that both mangrove forest canopy height and species richness can be predicted by pulses. The best predictor of forest canopy height in the West Pacific was the intensity of monsoonal rainfall, while in the Caribbean region the frequency of hurricanes was a better predictor. For species richness, tidal amplitude was the best predictor in the Western Pacific and rainfall gave the best results for Caribbean mangroves.

Lawrence Rozas presented data demonstrating that nekton productivity in salt marshes varies with differences in tidal amplitude and slope of the marsh surface; however, the use of marsh surface by nekton was not dependent on a constantly flooded marsh or a predictable flooding regime. Carole McIvor and Tom Smith showed that tidal amplitude was a critical determinant of crab abundance and functional role in Australian and south Florida mangrove forests. Along transects perpendicular to the marsh creek, total crab abundance increased with decreased depth of tidal flood water and total crab abundance was less in Australia where the average water depth on high tide was greater than in south Florida. In contrast to Australia where crab populations were dominated by herbivorous species, McIvor and Smith found only carnivorous or deposit feeding crabs.

The presentation by Jim Morris showed that changes in relative sea-level can have significant impact on salt marsh grass productivity by affecting the mass balance of salt in sediment pore water. Alice Chalmers presented a method of quantifying the relationship between tidal creek edge and drainage density patterns based on geographic information system technology (GIS) that facilitates comparison of the relative importance of the focus of Jud Harvey and Randy Chambers' paper. They found ammonium and phosphate concentrations were up to 3 times greater in the sediment matrix than in macropores, and should be considered in studies of the interaction between tidal flood water and sediment pore water.

Presentations by Dick Wiegert et al., Ken Moore and Dick Wetzel, and Mark Brinson et al. focused on the importance of the timing, intensity, and duration of pulsed events. Wiegert et al. suggested that the timing, intensity, and duration of

nitrogen pulses will determine whether pulsing will stabilize or further destabilize an inherently unstable system. Similarly, Moore and Wetzel showed evidence of a long-term dynamic equilibrium for seagrass ecosystems which are controlled by the timing, duration, and intensity of key external and internal pulses. Brinson et al. proposed a conceptual model of salt marsh transgression where the abrupt transition between marsh states (as determined by characteristic plant community dominants and soil/sediment properties) is controlled by infrequent but intense storm pulses within a background of chronic sea-level rise.

The presentations by John Day and Chuck Hopkinson also emphasized the role of timing and magnitude of pulses in structuring ecosystems in the context of human activities that have altered the pulses reaching estuaries. Day discussed the demise of deltaic wetlands from decreased sediment pulses as a result of management practices such as river dikes and impoundments designed to prevent flooding. Hopkinson showed how river channelization and dams may have altered both nitrogen and organic carbon inputs to estuaries and thus the autotrophic-heterotrophic nature of estuaries.

The wide range of topics covered during the symposium reflected the diversity of research that characterized Bill Odum's scientific career. The concept that tied his diverse interests together was the role of pulses in structuring ecosystems. He was a strong advocate of the importance of pulsing in ecosystems other than estuaries and wetlands. He felt that despite great differences in the kinds of species, biodiversity, and community structure of ecosystems, the pulsing paradigm provided a useful framework for examination of the structure and function of estuarine ecosystems, and might provide an equally useful viewpoint from which to consider other types of ecosystems. Each of the symposium presentations lent support to the paradigm of pulsed ecosystems.

*Linda K. Blum in Estuarine Research
Federation Newsletter, Spring 1994*

"Sterile" Oysters Can Reproduce

An experiment testing the ability of non-native Japanese oysters to resist diseases in the Chesapeake Bay was abruptly halted last fall after researchers found some of the bivalves — thought to have been sterilized — were capable of reproducing.

The controversial experiment had been allowed in the York River last June only after scientists offered assurances that the oysters would receive a treatment that would make any chance of natural reproduction almost nonexistent.

Critics feared that if the oysters reproduced, the foreign species could spread throughout the Chesapeake, resulting in unpredictable consequences both for the ecosystem and for the already troubled native oyster.

But the experiment was abruptly halted last fall after scientists discovered the treatment that made the oysters sterile "triploids" — a condition thought to be permanent — was wearing off.

"There was no reason to think, when the study began, that this would happen," said Stan Allen, of the Haskin Shellfish Research Laboratory at Rutgers University in New Jersey. "There is no precedence for it in the animal kingdom that I've been able to find."

cont. on page 3

“Sterile” Oysters Can Reproduce cont. from pg.2

The experiment was carried out by Rutgers in Delaware Bay and the Virginia Institute of Marine Science in the York River. The change in reproductive ability took place only in the York River experiment.

“I think that’s going to have a significant impact on research with the beasts, obviously,” said Jack Travelstead, chief of the fisheries management division of the Virginia Marine Resources Commission. “It was only with the triploid process — and the assurances that it was safe — that a lot of East Coast states allowed the experiment to go ahead.”

Further, officials say, the finding calls into question whether other organisms that get similar treatment to prevent reproduction — including some used in aquaculture, as well as grass carp used in ponds and lakes to control weeds — may pose a greater reproductive risk than previously thought.

“That whole issue needs to be thoroughly examined,” said Dan Terlizzi of Maryland Sea Grant, who chairs the Bay Program’s Exotics Species Workgroup. “Triploid technology gives us a tremendous tool if it can be shown to work safely and effectively because then exotic species might be brought in for cultivation without the worry of establishing reproducing populations. But without that certainty, there are a lot of potentially valuable organisms that many will resist introducing for aquaculture production and other projects.”

Scientists had proposed the Japanese oyster experiment to determine whether that species — *Crassostrea gigas* — was more resistant to the diseases MSX and dermo than the native eastern oyster, *Crassostrea virginica*.

The proposal brought strong opposition from environmental groups and many East Coast states. Critics worried that an accidental introduction of the foreign oyster in the Bay could have unknown ecological consequences, and could ultimately wipe out the native species. Some also worried that if the oyster proved to be disease resistant, pressure would build for an outright introduction of the species to bolster diminishing oyster harvests, regardless of the consequences.

The controversy lasted more than two years. Maryland, most other states, and the Chesapeake Bay Foundation finally dropped their staunch opposition after VIMS scientists, based on research done by Allen, concluded that the risk of the experiment’s oysters producing viable offspring were “vanishingly small.”

At that point, the Virginia Marine Resources Commission issued a permit for the project to begin last June.

The Japanese oysters used in the experiment were chemically treated at Rutgers so they would have three sets of genes instead of the normal two. Such oysters would be unable to produce offspring that would survive. To further bolster protection, the Rutgers lab drew a blood sample from each oyster to make sure the treatment worked.

On June 29, trays containing 200 Japanese oysters and 400 native oysters were placed in the York River. The scientists periodically withdrew oysters from the trays for disease analysis. When that was done, the Japanese oysters were also tested to make sure they were triploid.

When researchers pulled oysters out for inspection in October, they found one oyster with two sets of genes — a

“diploid” — which could have been capable of reproduction under the right conditions.

“At first, we thought it was just a mistake,” said Eugene Burrenson. But a follow-up sample revealed more oysters with both triploid and diploid cells — or “mosaics.” At that point, Burrenson said, the last 85 oysters in the experiment were pulled out of the river and returned to Allen for inspection.

An examination revealed that 20 percent of those were mosaics. It appeared that those oysters were in the process of reverting to pure diploids.

“For it to have lost triploid cells in favor of diploid ones in the first place suggests that it is a progressive process,” Allen said. “And we found animals of all ilk: those that had only a few diploid cells, those that had a lot of diploid cells.”

Allen examined whether some error had been made in the original process rendering the oysters triploid, but could find none. He concluded that the reversion from triploids to diploids was “a true thing that happened.”

Allen said he could not explain why the reversion took place, but that it was a source of on-going examination. “I don’t have the answers right now,” he said. “Going into the study, there had been no examples — and I still have found none in the literature — to indicate that this kind of event, this reversion from a triploid to a mosaic, is to be expected.”

Managers in both Maryland and Virginia said they did not foresee any future open-water experiments with triploid oysters until there is an understanding of what happened with last year’s experiment.

“We would want more assurances now than we did before that this risk of reverting or some other unforeseen thing might happen,” said Pete Johnson, director of the Maryland Department of Natural Resources’ Fisheries Division.

Travelstead said he could not flatly say the find would end in-site research with triploids in the Bay, but added, “I think we’ll have to address that issue before this kind of research can be approved.”

From Karl Blankenship in Bay Journal, July-August 1994

Cooking/Cleaning and Contaminants in Fish

The cooking methods that Great Lakes fish consumers use can reduce their exposure to pesticide and PCB residues by approximately one-third, according to a study conducted recently by researchers from Michigan State University and the Michigan Department of Public Health, in cooperation with Michigan Sea Grant Extension.

Those who combine their cooking with cleaning, trimming, and filleting methods that eliminate fatty tissue will cut those contaminants from 46 to 64 percent, depending on the species and water source, according to MSU scientists Mary E. Zabik and Matthew J. Zabik and Harold E.B. Humphrey of the Michigan Department of Public Health.

The research team examined five representative Great Lakes species and cooked them in ways commonly used by fish eaters.

“This helped us get a better grasp of what people can do to reduce their exposure to these substances,” Mary Zabik said.

cont. on page 4

Cooking/Cleaning and Contaminants in Fish

cont. from pg.3

"It confirms the findings of some studies I conducted more than a decade ago on how using certain cooking methods reduces PCBs [an industrial chemical]."

It also confirms more recent research, conducted by the Michigan and New York Sea Grant programs, that demonstrated the effectiveness of filleting, removing the skin and trimming other fatty tissue from fish in reducing contaminant residues.

The species and sizes of fish used in the study were representative of those typically caught by anglers in the Great Lakes. The 500+ sample portions included carp from lakes Erie and Huron, processed into skin-on and skin-off fillets and cooked by deep fat and pan frying. Chinook salmon from lakes Huron and Michigan were baked, charbroiled, and scored/charbroiled as skin-on and skin-off fillets. Skin-off chinook salmon fillets were also canned. Lean lake trout from lakes Huron, Michigan, and Ontario and siscowets (fat lake trout) from Lake Superior were baked and charbroiled as skin-off fillets. In addition, skin-off lake trout from Lake Michigan and siscowets from Lake Superior were salt boiled, while skin-on lake trout from Lake Michigan and skin-on siscowets from Lake Superior were smoked. Walleye harvested from lakes Erie, Huron, and Michigan were baked and charbroiled as skin-on fillets, while additional walleye from Lake Michigan were deep fat fried. Finally, skin-on white bass fillets from lakes Erie and Huron were pan fried.

"We chose these species because many people fish for them and they need more information about how cooking can reduce their exposure to pesticides and PCBs," said Chuck Pistis, district Extension Sea Grant agent and one of the cooperators on the project. "We were particularly concerned about vulnerable groups of people who rely on fish for a substantial part of their diet."

After cooking, the fish were analyzed for numerous persistent organachlorine pesticides and for PCBs.

"This study shows that cooking by fat-reducing methods can significantly reduce the amounts of any of these substances," said Matthew Zabik of MSU's Pesticide Research Center. "Cooking takes out a little more of some substances than others, but the average is a one-third reduction from cooking alone."

More detailed information about reductions for particular species, lakes, and substances is available from Chuck Pistis, Michigan Sea Grant Extension agent in Grand Haven. Pistis can be reached at (616) 846-8250.

Our People

Shelby D. Gerking (AIFRB Emeritus 1984) received the Award of Excellence at the American Fisheries Society 1994 meeting in Halifax, Nova Scotia.

James Hall (AIFRB Member 1971) and **Robert Burgner** (AIFRB Emeritus 1968) received the Award of Excellence of the Western Division of the American Fisheries Society during the June 1994 meeting in Flagstaff. Dr. Hall's award was for his long career at Oregon State University as a researcher, advisor, and teacher. Dr. Burgner's honor was for a long and productive career of research on sockeye salmon and steelhead trout.

James M. Herkelrath (AIFRB Member 1987) has assumed command of the NOAA Research Vessel David Starr Jordan. The David Starr Jordan is a 171-foot fisheries research trawler which primarily supports projects sponsored by NOAA's National Marine Fisheries Service, Southwest Fisheries Science Center. The vessel is based in San Diego, California. Jim is a Lieutenant Commander in the NOAA Commissioned Corps.

Brian L. Murphy (AIFRB Member 1988) received the 1994 American Fisheries Society Award for Excellence in Fisheries Education at the Halifax, Nova Scotia meeting.

C. Richard Robins (AIFRB Fellow 1975) received the American Fisheries Society Meritorious Service Award at the 1994 meeting.

Rudy Rosen (AIFRB Associate 1983) has become Director of the Oregon Department of Fish and Wildlife after three years as Director of the Fish and Wildlife section of the Texas Parks and Wildlife Department and 10 years as staff member of the National Wildlife Federation.

Michael Tillman (AIFRB Fellow 1984) will soon be appointed by President Clinton as a Commissioner of the Inter-American Tropical Tuna Commission (IATTC). Tillman will be one of four commissioners representing the United States on the IATTC. He also serves as Deputy Commissioner of the International Whaling Commission.

District News

Northwest Washington Gregory T. Ruggerone, *Director*

During the June 1994 meeting, Cyreis Schmitt of the Washington Department of Fish and Wildlife described the results of an ongoing investigation into the status of marine fishes of Puget Sound and British Columbia. A brief abstract of her investigation follows:

Populations of lingcod and rockfishes have seriously declined since the mid-1980s in the inside waters of British Columbia and Washington. Others, such as herring, Pacific hake, walleye pollock, and Pacific cod, are at very low levels in Puget Sound, but appear to be relatively very healthy in British Columbia. We believe that fishery harvests, environmental conditions, increased marine mammal predation, and habitat degradation all likely contribute to the declines, but we do not have adequate information to evaluate the importance of each factor. We are just beginning to assess the consequences of human population growth and to develop the necessary remedies to safeguard our fish resources during the future. We propose a coordinated and prioritized effort to focus on monitoring, research, and management of our fish resources over the next decade.

Two District members have been nominated for officer positions for the upcoming term. Dr. John Strand, AIFRB Fellow, is on the slate for District Director, and Dr. Al Giorgi, AIFRB Member, is running for District Vice-Director.

The District held its annual Chinese banquet on November 17, and the sumptuous dinner was topped off by a special presentation on biodiversity of the Kuril Archipelago given by Dr. Theodore W. Pietsch of the School of Fisheries at the University of Washington.

Meetings and New Publications

Aquaculture '95

A conference and exposition entitled *Aquaculture '95* will take place on February 1-4, 1995 at the Town and Country Hotel in San Diego, California. This event will be sponsored by the Fish Culture Section of the American Fisheries Society, the World Aquaculture Society, and the National Shellfisheries Association.

The exposition will have hundreds of exhibitors with the latest products and services. The conference will feature presentations and workshops on the technical and practical aspects of aquaculture — plenary, technical, and poster sessions, plus workshops, discussions, and receptions.

Information is available from: Conference & Expositions Headquarters, c/o Sea Fare Expositions, Inc., 850 NW 45th St., Seattle, WA 98107.

Southern Division Meeting

The 1995 Midyear Meeting of the Southern Division of the American Fisheries Society will convene on February 23-26, 1995 at the Virginia Beach Resort and Conference Center, Virginia Beach, Virginia.

Symposia scheduled for the technical program include Management of Striped Bass and Its Hybrids (Striped Bass Committee, full-day), Interbasin Water Transfers and Ecological Issues (Warmwater Streams Committee, half-day), Blue Crab Research (Chesapeake Bay Stock Assessment Committee, one-fourth day), Success Stories in Public Education (Aquatic Resources Education Association, one-fourth day), and AFS Point-Counterpoint session entitled "Is it appropriate to jeopardize ecosystem integrity to achieve fishery management goals".

Friday afternoon will include several workshops and continuing education courses. A workshop on Design and Development of a Chesapeake Bay-wide Recreational Survey for Finfish and Blue Crabs will be conducted by the Chesapeake Bay Office of NMFS. Also, an AFS leadership-training workshop will be held for Presidents-Elect of Chapters in the Southern Division. We plan to present two sessions that qualify for CEU credit.

The social agenda for the meeting includes several events. On Thursday at 5-7 PM, we will meet in the Horizons Lounge at the Virginia Beach Hotel for an informal mixer; on Friday 6-9 PM we will have dinner, refreshments, and a tour of facilities at the Virginia Marine Science Museum, and on Saturday 7-10 PM we will have a student social aimed at promoting interaction between students and potential employers in a casual atmosphere. All socials promise to be casual, fun, interesting, and educational.

Details regarding accommodations, reservations, and meeting registration are available from AFS Southern Division Newsletter, 106 Cheatham Hall, Virginia Polytechnic Institute, Blacksburg, VA 24061.

Southeastern Lakes Management Conference

Southeastern Lakes: Expectations and Opportunities is the title of the 4th Annual Southeastern Lakes Management

Conference, to take place at the Radisson Plaza Hotel in Charlotte, North Carolina on March 30-April 1, 1995. Sponsored by the North American Lake Management Society and the North Carolina Lake Management Society, the Conference will offer presentations on lake and watershed management challenges and opportunities; water quality measurements or indices that are meaningful to the general public; and, community involvement in lake and watershed management issues.

Topics on the program are: Watershed Management and Local Government; Municipal Water Supply Protection; Watershed Nonpoint Source Control; Working with the Cooperative Extension Service; Geographic Information Systems; Lake and Watershed Monitoring, Modeling; Fisheries, Fish Consumption Advisories; Aquatic Plants; Lake Associations; Lake Stewardship; Volunteer Monitoring; and Aeration Techniques for Lake and Tailwater Management (Posters Only).

For information, write Barbara Wiggins, Mecklenburg Co. Environmental Protection, 700 North Tryon St., Suite 205, Charlotte, NC 28202-2236.

Southeastern Lakes Management Conference

A national symposium on managing reservoir fisheries will be held on June 12-14, 1995 at the Chattanooga Marriott at the Convention Center, Chattanooga, Tennessee. This is the Third Reservoir Fisheries Symposium and is organized by the Reservoir Committee, Southern Division, American Fisheries Society.

The goal of this symposium is to expand the ability of fishery managers to control reservoir fisheries by focusing on multidimensional approaches to reservoir fishery management. We hope to achieve this goal through oral and poster presentations and peer-reviewed technical articles addressing a diversity of subjects tangential to traditional fishery management orientations but vital to managing reservoir fishes, habitats, and resource users. The symposium will include invited (about 50 percent) and contributed papers and is open to reservoir scientists, managers, administrators, economists, sociologists, statisticians, and others concerned with managing reservoir fisheries.

For information, write Steve Miranda, Chair, Third Reservoir Fisheries Symposium, Mississippi Cooperative Fish & Wildlife Research Unit, P.O. Drawer BX, Mississippi State, MS 39762.

Classic Images

Classic Images, a print dealer specializing in S.F. Denton fish art, has the following prints in stock for the holidays: "Male Brook Trout," "Male Landlocked Salmon," "Brown Trout," "Rainbow Trout," "Striped Bass," "Bluefish," "Small-mouth Bass," "Largemouth Bass," "Walleyed Pike," "Atlantic Salmon," "Steelhead," and "Canadian Red Trout." The prints, which come matted and ready for framing, are available at a special holiday price of \$39 each (good through December 31, 1994).

According to Charles Steinhacker, President of Classic Images, these exquisite lithographs are instantly recognizable

cont. on page 6

and in great demand by anglers and art lovers alike. They make particularly timely gifts for Christmas because each print comes with the following pledge: "Guaranteed to get the most despondent angler through the long and fishless winter."

Brochures are available and prints may be ordered from Classic Images, 76 Glenview, Wilton, CT 06897 (800) 638-9434.

Ecology of the Southern California Bight

This 941-page volume, *Ecology of the Southern California Bight — A Synthesis and Interpretation*, has been edited by Murray D. Dailey, Donald J. Reish, and Jack W. Anderson.

Here is a benchmark study of one significant stretch of the Pacific Ocean, the Southern California Bight. Extending from Point Conception to the Mexican border and out to the 200-mile limit, these waters have never before been investigated in such detail, from so many points of view, by such an eminent group of scientists. The twenty-five expert contributors summarize everything known about the physical, chemical, geological, and biological characteristics of the area in individual chapters; the volume concludes with a synthesis of the information presented. In addition, chapters are devoted to the influence of humans on the marine environment and to the various laws and governmental agencies concerned with protecting it. Because Southern California is so heavily populated and because the ocean is a major recreational area for its people, the information in this unique volume will be invaluable for the region's planners and decisionmakers as well as for all those who study the globe's marine resources and ecology.

Contents include: Background and Setting of the Bight; Physical Oceanography; Chemical Oceanography and Geochemistry; Microbiology; Phytoplankton; Zooplankton; Benthic Macrophytes; Benthic Invertebrates; Fishes; Birds; Marine Mammals; Human Impacts; Governance; and Ecosystem Interrelationships.

Order for \$100 from California-Princeton Fulfillment Services, 1445 Lower Ferry Road, Ewing, NJ 08618.

Integrated Environmental Management

John Cairns, Jr., Todd V. Crawford, and Hal Salwasser have edited *Implementing Integrated Environmental Management*, a 138-page book with 6 tables and 8 illustrations.

This book focuses on implementing integrated environmental management. Environmental management has been fragmented because various organizations are charged with a specific component but do not manage entire landscapes or all ecological components of even a small area.

This book should be useful to policy makers, regulatory agencies, environmental activist groups, ecologists, environmental managers, and biologists.

The volume is available for \$7.00 from UCE&HMS, Attn: Barbara Falls, 1020 Derring Hall (Mail Stop 0415), Virginia Polytechnic Institute and State University, Blacksburg, VA 24061.

Dissertation and Thesis Abstracts

Market Interactions and Competition Between Public and Private Oyster Production and Supplies from Other States

Ya-Ke Hsu, Ph.D. 1993

College of William and Mary in Virginia

Oyster production in Virginia has declined dramatically in the past ten years, causing Virginia oyster processors to rely increasingly on oyster supplies from other regions. In response to the industry problems, the Virginia Marine Resources Commission (VMRC) developed and began implementing an Oyster Fishery Management Plan (OFMP) in 1985. Primarily, the plan seeks to increase Virginia oyster production from both public and leased grounds. A large increase in production could significantly affect the oyster market.

There is thus a need to understand the Virginia oyster market, which derives raw material supplies primarily from public and leased-grounds production and from other states. Although the level of competition among the three sources is uncertain, it is thought to be substantial and quite important for the success of the OFMP. This study assesses the level of competition and associated sector interaction. A simultaneous equation system is specified and estimated by Full-Information-Maximum-Likelihood procedure. Estimates and a market simulation model are used to assess the impact of the OFMP on market behavior.

Analyses indicate that the market for the public ground fishery consists of an elastic demand and an inelastic supply, but the market for private oyster cultivation consists of an inelastic demand and an elastic supply. The market interaction between the eastern oyster and Pacific oyster is weak. Oysters from leased grounds compete with supplies from other regions and with Pacific oysters.

Market simulations indicate that the OFMP will increase total revenue for both public and private producers, suggesting that (1) the seasonal closure on the commercial oyster fishery may be extended as stock size recovers, (2) increasing private production may reduce oyster supplies from other states, and (3) from the market interaction point of view, the Pacific oyster may be an alternative for private oyster planters.

Responses of Cytochrome P450IA in Freshwater Fish Exposed to Pulp Mill Effluents in Experimental Stream Channels

Laurel Anne Bankey, M.A. 1993

College of William and Mary in Virginia

Two species of finfish, channel catfish (*Ictalurus punctatus*) and largemouth bass (*Micropterus salmoides*), were exposed to high substitution (70% ClO₂) bleached kraft mill effluent (BKME) in experimental stream channels to evaluate induction of hepatic cytochrome P450IA. Enzyme levels and activities were measured for nine months during continuous exposure to different effluent concentrations and were subsequently examined after fish were removed from the experimental streams and placed in clean water. After an oxygen delignification pulping and bleaching process was incorporated into plant procedures, fish were again stocked in the stream channels and sampled after eleven months of exposure to determine effects of the new process on contaminant exposure as indicated by levels and activity of the enzyme.

During the original nine-month exposure period, the fish were evenly divided into four experimental stream channels with effluent concentrations of (2)0%, 4%, and 8% by volume. Fish were sampled

Dissertation and Thesis Abstracts cont. from pg.6

at Day 0 and after 26, 54, 110, 172, and 262 days of exposure. On the final day of exposure, the remaining fish were placed in well water and monitored after effluent exposure had stopped. Some catfish were also kept in the 8% effluent stream (now supplied with only Neuse River water) to examine effects of previously exposed sediment on P450IA induction. Upon sampling, livers were immediately excised and frozen in liquid nitrogen for transport back to the laboratory. Total P450 was analyzed, P450IA induction was evaluated by Western blot using monoclonal antibody (MAb) 1-12-3, and by measurement of ethoxyresorufin O-deethylase (EROD) activity. Bass were again stocked in the experimental stream channels after the oxygen delignification system began operating and were sampled after eleven months to compare P450IA inducibility when exposed to the different effluent regimes. These bass were exposed to 0%, 4%, and 12% oxygen delignification effluent.

Hepatic P450IA in both species was significantly induced during exposure to both concentrations of BKME as compared to the control. Catfish hepatic EROD activities were increased up to 10-fold and immunochemically detectable P450IA was increased up to 28-fold in fish exposed to 8% effluent. Hepatic EROD activity and P450IA levels in bass exposed to 8% effluent were increased as much as 5-fold and 55-fold, respectively. Hepatic EROD activity in catfish decreased to control values within 30 days of post-exposure while P450IA levels also decreased but remained significantly different from controls. Only P450IA levels in bass exposed to 12% oxygen delignification/BKME were significantly different from controls (4-fold induction).

Distribution of Organochlorine Pollutants in Sea Turtles

Mary J. Rybitski, M.A. 1993

College of William and Mary in Virginia

Tissues were collected from three species of sea turtles which had stranded in Virginia, North Carolina, and Hawaii. The samples were analyzed to determine the concentrations of organochlorine pollutants present. Tissues were desiccated and extracted with dichloromethane. Extracts were purified by size exclusion gel permeation chromatography to remove biological molecules and open column chromatography with Florisil to remove polar interferents by absorption. Purified extracts were injected on a capillary gas chromatograph equipped with an electrolytic conductivity detector. Tentative identifications were obtained by comparison of retention indexes to those of known standards and confirmed by negative chemical ionization mass spectrometry. Quantitation was accomplished by comparison of area counts of organochlorine analytes to those of an internal standard. A pilot study of organochlorine partitioning indicated that organochlorine concentrations decreased with decreasing tissue lipid content.

Subcutaneous fat had the highest lipid content (mean = 49.3% wet weight, std. dev. = 19.1) and organochlorine concentrations (mean = 252 µg/kg, std. dev. = 196), followed by liver, kidney, and pectoral muscle. Gonad tissue had a higher lipid content than pectoral muscle, yet no organochlorine pollutants were detected. This may be attributed to the small amount of gonad tissue available from the juvenile turtles in this study, resulting in a high method quantitation limit. Further analyses of subcutaneous fat and liver from Atlantic loggerheads and Kemp's ridleys yielded organochlorine contaminant concentrations of 55.4 - 1730 µg/kg and 7.46 - 607 µg/kg, respectively. Hawaiian green turtles contained lower levels. The predominant organochlorines present were polychlorinated biphenyls (PCBs) and the organochlorine pesticide DDT and its metabolites, DDE and DDD. Five congeners accounted for a mean of 66.0% of the total PCBs in the liver (std. dev. = 15.9). A similar pattern was seen in the

subcutaneous fat. Congener #153 (IUPAC nomenclature) was the major congener present, followed by #138, #180, #118, and #187.

The effect of the tissue lipid composition on organochlorine accumulation was studied. Samples of selected sea turtle tissues were extracted using a modified Bligh and Dyer procedure. Lipid classes were separated by thin layer chromatography on silica-coated glass plates. Subcutaneous fat contained the highest proportion of triglycerides, followed by liver and pectoral muscle. This pattern corresponds to the pattern of organochlorine accumulation. A comparison of methylene chloride Soxhlet extraction to the widely used chloroform-methanol extraction method, revealed that the total amounts of lipid extracted were not significantly different ($\alpha = .05$). The Soxhlet method, however, resulted in some degree of lipid class degradation and discrimination.

Oyster (*Crassostrea virginica*) Metamorphosis — Effects of Low Oxygen

Shirley Marie Baker, Ph.D. 1994

College of William and Mary in Virginia

The objective of my research was to examine the physiology and behavior of metamorphosing oysters, *Crassostrea virginica*, and to investigate the effects of low oxygen stress on metamorphic processes. Specifically, I examined the effects of hypoxia (20% of air saturation) and microxia (< 1% of air saturation) on settlement, survival, growth, morphology, metabolic rate, and feeding on post-settlement oysters.

All of the functions I measured were adversely affected by hypoxia and microxia, compared to normoxic controls. Survival times indicate that, like larvae and adults, post-settlement oysters are capable of anaerobic metabolism. The 2-week period following settlement is especially critical to recruitment. Low oxygen conditions increase mortality and have detrimental effects on the development and growth of post-settlement oysters. Oysters have the ability to feed at nearly all stages of settlement and metamorphosis. While hypoxic conditions reduce feeding only in the youngest metamorphosing oysters, microxic conditions affect all ages. Not only does weight-specific metabolism decrease as the oysters grow, but metabolic responses to low oxygen change from relatively oxygen-independent to oxygen-dependent.

I conclude that oyster distribution may be influenced by low oxygen, especially in those areas that experience prolonged (24-48 h) hypoxia or severe microxic events. Low oxygen events may control recruitment into the adult population directly, because of larval settlement failure and post-settlement mortality, and indirectly, because of reduction in feeding, development rate, and growth of post-settlement oysters.

Food, Feeding, and Length-Weight Relationships of Young-of-the-Year Striped Bass, *Morone saxatilis*, and Young-of-the-Year White Perch, *Morone americana*

Paul J. Ruderhausen, M.A. 1994

College of William and Mary in Virginia

YOY striped bass, *Morone saxatilis*, and white perch, *Morone americana*, were collected to identify the prey, temporal and spatial feeding patterns, and length-weight relationships for these recreationally and commercially important species. Sampling with three gears was conducted every 3-h for nine 24-h periods in James River, VA from June-August, 1992. A pushnet was deployed at channel and shoal surfaces, an otter trawl at the channel bottom, and a beach seine nearshore.

A total of 188 striped bass and 199 white perch were captured. Catches are likely due to poor year-class success of both species in James River in 1992. Striped bass and white perch caught were significantly longer, respectively, than those caught

Dissertation and Thesis Abstracts cont. from pg.7

Copepods were the most numerous prey of both species. Fish and mysids comprised the largest volumetric percentage of striped bass and white perch prey, respectively. Using an index of relative importance, leptodoridae were the most important striped bass prey and copepods were the most important white perch prey. The Spearman coefficient, Horn's index of overlap, and Shannon-Weaver diversity index found, respectively, that diets between species were highly correlated, highly overlapping, and equally diverse. With the exception of specimens caught by pushnet, there were no significant interspecific differences in feeding success.

Neither striped bass nor white perch diets were significantly correlated between trawl and seine. Striped bass diets moderately overlapped between trawl and seine while white perch diets displayed low overlap between trawl and seine. Striped bass and white perch captured by seine had significantly more diverse diets, respectively, than those captured by trawl. For both species, a shift from planktonic to epibenthic foods was found with increasing length. White perch captured at twilight, and white perch captured by pushnet, had significantly higher average feeding success than white perch captured at day or night, or by seine or trawl, respectively. However, no other

significant intraspecific differences in feeding success were found for white perch or for striped bass, which suggests that vision, chemoreception, and mechanoreception are important methods of prey detection for both species to feed in turbid nursery zones. Stepwise regression results suggest that abiotic factors have little direct relationship with striped bass and white perch feeding success. These factors may indirectly affect the abundance and diversity of available foods.

The wet weight-fork length relationship was described for striped bass as $\ln W = -11.825 + 3.111 \ln L$ and $\ln W = -12.114 + 3.230 \ln L$ for white perch. The insignificant difference between the variability of wet, dry, and ash weight for specimens of each species indicates that all three are appropriate for food studies of young fish, where accurate measurements are a concern.

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 District, 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, Northeast Fisheries Center, 166 Water St., Woods Hole, Massachusetts 02543, President; Katherine Myers, Fisheries Research Inst., WH-10, University of Washington, Seattle, Washington 98195, Secretary; Joseph Rachlin, Lehman College Bio., Bedford Park Blvd. West, Bronx, New York 10468, Treasurer.

ISSN-8755-0075

FIRST CLASS

American Institute of Fishery
Research Biologists
c/o Joseph Rachlin
Lehman College, Biology
Bedford Park Boulevard West
Bronx, NY 10468-1589
Address Correction Requested